THE CANNABIS USE PROBLEMS IDENTIFICATION TEST (CUPIT): DEVELOPMENT AND PSYCHOMETRICS

A thesis presented in partial fulfilment of the
requirements for the degree of
Doctor of Philosophy
in Psychology
at Massey University, Palmerston North, New Zealand

Janet Lorraine Bashford

2007

The youth of a nation are the trustees of posterity

- Benjamin Disraeli, 1845.

This thesis is dedicated to the health and wellbeing of all young New Zealanders

ABSTRACT

Lack of a brief empirically-verified screener for problematic and potentially problematic cannabis use has hampered implementation of a proactive opportunistic cannabis screening and early intervention (SEI) initiative in New Zealand. Addressing this instrumentation need was the primary aim of this thesis. This thesis also investigated the nature, prevalence, severity, and natural history of cannabis-related problems among a heterogeneous sample of 212 'at risk' adolescent and adult users recruited from the community. In a 3-phase developmental design the CUPIT question candidates were first generated employing an Expert Panels methodology. The CUPIT structure, cross-sectional, and longitudinal psychometric properties were then systematically tested, incorporating measures of cannabis-related pathology and DSM-IV/ICD-10 diagnoses of cannabis use disorders as criterion standard.

High levels of cannabis consumption and related health and psychosocial problems reported portrayed a highly-disordered sample, most marked among adolescents. DSM-IV/ICD-10 diagnoses were almost universal with no significant adolescent/adult differences in dependence symptoms count or severity. The two CUPIT subscales (Impaired Control, Problems) derived from principal components analyses exhibited good test-retest and internal consistency reliability and highly significant ability to discriminate diagnostic subgroups along the severity continuum (nonproblematic, risky, problematic use).

At the 12-month follow-up, 194 adolescents and adults reported significantly increased cannabis consumption (adolescents), symptoms, and dependence severity. Baseline CUPIT subscale scores demonstrated highly significant longitudinal predictive utility for respondents' diagnostic group membership, health and psychosocial problems, and significantly improved prediction of other measured outcomes in conjunction with age and gender. ROC analyses identified a CUPIT score of 12 to be the optimal cut-point for maximum sensitivity for both currently diagnosable cannabis use disorder and those 'at risk' in this sample.

The empirical findings of this thesis research provide a compelling rationale for systematic implementation of opportunistic SEI among consumers of publicly-funded health and social services in New Zealand. Data confirmed that the vast majority of those needing help are unaware, or do not perceive, they need help. This thesis argues that, facilitated by the CUPIT, reliable proactive detection and appropriate intervention for early-stage cannabis use problems has potential for enormous cumulative impact on public health gains and the individual's quality of life.

ACKNOWLEDGEMENTS

From concept to completion this thesis spanned almost seven years. There have been no research funds to support the project. I am indebted to the many people whose efforts and contribution throughout this lengthy journey helped make this thesis a reality. First and foremost, I was truly fortunate to be mentored by two top shelf supervisors, Dr. Ross Flett (principal) and Dr. Jan Copeland. The unique skills, talents, intellect and insights you both brought to this project, Ross and Jan, your wise blend of sound academic standards and pragmatic guidance, and your remarkable patience and humour in face of my many foibles, constantly inspired and sustained me. My heartfelt thanks to you both.

Special thanks also to Dr. Wendy Swift for her valued supervisory advice and her important contribution in the foundational stages of the thesis. My grateful thanks go to all Expert Panelists who perceived the need for this research and generously donated their precious time and expertise. It was an honour, indeed, that this project was privileged with their collective wisdom and individual perspectives.

A special acknowledgement and thanks to Mrs. Robyn Knuth, whose creative flair and technology know-how transformed my ideas into such superb formats. Both your technical and personal support over all these years, Robyn, has been extraordinary. My thanks also to Mr. Harvey Jones, for his ready assistance with the all-important computer programming matters required in this research. Thanks also to Julian for his input in this domain. You are all very much appreciated.

My sincere thanks to all organizations and their personnel who assisted in recruiting participants for this study. A special tribute goes to all treatment and school counsellors, Youth Aid and other youth workers for enthusiastically welcoming the project, and their productive collaboration and cooperation in recruitment and ongoing support. Your role in the project's success was pivotal, and your contribution valued immensely.

A huge debt of thanks goes to the respondents for their willingness to commit their time and energies to this project. Your trust and your frankness in sharing your stories and experiences both humbled and inspired me. Your contribution is embodied as the substance of this thesis, and I dedicate it to you. Thank you.

Finally, it is with deep appreciation that I acknowledge my dear husband, mother, family and friends, for their unflagging faith in me over the years. Your tolerance, empathy, encouragement, practical and emotional support has carried me through. Bless you all.

TABLE OF CONTENTS

Chapter Eight

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

EXPERT PANELS

Panel One

Gerard Dolan, M. Soc. Sci.,
Psychologist,
Team Leader, Child and Adolescent Mental Health Team,
Taranaki District Health Board,
New Plymouth.

Jen Edens, M.Sc (Oxford)
Clinician, Triage/Brief Intervention,
Regional Alcohol and Drug Services,
Auckland.

Ann Flintoft, Dip Psych (Clin), M.A (Hons),
Lecturer, Alcohol and Drug Studies,
School of Health Sciences
Massey University,
Palmerston North.

Ashley Koning, Dip Psych., M.A.
Senior Clinician,
Alcohol and Drug Treatment Services,
Nelson.

Rob McGee, Ph.D.,
Associate Professor,
Department of Preventive and Social Medicine,
University of Otago Medical School,
Dunedin.

Grant Paton-Simpson, Ph.D.,
Casemix Information Manager,
Waitemata District Health Board,
Auckland.

Sean Sullivan, Ph.D.,
Director, Abacus Counselling and Training Services,
Lecturer, Department of General Practice and Primary Health Care,
Auckland University,
Auckland.

Phil Townshend, Ph.D.,
Consultant Psychologist,
Alcohol and Drug Treatment Services,
Nelson

Panel Two (International)

Alan J. Budney, Ph.D.,
Professor,
Center for Addiction Research (CAR),
Department of Psychiatry,
College of Medicine,
University of Arkansas for Medical Sciences,
Arkansas, USA.

Jan Copeland, Ph.D., (Thesis Supervisor)
Associate Professor,
National Drug and Alcohol Research Centre,
School of Community Medicine and Public Health,
University of New South Wales,
Sydney, Australia.

Kate Conigrave, FAChAM, FAFPHM,
Staff Specialist and Conjoint Associate Professor,
Disciplines of Medicine and Psychological Medicine,
and School of Public Health,
University of Sydney,
Sydney, Australia.

Michael L. Dennis, Ph.D.,
Senior Research Psychologist,
Chestnut Health Systems, Bloomington,
Illinois, USA.

Wayne Hall, Ph.D.,
Director, Office of Public Policy and Ethics,
Professorial Research Fellow, Institute for Molecular Bioscience,
School of Political Science and International Relations,
School of Population Health, School of Psychology,
University of Queensland, Australia.

John Hannifin, B.A.,
Health Management Contractor and Consultant,
Public Health and Addiction Specialist,
Palmerston North,
New Zealand.

Thomas Lundqvist, Ph.D.,
Associate Professor,
Clinical Psychologist,
Lund University Hospital,
Lund, Sweden.

Panel Two (International) continued over…

Panel Two (International) continued…

Michael Lynskey, Ph.D.,
Associate Professor,
Department of Psychiatry,
Washington University School of Medicine,
St. Louis, USA.

Roger A. Roffman, Ph.D.,
D.S.W. Professor,
Director, Innovative Programs Research Group,
School of Social Work,
University of Washington,
Seattle, USA.

Robin Room, Ph.D.,
Professor,
Director, Centre for Social Research on Alcohol and Drugs,
Stockholm University,
Sweden.

Robert Stephens, Ph.D.,
Associate Professor,
Director, Graduate Programs,
Department of Psychology, Virginia Tech,
VA, USA.

Wendy Swift, Ph.D., (Co-supervisor 2001-2006)
Lecturer,
National Drug and Alcohol Research Centre,
School of Community Medicine and Public Health,
University of New South Wales,
Sydney, Australia.

Cultural Consultants

Paul Hirini, Ph.D.,
Clinical Psychologist,
Senior Lecturer/Researcher,
Schools of Psychology and Maori Studies (Te-Pūtahi-ā-Toi),
Massey University,
Palmerston North.

Ned Cook, B.A.
Consultant, Pacific Reference Group (ALAC),
Alcohol and Drug Clinician,
Pacific Peoples Addiction Services,
Hamilton.

Philip Siataga, PG Dip, BA,
Consultant, Pacific Reference Group (ALAC),
Chairperson, Tauturu Trust,
Christchurch.

Havila Matangi-Karsten, Dip Psych, M.A.,
Clinician, Pacific Peoples Addiction Services,
Cultural Advisor,
Auckland.

CHAPTER ONE

GENERAL INTRODUCTION

Few would challenge the proverbial wisdom: ‘a stitch in time saves nine’. In antiquity, Hippocrates said that the function of protecting and developing health must rank above that of restoring it when it is impaired (Foege, 1997). Recast in modern health philosophy: ‘prevention is better than cure’. To prevent, efforts must be applied *pre*-event (Stoker, 2001). Here, screening plays a central role.

Screening for actual or potential disease or disability has enormous intuitive appeal. A physician diagnosing incurable cancers laments the means of advancing the diagnosis for early detection and preventive medical therapy. The possibility of screening people before they develop a condition, or at an early stage of a disorder, was a revolutionary prospect that became popular in the 1960s (National Health Committee, 2003). Today, health care systems worldwide routinely administer a range of screening activities across the lifespan. To prevent development of disease, premature death and disability, and to improve quality of life and reduce suffering, the case for screening as a primary obligation of public health is compelling and can be argued on rational, economic, moral, political, ethical, and humanitarian grounds. Ergo, a shift in focus from traditional diagnosis and treatment of illness and its complications towards prevention, early detection and modification of risk factors, and management of disease precursors or early disease is occurring globally (NHC, 2003). Screening is pivotal in this important new paradigm.

As in other treatment fields, historical approaches to alcohol and other drug (AOD) problems exemplify a kaleidoscope of changing paradigms about the nature of substance use problems and the most appropriate and effective way to respond to those affected. Until the 1980s, the biomedical disease model of addiction prevailed with its clear dichotomy between the alcoholic versus the social drinker, the non-drug user and

Chapter One
General Introduction

'the drug addict', with no allowance for a continuum of harm that includes non-problematic, social/recreational or low-risk use of substances (Saunders, 2002a). In the traditional medical model, addiction/dependence supported individual-directed solutions, tertiary treatment and rehabilitation attempts to cure, giving little place to prevention and the Screening and Early Intervention (SEI) traditions of public health (Edwards, 1992).

In the last 25 years, however, a philosophical shift in the AOD field has occurred, discrediting traditional orthodoxy and bringing "a new vision of the cause of concern" (Lader, Edwards, & Drummond, 1992):

> The idea which for too long held sway, that the exclusive focus for concern relating to misuse of alcohol or drugs should be with 'the addict', is now clearly ripe for abandonment. We have instead to take within our field of vision the much more extensive array of people who at some point in their lives, with some frequency or persistence, with any degree of severity, experience this or that adverse consequence of drinking or drug taking. From that shift in vision many practical implications flow (p. 189).

Growing dissatisfaction with escalating costs of modestly effective specialist programmes and health care attributable to substance-related morbidity coincided with a re-conceptualisation of the nature of drug consumption and related problems. As a result, the alcoholic/social drinker and addict/non-drug user dichotomy has been replaced with the concept of a *continuum of use and misuse* of substances (Institute of Medicine, 1990a). The far end of the continuum includes dependence, with a gradient of abuse/misuse and risky use that encompasses a greater proportion of the population and associated problems (IOM, 1990a, 1990b; Kreitman, 1986). When considering the most appropriate time to intervene in the natural history of drug-related problems, the WHO called for efficient methods to detect persons with harmful and hazardous AOD consumption *before* health and social consequences become pronounced. To correspond to progressive points along the AOD problem severity continuum, a matching continuum of responses was needed, ranging from minimal, through brief interventions, to intensive, specialized treatments (Babor & Higgins-Biddle, 2000; Hall

& Swift, 2006). This necessitated "broadening the base" of interventions to include population-based primary and secondary prevention strategies that could be offered at the primary health care level with a minimum of time and resources, targeting individuals who consume substances at high-risk levels for harms (IOM, 1990a, 1990b). Predicated on the *harm minimization* philosophy, SEI has emerged as a key component in 'new public health' strategies for opportunistic detection and management of drug-related problems in primary health care (WHO, 1998).

Since this historical watershed, the "globalization of brief intervention research" (Drummond, 1997, p. 376) led by researchers in the alcoholism and smoking cessation fields has produced an array of new screening tools and brief interventions (SBI) for alcohol and tobacco use. In stark contrast, similar research attention has *not* been devoted to SEI approaches for individuals with harmful or risky drug use, most conspicuously - cannabis (Adamson & Sellman, 2003; Alexander, 2003; Copeland, 2004; Hall & Swift, 2006; Paton-Simpson & McKinnon, 2000). Existing drug screens are inadequate for opportunistic detection of both currently problematic and risky cannabis use among consumers of generalist health and social services.

This instrumentation void was the focus of the research reported in this thesis: the development and preliminary evaluation of a brief screen for detecting currently problematic and/or potentially problematic cannabis use among adolescent and adult users in the community to facilitate early intervention to prevent escalation to more serious harms. The following introductory chapters review the cannabis literature and research to provide important background and concepts relevant to the present research. Chapter three outlines screening concepts and principles germane to a Public Health SEI approach to cannabis use problems. Chapter four reviews and evaluates available drug screening technology, generic drug and cannabis-specific screens, with emphasis on these latter 'new' screens. The area is then summarized and the research goals specified. The thesis then moves on to development and empirical testing of the draft screener.

CHAPTER TWO

CANNABIS

Cannabis has been used commercially, medicinally, and recreationally for millennia, woven into the social tapestry of many societies (Abel, 1980). Assimilated into Western medicine in the 1800s, cannabis was a leading ingredient in colonial New Zealand pharmacopoeia until made illegal in 1927 (Yska, 1990). Today, proliferating despite its prohibition, cannabis is by far the most popular illicit drug worldwide, commonly used by adolescents as the first illicit drug (Kingery, Alford & Coggeshall, 1999; Smart & Ogborne, 2000). Ranked behind only alcohol and tobacco, cannabis use pervades New Zealand society and dominates youth culture (Field & Casswell, 2001; National Health Committee, 1999; Wilkins, Casswell, Bhatta, & Pledger, 2002). A recent surge in use and regular use coincident with declining age of uptake poses a public health challenge to reconcile soaring consumption levels with cannabis' harm liability. Cannabis use now ranks among society's most urgent medical and social concerns (Field & Casswell, 2001; Ministry of Health, 2002b, 2002c; NHC, 1999). Given the pernicious and often chronic progressive nature of drug use and disorders (American Psychiatric Association, 1994; WHO, 2004) this is no small challenge for, as Farrell (1999, p. 1277) warns, "cannabis as a habit is here to stay".

Cannabis-related presentations to specialist treatment services evince advanced health and social harms (Copeland, Rees & Swift, 1999; Hall & Swift, 2006). Espousing a public health *harm minimization* perspective, a new proactive paradigm emphasizing community-based screening and early intervention (SEI) *before* cannabis-related morbidity becomes entrenched - if not irreversible - is proposed (NHC, 1999; MOH, 1998; WHO, 1997a). Promulgated internationally for identification and intervention for both harmful and hazardous alcohol use (WHO, 1998, 2002), this thesis advocates a similar approach be applied to cannabis-related problems. Calls for this paradigm now resonate from a range of voices (e.g., Anthony, 2000; Copeland, 2004; Copeland et al.,

1999; Copeland, Swift, & Rees, 2001a; Degutis, 2003; Gerada, 2003; Hall & Swift, 2006; McCambridge, Strang, Platts, & Witton, 2003; MOH, 1998, 2005; NHC, 1999). Lack of a brief cannabis screen suitable for use across generalist health care settings, however, is a major obstacle to implementation of SEI for cannabis problems in New Zealand, and internationally. This need for a reliable and valid cannabis screening instrument provided the impetus for the developmental research reported in this thesis.

Providing important background for empirical chapters, this chapter outlines cannabis' key characteristics; patterns, correlates, and natural history of its use; harmful effects, high-risk groups, and indicators of the magnitude of cannabis use problems. A brief review of diagnostic frameworks and issues follows. The chapter concludes with an overview of existing treatment approaches, advocating the SEI paradigm for cannabis use problems.

Cannabis the Drug

Characteristics

Cannabis is the generic term for a variety of drug preparations derived from the plant species Cannabaceae, predominantly the Indian hemp plant, *Cannabis sativa.* While this term is used throughout this thesis, there are a number of other terms applied to the substance, the familiar including herbal *marijuana* ('dope, 'weed', 'bush', 'grass', 'bhang', 'ganja', 'pot', 'mull', 'dak'), and more potent resin *hashish* ('hash') and viscous forms, *hash oil.* Hydroponic ('hydro') cultivars include 'skunk', a popular hybrid form. Cannabis is typically smoked in a 'joint' ('reefer'), or packed into 'cones' ('bullets') and smoked in a 'bong' (water pipe) or 'bowl' (pipe). Cannabis is also inhaled as a vapor ('spotted') and ingested orally ('green' cake or tea, 'hash brownies').

The pharmacology of cannabis is unique and complex. The plant contains over 400 identified chemicals, 60 of which account for its pharmacological and psychoactive effects (Adams & Martin, 1996; British Medical Association, 1997b). Most effects

derive from a primary cannabinoid, delta-9-tetrahydrocannabinol (THC) (APA, 1994). THC is to cannabis as nicotine is to tobacco: the amount of THC available to the consumer is dependent upon the plant quality, cultivation techniques, drug preparation (leaf, more potent heads, or resin) and administration. THC concentrations have typically ranged from 0.5% and 5% in marijuana, up to 20% in hashish and 60% in hash oil. However, advanced hydroponic cultivation techniques have increased potency over the past decade (Hall & Swift, 2000; WHO, 1997a). Variation in THC content in analyzed black market cannabis samples has been considerable, ranging from 0.5% to 22% in hybrid forms (see Copeland, Gerber, & Swift, 2006, for review). Claims of dramatic (thirty-fold) potency increases are rebutted by laboratory analysis of cannabis confiscated in New Zealand showing no significant general increase in average THC content over the past 25 years (Poulsen & Sutherland, 2000). However, given their preference for stronger forms of cannabis and method of delivery the ever-younger cannabis smoker today is likely to be exposed to doses of THC many times greater than users in the 1960s and 1970s (Copeland et al., 2006; Hall & Swift, 2000; WHO, 1997a; United Nations Office on Drugs and Crime, 2006).

Cannabis in New Zealand

Before 1960, only sporadic cannabis use was documented in New Zealand. Triggered by the United States civil rights 'counter-culture' movement, cannabis use swelled dramatically, flowing on to Australia and New Zealand in the 70s and 80s, and escalating in the 1990s (Field & Casswell, 2001). Under the Misuse of Drugs Act 1975 it is illegal to cultivate, manufacture, distribute, possess, and use cannabis. The Act divides illegal drugs into three categories (classes A, B and C) according to their putative harm potential. Hashish and hash oil are classified Class B, and marijuana, Class C. Enforcement measures include detection and apprehension of suppliers and users, and crop eradication. However, temperate latitudes and a thriving clandestine 'green economy' or 'black market' has ensured local cannabis production satisfies domestic demand (Wilkins & Sweetsur, 2005). Despite overseas experimentation with legislative models (MacCoun & Reuter, 2001; Miron, 2005), New Zealand has maintained fairly strict prohibition while allowing informal *de facto* 'decriminalization'

through police discretion about prosecution of minor cannabis offences and diversion to treatment (Dawkins, 2001).

The Epidemiology of Cannabis Use

International Estimates and Trends

Cannabis use is estimated at 162.8 million people worldwide (4% of the global population aged from 15 years), more than all other illegal drugs combined (UNODC, 2006). A recent surge in both use and regular cannabis use has been recorded (Hall & Babor, 2000). In 2003, of 19.5 million Americans (8.2% population aged 12 years upwards) reporting past month illicit drug use, most (75.2%, 14.6 million users) was cannabis (Substance Abuse and Mental Health Services Administration, 2004). Today, cannabis use is a normative event in developed societies where 30-50% of the population (USA, Australia, Canada, Germany, UK), and even more (52%) in New Zealand, have tried it (Adlaf, Begin, & Sawka, 2005; Australian Institute of Health and Welfare, 2005; EMCDDA, 2002; Rigter & van Laar, 2002; SAMHSA, 2004; Wilkins et al., 2002). The 'normalization' of cannabis use reflects a conspicuous shift from the locus of marginalized deviant subcultures to mainstream youth identities and lifestyles (Dawkins, 2001; Duff, 2003; Parker, Aldridge & Measham, 1998; Shildrick, 2002). With frequent cannabis use by high school students now at record levels, 12- to 19-year olds are more likely to be recent users of cannabis than tobacco (AIHW, 2005; Johnston, O'Malley, & Bachman, 2002; Miller & Plant, 2002).

Equally alarming is a parallel trend towards declining age of cannabis initiation, most marked in the 10-14 years cohort (AIHW, 2005; Brook, Kessler, & Cohen, 1999; Degenhardt, Lynskey, & Hall, 2000; Dennis, Babor, Roebuck, & Donaldson, 2002; Durie, 2001; Home Office, 2003; McArdle, 2004; MOH, 2002b; Monshouwer, Smit, de Graaf, van Os, & Vollebergh, 2005; SAMHSA, 2004). Over the past decade approximately 40% of all cannabis initiates in the USA were under 15 years (Dennis et al., 2002b). This is disturbing because those who start early are 8 times more likely

than initiates over 18 years to be dependent in adulthood (Dennis & McGeary, 1999; Dennis et al., 2002b). Cannabis is now the leading illicit drug use disorder of American adults and adolescents (Compton, Grant, Colliver, Glantz, & Stinson, 2004; Chen & Anthony, 2003; Epstein, 2002). Similar patterns are emerging in Australia (AIHW, 2005; Coffey et al., 2002; Coffey, Carlin, & Lynskey, 2003; Reid, Lynskey, & Copeland, 2000), and New Zealand (Adolescent Health Research Group, 2003; Fergusson & Horwood, 2000b; MOH, 2002b, 2002c; Regional Public Health, 2000; Wilkins et al., 2002).

New Zealand Population Data

Three waves of national household drug use surveys of New Zealanders (n= 5,500) aged 15 to 45 (Field & Casswell, 1999a, 1999b; Wilkins et al., 2002; Wilkins, Girling, Sweetsur, & Butler, 2005) provide an updated representative profile of cannabis use and trends. No significant change in the proportion of the sample who had used cannabis in 1998 (50%) and 2001 (52%) was reported (Wilkins et al., 2002). However, a significantly higher proportion of the population had used cannabis in 2003 (53.8%) compared to 1998 (50.4%) (Wilkins et al., 2005). Between 1998 and 2001 consumption rose most markedly among young women aged 15-17 years (26% to 38% ever tried; 6% to 15% past month use) (Wilkins et al., 2002). Across all three survey waves most use was ‘experimental’ (69% no longer using), while approximately 20% reported past year, and 15% current cannabis use. Only a small minority (3% in 1998, 4% in 2001) reported *frequent* use (10 or more times in the past month). Frequent, heavy use (daily/almost daily) continued most commonly among 18-24 year-old males. Consistent with overseas trends, increased frequent use among 15-17 year-olds (1% to 4%) was again mainly due to young women (0% to 4%) (Wilkins et al., 2002). Notably, among lifetime users (at least 50% across all 3 surveys), 30% had tried cannabis by 15 years. Given the survey age threshold, and the problems inherent in obtaining reliable prevalence estimates of *any* illegal drug, these statistics are likely to be an underestimate (Field & Casswell, 1999b).

Chapter Two
Cannabis

Adolescent Samples

No systematic data on cannabis use trends among those less than 15 years exists (MOH, 2002b). Perception of a growing 'epidemic' in cannabis use and abuse among young New Zealanders derives from ubiquitous media reports of cannabis-related school expulsions, suspensions, and crime (Field & Casswell, 2001). Studies report use rates considerably higher than in the National Drug Survey and adolescent samples overseas (e.g., Fergusson & Horwood, 2000b; McGee, Williams, Poulton, & Moffitt, 2000; Poulton, Brooke, Moffitt, Stanton, & Silva, 1997; Poulton, Moffitt, Harrington, Milne, & Caspi, 2001; Smart & Ogborne, 2000). In a prospective study of a Dunedin birth cohort 43% reported trying cannabis by age 18 years, 62% by age 21, and 70% by age 26 years (Poulton et al., 1997, 2001). Rising consumption trends were also evident in a Christchurch birth cohort (Fergusson & Horwood, 1997, 2000b). Younger age of cannabis initiation is reported in cross-sectional surveys. In 2000, about 20% of 13-year-olds (50% at age 16) among 9699 (13-18 years) secondary school students nationwide had tried cannabis. Regular use (weekly or more often) peaked at age 15 years (AHRG, 2003). Among the 30% of Wellington students aged 13-17 years (n=4617) reporting having tried cannabis, 4% had done so before age 10. Most (60%) of those initiating cannabis between 10 and 12 (19% total sample) were still using (Regional Public Health, 2000). Ergo, with use rates apparently higher than elsewhere in the world, cannabis has become an integral, normative (and vexatious) element of New Zealand youth culture and increasingly, pre-adolescents (Durie, 2001; Fergusson & Horwood, 2000a, 2000b; Field & Casswell, 2001; MOH, 2002b, 2002c; NHC, 1999; Poulton et al., 2001).

Natural History and Correlates of Use

The epidemiological literature on the natural history of cannabis use and disorders is only embryonic. Initiation risk peaks around 15-18 years (Kandel & Chen, 2000; Wagner & Anthony, 2002). Cannabis is typically used experimentally or intermittently, and discontinued by the mid-to-late 20s (Chen & Kandel, 1995, 1998; Hall et al., 1999). Gender and age are strong correlates of cannabis use, with males more likely to have

tried cannabis and to use more frequently than females (Brook et al., 1999; Hall et al., 1999; Kandel, Chen, Warner, Kessler, & Grant, 1997; Wilkins et al., 2002).

Consumption also increases in late adolescence, peaks in the early 20s and then declines, with few recruits after age 29 (Kandel et al., 1997; Kandel & Chen, 2000). A small minority continue to use cannabis into their 30s, a 'maturational effect' attributed partly to new responsibilities (marriage, children, employment) and social networks (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997; Chen & Kandel, 1995, 1998; Hammer & Vaglum, 1990; Kandel & Chen, 2000). About 8% of cannabis users developed cannabis dependence by age 30, within ten years of first use (Rosenberg & Anthony, 2001; Van Etten, Newmarket, & Anthony, 1997; Wagner & Anthony, 2002). Rather than "explosive" (as with cocaine dependence), the cannabis dependence syndrome displays an "insidious onset" (Wagner & Anthony, 2002, p. 479).

Recent research, however, contravenes these historical trends. Replicating overseas findings (e.g., Compton et al., 2004; Eggington & Parker, 2002; Perkonigg et al., 1999; Sydow et al., 2001, 2002; Williams & Parker, 2001), *incidence* and *escalation* of cannabis use and disorder were more common than remission or decrease among a local birth cohort in recent assessment waves (Poulton et al., 1997, 2001, discussed above). By age 26, there was *no* evidence of either a tailing-off in cannabis uptake or increasing cannabis remission (Fergusson & Horwood, 2000b; Poulton et al., 2001). The unexpectedly low remission rate, dominant pattern of continued or increasingly frequent cannabis use, new recruits, and escalating incidence and persistence of abuse and dependence among these age cohorts (especially females) radically challenges the 'experimental hypotheses'. Cannabis use in adolescence may be "less transient than many people would believe" (Perkonigg et al., 1999, p. 1663), a trend with "worrying public health implications" (Williams & Parker, 2001, p. 399). Posing a severe challenge to national drug policy, particularly reduction of its use and harms among youth, cannabis consumption trends "cannot be regarded as trivial" (Poulton et al., 2001, p. 546).

Chapter Two
Cannabis

As yet, a specific risk factor typology for cannabis use and disorder is unknown (Spooner, 1999; Swadi, 1999; van den Bree & Pickworth, 2005; WHO, 2004). Drug use and abuse have different determinants. While drug use appears to be a function of social factors, drug use disorder appears to be related to biological and psychological processes (Derzon & Lipsey, 1999; Spooner, 1999; Warner, Kessler, Hughes, Anthony, & Nelson, 1995; van den Bree & Pickworth, 2005; Weinberg, Rahdert, Colliver, & Glantz, 1998). Peer drug use or pressure strongly predicts both adolescent cannabis use and the pace at which a 'cannabis career' develops (van den Bree & Pickworth, 2005; Windle, 2000). Resembling the person-to-person spread of infectious diseases, an "epidemic" cannabis initiation process "altruistically" propagated by same-age peers, with initiates typically making a rapid transition to regular use, has been described (Anthony, 2000). Use may start from peer pressure or curiosity, continue for social purposes, continue or increase when used to cope or get relief from life problems (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000; Spooner, 1999). Cannabis use and abuse often aggregates in families. Some aspect of this, such as predisposition towards cannabis use, or cannabis dependence once use begins, may have a genetic basis (Kendler & Prescott, 1998; Lyons et al., 1997; True et al., 1999). Early positive subjective responsiveness to cannabis use (perhaps genetically mediated) predicts later cannabis dependence (Fergusson, Horwood, Lynskey, & Madden, 2003). Ultimately, however, drug disorders have multiple etiological pathways. No single factor *causes* cannabis use disorder, an outcome of complex interaction between multiple biological, behavioural, and environmental factors (Derzon & Lipsey, 1999; Newcomb, 1992; Tarter & Vanyukov, 2001; van den Bree & Pickworth, 2005; Wagner & Anthony, 2002). In short, there is no unique 'cannabis user' profile (Kandel & Chen, 2000; Rigter & van Laar, 2002).

Less is known about predictors of cannabis continuation and cessation. Longitudinal studies of up to 20 years duration of adolescent cohorts (Chen & Kandel, 1998; Kandel & Chen, 2000) found early age of cannabis onset, heavier baseline consumption, use of other illicit drugs, drug using peers, and psychiatric problems foster progression to heavy cannabis involvement. These findings were replicated in diverse samples (Anthony & Petronis, 1995; De Wit, Hance, Offord, & Ogborne, 2000; Ellickson,

D'Amico, Collins, & Klein, 2005; van den Bree & Pickworth, 2005). Epidemiological data (Grant & Dawson, 1998; Grant & Pickering, 1999) also suggest escalation to dependence is predicted by early age of cannabis initiation, peer use and availability, heavy baseline consumption, coexisting substance (especially alcohol) use disorder, and depression. Similar predictors were found among adolescents in Germany (Sydow et al, 2002) and Australia (Coffey et al., 2000, 2002, 2003), where escalation to daily use occurred in 12% of early (by age 15) and frequent cannabis users. Among a New Zealand birth cohort (Poulton et al., 2001) consumption by age 15 strongly predicted consumption at age 21 and 26 years. By age 26, nearly three-quarters (70.1%) had tried cannabis, with as many as 18.3 % meeting DSM-IV criteria for cannabis dependence. In addition, of those identified as cannabis dependent, 75% reported using, and 66% reported having sold, other drugs in the past year (Poulton et al., 2001). In terms of the 'gateway' theory, the finding that cannabis-dependent young people are already deeply embedded in hard drug markets indicates that cannabis dependence among users is a serious public health issue that merits immediate attention (Fergusson & Horwood, 2000b; Poulton et al., 2001).

It is reiterated, however, that most cannabis use is experimental, without progression to 'harder' intoxicants (cocaine, heroin, LSD, methamphetamine). Some research evidence supports the highly publicized hypothesis that cannabis is a 'gateway' drug or 'stepping stone' to harder drugs (e.g., Fergusson, Boden, & Horwood, 2006; Fergusson & Horwood, 2000a; Hall & Lynskey, 2005; Kandel, 2003, 2002; Kandel, Yamaguchi, & Chen, 1992). However, reviews conclude that overall evidence is scant (see Hall et al., 2001; Morgan & Zimmer, 2002; Morral, McCaffrey, & Paddock, 2002). While this hypothesis remains contentious, one fact *is* incontestable**:** multiple drug use is the 'norm' today, and the "pure" cannabis user, as with other illicit drug users, a rarity (APA, 1994, 2000; Shillington & Clapp, 2001; Swift, Hall & Copeland, 1998b; Wilkins et al., 2002). Cannabis and other substance use (particularly alcohol), and cannabis dependence and dependence on other substances, commonly co-occur (APA, 1994, 2000; Degenhardt et al., 2001; Hall, 1995a; Swift, Hall, & Teesson, 2001a). However, rather than other illegal drugs, polydrug use in New Zealand is more likely to involve alcohol, tobacco and cannabis (Wilkins et al., 2002). Younger cannabis users commonly

binge drink, a combination with a synergistic increase in intoxication that has potential to cause greater harm (Eggington & Parker, 2002; Field & Casswell, 1999b; Reid et al., 2000; Shillington & Clapp, 2001, 2002).

With rates of cannabis dependence among adolescents (12-18 years) many-fold higher than among adults, cannabis is now the leading substance use disorder of American adolescents (Dennis et al., 2002a, 2002b). The DSM-IV-TR (2000) estimates lifetime rates of cannabis abuse or dependence at 5%. One estimate (MOH, 1999) put 2-3% New Zealanders at serious risk of cannabis dependence. However, considering the risk of developing cannabis dependence (at least 50% daily users, 20-33% less frequent users, and about 10% lifetime users) in the context of the elevated use profile in New Zealand, cannabis use problems may be far more pervasive. Frequent use is *not* a necessary condition for developing dependence symptoms, and adolescents (particularly females) are twice as vulnerable as adults, even at low use levels (Chen & Anthony, 2003; Chen, Kandel, & Davies, 1997; Dennis et al., 2002b). Younger initiates are 8 times more likely than initiates over 18 years be dependent in adulthood (Dennis et al., 2002a). Adverse psychosocial outcomes also predominate among younger cannabis users (Ellickson et al., 2005; Fergusson, Horwood, & Swain-Campbell, 2002; McGee et al., 2000; Solowij & Grenyer, 2002). Unquestionably, cannabis use and misuse/abuse is endemic among adolescents, post-adolescent cohorts, and a growing number of pre-adolescents in New Zealand. Universal availability and lower prices, social acceptability, soaring consumption and (possibly) potency, together with plummeting age of onset thus far noted all militate to increase the numbers using regularly and therefore at risk of becoming cannabis dependent and/or experiencing use-related problems.

Cannabis-Related Health and Other Adverse Consequences

The harm liability of cannabis has long been a topic of polemical debate (Robson, 2001; Strang, Witton, & Hall, 2000). Controversy aside, the best available evidence suggests occasional recreational users (i.e., the majority) to be at low risk of cannabis-related

harms, apart from those associated with intoxication. Harmful outcomes are more likely with chronic, regular use. The *probable* and *possible* harms associated with acute and chronic cannabis use are documented in authoritative research reviews (see Adams & Martin, 1996; Ashton, 2001; Copeland et al., 2006; Earlywine, 2002; Hall et al., 2001; Hollister, 1986, 1998, 2001; Institute of Medicine, 1999; Johns, 2001; Joy, Watson & Benson, 1999; Kalant, Corrigal, Hall & Smart, 1999; Mack & Joy, 2000; Stephens, 1999; WHO, 1997; Zimmer & Morgan, 1997b). This is a substantial literature, and the entire spectrum of health effects is beyond the focus of this thesis. A brief overview only of the major risks is provided below.

Acute Effects

Following the desired period of relaxation and euphoria (the 'high' or 'stone') users typically experience drowsiness and lethargy. Transient cardiovascular changes (tachycardia, hypotension) and dysphoric effects (anxiety, panic attacks, paranoia and depression) are common among naïve users. While high doses may precipitate psychotic symptoms in vulnerable individuals, with low acute toxicity cannabis is only a minor contributor to drug-related mortality (Sydney, 2003). Dose-related impairment in cognition (memory, concentration), orientation and psychomotor performance, especially when exacerbated by alcohol, is the major acute risk when performing tasks such as driving vehicles or trains, flying planes, operating machinery or controlling traffic (Smiley, 1999). After alcohol, cannabis is the drug most frequently detected in road accidents (Ashton, 2001; Bates & Blakely, 1999; Braun, Tekawa, Gerberich, & Sidney, 1998; Degutis, 2003; Woolard et al., 2003). Cannabis is now the most frequently reported illicit drug adolescent hospital emergency department admissions and autopsies in the USA, associated with accidents, homicide, suicide, violence, and other trauma (Braun et al., 1998; Chung, Colby, O'Leary, Barnett, & Monti, 2003; Dennis et al., 2002a; OAS, 2000b).

Cannabis-related hospitalisations have been rising annually. In a 3-year period, 2722 hospitalisations (71% male) involving cannabis were recorded in New Zealand (NZHIS, 2001). Cannabis is the illegal drug most often detected in workplace drug tests, causing

preventable accidents, increased absenteeism, diminished productivity, high job turnover and dismissals (Galif, Newcomb, & Carmona, 2001; Schwenk, 1998). Cannabis intoxication is a predictor of unsafe sexual behaviour among adolescents, which increases the risk of STDs and unplanned pregnancies (Boyer et al., 1999; Staton et al., 1999).

Adverse Effects of Chronic Use

Cannabis smoking deposits four times as much tar as cigarettes in the smoker's respiratory system (British Lung Foundation, 2002; Tashkin, 1999; Taylor et al., 2002). Reviews conclude that prolonged cannabis smoking confers a *probable* risk of respiratory diseases such as chronic bronchitis, histopathological changes that may be precursors to development of malignancy, and risk of cancers to the aerodigestive tract. Development of cannabis dependence, characterized by inability to abstain from or control cannabis use is a major risk that, in turn, increases the risk of other serious consequences. These include a *possible* risk of a decline in occupational performance characterized by underachievement in adults and impaired educational attainment in adolescents, immune system modulation, and exacerbation of some medical and psychological (anxiety, depression, psychosis) symptoms. Commonly reported are subtle forms of cognitive impairment, particularly of attention and memory, which persist while the user remains chronically intoxicated, the reversibility of which remains unknown (Hall et al., 2001).

Other Cannabis-Related Harms

Law enforcement, court cases, and incarcerations for cannabis offences exert substantial costs. In New Zealand over the past decade, cannabis has accounted for an average of 4.6% of total offences and 94% of drug offences. In 2005, police made around 15, 000 cannabis-related arrests (New Zealand Police, 2006). With the world's highest per capita arrest rate for personal use and possession, annual chances of arrest for a minor cannabis offence (4%) exceeds that of Australia (1.25%) and the USA (2%) (Health Committee, 2003). Cannabis accounted for three-quarters of all drug-related

convictions in 2005 (Soboleva, Kazakova, & Chong, 2006), with between 2.7% and 5.9% of prison incarcerations being cannabis-related (NZHIS, 2001). Cannabis is the drug most often detected by urinalysis among recent detainees (Makkai, 2001). Undetected use and diversionary strategies compromise interpretation of these statistics. However, whether cannabis-related crime is committed either to support a drug habit or to subsist, the personal, familial, and public costs in New Zealand are substantial, and inestimable (see Abel & Casswell, 1998; Field & Casswell, 2000). Both direct (e.g., specialist treatment, health care, vehicular and other accidents, related crime, law enforcement, prevention and research) and indirect statistics (such as cannabis-related unemployment, productivity loss, and income, health and other benefits) suggest the social and economic 'costs' (harms) of excessive cannabis use to be extremely high.

High Risk Groups

Vulnerable groups at higher risk of developing the adverse effects of cannabis include adolescents and young adults, Māori, women of childbearing age, and persons with pre-existing medical and psychiatric conditions. Adolescent cannabis use/misuse is a major health problem with social, developmental, academic, and legal ramifications (American Academy of Pediatrics, 1999; Hall, 1995b; Solowij & Grenyer, 2002). Early onset and heavy cannabis use have consistently been associated with such negative effects as impaired educational performance, other drug use, impaired psychosocial development, unemployment, early parenthood, delinquency and crime, and poor mental health – especially depression, psychosis, suicidal behaviour, and antisocial personality disorder in both New Zealand (Arsenault et al., 2002; Beautrais, Joyce, & Mulder, 1999; Fergusson & Horwood, 2000a; Fergusson, Horwood, & Beautrais, 2003; Fergusson et al., 2002; McGee et al., 2000) and overseas research (Brook, Adams, Balka, & Johnson, 2002; Field, Diego, & Sanders, 2001; Lynskey & Hall, 2000; Patton et al., 2002; Rey, Sawyer, Raphael, Patton, & Lynskey, 2002; Solowij & Grenyer, 2002; Weinberg et al., 1998). With this malignant comorbidity, cannabis use disorder may cascade into adolescent users' adult life, robbing them of their potential, thus one of the most expensive social and health care problems facing societies today (Field & Casswell, 2001; Health Committee, 2003; MOH, 2002b, 2002c).

Chapter Two
Cannabis

Among young Māori aged 15-29 years cannabis use is even higher than non-Māori (60% lifetime, 23% current users), with 41% having tried it between ages 15-17 (Dacey & Barnes, 2000). Among a birth cohort adolescent Māori participants had double the risk of non-Māori (15% versus 8%) for developing cannabis dependence (Fergusson & Horwood, 2000b). A Māori health report described an "epidemic" of cannabis abuse among Northland Māori where generations of Māori use cannabis (Te Runanga o te Rarawa, 1995) and children are raised in a "cannabis environment". In some "cannabis country" areas where use has been "normalized", users range from primary school children to elders, which is threatening the health and structure of many Māori communities (Durie, 2001). Māori are convicted four times more often for cannabis offences than other ethnic groups (Fergusson & Horwood, 2000b; NZHIS, 2001). Māori are also over-represented (40%) in hospital statistics involving cannabis-related conditions or poisoning (NZHIS, 2001). Cannabis is a major trigger for increased Māori admissions to psychiatric facilities (Dyall, 1997). Lux and colleagues (1993) warn that excessive use of cannabis by Māori is likely to exacerbate their existing risks for respiratory and mental illness, educational failure and unemployment, poverty and social/cultural alienation.

Cannabinoids readily cross the placenta of pregnant women. Foetal abnormalities and developmental defects are possible from *in utero* cannabis exposure (Fergusson et al., 2002; Fried, 2002). Multiple difficulties hinder isolation of the possible teratogenic effects of cannabis use. There is firm evidence that prenatal cannabis use is associated with reduced birth weight, and mixed evidence of physical or psychological deficits that endure or become apparent as the child develops (see Copeland et al., 2006, for review). Recent admissions to New Zealand hospitals of babies suffering effects of exposure to cannabis smoke (drowsiness, inertia, comatose) are at risk of harm from passive cannabis smoking. Cannabis-exposed infants and children "may be quite common in New Zealand society and should be considered as a significant aspect of cannabis abuse" (Ramadas & Moyes, 1996, p. 366). The recent increase in cannabis initiation and heavier use among young women in New Zealand (Wilkins et al., 2002) highlights this concern. In addition, persons with certain pre-existing medical diseases (cardiovascular, circulatory, and respiratory diseases) and psychiatric disorders (schizophrenia,

depression, alcohol, or other drug dependence) risk precipitating or exacerbating the symptoms of their condition by cannabis use (Hall et al., 2001).

Self-Reported Harmful Effects

Many people use cannabis occasionally and non-problematically (Gorman & Derzon, 2002; Wilkins et al., 2002). Data indicate a linear association between frequency and quantity of past year cannabis use and the probability of being dependent and/or experiencing adverse consequences (Chen et al., 1997). The type and severity of cannabis problems reported by general population (Adlaf et al., 2005; Degenhardt et al., 2001; Field & Casswell, 1999b; Thomas, 1996; Wilkins et al., 2002), treatment-seeking (Agosti & Levin, 2004; Budney, Radonovich, Higgins, & Wong, 1998; Budney & Moore, 2002; Copeland et al., 2001a, 2001b; Dennis et al; 2002b; Stephens, Babor, Kadden, Miller, et al., 2002; Stephens, Roffman, & Curtin, 2000), frequent user (Wilkins et al., 2005) and long-term user samples (Reilly, Didcott, Swift, & Hall, 1998) accords with the research literature. Problems most often reported were loss of memory, motivation, energy and wellbeing, psychological distress (anxiety and depression), physical health problems (respiratory, nausea, headaches), strange thoughts, paranoia, and multiple social (relationships, school, employment, financial, criminal/legal) problems. Reported loss of control over cannabis, and a strong desire to use (indicative of dependence), were common. Higher consumption levels, often in conjunction with hazardous alcohol use, predicted greater problem severity across all samples. However, even *irregular* users evidenced substantial functional impairment and distress (Dennis et al., 2002a). Although only a small minority had sought help, many perceived their problems serious enough to warrant treatment (Budney et al., 1998; Copeland et al., 2001b; Stephens et al., 2000; Swift et al, 1998b). Such data provide a strong rationale for cannabis screening/early detection and a spectrum of interventions to match problem severity, ranging from relatively brief cannabis education and advice, through to more sustained behavioural modification counselling (Copeland et al., 1999, 2001a; Dennis et al., 2002b; Hall & Swift, 2006).

Chapter Two
Cannabis

Demand for Treatment

Despite the rarity of specialist help-seeking, over the past decade treatment demand for cannabis problems increased dramatically (Copeland, 2004; Hall & Babor, 2000; SAMHSA, 2005; Sellman & Adamson, 2002; UNODC, 2006). In the USA, primary cannabis admissions aged 12 years and older tripled (increased by 162%) between 1992 and 2002, representing 15% of all admissions to publicly funded treatment services. A parallel significant upsurge in cannabis treatment is reported from Europe, the UK, and Australia (Copeland, 2004; UNODC, 2006). Cannabis treatment-seeking rates doubled between 2000 and 2002 in Australia (AIHW, 2003). Adolescent cannabis presentations represent an increasing proportion of admissions to publicly funded treatment in western societies (Hall & Babor, 2000). Cannabis was the principal drug of concern for almost half (46%) of treatment-seekers aged 10-19 years in Australia (AIHW, 2003).

New Zealand lacks comparable treatment census data. Statistics suggest 0.3% of the total population was treated by community drug treatment services in a 6-month period in 2003, an average of 5270 per month (MOH, 2004). Drug treatment services reported a significant shift towards increased cannabis use, in terms of use of cannabis and alcohol equally (nearly 76% of all national admissions) (Sellman & Adamson, 2002). Nearly a third of all admissions to the Auckland regional drug treatment services reported using cannabis at least daily (Paton-Simpson & McKinnon, 2000). In short, although not reflective of the *true* prevalence, the dramatic growth in treatment seeking among cannabis users is (more than) sufficient to affirm that New Zealand has a cannabis problem of considerable magnitude that, according to Farrell (1999, p. 1227), " is here to stay". Given this disturbing trend, early detection, diagnosis, and effective treatment for cannabis use problems are a major clinical concern.

Diagnosis of Cannabis Use Disorder

Two main diagnostic systems are used in the alcohol and drug field, the World Health Organization's *International Classification of Diseases (ICD)* and the American Psychiatric Association's *Diagnostic and Statistical Manual (DSM).* Diagnostic criteria, classification rules, nomenclature, and nosological terminology for psychoactive substance use disorders (PSUDs) in the mental disorders section of successive editions of both taxonomies have undergone substantial evolution over the last century (see Babor, 1992; Maddux & Desmond, 2000; Nathan, 1991; Room, 1998). Featuring the rise of the 'problems' concept which epitomized a hiatus in the nosological definitions, a brief review of this evolution will clarify the current status of clinical and scientific thought on cannabis use disorders. An outline of diagnostic issues with potential implications for empirical development of a brief cannabis screen follows.

PSUDs as Bipartite Disorders: Dependence and Abuse/Problems Dimensions

Contemporary conceptualisation of drug dependence as a behavioural and psychic disorder distinct or "disaggregated" from the problems that often accompany it has roots in historical thought about alcohol. In turn, intoxication was viewed as a 'sin', and then as a 'habit'. By the 1960s, the 'disease' model had hijacked the dependence dimension, and addiction became a physical, progressive "biologised disease" (Edwards, 1992, p. 8). Diagnostic classification of substance-related problems emphasized this medical concept as pertaining to more severe manifestations of alcohol and drug-related disorders, giving lesser attention to the various problems associated with acute intoxication and chronic substance use in the absence of addiction/dependence. As a medical category, addiction/dependence supported individual-directed solutions, inpatient (tertiary) treatment and rehabilitation attempts to cure, giving little place to prevention and the screening/early intervention traditions of public health (Edwards, 1992).

Chapter Two
Cannabis

This alcoholism as categorical disease consensus was challenged in 1977 by a landmark WHO report describing the 'alcohol dependence syndrome' (ADS; Edwards & Gross, 1976), explicitly reclassifying 'alcoholism' from a unitary concept of dependence to a bi-axial disorder: alcohol 'dependence' and 'abuse' (disabilities, problems). A WHO Memorandum rapidly followed, developing and extending the ADS description to all other psychoactive drugs, the 'drug dependence syndrome' (DDS; Edwards, Arif & Hodgson, 1981). Loss of control over drug use was the cardinal symptom. A new category, 'Non-dependent abuse of drugs' (DSM) or 'Harmful Use' (ICD) was created to accommodate the maladaptive effects of non-dependent drug use. Marking an historical hiatus in both nosological traditions, two important assumptions were thereby incorporated: (1) that dependence can be classified similarly across a broad range of psychoactive substances; and (2) that substance use problems in the absence of dependence (DSM Abuse; ICD Harmful Use) warrants a separate diagnostic category by virtue of its detrimental effects on health (Babor, 1992, 1995). This precedent formalized a reconceptualisation of the nature of drug consumption and related problems, and a shift in focus from traditional long-term treatment of advanced drug disorder towards population-based screening and early/brief intervention for drug-related problems in primary health care settings worldwide.

From this historical watershed, the ADS and DDS have formed the conceptual framework for diagnoses of dependence and abuse/harmful use in successive reformulations. Operationalization of this dependence-problems distinction (the 'orthogonal hypothesis') implies that dependence and abuse are separate, but potentially related, disorders (Babor, 1992; Room, 1998). Both systems currently conceptualize the 'drug dependence syndrome' as a cluster of cognitive, behavioural, and physiological symptoms related to a cardinal phenomenon, "that the individual continues use of the substance despite significant substance-related problems" (APA, 1994, p. 176). A dependence diagnosis requires meeting any three of 7 criteria (DSM-IV, 1994; DSM-IV-R, 2000), or any three of 6 criteria (ICD-10; WHO, 1992) within a 12-month period. A separate syndrome, 'drug abuse' (DSM) or 'harmful use' (ICD), allows for a diagnosis of drug-related problems that do not satisfy dependence criteria. The reader is referred to Appendix 1 for DSM-IV and ICD-10 diagnostic criteria, some important

assumptions associated with the DDS, and clarification of terminology with regard to the concept categories of ‘use’, ‘misuse’, ‘problematic use’, ‘abuse’ and ‘dependence’, and the *harm minimization* approach to cannabis use-related problems.

Cannabis Use Disorder

The longstanding view that cannabis was *not* a drug of dependence was challenged in 1964 when the WHO defined cannabis as a drug of dependence capable of producing public health and social problems. These included inertia and lethargy, self-neglect, precipitation of psychosis, association with deviant subcultures, and the social and economic costs of individual impairment. Despite the WHO view of cannabis’ dependence liability (since buttressed by four decades of epidemiological evidence), beliefs to the contrary persist. DSM-IV and DSM-IV-TR (APA, 1994, 2000) continued to reflect this historical uncertainty by sub-typing Cannabis Dependence according to the presence or absence of the physical dependence symptoms of tolerance or withdrawal. Consistent with the assumption of equivalent phenomenology of substance use disorders across the different substances, “there are no unique criteria sets for Cannabis Dependence or Abuse” (APA, 2000, p. 235). Cannabis Dependence is characterized thus: “Individuals with Cannabis Dependence have compulsive use…(and) may use very potent cannabis throughout the day over a period of months or years…(and) may also persist in their use despite knowledge of physical problems... or psychological problems” (APA, 1994, p. 216).

As an independent, second syndrome related to the negative consequences of problematic cannabis use, the essential feature of a Cannabis Abuse/ Harmful Use diagnosis is repeated consumption resulting in recurrent significant damage to the user’s physical or mental health (ICD, DSM) and social functioning (DSM). Thus, Cannabis Abuse/Harmful Use refers to repeated use of cannabis that causes recurrent physical, psychological, economic, legal, or social harm to the user or to others affected by the drug user’s behaviour.

Chapter Two
Cannabis

Nosological Issues in Diagnosis of Cannabis Use Disorder/Problems

Several interrelated diagnostic issues are associated with use of the ICD-10 and DSM-IV as diagnostic standards for cannabis dependence and abuse/harmful use for the development of a screen for cannabis use problems. These include the validity of the cannabis dependence-abuse distinction, its applicability to adolescent cannabis use disorders, and appropriate disposition of a sub-diagnostic group for whom the term "diagnostic orphans" (Hasin & Paykin, 1998) was coined.

Validity of the bi-axial concept: Categorical and dimensional approaches

Statistical and conceptual independence of cannabis dependence from its consequences (abuse) is equivocal. While some researchers report statistical independence (a two-factor solution), others report one latent dimension on which the two constructs were highly correlated (see Swift, 1999). Feingold and Rounsaville (1995a, 1995b) interpreted their results as supporting a quantitative model in which abuse is a mild pro-dromal form of dependence, rather than a qualitatively distinct, but related, entity. Thus, the qualitative (categorical, two constructs) distinction would be more efficiently replaced by a quantitative (one construct, single underlying syndrome) model, in which a pooled set of criteria are used to determine gradations (none, low, mild, moderate, severe) along the problem severity continuum. In this dimensional view, sub-clinical or sub-threshold ratings may indicate an earlier stage in progression from consumption to drug-related problems, while lower dependence severity scores suggest an 'abuse' or 'mild dependence' diagnosis (Feingold & Rounsaville, 1995a, 1995b). Swift (1999) found evidence that when cannabis dependence symptoms form unidimensional scales, they evince a continuum of severity.

The essence of the dimensional approach is the flexibility of cut-points to suit different populations and purposes (Widiger & Trull, 1991). Distinguishing dependent from non-dependent individuals (i.e., determining caseness) is a matter of degree, with no single arbitrary cut-point universally suitable (Edwards et al., 1981; Streiner & Norman, 1995). Kendell (1975) notes that both the dimensional and categorical models are necessary and complementary. With their predetermined cut-points, categorical

diagnostic techniques are needed to classify individuals for treatment planning and provision. Difficulties arise, however, when continuous dimensions (e.g., psychiatric symptoms) are denoted either 'present/absent'. Screening and treatment based on fitting "round" dimensions into "square" categories could lead to inappropriate diagnoses and treatment decisions (Goldberg, 2000). An axiom of statistical and psychometric theory is that forcing information based on an underlying dimensional trait into a categorical format sacrifices measurement precision (Jensen, 1995). Although a DSM-IV (and ICD-10) dependence diagnosis overrides an abuse diagnosis (APA, 1994), many drug users qualify for both diagnoses. Hence, recording the number of drug-related symptoms or problems as a way of screening for drug misuse or disorder, measuring severity of dependence or identifying case-ness in drug research "will continue to be a legitimate preference of many in the field" (Sellman, 1994, p. 210; and see Costello, 1992).

Adolescents and DSM-IV/ICD-10 diagnosis

Being neither age nor developmentally specific, DSM-IV and ICD-10 diagnostic frameworks can be challenged with respect to adolescents (Clark, 2004; Deas, Roberts & Grindlinger, 2005). Adolescents generally have shorter drug use histories and more pathological symptom profiles than adults (Bukstein & Kaminer, 1994). Dependence symptoms and medical problems, which may take years to develop, present differently in adolescents (American Academy of Child and Adolescent Psychiatry, 1997; Bailey, Martin, Lynch, & Pollock, 2000; Crowley, MacDonald, Whitmore, & Mikulich, 1998; Harrison, Fulkerson, & Beebe, 1998; Martin, Kaczynski, Maisto, Bukstein, & Moss, 1995; Winters, Latimer, & Stinchfield, 1999). Since many adolescents intentionally initiate out-of-control drug use "to get high or smashed" (Harrison et al., 1998, p. 487), the construct 'impaired control' is also problematic (Clark, 2004; Harrison et al., 1998). Nevertheless, teenagers *can* and *do* meet formal diagnostic criteria for substance dependence within a year of initial use (Deas et al., 2005; Martin et al., 1995). Moreover, tolerance (Deas et al., 2005) and withdrawal (Crowley et al., 1998; Vandrey, Budney, Kamon, & Stanger, 2005; Wiesbeck et al., 1996) were prevalent among adolescents (12-17 years) who were either cannabis dependent or non-treatment frequent users.

A major limitation is the categorical versus the dimensional nature of DSM-IV and ICD-10 formulations (Deas et al., 2005; Harrison et al., 1998). Given their generally more pathological profile at treatment admission, diagnostic thresholds may be inadequate for adolescents, especially for dependence (Clark, 2004; Dennis et al., 2002b; Mikulich, Hall, Whitmore, & Crowley, 2001; Harrison et al., 1998; Pollock & Martin, 1999; Winters et al., 1999). Similarly, behaviours that elicit legal and social consequences (apropos of an abuse diagnosis) for adolescents as minors may not create problems for adults (Bailey et al., 2000; Hays & Ellickson, 1996). Thus, diagnostic thresholds for both dependence and abuse should be lower for adolescents (Chung et al., 2000; Clark, 2004). However, whether the distinction between abuse and dependence among adolescents is diagnostically meaningful is questionable. The heterogeneity of symptoms endorsed by adolescents in recent studies suggests classificatory criteria may not adequately differentiate abuse from dependence (see Deas et al., 2005; Harrison et al., 1998). Empirical support for the dimensional approach to diagnostic classification based on a problem severity continuum (discussed above) as the most parsimonious model for adolescent drug use disorders is accumulating (Deas et al., 2005; Fulkerson, Harrison, & Beebe, 1999; Harrison et al., 1998; Pollock & Martin, 1999).

In short, “the tip of the iceberg has barely been touched in reaching consensus on the most appropriate criteria for adolescents” (Deas et al., 2005, p. 20). Since using adult measures can present psychometric problems, it cannot be assumed that adult models are directly transferable to adolescents (Chung et al., 2000; Clark, 2004; Leccese & Waldron, 1994; Winters, 2003). Given adolescents’ different developmental stages, patterns of use, family and peer issues, problem recognition and level of self-insight, some consider use of DSM-IV and ICD-10 criteria for adolescent drug disorders dubious (e.g., AACAP, 1997; Dennis et al., 2002b; Fulkerson et al., 1999; Harrison et al., 1998; Weinberg et al., 1998). Albeit, while perhaps not optimal, research generally supports the validity/utility of DSM-IV criteria for adolescent cannabis (and alcohol) use disorders (Bailey et al., 2000; Clark, 2004; Martin et al., 1995; Mikulich et al., 2001; Winters et al., 1999). While much evidence indicates the relevant constructs can be measured reliably and validly (Leccese & Waldron, 1994), *cautious* use of diagnostic

criteria among adolescents until validated, developmentally-appropriate, adolescent-specific diagnostic criteria are established is recommended (Kaminer, 1994). Meanwhile, the frequent differences between the most common manifestations of drug use, problems, abuse and dependence in adolescents versus adults should be kept in mind (AACAP, 1997; Clark, 2004; Spooner et al., 1996). Data in this research afforded an examination of this important aspect incorporated as an additional empirical question.

"Diagnostic orphans"

A third diagnostic dilemma flows directly from those just discussed. Researchers and clinicians have long recognized that drug use and disorders exist within continua among the population, and that use patterns below the diagnostic threshold may still be associated with substantial morbidity (Drummond, 1992; Edwards, 1992; IOM, 1990a, 1990b). Alcohol research has identified a sub-diagnostic group called "diagnostic orphans" (Hasin & Paykin, 1998, 1999; Pollock & Martin, 1999), defined as users who report one or two dependence symptoms, and therefore do not meet full criteria for dependence, while reporting no abuse symptoms. Compared to other adolescent and adult diagnostic groups, diagnostic orphans were more similar to 'abuse' than 'dependence' diagnostic groups, or those reporting no problems (Bailey et al., 2000; Hasin & Paykin, 1999; Sarr, Bucholz, & Phelps, 2000). This suggests diagnostic orphans and abuse groups have similar risks of substance-related problems. Diagnostic orphans and those assigned sub-clinical ratings on diagnostic criteria often characterize individuals in earlier, prodromal stages of problem development, providing valuable information beyond traditional categorical 'present/absent' symptom classification. Sub-threshold symptoms suggest a trajectory of escalating drug use and related problems.

These concepts extend to cannabis-using adults and adolescents (Deas et al., 2005; Degenhardt, Lynskey, Coffey, & Patton, 2002; Dennis et al., 2002b; Tims et al., 2002; Winters et al., 1999). As in alcohol samples, cannabis diagnostic orphans formed a separate group from dependent groups, evincing similar use patterns and problem profiles, including other illicit drug use, regular tobacco and alcohol use, mental health

problems, to the ‘abuse’ groups. The associated problems and symptom severity reported by diagnostic orphans in adolescent samples *clearly* indicated need for treatment (Deas et al., 2005; Dennis et al., 2002b; Dennis & McGeary, 1999; Tims et al., 2002). Diagnostic criteria appear inadequate to capture all those having significant problems with their cannabis use (Degenhardt et al., 2002; Tims et al., 2002; Winters et al., 1999). Hence, with incubating problems likely to fall through the ‘diagnostic crack’, cannabis diagnostic orphans and those reporting sub-threshold problem levels are “an important area for assessment in early case identification efforts” that “should alert practitioners to potentially serious problems” (Bailey et al., 2000, p.1800-1801). This at-risk group is an appropriate target for screening/early intervention to attempt to arrest progression of problems to a more advanced stage.

Interventions for Cannabis Use Disorder

State of the Art in Treatment Approaches

By the time individuals seek specialist cannabis treatment, many have already suffered serious social disruption and health outcomes (see Agosti & Levin, 2004; Budney et al., 1998; Dennis et al., 2002a; Copeland et al., 1999, 2001a; Stephens et al., 1993, 2002). New Zealand empirical literature on cannabis treatment is sparse. Researchers describe typically youthful presentations with a history of chronic, regular cannabis use, comorbid alcohol problems, psychopathology and social dysfunction (Adamson & Sellman, 2003; Bashford, 2000). Despite evidence of significant levels of cannabis use and dependence, harmful effects and comorbid psychopathology in the community, research on appropriate psychological interventions for cannabis use problems is only a decade old (see Copeland, 2004 for review). Given this historical neglect, little is known about how best to respond to cannabis use problems (Babor, Steinberg, McRee, Vendetti, & Carroll, 2002; Carroll, 1998; Kamon, Budney, & Stanger, 2005; Stephens et al., 2000, 2004). Copeland (2004) concludes that while several cognitive-behavioural approaches show promise as empirically validated treatments specifically tailored for cannabis use problems among both adults and adolescents, some groups (adolescents,

juvenile justice clients, clinically serious and psychiatric populations) are often challenging to engage and treat. Escalating relapse rates at successive follow-ups are comparable to other drugs, suggesting the "intractability" of severely problematic cannabis use to be a "formidable problem requiring treatment, and perhaps multiple attempts to quit" (Stephens & Roffman, 1993, p. 216; and see Moore & Budney, 2003; Stephens et al., 1994).

Importantly, moreover, a major review finding was that brief assessment and intervention (even a single session) was just as effective at the 15-month follow-up in reducing cannabis use and problems as longer, more intensive therapy among severely dependent cannabis users. A similar finding at the 12-week follow-up was recently reported after an opportunistic single session intervention among non-treatment seeking cannabis-using adolescents (McCambridge & Strang, 2004). Given the "apparent epidemic of cannabis use disorders among young people, effective treatment models are needed as quickly as possible" (Compton et al., 2004, p. 2120). Meanwhile, burgeoning demand for treatment with paucity of evidence on best practice interventions prompted Copeland (2004; Copeland et al., 1999, 2001a) to advocate targeted screening of high-risk individuals in primary health care settings to efficiently identify those with *earlier stage* cannabis use problems for brief interventions. This call reverberates from diverse authorities (e.g., Anthony, 2000; Degutis, 2003; Dennis et al., 2002a; Fergusson et al., 2002; Hall & Babor, 2000; Gerada, 2003; Hall & Swift, 2006; McCambridge et al., 2003; McCambridge & Strang, 2004; MOH, 1998, 2005a; NHC, 1999; Solowij & Grenyer, 2002; WHO, 1997, 1998; Woolard et al., 2003).

Screening and Early Intervention (SEI) for Cannabis Problems: A Paradigm Shift

As earlier outlined, a radical shift in the approach to drug-related problems worldwide has occurred over the past three decades (Lader et al., 1992; Saunders, 2002a). Synchronous with the 'new public health' prevention approach to population morbidity and mortality, drug use problems and disabilities are recognized as "public health

concerns of pervasive importance in their own right" (Drummond, 1992, p. 8). Signaling movement away from "yesterday's vision" and medical hegemony:

> The idea which for too long held sway, that the exclusive focus for concern relating to misuse of alcohol or drugs should be with 'the addict', is now clearly ripe for abandonment. (Lader et al., 1992, p. 189)

Reexamination of the fundamental philosophies, techniques, and delivery of drug treatment services at the most appropriate time in the natural history of drug problems, soon followed (Lader et al., 1992). Proposing diametrically opposite strategies to traditional intensive tertiary treatment and rehabilitation, the problems model recognized the need to "broaden the base" of interventions (Institute of Medicine, 1990a) to encompass the whole spectrum of drug consumption and related problems that exist along severity continua among the population. The far end of the continuum includes dependence, with a gradient of misuse and risky use that encompasses a greater proportion of the population and the greatest amount of harms (Fleming, 2002; Heather, 1996; Kreitman, 1986; Saunders, 2002a, 2002b). This requires a matching continuum of intervention responses, ranging from minimal (advice, education) through brief motivational counselling to intensive, specialized psychological treatments (Hall & Swift, 2006).

This chapter has clarified that, as with alcohol, risky/unsafe and harmful cannabis consumption exist as continua. Similarly, acute cannabis intoxication and certain patterns of consumption often cause considerable damage to people's lives. The comorbid association of cannabis use with other mental health and drug disorders is widespread (APA, 1994, 2000; WHO, 2004). Other common correlates include medical, interpersonal, social (marital, parental, school, employment, financial, and legal/criminal) problems, and increased risk of serious accidents. The magnitude of these cannabis-related problems *in themselves* embody a rationale for screening and early intervention, and not merely as precursors of more severe levels of dependence (Anthony, 2000; Compton et al., 2004; Copeland, 2004; Copeland et al., 1999, 2001a; Hall & Swift, 2006; WHO, 2004). In short, cannabis consumption *with or without* cannabis dependence is itself an important risk factor for a multiplicity of potentially

serious medical and psychosocial problems, a risk exacerbated with increasing levels of consumption (Compton et al., 2004). The 'problems' approach views the goal of screening as identification of a broad range of cannabis-related health and social problems and, along with dependence, harmful as well as potentially harmful/risky cannabis use are legitimate targets of intervention (Anthony, 2000; Babor & Higgins-Biddle, 2000; Hall & Swift, 2006; Jaffe & Compton, 1997).

Research consistently shows individuals at early stages of drug use problems have better prognoses. Chronicity and severity of drug dependence predict treatment outcomes (Carroll, 1998; Skinner, 1990). The importance of detecting and treating early stage cannabis use problems highlights the need for an expanded repertoire of treatment approaches beyond the traditional tertiary response (Anthony, 2000; Hall & Swift, 2006). A narrow preoccupation with the most serious dependence cases neglects pre-dependent drug users who, in an "epidemic-like pattern", account for mounting numbers of new users, and eventually more cases of drug dependence (Anthony, 2000). The rigid application of one approach to a narrow population is indefensible (Brown & Fleming, 1998; Drummond, 1992). The vast majority of those with drug problems do not access specialist services (Carroll, 1998; Copeland et al., 1999; Degenhardt et al., 2001; Hall et al., 2001; IOM, 1990a; MOH, 2004). Demand for help far exceeds treatment capacity, and rationing of health care with triage rules for allocating limited resources is inevitable globally (Anthony, 2000; Ustun, 2000). An equitable, efficient health system will prioritize services and allocate resources to maximize possible health gains to ensure the greatest good for the greatest number. By definition, a 'problems' approach to prevention must deal with the larger number of *potential*, as well as actual, victims to prevent long-term adverse consequences of cannabis use (Anthony, 2000; Fleming, 2002; Hall & Swift, 2006).

A major development in conceptualising and responding to alcohol-related health problems has been the adoption of a public health perspective on alcohol use (Hall & Teesson, 2000). Rather than an exclusive focus on the 'alcoholic' this approach spans the entire spectrum of health problems caused by alcohol. As argued throughout this thesis, a similar perspective could productively inform the approach to cannabis-related

problems, including screening/early identification and intervention for potentially harmful/risky, harmful, and dependent patterns of cannabis consumption (Anthony, 2000; Hall & Swift, 2006; MOH, 2004; NHC, 1999). This paradigm also advocates a youth focus (Anthony, 2000; MOH, 2002b, 2002c; Shrier, Harris, Kurland, & Knight, 2003; Smart, 1992), since data show conclusively that young people are much more likely to use cannabis.

Predicated on the public health *harm minimization* philosophy, this revolutionary proactive approach has spawned such initiatives as population screening and early/brief intervention (SEI/SBI) for both harmful and potentially harmful cannabis use to prevent progression to a more serious- perhaps irreversible - stage of disorder. Capitalising on their accessibility and high throughput, primary health and social services have been identified as *the* ideal environment for screening and early intervention for cannabis use problems (Gerada, 2003; Copeland et al., 1999, 2001a; MOH, 2002c, 2005a; McArdle, 2004; McCambridge et al., 2003; Monti, Colby, & O'Leary, 2001; NHC, 1999; Shrier et al., 2003; WHO, 1998, 2004). This paradigm shift has introduced novel challenges to the cannabis problem recognition process, highlighting a conspicuous gap in suitable screening instrumentation. These issues are explored in the following two chapters.

CHAPTER THREE

SCREENING AND EARLY INTERVENTION (SEI): A PUBLIC HEALTH PARADIGM

'A stitch in time saves nine…'

Discovery of the 'clinical iceberg' of most diseases triggered a shift from just traditional diagnosis and treatment of illness and its complications towards prevention, early detection, and modification of risk factors (NHC, 2003). Playing a principal role in this revolutionary new paradigm, screening has become a component of public health and preventive medicine since the 1960s (Morrison, 1992; Peckham & Dezateux, 1998). With potential to prevent or delay onset of disease and disorder, premature death and disability, improve quality of life and reduce health inequalities, screening for early detection and intervention can be readily justified on rational, economic, political, ethical, and humanitarian grounds. Foege (1997) articulates the mandate:

> It is not enough to predict the future. Public health faces an enormous challenge in protecting the future. The other side of possessing a window on the future is the requirement to look through that window and respond appropriately (p. 413).

Health care systems now routinely incorporate an extensive range of screening activities throughout the lifespan (NHC, 2003). Faced with mounting screening demands, health professionals seek ever briefer screening tools to enable rapid and accurate identification of early-stage diseases/disorders and risk factors (Del Mar & Glasziou, 2003). As noted in Chapter one, a parallel shift from a myopic focus on the chronic 'addict' or 'alcoholic' towards opportunistic screening and brief intervention for harmful or risky cannabis use has occurred. A key ingredient of this new public health approach to early intervention for cannabis misuse is a suitable screening tool.

Chapter Three
Screening and Early Intervention (SEI):
A Public Health Paradigm

This chapter profiles *screening* including definitions, concepts, models, psychometric characteristics, and ethical criteria relevant to drug/cannabis screening. Ideal sites for opportunistic cannabis screening are discussed. The lack of suitable instrumentation for this initiative is identified.

Screening Characteristics

Definitions and Concepts

Definitional variations of 'screening' abound (e.g., Morrison, 1992; NHC, 2003; Wald, 1994; Wilson & Junger, 1968). Despite semantic disparities, screening classically refers to the identification of precursors of defects, disease, or disorders in asymptomatic (apparently well) people. Screening differs from traditional curative medicine in that it aims to identify a disorder or disease at an early stage *before* medical advice is sought, ideally at a time when that symptom or condition is reversible (Peckham & Dezateux, 1998). The process resembles a relatively unrefined sieve, designed to segregate the cohort under assessment into 'positives' who presumably have the condition, and 'negatives' who are ostensibly free of the disorder and typically not evaluated further. The true yield of screening is identification of cases who would have remained undetected without screening, or would have surfaced at a time when treatment would be less effective or more costly.

Thus, rather than a diagnostic procedure *per se*, screening is a preliminary filtering technique to identify those individuals with the highest probability of having the index disorder for subsequent specific diagnostic evaluation, the *diagnostic test* (Derogatis & Lynn, 2000; Morrison, 1992). Screening aims to identify those who may benefit from further assessment and treatment for a condition or disorder by treating it as early as possible in its natural history (Last, 1987). A critical assumption is that intervention for screen-detected disorder/disease is more effective at this pre-clinical stage than when given to those clinically diagnosed with the condition (Morrison, 1992; Peckham & Dezateux, 1998). The set of coordinated procedures for early detection and treatment of

a disorder or disease is a *screening programme*. Clearly, screening is not just an initial discrete activity, but also the sequence of events that comprise the *screening pathway* (NHC, 2003). Figure 1 depicts this complex process spanning health promotion/education, disorder/disease, detection, diagnosis, treatment/management, and long-term follow-up to determine outcomes (NHC, 2003).

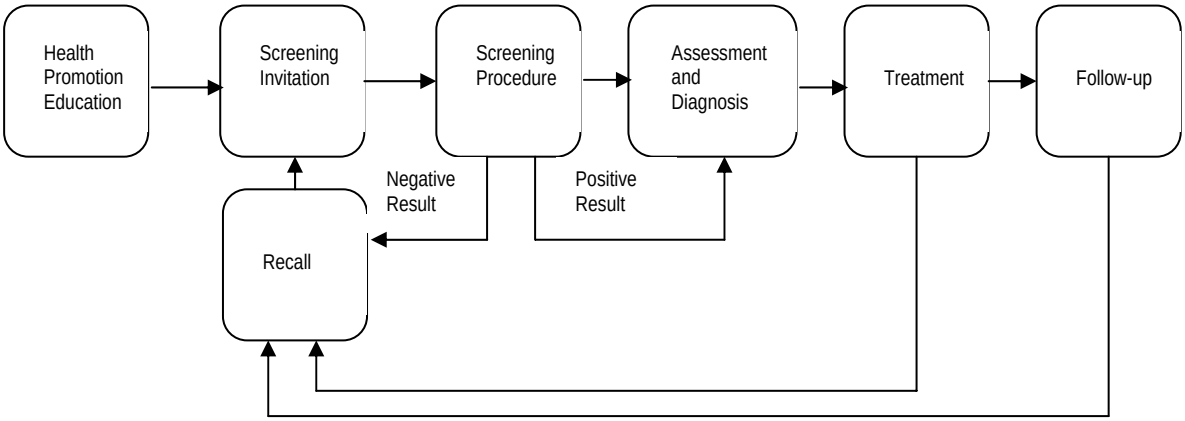


Figure 3.1. *The screening pathway (Source: adapted from MOH, 2005b, p. 2).*

Screening for Detection of Harmful and Risky Drug Use

In detection and diagnosis of drug use disorders the distinction between *screening* and *assessment* is important. Characteristics of drug use disorder screening are:

(1) Screening is a *preliminary* assessment that attempts to measure whether key or critical features of the target drug problem are present or absent in an individual.

(2) A screening test or instrument does not enable a clinical diagnosis to be made, but merely indicates the *likelihood* or *probability* that the target condition is present.

(3) Screening typically involves a discrete, time-limited event such as administration of a questionnaire, an interview, or biological test

(4) The options arising from the results of screening include:

   (a) the individual is likely to benefit from a referral for a comprehensive assessment;

   (b) more assessment is not warranted at this time; or

   (c) the screening will be repeated at a later time (Dawe, Loxton, Hides, Kavanagh, & Mattick, 2002; Winters & Zenilman, 1994).

Chapter Three
Screening and Early Intervention (SEI):
A Public Health Paradigm

Hence, the purpose of drug screening is to detect persons with *possible*, and those *at risk* of developing, drug use-related problems (Cooney, Zweben, & Fleming, 1995; Leccese & Waldron, 1994). Screening instruments are valuable tools for confirming the presence of a suspected drug use disorder when medical or psychosocial indicators are apparent or, conversely, to raise the health professional's index of suspicion in apparently asymptomatic individuals (Maly, 1993). Since the professional training required for formal diagnosis of DSM/ICD drug disorders is often lacking, non-specialist clinicians and laypersons in any health, educational, counselling, criminal justice, employment and social services setting should be able to conduct screening (Cooney et al., 1995; Dawe et al., 2002; Fleming, 2002). Screening looks at the 'big picture' so procedures are brief, restricting data collection to the minimum needed. Screening is also used in research for detection of drug use disorders in the general population. Whatever the application, screening reduces the potentially enormous cost and inconvenience of conducting full assessments of drug use problems among people without such a problem. As an entry-level filter in services planning, screening can prevent wastage of limited resources (Newman, Shrout, & Bland, 1990; Spooner et al., 1996).

By contrast, rather than a discrete one-off exercise, *assessment* is a more extensive, multidimensional, longitudinal clinical process conducted by qualified and accredited professionals, that aims to establish a diagnosis and develop an individualized treatment plan tailored to the client's presenting needs (Cooney et al., 1995; McLellan & Dembo, 1993). Assessment includes monitoring and responding to change in the individual throughout the entire span of the treatment process. This thesis is primarily concerned with preliminary *screening* for harmful and potentially harmful/risky cannabis use, referred to as 'screening' throughout.

Conceptual Models

Screening occurs through formal screening programmes, or opportunistically. Two models, which evolved in response to different health problems and generally propose different solutions for those problems, are distinguished (Safer, 1986). The traditional

approach, *case finding* or *screening for disease/disorder detection,* is to test ostensibly well individuals to identify those who have precursors or occult instances of a treatable disease. Known as 'opportunistic' screening (Sackett & Holland, 1975) conducted during a health consultation initiated by the patient for another (perhaps unrelated) reason, this procedure is primarily administered by health care professionals using history taking, physical examination, and biochemical (blood, urine, tissue) tests to classify people as either 'cases' or 'non-cases'. When applied to cannabis problems along the use/problems severity continuum, screening for disorder detection seeks to identify individuals with mild-to-moderate harmful consumption and/or more advanced physical or mental symptoms of dependence (Cooney et al., 1995; Dawe et al., 2002). The goal is to initiate an early and more successful intervention to reduce morbidity and mortality. Another variant is to identify those who are only just beginning to experience symptoms of a disorder in order to intervene to arrest progression to more serious outcomes (NHC, 2003; Safer, 1986). Target population screening for cannabis and alcohol problems among adolescents and adults (and cardiovascular disease risk factors, diabetes, various cancers) are examples of opportunistic screening activities in New Zealand (NHC, 2003).

An alternative model is known as *screening for risk reduction.* This model is based on a general 'susceptibility' or 'vulnerability' model to morbidity that involves testing asymptomatic individuals who, while not experiencing symptoms, engage in risky behaviours that can be modified to lower the probability of the particular disease developing. A continuous variable, susceptibility or vulnerability does not automatically dichotomize people into cases and non-cases (Safer, 1986). Screening for risk reduction among cannabis users, for example, attempts to identify individuals who, while not having *currently* diagnosable cannabis-related problems, use cannabis in a way that places them at risk of developing such problems (Cooney et al., 1995; Saunders & Aasland, 1987). The principal screening instrument is a self-report questionnaire, often administered by laypersons without clinical training. Cannabis users answer questions about behaviours (cannabis, other drugs and alcohol consumption) and adverse consequences (medical, psychological, interpersonal and social problems) which are all predictors of drug/cannabis use disorder. Age, gender, and other demographics are also

measured. Screening participants identified as at risk of developing cannabis use disorder or problems typically receive drug/health education and brief behaviour modification counselling to motivate and assist them to change risk-increasing behaviours.

Despite the different origins, goals, and outcomes of these screening models, the two processes differ very little in practice, and their best features are routinely combined in screening for various conditions/risk factors. Opportunistic cannabis screening would thus target detection of early (prodromal) or advanced symptoms of a cannabis use disorder, as well as asymptomatic people whose behaviour (frequent or heavy cannabis consumption) puts them at risk of, or susceptible to, developing that disorder. Intervention decisions for screen-detected cases correspond to individual scores along the problem severity continuum, ranging from relatively brief drug education and advice through to referral to specialist drug services for more intensive counselling (Hall & Swift, 2006).

Psychometric Characteristics and Principles in Screening

While several key characteristics determine the reliability and utility of a self-report screen, the principles underlying screen development are those that govern all scientific measures. Ascertaining the various types of *validity*, however, is more complex. In screening paradigms, the relationship between scores on the new cannabis screen and an external referent such as the major diagnostic systems DSM-IV and ICD-10 (the *criterion* or *'gold' standard)* is a critical aspect of criterion or predictive validity. *Criterion* or *predictive validity* or *utility* refers to the screen's ability to discriminate individuals with, or at risk of developing, the index disorder from those without, or at low risk of, the condition. In a screening context, these fundamental validity indices are respectively termed *sensitivity* and *specificity*. Correctly identified individuals with or at risk of the index disorder are referred to as *true positives*, while those accurately identified as being free of, or at low risk of, the disorder are called *true negatives.* Misidentifications are labelled *false positives* and *false negatives.* Screen scores that maximize sensitivity and specificity (*cutoffs)* can be obtained using a statistical

procedure that enables the selection of an optimal criterion threshold, Receiver Operating Characteristic (ROC; see Hanley & McNeil, 1982; Metz, 1978; Rey, Morris-Yates, & Stanislaw, 1992; Murphy et al., 1987; Somoza & Mossman, 1990, 1992).

Several further parameters affect a screen's performance. Sensitivity/specificity estimates depend heavily on criteria used to establish the criterion 'gold' standard, and thus likely to change if different criteria were used. The *base rate* (prevalence) of the disorder in the population under investigation impacts powerfully on screening results (Fowler & Austoker, 1997; Meehl & Rosen, 1955; Morrison, 1992). Other performance indicators are *positive predictive value*, the proportion of those with the clinical disorder among those who were screen-positive, and *negative predictive value*, the proportion of those without the disorder among those who screened negative (Dawe et al., 2002; Derogatis & Lynn, 2000; NHC, 2003). Application of these screening concepts to the development of an instrument to identify currently problematic and potentially problematic cannabis use will become clear throughout this thesis.

Ethical Considerations in Screening

Screening requires careful consideration of clinical, social, economic and ethical issues (Calman & Downie, 1997). The overarching principle is the Hippocratean *primum non nocere*, 'first do no harm' (Last, 1992; Fowler & Austoker, 1997). Once initiated, there is an ethical obligation to ensure the screening enterprise can deliver the potential benefits and minimize any potential harm. Failing to capitalise on opportunistic screening is an inefficient method of contact, wastes valuable and important resources, and violates ethical principles (NHC, 2003). Screening is neither neutral nor passive. Used constructively, it is a tool to improve the health of the population. Used carelessly and unprofessionally, it can harm the very individuals who need help (NHC, 2003). On the one hand, individuals who considered themselves to be healthy may, after screening, be identified as potentially ill or disordered, some ('false positives') wrongly so, which may impact negatively on the individual's general health, psychological and social wellbeing. On the other hand, false negative results may give false assurance in a

"certificate of health effect", bolstering a subjective sense of invulnerability, reinforcing unhealthy or risky behaviour, and/or evoking resistance to further check-ups or advice (Marteau, 1989, 1990).

Ethical Criteria for Screening

Most screening in New Zealand is minimal and opportunistic, occurring outside of formally evaluated programmes, hence carries considerable ethical obligations (Law, 2004; NHC, 2003). Basic WHO ethical criteria (Wilson & Junger, 1968) which represent a balanced mix of medical, ethical, economic, and democratic principles, must be satisfied. However, the landscape of preventive medicine has changed dramatically since 1968, and various modifications of the original principles have been proposed. Drawing on the conceptual frameworks of several international models, the NHC has developed specific criteria for assessing screening in the New Zealand context (see Table 1). Although ostensibly simpler than the classic version, each principle subsumes further subsets (NHC, 2003, p. 24-28). A major consideration is that, crucial to reducing existing inequalities in morbidity and mortality for Māori in New Zealand, screening initiatives must accord with the 'Partnership, Participation, Protection' principles of the Treaty of Waitangi. Accordingly, screening must be culturally responsive to, and enable participation of, Māori in the planning, promotion, and delivery of screening and intervention programmes within a Māori health framework (NHC, 2003).

Do cannabis use problems satisfy these criteria?

Chapter one identified that while satisfying most, cannabis-related disabilities do not fulfill all of the currently accepted ethical criteria for health screening activities. Relative to many medical diseases and alcohol dependence, the cannabis literature on natural history, potential harms, treatment efficacy and cost-effectiveness is only embryonic. Albeit, these ethical criteria "are not absolute", (and) "no existing or potential screening fulfils every criterion entirely" (NHC, 2003, p. 3). A medical analogy is hypertension, which like cannabis-related problems exists as a continuum, and the level of blood pressure above which treatment is necessary is imperfectly defined. Nonetheless, routine screening for elevated blood pressure and appropriate

intervention (education, behaviour modification) has proved a cost-effective way of reducing morbidity and mortality (Robson, 1998). As demonstrated conclusively in Chapter one, cannabis-related problems and disorder represent a significant and serious public health problem in their own right. Furthermore, their common co-existence with psychiatric or alcohol/other drug use disorders dramatically increases their health care liability and other associated costs. Screening for early detection to enable intervention before the pervasive morbidity associated with chronic cannabis use sets in can readily be justified on medical, economic, political, ethical and democratic/humanitarian grounds.

Table 3.1: Screening assessment criteria

WHO principles of early disease detection	**Recommended New Zealand criteria**
Condition	
The condition should be an important health problem for the individual and the community.	The condition is a suitable candidate for screening.
The natural history of the disease, from latent phase to declared disease, should be adequately understood.	
There should be a recognizable latent or early symptomatic stage.	
Test	
There should be a suitable test or examination.	There is a suitable test.
The test should be acceptable to the population.	
Treatment	
There should be an accepted treatment for patients with recognized disease.	There is an effective and accessible treatment or intervention for the condition identified through early detection.
Screening Programme	
Facilities for diagnosis and treatment should be available.	The health care system will be capable of supporting all necessary elements of the screening pathway, including diagnosis, follow-up and programme evaluation.
There should be an agreed policy on whom to treat as patients.	
Treatment at the presymptomatic, borderline stage should favourably influence its course and prognosis.	There is high quality evidence, ideally from randomized controlled trials, that a screening programme is effective in reducing mortality and morbidity.
The cost of casefinding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.	The potential benefit from the screening programme should outweigh the potential physical and psychological harm (caused by the test, diagnostic procedures, and treatment).
Casefinding should be a continuing process and not a ‘once and for all’ activity.	There is consideration of cost-benefit issues.
	There is consideration of social and ethical issues
Source: Wilson and Junger (1968).	Source: NHC (2003, p. 23).

Chapter Three
Screening and Early Intervention (SEI):
A Public Health Paradigm

Screening in Primary Health Care Services

Primary care services are the traditional pathway for delivery of most screening programmes. Discussion of lifestyle risk factors and clinical interventions to reduce harm among at risk patients are now routine (Peckham & Dezateux, 1998; Robson, 1998). With resources increasingly shifted from curative to preventive medicine, emphasis is on opportunistic, high-risk groups, and prevention screening (NHC, 2003). Both *case finding* and *risk factor* screening in health care settings is "a must" to reduce morbidity and mortality (Holland, 1997; WHO, 2002). The "new reality" is that "small shifts in some risks in the population can translate into major public health benefits" (WHO, 2002, p. 12). Ergo, as the foremost layer of the health care system, primary health is the place where "the rubber hits the road" (Ustun, 2000, p. 164).

In direct contrast to physical disorders, however, comparable efforts have not been applied to prevent onset or progression of addictive disorders (Kessler, 2000; Roche & Freeman, 2003; Ustun, 2000). This is paradoxical, given that substance use accounts for 8.9% of the global burden of disease, second only to depression (WHO, 2002). Primary health care is clearly where the most energetic efforts towards recognition and prevention of addictive disorders should be deployed (WHO, 1998).

'Primary health care' is the umbrella term for a heterogeneous set of services with operational characteristics amenable to screening activities. Foremost are accessibility and high contact rates, and a 'gatekeeper' or filter function with responsibility for coordinating health services along the continuum of care (Keleher, 2002; Roche & Freeman, 2003; Ustun, 2000). Several more specific factors render primary health care a prime locus for opportunistic cannabis problem screening and early intervention. Primary health is the *de facto* mental health care delivery system for most people, and approximately 25% of individuals seen in these settings have behavioural health problems that require intervention (Maruish, 2000; Ustun, 2000). Many of these are at risk or already experiencing drug-related problems, and typically do not consult drug treatment specialists but seek help from a primary health care provider (Copeland et al., 1999, 2001a; Fleming, 2002; Hall & Swift, 2006; MOH, 2005; Shrier et al., 2003).

Heavy drinkers/drug users consult health professionals twice as frequently as lighter drinkers and users, highlighting the screening potential in this "teachable moment" (McCormick et al., 1999; Williams, Brown, Patton, Crawford, & Touquet, 2005). Approaching the drug use problem in medical terms provides a socially acceptable context for admitting a problem, avoiding problems of stigma and labelling historically associated with attending a mental health or drug treatment clinic (Hall & Babor, 2000). Endowed with high prestige, credibility, and trust as role models for giving advice, health professionals are expected to provide preventive lifestyle advice and support (Copeland et al., 1999; Gerada, 2003; Keen, 1999; Maruish, 2000; Norman, 2001; Roche, Hotham, & Richmond, 2002). Primary health care interventions are likely to be more cost-effective than specialist treatment in terms of cost-offset such as health services utilization and long-term medical care, lost income, and lowered productivity in the workplace (Fleming, 2002; Proudfoot & Teesson, 2000; Skinner, 1987).

Screening for Cannabis Use Problems in Health and Social Services: A Public Health Model

Reduction of the prevalence of cannabis use and harms in the general population, particularly high-risk groups, and provision of appropriate interventions for those with cannabis-related problems are national priorities articulated within the strategic framework of New Zealand National Drug Policy (MOH, 1998). However, as earlier outlined, reflecting worldwide trends national surveys and other diverse indices record an *in*crease, rather than a decrease, in cannabis use over the past decade, particularly among younger cohorts. Clearly, the belief that non-medical cannabis use will be eliminated is utopian (Strang et al., 2000). The evidence converges on one inescapable reality: as elsewhere in the world, cannabis use in New Zealand is adversely affecting the health and social functioning of a large cohort of adults, young adults, adolescents and, increasingly - children.

Cannabis-related harms are expected to increase with current growth in the youth population, younger initiation, consumption trends, acceptability, availability and

'normalisation' of cannabis (MOH, 2002a, 2002b). Use is heaviest during adolescence and early adulthood, amplifying the risk of harmful acute effects, abuse and dependence in a critical time of rapid development and life transitions (AACAP, 1997; Brook et al., 2002; Fergusson et al., 2003; Hall, 1995b; Jaffe & Compton, 1997). As Spooner (1999, p. 464) warns, not all cannabis initiates will "mature out" successfully, and "simply waiting to see who will grow out of it is shirking our societal responsibility to those who are having difficulty in their maturation process". Casswell (2000) captures the dilemma:

> While we continue to debate what, if any, legislative change to the marijuana laws is needed, one thing is clear – some young New Zealanders' use of marijuana is exacerbating their lack of opportunities; it impedes their chance of educational achievement, in some cases it becomes a habit that is hard to break; and in some cases it impacts negatively on mental health. (cited in Regional Public Health, 2000, p. 9)

Anthony (2000) mounts a compelling argument for focusing intervention efforts at the early stages of drug involvement. Calling for the abandonment of traditional treatment paradigms that neglect pre-dependent drug users, he argues that:

> By applying public health perspectives and drawing upon recently obtained epidemiological evidence, we can rediscover and strengthen the rationale for 'early intervention' directed towards individuals who do not classify as cases, according to the full diagnostic criteria. By fostering clinical attention to drug users who do not meet diagnostic criteria, we create opportunities for preventing and reducing the numbers of future drug-dependent individuals. The increased risk of other psychiatric syndromes among pre-dependent drug users reinforces the argument for *earlier* rather than later clinical attention being given to these drug users. (p. 307)

Primary Health and Social Services: The "Ideal" SEI/SBI Environment

Health utilization statistics show that at least 80% of the total population consults health professionals in community organizations, with vulnerable groups such as Māori, low-income groups, and drug misusers, consulting more often (MOH, 1999). Higher contact rates are expected with the recent inauguration of Primary Health Organisations (MOH, 2005). Intervening at the point of first contact is preferable to referral because of the high rate of attrition in the referral process (Keleher, 2002). For many, merely having a health professional raise the issue of their drug misuse is sufficient to instigate a positive change in their behaviour (Grossberg, Brown, & Fleming, 2004; NHC, 1999; Williams et al., 2005). In short, "the capability of saving lives is moving to primary care" (Christie, 2001, p. 592).

The *potential* of health practitioners to reduce the prevalence of cannabis-related problems, however, contrasts sharply with current practices. Excessive cannabis users are rarely identified or referred to specialist drug treatment by health professionals (Copeland et al., 1999, 2001a; Hall & Swift, 2006; McArdle, 2004; McAvoy, Kaner, Lock, Heather, & Gilvarry, 1999; NHC, 1999). Hence, many attendees present with advanced problems. Clinical under-diagnosis may be due to inadequate training, perceived role incompatibility, skepticism about treatment effectiveness, discomfort discussing illegal drug use, time and fiscal constraints, judgmental attitude towards drug-related problems, and patient resistance (CASA, 2000; McAvoy et al., 1999; Penrose-Wall, Copeland, & Harris, 2000). Local GPs had lower self-efficacy in advice and treatment for drug problems than the international average (Adams, Powell, McCormick, & Paton-Simpson, 1997). Copeland and her associates (1999) found that while more than half of 229 cannabis users had discussed their cannabis use with their GP, only 10 were satisfied with the GP's response. More than 25% were simply told to reduce or stop use without further advice, support, or referral. Other inappropriate physician responses were: making no comment at all, problem deflation, expressing surprise that the cannabis use was, in fact, perceived as a problem, inaccurate advice on harm reduction techniques, and inappropriate referrals and prescription medicines

(Copeland et al., 1999). As Copeland asserts, "there is clearly an urgent need for GPs to be aware of the health and psychological consequences of cannabis use" (p. 541).

Like alcohol, there is likely to be high cannabis use rates among primary health consumers. Fleming (2002, p. 50) avers busy practitioners will detect more than 80% of drug users if they limit their initial screening questions to cannabis. Adolescents with respiratory problems or psychiatric symptoms should be routinely screened about their cannabis use alongside alcohol and tobacco (AACAP, 1997; Copeland et al., 1999, 2001a; Hall & Swift, 2006; Jaffe & Compton, 1997; NHC, 1999; Shrier et al., 2003). Silber's (1987a, 1987b) exploration of the ethical and moral issues inherent in a screening and surveillance approach to adolescent cannabis use provides justification for active physician intervention as a "rational" basis for a preventive public health approach.

Potential Benefits of SEI for Harmful and Potentially Harmful Cannabis Use

The potentially enormous cumulative impact of cannabis screening/early intervention on public health gains and improvements in the individual's quality of life have been agreed (see Copeland et al., 1999, 2001a, 2001b; Fleming, 2002; Hall & Swift, 2006; NHC, 1999). There is good economic argument for such a high-frequency/low-involvement intervention costing only a fraction of intensive specialist treatment with cost-effective referrals for services needed (Anthony, 2000; French et al., 2003; Hall & Swift, 2006). Case-finding, and targeted interventions at earlier stages where prognosis is more favourable, will enhance the overall efficiency and equity of health care service delivery, have a major impact on the future incidence of cannabis-related morbidity and mortality, and result in substantial savings through avoided costs in social, legal, and health service delivery systems. These include:

(a) prevention of possible cannabis-related motor vehicle or other accidents resulting in death or injury to the user and others, and the avoided costs of treatment;

(b) prevention of cannabis health-related risks to the user including respiratory problems, cognitive impairment, acute cannabis psychosis, cannabis dependence, and possible exacerbation of psychotic symptoms and schizophrenia in vulnerable persons;
(c) increased productivity in the workplace;
(d) a better educated society as a result of fewer cannabis-impaired youth;
(e) enhanced quality of life and participation in society for youth;
(f) prevention of cannabis-related harm to others including: harm to the unborn child, to interpersonal relationships, financial strain on families, harm due to violence, or passive cannabis smoking;
(g) saving in health care spending by lowering admissions for mental health treatment;
(h) prevention of cannabis-related harm among Māori and enhanced health gains for whānau/families, thereby improving health status and reducing inequity with non-Māori; and
(i) prevention of harm from the individual's contact with the legal system. Potential fiscal savings in Police and Justice activity, freeing up finite resources for other activity.

(PHG, 1996, p. 52). (For further perspectives see Dennis & McGeary, 1999; French et al., 2003; Greenblatt, 2002; Jaffe & Compton, 1997; MOH, 2002c; Monti et al., 2001; Poulton et al., 2001; Rey et al., 2002; Spooner et al., 1996).

Screening can clearly be used as a tool to improve the health and wellbeing of the whole population. The key is to maximize the potential of health contacts by implementing a brief, systematic programme for screening and early/brief intervention. The NHC (1999) provide comprehensive guidelines on screening/brief intervention in primary health settings, natural "capture" sites for early identification of problem cannabis use. Because of the proven effectiveness of early intervention, consensus is that *all* attendees in primary health care should be screened periodically and routinely (see also Brown & Fleming, 1998; Fleming, 2002; Heather, 2002; McCormick et al., 1999; MOH, 1998; IOM, 1990a, 1990b). Given the known high rates of cannabis use, everyone between the ages of 14 and 29 years "should be screened whenever they present" (NHC, 1999, p.

13). Such screening "*must* be the standard of care in medical practice" (Knight, Goodman, Pulerwitz, & DuRant, 2000, p. 953). The NHC (1999) concluded that:

> Brief intervention in primary care is *dependent on having a formal screening programme,* as the majority of substance abusers will be missed unless they show obvious signs of dependency. (emphasis added) (p. 25)

Responsibility for identification, diagnosis, intervention and management of cannabis-related problems rests with health professionals. A concerted effort *must* be made to facilitate health professionals' proficiency in proactive detection of early-stage problem cannabis use. This requires a substantial shift in attitude for many health practitioners, by tradition symptom-focused and reactive. This shift is crucial.

As a diagnostic aid, the most efficient and thoroughly investigated psychological screening procedures are self-report instruments (Maruish, 2000). Screening questionnaires are also the most acceptable, clinically viable, rapid and efficient method for assisting in detection of problem drug users (Babor & Higgins-Biddle, 2000; Dawe et al., 2002). Little research attention, however, has been devoted to the development of a suitable cannabis-*specific* screen with adequate psychometric properties for use in generalist health and social services. Given the rising consumption of cannabis in New Zealand, its relatively unique history and status among recreational drugs in our culture, the nature and scale of use-related problems signaling increased societal morbidity, the persisting dearth of empirical investigation in this critical area is a paradox. Given the illness prevention and *harm minimization* philosophy of both the National Drug Strategy and Mental Health and Addiction Action Plan, lack of a cannabis screen to assist in routine detection of cannabis-related problems and those at risk is a major barrier to implementing a screening/early intervention strategy (MOH, 1998, p. 46; MOH, 2005a). Building on the developing rationale for the empirical aims of this thesis, the following chapter reviews historical approaches to, and recent developments in, screening for cannabis use problems.

CHAPTER FOUR

SCREENING FOR HARMFUL AND POTENTIALLY HARMFUL CANNABIS USE

Several different techniques exist for alcohol and other drug (AOD) screening. Each has limitations. Demand generated by the 'new public health' approach for brief screening tools in primary health settings triggered an explosion of SEI/SBI research for alcohol dependence and smoking cessation. Equivalent efforts, paradoxically, have not been invested into illicit drug screens, cannabis in particular (Dawe et al., 2002; Hall & Swift, 2006; McPherson & Hersch, 2000). Existing generic drug screens are inadequate for opportunistic cannabis screening (Aarons, Brown, Stice, & Coe, 2001; Alexander, 2003; McCambridge et al., 2003). Among the sparse literature redressing the historical void in cannabis-*specific* tools, the few new screens lack utility for universal application across demographic, problem severity, and setting spectra. This chapter clarifies the current status in screening tools available to assist generalist health professionals opportunistically detect both harmful, and potentially harmful, cannabis use.

The first section reviews historical methods and shortcomings of AOD screening, outlining the advantages of, and issues in, self-report procedures. As a blueprint for the brief cannabis screen, development and characteristics of the alcohol AUDIT are discussed. An outline of the inadequacies of generic drug screens for cannabis is followed by review of historical assessment of cannabis use problems, featuring recent development and limitations of cannabis-specific screening tools. Finally, current research aims, objectives, and empirical questions preface an outline of organization of this thesis.

Chapter Four
Screening For Harmful And Potentially Harmful Cannabis Use

Drug Screening Procedures and Technology

'Drug screening' is an umbrella term encompassing a broad spectrum of diverse techniques and procedures. The early identification of persons with potentially harmful alcohol consumption, for example, has variously utilized: self- or interviewer-administered psychosocial questionnaires; quantity/frequency (Q/F) drinking scales; clinical examinations to detect cardinal physical stigmata; medical history; liver function tests, mean corpuscular volume, or carbohydrate-deficient transferrin; blood, urine, and breath alcohol analyses to confirm recent heavy alcohol consumption and estimate blood alcohol concentration (Dawe et al., 2002).

Considerably fewer instruments exist for drug screening (Dawe et al., 2002; McPherson & Hersch, 2000; Roche & Freeman, 2003; Winters & Zenilman, 1994; WHO ASSIST Working Group, 2002). Recent technological advances have produced an array of increasingly sophisticated standardized interviews and questionnaires, physical examination, biochemical tests, and radiological techniques (Wolff et al., 1999). When used alone, however, all of these screening or diagnostic procedures are subject to their own particular threats to validity (Dawe et al., 2002; Nathan, 1996; Wolff et al., 1999). The following brief review of these procedures will illustrate their various strengths and weaknesses, using cannabis as the referent.

Practical and Technological Limitations of Drug Screening Procedures

Clinical examination

Although over-represented in primary health care settings, up to 90% of AOD misuse problems remain undetected by health professionals (Brown & Fleming, 1998; CASA, 2000; McPherson & Hersch, 2000; Roche et al., 2002). Unlike the somatic and often overt symptoms of alcohol abuse, identification of harmful and potentially harmful cannabis use presents a diagnostic challenge. Obstacles include denial or non-disclosure of cannabis use; no clear constellation of early signs specific to cannabis abuse; wide inter-individual variation in cannabis effects; likely distortion in subjective appraisal of related consequences; concurrent use of other drugs; fear of legal repercussions of

disclosure of illicit drug use, and difficulties in quantifying cannabis use. There *are* no guidelines on how to assess or differentiate dependent, harmful or at risk cannabis use (Carroll, 1995; Dennis et al., 2002b; Nathan, 1996; Roffman & Stephens, 1993; Swift et al., 1998a). Thus, cannabis problems may go undetected if less obvious physical symptoms (drug paraphernalia, trauma/accident history, disrupted sleep patterns, gastrointestinal disturbance, weight loss, poor nutritional intake, poor hygiene, respiratory infections/problems) and mental health symptoms (low self-esteem, restlessness and agitation, anger problems, anxiety and depression, suicidal ideation, unusual fears, memory deficits, difficulties in thinking and expressing thoughts, hallucinations or paranoia) are not routinely assessed (Carroll, 1995; Cottler & Compton, 1993). Those screening adolescents should be sensitive to "red flags" of serious cannabis-related problems (AACAP, 1997; McLellan & Dembo, 1993). "Red flags" include physical or sexual abuse; suicide attempts or other self-harm; parental drug abuse, dysfunctional family relationships; affiliation with delinquent peer group, social alienation, poor school/work attendance or performance; truancy, criminal offending, unprotected sex or other high-risk behaviours; and legal problems (AACAP, 1997; McLellan & Dembo, 1993; Monti et al., 2001; Spooner at al., 1996).

In sum, error and unreliability will seriously reduce the sensitivity of clinical examinations reliant on observation and medical history. Since clinically detectable symptoms tend to occur relatively late in the evolution of AOD problems, these procedures are unlikely to detect early-stage cannabis problems. A major practical limitation is that clinical screening requires the involvement of a primary health care practitioner.

Biochemical measures

Modern biochemical indicators of AOD use include urine, blood/plasma, scalp hair, saliva, fingernails, breath, tears, sweat, breast milk and meconium (Mura, Klintz, Papet, Ruesch, & Piriou, 1999; Wolff et al., 1999). Although less susceptible to many distortions, demand characteristics or biases associated with self-reports, these biological markers of cannabis use are *not* infallible (Carroll, 1995; Wolff et al., 1999). THC metabolites disappear rapidly from the bloodstream. After about 20 minutes, long

before the ‘high’ state has ended, no detectable metabolites remain. Laboratory error, misinterpretation, contamination, rapid decay, accidental or intentional donor dilution, adulteration or substitution of a freshly-voided sample, passive cannabis exposure, or concurrent use of other substances - all affect the accuracy of blood and urine tests (AACAP, 1997; Buchan, Dennis, Tims, & Diamond, 2002; Wolff et al., 1999).

Laboratory detection of targeted substances is complex, dependent on dose and pharmacokinetics of the drug ingested (Dawe et al., 2002; Wolff et al, 1999). Since drugs metabolise at different rates, urine testing cannot be used to determine dosage, time or route of administration, extent of drug effects in the user, or distinguish chronic from single dosing (Dawe et al., 2002; Kapur, 1993; Wolff et al., 1999). The biological half-life of lipophilic THC creates substantial individual variability in absorption, distribution, and elimination kinetics. Complete elimination of a single dose from urinary fuids might take more than 30 days (Adams & Martin, 1996; Buchan et al., 2002; Dawe et al., 2002). Repeated use results in accumulation of THC and its metabolites in the body, detectable up to 42 (and recorded up to 77) days after cessation of chronic, heavy intake (Vereby & Buchan, 1997; Wolff et al., 1999). A positive result could occur in a chronic heavy user who quit several weeks ago or a non-user with recent passive exposure to cannabis smoke (Hayden, 1991; Heustis & Cone, 1998; Wolff et al., 1999). However, although urinary cannabinoids cannot be used to reliably predict the recency of ingestion, semi-quantitative analysis can be used to monitor the fluctuations of urinary THC concentration over time, and serve to verify respondents’ self-reports (AACAP, 1997; Yacoubian, 2000).

Typically detecting recent (2-3 days) drug use, most biological measures provide no information on the severity of the underlying clinical syndrome or the cumulative effects of drug use (Carroll, 1995; Nathan, 1996; Saunders, Aasland, Amunsden, & Grant, 1993). Their low-to-moderate sensitivities and specificities for detecting drug dependants clearly limits their ability to identify at-risk and harmful drug use (Bohn, Babor, & Kranzler, 1995; Nathan, 1996; Poikolainen, 1999; Saunders et al., 1993). The mere presence of urinary or plasma cannabinoids does *not necessarily* indicate a pattern of dependent, harmful, or risky use (Carroll, 1995; Cone & Johnson, 1986; James &

Moore, 1999; Riley, Lu, & Thylor, 2000; Schwartz, 1988). Given their inability to provide information on the negative psychological, occupational, social and physical consequences of drug use, urine assay results should not be viewed as the definitive 'gold' standard to determine either recent or problematic cannabis use (Fals-Stewart, O'Farrell, Freitas, McFarlin, & Rutigliano, 2000; Heustis & Cone, 1998).

Major drawbacks of biological screens include high cost of laboratory equipment, expertise needed for results interpretation, and the invasiveness of some tests (Buchan et al., 2002; Fals-Stewart et al., 2000; WHOAWG, 2002). For urine, standard laboratory procedure involves an initial qualitative (positive/negative) screen test followed by quantitative confirmation. Commonly used qualitative screens (e.g., EMIT, homogeneous enzyme immunoassay) are generally reliable and valid, but unless confirmed with quantitative analysis, can yield false-positive results (Wolff et al., 1999). The most sophisticated 'gold' standard confirmatory technique available for routine urine screening is gas chromatography coupled to mass spectrometry (GC-MS). GC-MS is, however, an expensive procedure. Results are usually not available for at least 48 hours, which is an obvious barrier for rapid primary health care screening (Buchan et al., 2002; Saunders & Aasland, 1987). On-site use of self-contained cannabis testing kits requires clinical interpretation of laboratory values, a highly specialized task (Wolff et al., 1999). Finally, the full potential of most innovative techniques (hair analysis, sweat, saliva and breath tests) for cannabis screening is not yet known (United Nations, 1998; Wolff et al., 1999) and their cost is currently prohibitive for routine use.

Urine currently remains the preferred, most reliable biological fluid for the routine analysis of illicit drugs and their metabolites (Wolff et al., 1999). Its many advantages include: ease of collection, little preparation required, ability to be monitored for adulteration; comparative non-invasiveness, acceptability, cost-efficiency; and corroborative utility for self-reports (AACAP, 1997; Buchan et al., 2002; Wolff et al., 1999). Despite proliferation and sophistication of biological tools for drug use screening, however, accurate interpretation of laboratory findings requires other contextual information, and urine toxicology is more appropriately used in an adjunct

role. To date, no laboratory test *in itself* provides adequate information for discriminating problematic from nonproblematic cannabis use (Fals-Stewart et al., 2000; Fleming, 2002; Wolff et al., 1999).

Collateral information

Collateral reports from a spouse, family member, friend or coworker are relatively inexpensive, flexible, less invasive, and usually better than biological measures for collecting information on continuous outcomes and historical information. Collateral reports do, however, present their own limitations (see Babor et al., 2002; Carey & Simons, 2000; Del Boca & Noll, 2000). These include: recruitment difficulties, and lack of collateral informants to provide reports; lack of independence of collateral report from the drug user's own report; collaterals having limited opportunity to directly observe the drug-using behaviour; collaterals "punishing" respondents by reporting higher levels of consumption than they actually observe; collaterals being drug users themselves (issues of accuracy, cooperation, or collusion); and the inability of collateral to independently observe small behavioural changes over time. Ultimately, collateral data rarely provides any more information than that provided by drug users themselves (Carey & Simons, 2000).

Self-report approaches

Undoubtedly, self-report methods have become the dominant means for collecting drug use information (Babor & Del Boca, 1992; Dennis et al., 2000). As yet, no single questionnaire has been universally adopted by the drug field (McPherson & Hersch, 2000; Sobell, Kwan, & Sobell, 1995). The most common screening questions used by health professionals focus on quantity/frequency of drinking and drug use (Dawe et al., 2002).

(A) Quantity/Frequency (Q/F) scales

Consumption information is an indispensable component of any screen, and frequency of use "the best single indicator of drug use involvement" (Clark, Pollock, Mezzich, Cornelius, & Martin, 2001, p. 16). Individuals are typically asked, "On average, how many days per week do you drink/use drugs? On a typical day when you drink/use

drugs, how much do you use?" Quick and easy to administer, Q/F scales have much to commend them (Fleming, 2002). Compared to detailed calendar-type methods recording daily substance use over a targeted time interval, however, Q/F scales are less precise (Sobell & Sobell, 1992). Limitations in obtaining cannabis consumption information only include:

(a) no existing guidelines on, or even the ability to determine, what constitutes a robust 'standard' measure/unit of cannabis;
(b) no consensus about cannabis consumption levels above which intake is hazardous or risky. 'Safe' drug consumption levels or standards are subject to perennial debate;
(c) substantially different individual outcomes at similar consumption levels;
(d) unknown threshold use level or pattern for development of dependence;
(e) an assumption of stable consumption patterns and no information on fluctuations and atypical periods, such as episodic "binge" use, which is often indicative of early stages of problem use;
(f) no indication of respondents' concern about their own consumption;
(g) provides no information about drug-related medical and psychosocial problems;
(h) unacceptably low sensitivities as screening procedures for low-level misuse; and
(i) reliability and validity issues common to *all* self-reported health data (APA, 1994, 2000; Dawe et al., 2002; Maly, 1993; Saunders et al., 1993).

Measuring levels of drug use other than alcohol and tobacco is challenging (Carroll, 1995; Sobell et al., 1995). First, most drugs are illicit - a feature which could discourage honest reporting of their use. Second, since the purity (strength) of drugs varies considerably, the actual intake of illicit substances is extremely difficult to quantify (Sobell et al., 1995). THC concentration in cannabis varies substantially (Hall & Swift, 2000). The variability within common street units (such as the 'tinny', 'bag', 'blunt', 'joint', 'cone', 'bullet') is too high to render them useful for research or ituations requiring precision. These units may include varying mixes of tobacco. Further measurement problems derive from frequent sharing of cannabis (Hall & Swift, 2000). Third, route of administration (e.g., smoking, spotting, eating) affects THC delivery, thus speed of effect onset. There *is* no standard method of intake (Clark et al., 2001;

Hall & Swift, 2000). Besides considerable individual vulnerability to its effects, various other factors (purity, plant strain, cultivation, product used, amount, potency, administration route, titration, degree of intoxication sought and attained, and so on) determine THC bioavailability (Adams & Martin, 1996; Hall & Swift, 2000; Stephens et al., 2002).

Thus, in stark contrast to the marked dose-response curves and ethanol-proof data in alcohol measurement, quantification of historical cannabis use is far less amenable to standardisation/estimation (APA, 2000; Hall & Swift, 2000; Stephens et al., 2002). The assumption that 'cannabis use = cannabis problems' is patently erroneous. Currently, cannabis consumption patterns and levels unequivocally associated with negative consequences are unknown (Kandel & Chen, 2000). While there is consensus that "heavy" cannabis use can be harmful or risky, terms such as "experimental" "heavy" or "frequent" use differ across studies, or are often not clearly defined (Earlywine, 2002; Kandel & Chen, 2000; Matt & Wilson, 1994; Zimmer & Morgan, 1997a, 1997b). Frequent use, moreover, "is not a necessary condition for the development of dependence symptoms" (Dennis et al., 2002a, p. 6). Thus, while consumption information must always be included in drug screening, clinical efficiency and utility is enhanced by administration of brief standardised screening instruments in which self-reported consumption is just one of the measures. Such a screening procedure is less threatening for the cannabis user, increasing the likelihood of eliciting reliable, valid information about drug use and attendant problems (Dawe et al., 2002; Del Boca & Noll, 2000; Dennis et al., 2000; Fleming, 2002; NHC, 1999).

(B) Standardised screening questionnaires

Standardised, self-administered computerized or paper-and-pencil questionnaires and clinical or nonclinical structured interviews have decided advantages over laboratory tests and clinical examination procedures with regard to cost and time consumption, acceptability, intrusiveness, level of administration and interpretive skill required. These procedures are also flexible, sensitive, potentially more comprehensive and clinically useful (Babor & Higgins-Biddle, 2000; Carroll, 1995; Dawe et al., 2002; WHOAWG, 2002). Important features are a high response rate, accurate sampling, and automatic

elimination of requirement for training and inter-rater reliability studies. Interviewer bias, which can enter the lengthy unstructured interview situation, is removed or greatly reduced by administration of short, standardised questionnaires with scoring guides or templates requiring minimal interpretation (Carroll, 1995; Dawe et al., 2002).

Self-report methods, however, rely on respondent veracity. Invalid response tendencies, including 'faking good', 'faking bad', inattention, and careless or random responding may be due to intentional efforts by the subject to manipulate the impression they wish to make upon others, or may be associated with lack of insight, defensiveness, poor attention, cognitive or reading deficits (Del Boca & Noll, 2000; Winters et al., 1991). A brief review of these issues follows.

Reliability and validity of self-reported cannabis use

Reliability and validity of self-reports in drug research has evoked vigorous debate (see Babor & Del Boca, 1992; Del Boca & Noll, 2000; Dawe et al., 2002). The negative pole is exemplified thus: "Substance abuse characteristics are unmatched by those of most other diseases. Denial, deception, and distortion are its handmaidens" (Schwartz & Wirtz, 1990, p. 38). Contradicting such (extremist) claims, comprehensive reviews of the reliability and validity of self-reported drug use among adults (e.g., Maisto, McKay & Connors, 1990; Spooner & Flaherty, 1992) found these generally reliable and valid, with greater consistency found for cannabis than other drug classes (see Darke, 1998, for more comprehensive review). Self-reported adolescent cannabis use is also generally reliable (Dennis et al., 2002b; Gignac et al., 2005; Lynskey, Fergusson, & Horwood, 1998).

Nonetheless, self-reported drug use cannot be uncritically accepted. The obvious intent of the questions in brief, simple self-report instruments renders them vulnerable to deliberate falsification or denial (Nathan, 1996). Mixed messages from ongoing legal, medical, clinical and scientific controversy about potential cannabis-related harm confuse public perceptions of risks involved (Hall, 1999; Hall & Solowij, 1998). Cannabis users tend to view their use as harmless and congruent with their lifestyle, have little interest in quitting, or lack motivation to accurately recall their use patterns or

problems (Buchan et al., 2002; Frances, First, & Pincus, 1995). While immaturity or lack of insight can interfere with an adolescent's ability or motivation to introspect objectively, normal adolescence attributes (e.g., anti-authoritarianism, defiance) can curb motivation to cooperate, especially when under coercion to disclose (Spooner et al., 1996). Adolescents are less likely to report cannabis use if their parents are present, but more likely if friends or peers are present (Reid et al., 2000).

Denial and other response biases can impact on drug use recall, especially when respondents perceive response-contingent repercussions (Del Boca & Noll, 2000; Finch & Strang, 1998; Nathan, 1996). Illicit drug users face strong disincentives to divulge drug use, especially under circumstances of legal entanglement (arrests, probation, parole, intoxicated driving) (Buchan et al., 2002; Morral, McCaffrey, & Iguchi, 2000; Spooner & Flaherty, 1992). Under-reporting cannabis use may not be confined to users (Struve et al., 2000). In this study, after 8 weeks of intensive assessment including bi-weekly urine screens, 20% current users *and* presumptive non-user controls had deliberately falsified reports of their cannabis use. Mieczkowski and associates (1998) found, however, that while arrestees' urine and hair bioassays indicated significantly more drug use than predicated by self-reports…"if youth *do* admit to drug use, it is likely to be marijuana use as opposed to any other drug" (p. 1565).

Not surprisingly, validity of self-reported drug use is biased by the assessment context (a job application, jail, treatment entry, a research interview, the presence of peers or parents), interviewer characteristics, and perceived threat to confidentiality (Finch & Strang, 1998; Matt & Wilson, 1994). The bias direction, however, is not consistent by context. Contrary to popular belief, evidence suggests that individuals are more likely to *over*-report than under-report drug use (Dawe et al., 2002). In contrast to Struve (2000), over-reporting occurred in an AIDS outreach study where access to treatment was limited to users (Dennis et al., 2000). Several other studies found self-reported cannabis use generally valid, detecting more use than rigorous laboratory tests, on-site qualitative tests, and collateral reports (e.g., Babor et al., 2002; Buchan et al., 2002; Darke, 1998; Dennis et al., 2002b; Stephens et al., 2002; Swift et al., 1998b). Research specifically designed to evaluate this issue (Buchan et al., 2002) found disagreements went both

ways. When validated against the gas chromatography/mass spectrometry (GC/MS; 'gold' standard) technique, however, self-reported past month cannabis use among 12-18 year-old adolescents was always higher than the GC/MS findings. Conclusions were that given (1) that both self-report and laboratory measures have their own unique sources of error, and (2) the many considerations in the metabolism and excretion of cannabis (window of detection), these findings highlight the advantages of collecting multiple sources of consumption data. False positives in laboratory tests are often an artifact of decomposing metabolites (Buchan et al., 2002; Dennis et al., 2002b). Similar results emerged from another adolescent study (Akinci, Tarter & Kirisci, 2001) in which 13% (n=200) inaccurately reported cannabis use, with most discrepancy explained by over-reporting. A recent adolescent study (n=207) found that 97% youth directly reporting no past month use in a structured interview obtained a negative urine, while 79% who endorsed cannabis abuse/dependence had a positive urine screen. Toxicology screens and parental reports were less sensitive and specific (Gignac et al., 2005).

A study specifically designed to assess the validity of self-reported cannabis among polydrug users (Martin, Wilkinson, & Kapur, 1988) provided "strong evidence of the validity of self-reported cannabis use" (p. 149). In appropriate conditions (assurance of confidentiality, no fear of repercussions from disclosing drug consumption) multiple drug users do give valid self-reports, at least for cannabis use (Martin et al., 1988). Self-reported cannabis use was independently verified by urinalysis and collateral reports in a clinical trial for treatment of cannabis dependence in the United States (Babor et al., 2002), among Australian adolescents by correlating laboratory urine reports with self-reports (Copeland et al., 2001a; Martin et al., 2005), and in observational research among Australian long-term cannabis users (Swift et al., 1998b, 2000). Overall concordance was very high across these diverse contexts. Most discordance was due to either participant over-reporting or inadequate sensitivity of the screening test, prompting the conclusion that cannabis users do not systematically underreport their cannabis use (Babor et al., 2002; Swift et al., 1998a, 2000). High agreement between baseline and 10-year retrospective accounts of cannabis use among a general population sample was reported (Shillington, Cottler, Mager, & Compton, 1995). Cannabis had the

highest agreement rates of all drugs (86% lifetime use and 99.5% age of onset). Given the 10-year interval, this "highly accurate recall history" for an illicit drug was "particularly remarkable" (p. 106). Finally, among a New Zealand clinical sample of cannabis users assured of confidentiality and anonymity, Bashford (2000) reported both pre- and post-treatment coefficients between self-reported cannabis use and laboratory verifiers. The close correspondence between these measures provided strong support for the validity of these polydrug users' cannabis accounts.

This brief review clarifies that, rather than an either/or phenomenon, validity of self-reported cannabis use is context-dependent, varying with the data collection method and respondent characteristics. Factors impacting on reliability and accuracy of self-reports include:

(a) respondent characteristics such as intelligence, cognitive deficits, and motivation. Large doses of cannabis, for example, can impair cognitive abilities related to recall or processing information (see Solowij, 1998, 1999);
(b) recency of substance use. Acute intoxication, chronic substance effects, and withdrawal states may affect the reliability and validity of data;
(c) type of drug use studied, whether it is illegal or socially undesirable;
(d) social context of the data collection process;
(e) perceived threat, and the respondent's understanding of the contingencies that operate within a particular setting;
(f) type and precision of information sought and specificity of the validation criteria;
(g) use of corroborating sources such as biological markers or collateral informants;
(h) time window/length of the interval between the substance use and retrospective assessment; and
(i) various task variables, such as complexity and duration of the task (instrument layout/clarity of wording and instructions), collection of information in face-to-face interview (including interviewer characteristics), demand characteristics of the task situation (e.g., clinical interview vs. research evaluation) or self-report through a questionnaire (perceived confidentiality and/or anonymity) (Babor & Del Boca, 1992; Carroll, 1995; Del Boca & Noll, 2000; Lessler, 1995; Midanik, 1988; Schwarz, 1999).

Clearly, the important question is: *what conditions* produce reliable and valid information for a given purpose (Babor & Del Boca, 1992). Self-reported drug use and related consequences are generally reliable and valid when respondents are assured of confidentiality and/or anonymity, trust and safety in non-coercive contexts. Drug use questions will be less threatening, thus likely to produce more frank responses, when embedded in a general health interview (Babor & Higgins-Biddle, 2000; Del Boca & Noll, 2000; NHC, 1999). Recall accuracy can be enhanced by carefully designed questions pertaining to recent rather than typical or distant behaviour seeking broad categorical responses rather than exact, continuous data. Memory errors and response distortion are minimized by use of skilful interviewer probes, memory aids, better instructions (specific rather than global questions) and aided recall, such as fixed-response choices. Exemplifying such procedures is the Timeline Follow-back (TLFB; Sobell & Sobell, 1992), a technique maximizing precision of retrospective recall of drug consumption for periods up to 12 months. This well-validated procedure was used in the current research.

Advantages of standardised self-report drug screening questionnaires

Self-report "continues to be the richest and probably most useful source of data for health research" (Dennis et al., 2000, p. S294). Despite some limitations, self-reported drug screening questionnaires provide the most time- and cost- efficient, consumer-friendly way to identify people at risk (Babor & Higgins-Biddle, 2000; Carroll, 1995; Del Boca & Noll, 2000; Skinner, 1986; Spooner et al., 1996). Amenable to actuarial methods of scoring and interpretation, this genre is "by far the best approach available" (Nunnally, 1978, p. 141). Ergo, self-reports are "the blood and guts of a clinical diagnosis" (Seligman, 1995, p. 972) in that:

(1) they derive from the individual who is the "expert" and the most potentially credible repository of factual information on his or her own behaviour or situation;

(2) clinical observers cannot be party to such subjective experience, and are constrained to reporting ostensible versions based on behaviour and verbal reports. Drug users' self-reports, as in any other health area, are crucial for diagnostic assessment, treatment planning and outcomes evaluation;

(3) no data source is totally error-free (Seligman, 1995); and

(4) from an economic imperative rationalizing limited health resources, currently there *is* no economically feasible or acceptable alternative (Carroll, 1995; Dennis et al., 2002b; Fleming, 2002; Sobell et al., 1995).

Benefits of self-report procedures include flexibility, adaptability, low cost, and efficiency. They are highly portable, often exportable among similar cultures, and can be administered via telephone, computer, and even television (Del Boca & Noll, 2000). Clinicians are constantly under time pressure, and there is demand for very short screening questionnaires (Degenhardt et al., 2001; Fleming, 2002). Screening instruments need to be brief, simple, reasonably innocuous, easily understood by the client, easily scored by the clinician, and provide sufficiently reliable information to enable the clinician to rapidly decide whether further assessment and intervention is required (Dawe et al., 2002).

The most effective mode of administration to maximize accuracy of self-report data is debated, but no differences in sensitivity and specificity between pencil-and-paper or computerized brief drug screens in primary care samples have been reported (Barry and Fleming, 1990; Chan-Pensley, 1999). Proponents claim computerized administration to be time-and cost-efficient for drug screening in community settings, optimal for engaging younger respondents, promoting more accurate reporting of illicit and sensitive matters (Fleming, 2002; Lessler & O'Reilly, 1997; Turner et al., 1998). Computerized screening has several limitations for self-reports, however, including lack of universal access to computer technology and level of technological and literacy skills required. Even today, sizeable segments of the population lack adequate reading skills and/or basic computer literacy. Arguably, this deficit is more pronounced among marginalized subgroups such as older people, those of lower socioeconomic status, some ethnic minorities, those with comorbid psychiatric, intellectual, learning, neurological or some physical disabilities, and commonly illicit drug users.

Chapter Four
Screening For Harmful And Potentially Harmful Cannabis Use

Summary

No ‘gold’ standard for drug use screening exists, and each procedure has its own merit and application under suitable conditions. Where possible self-report instruments should be triangulated, using objective techniques such as biochemical tests to enhance diagnostic or predictive sensitivity. The critical importance of early detection and intervention demands that preliminary screening procedures are quick, efficient, and oversensitive to possible drug use problems (Fleming, 2002; McLellan & Dembo, 1993). As reiterated throughout this paper, while sensitivity (true positives) and specificity (true negatives) are both important screen characteristics, from a public health viewpoint sensitivity is paramount. Any screen designed to maximize detection of true positives can be expected to generate some classification errors (Degenhardt et al., 2001). While most self-report screens work well in clinical settings where the prevalence of the disorder is high, their accuracy declines among the general population where base rates are much lower (Derogatis & Lyn, 2000). However, misclassification has very different consequences in different settings (Dawe et al., 2002). From a public health perspective, missing a potential or actual cannabis misuser/abuser can ultimately have considerably more negative repercussions than pinpointing a person who turns out later to be neither disordered nor at risk. When embedded within a continuum of ethically sound assessment activities that ensure sensitive and direct follow-through, it is better to cast a wide net initially for maximum detection and then eliminate the inevitable false-positives through diagnostic assessment. Any screening procedure *must* be promptly followed by confirmation of ‘cases’ (those scoring in the clinical range) to eliminate false-positives.

Chapter Four
Screening For Harmful And Potentially Harmful Cannabis Use

Self-Report Screening Instruments

Brief Alcohol Screens

A number of brief self-report screens are available to help identify problem drinkers. Prominent among those validated for use in primary health care environments are the 4-item CAGE (Ewing, 1984), the 24-item Michigan Alcoholism Screening Test (MAST; Selzer, 1971) and its subsets: the 13-item short MAST (SMAST) the 10-item brief MAST (BMAST). The T-ACE (Sokol, Martier, & Ager, 1989) and TWEAK (Russell, 1994) were specifically designed to identify at-risk drinking in pregnant women. The utility of these devices has been found to vary across the target population (clinical, general, pregnant, gender, ethnicity, adolescent, elderly), and the type of problematic drinking under investigation (severely dependent, harmful or abuse, hazardous/at risk) (see Dawe et al., 2002, for review).

However, these screens were developed in a period when the disease concept of alcohol and drug dependence prevailed. While typically identifying clinical alcoholic dependence they detect only 30-60% of currently problematic or at-risk drinkers, the appropriate target for a screening/early intervention approach (Babor & Higgins-Biddle, 2000; McPherson & Hersch, 2000; MOH, 1998; Nilssen & Cone, 1994; Saunders et al., 1993). Questions in the lifetime framework (“have you ever…?”) provide little information beyond that the individual *has* used drugs or alcohol - sometime in the past (WHOAWG, 2002). Case identification is more difficult when the point of attempted detection is earlier stages of excessive drinking or drug use, as significant physical and mental health consequences may not yet have developed (Saunders & Aasland, 1987). Moreover, with regard to problem detection, consumption-based indicators such as quantity/frequency of intake and ‘binge’ drinking/using patterns are indispensable components of any drug screen (Dawe et al., 2002). Absence of this vital information is a major deficiency of the above-listed screens. A fundamental limitation of these (and other) alcohol screens, however, is that few were developed *specifically for* primary health care settings (McPherson & Hersch, 2000; Saunders et al., 1993).

More recently, as part of an international collaborative programme on early intervention the Alcohol Use Disorders Identification Test (AUDIT; Saunders & Aasland, 1987; Saunders et al., 1993) was systematically developed to represent a new approach to screening for alcohol risk groups. Emphasizing early detection of a broader clinical spectrum of alcohol-related disorders, problems and disabilities, the AUDIT is now the most extensively researched screening test in the alcohol and drug field (Reinert & Allen, 2002).

The Alcohol Use Disorders Identification Test (AUDIT)

The AUDIT was devised by WHO-affiliated investigators as a brief screening device (Saunders & Aasland, 1987; Saunders et al., 1993). It consists of two screening instruments: a 10-item Core questionnaire and an optional supplement, the Clinical Screening Instrument (CSI), which assesses three distinct factors (trauma history, abnormal physical examination findings, and blood GGT level) reflective of alcohol-related physical effects. Each instrument is comprised of items selected following factor analysis of results from a comprehensive assessment procedure devised by the collaborative group in conjunction with WHO advisers. This assessment covered socio-demographic variables, presenting conditions, current symptomatology, past medical history, alcohol consumption, other substance use, diet, drinking behaviour, psychological reactions to alcohol, alcohol-related problems, family history of alcoholism, and self-perception of an alcohol problem (Saunders & Aasland, 1987).

In the initial development stage, subjects aged at least 18 years were recruited from among health clinic attendees in six culturally diverse countries (Australia, Bulgaria, Kenya, Mexico, Norway and the USA), and classified as either ‘non drinkers’, ‘drinking patients’ or known ‘alcoholics’ from responses to a structured interview. The final sample comprised 678 (36%) drinkers, 913 (48%) drinking patients, and 297 (16%) alcoholics. A clinical examination followed administration of the interview schedule, and blood samples were taken. The non-drinkers and alcoholics were used as reference groups for instrument validation only (Saunders & Aasland, 1987; Saunders et al., 1993).

Chapter Four
Screening For Harmful And Potentially Harmful Cannabis Use

Given the absence of internationally agreed criteria for high risk or 'hazardous' drinking, several reference standards were devised to enable calculation of interim sensitivity and specificity of the AUDIT (Saunders & Aasland, 1987; Saunders et al., 1993). Based on the level of consumption or harm above which intervention was judged to be preferable to no intervention, these were: (1) 'hazardous' alcohol consumption, defined as a typical daily intake of >60g male and >40g female, or 'recurrent intoxication'; (2) dependence symptoms, defined as a positive response to at least one ICD-10 diagnostic criterion for alcohol dependence; (3) alcohol-related problems in the past year, defined as a positive response to any one of the five questions on physical or psychosocial consequences; (4) a combined index, defined as a summation of all of the evidence of harmful or hazardous alcohol consumption from the dataset; and (5) positive classification within known groups of alcoholics or abstainers. The first four conditions were used to determine the maximal cut-points.

The AUDIT's performance was examined in two ways. Firstly, cut-off values were examined by receiver operating characteristic (ROC) analysis to identify the point(s) of maximal sensitivity and specificity with respect to hazardous and harmful alcohol use. The sensitivity of the final instrument for detecting known alcoholics (external reference group) was then determined (Saunders & Aasland, 1987). Two cut-off points (8 and 10) were identified, which resulted in maximal sensitivity and specificity for hazardous and harmful alcohol consumption across the six samples. At the lower cut-off point, sensitivity was 92% and specificity 93%. At the cut-off point of 10 sensitivity was lower (80%), while specificity was correspondingly higher (98%). Both were higher in men than women (Saunders & Aasland, 1987; Saunders et al., 1993). Among the alcoholics, 99% had a score of 8 or more, 98% a score of 10 or more, and all scored 10 or more when those who were currently abstinent were excluded (Saunders & Aasland, 1987; Saunders et al., 1993). By comparison, the clinical procedure (physical examination and laboratory tests) performed relatively poorly.

Selection of items for the provisional screen was determined on the dual basis of statistical parameters and several important operational attributes (Saunders & Aasland, 1987). These were the cross-cultural acceptability/suitability of the questions for

screening, their usefulness in providing a framework for subsequent intervention, the need for all questions to be readily understandable and valid across different cultures, and their face validity (Saunders et al., 1993). Because different elements of the dependence syndrome were desirable (Saunders & Aasland, 1987), the final items in the three sub-scales represent the tri-dimensional concept of intake, drinking behaviour (dependence) and problems: i.e., hazardous alcohol consumption (items 1-3), drinking behaviour (items 4-6), adverse psychological reactions (items 7-8) and alcohol-related problems (items 9-10). All items in the AUDIT Core refer directly to drinking and its effects, including the past year and lifetime experience, with an emphasis on current (past month) drinking status and problems, a consideration heretofore neglected in other screens.

Designed as a self-report measure and requiring a minimum reading level of seventh grade (9 years of formal education), the AUDIT Core takes between 2 and 5 minutes to complete. Scoring involves simple summation of the values associated with the 10 response alternatives. Items 1-8 are scored on a 0-4 Likert (1932) scale format, and items 9 and 10 on a 3-point (0, 2, 4) scale. AUDIT Core scores can range from 0 to 40. Different cut-off points will be appropriate for different purposes. In each instance, the trade-off between sensitivity and specificity which best addresses the context and 'cost' of use (e.g., consequences of missing a true positive case) must be considered. Generally, while a score of 8 or more is suggestive of hazardous drinking, 13 or more is likely to indicate alcohol dependence (Conigrave, Hall, & Saunders, 1995; Dawe et al., 2002; Saunders, 2002b). Completion of the AUDIT Clinical Instrument requires approximately 10 minutes. Scores may range from 0 to 24 (Saunders et al., 1993).

The AUDIT has been studied in terms of its psychometric qualities and suitability for various subgroups. Considerable empirical evidence supports its internal consistency (Dawe et al., 2002). AUDIT scores are moderately to highly correlated (r = .62 to .88) with other self-report screening tests such as the MAST and the CAGE among various medical samples (Reinert & Allen, 2002; Saunders et al., 1993). Among drinkers in a primary care sample in an emergency room setting, the AUDIT was found to vary across gender and ethnic subgroups, performing particularly poorly among women at

the standard cut-point of 8 (Cherpitel, 1995a, 1995b, 1997, 1998; Cherpitel & Borges, 2000). In contrast, Volk and associates (1997) found no evidence of gender or racial/ethnic bias in AUDIT scores among a multi-ethnic sample of family medicine patients, and the screen's efficacy varied little by patient subgroup. These discrepant findings appear to derive from several factors including different sample characteristics, use of a different criterion standard, analytic procedures, and selection of a different cut-point for risky ('hazardous') drinking (Volk et al., 1997). Overall, there is little evidence of variation in psychometric properties as a function of either ethnicity or gender (see Reinert & Allen, 2002, for review).

Among university students in the US, Belgium and Australia, the AUDIT performance was variable (see Dawe et al., 2002). AUDIT performance against diagnostic criteria among adolescents has not been adequately examined (reviewed in Reinert & Allen, 2002). As noted earlier, applying DSM-IV diagnostic criteria to adolescents is an unresolved issue. Sensitivity of the AUDIT was greatly enhanced when cut-points were lowered from >8 to >4 for adolescents (Chung et al., 2000). The AUDIT performs favourably among the severely mentally ill, but relatively poorly among the elderly (Dawe et al., 2002; Reinert & Allen, 2002).

Arguably, the most important measure of a screen's performance is its ability to predict adverse outcomes. In the original WHO study, Norwegian respondents with AUDIT scores of 11 or more had a 2.6 times increased risk of being unemployed two years later (Claussen & Aasland, 1993). At a 2-3 year follow-up, 61% of Australian respondents with baseline AUDIT scores of 8 or more had experienced alcohol-related social problems, compared with 10% of those with lower scores. The high-scoring group also reported more alcohol-related medical disorders and hospitalizations. AUDIT scores were a better predictor of social problems and hypertension than were laboratory markers (Conigrave, Saunders, & Reznik, 1995). With good predictive ability of adverse endpoints added to its other excellent credentials, the international AUDIT offers considerable advantage over alternative methods in front-line assessment of risky drinking (Conigrave et al., 1995). Given the whole spectrum of primary care interventions suggested for different types of drinkers/drug users along the risk

continuum, the AUDIT can efficiently be linked to a decision tree for intervention assignment, including feedback, advice, and problem solving (Saunders, 2002b). The AUDIT appears to perform just as well embedded in a standard medical history as when administered as a discrete scale (Reinert & Allen, 2002).

The AUDIT is a watershed in the historical development of screening tools for problematic drug use, now widely used internationally (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). As the following review of drug screens will show, the AUDIT has become the blueprint or template model for brief drug screens intended for use in primary care contexts in the 21st century, including the empirical development of the brief cannabis screen reported in this thesis.

Drug Screening Instruments

In stark contrast to the proliferation of alcohol screens, there is a dearth of validated brief self-report drug screens suitable for use in generalist health care settings (Berman, Bergman, Palmstierna, & Schlyter, 2003; Brown & Rounds, 1995; Dawe et al., 2002; Fleming, 2002; Murphy & Impara, 1996; McPherson & Hersch, 2000; Roche & Freeman, 2003; WHOAWG, 2002). Moreover, those that are available are inadequate to specifically target problematic or at-risk cannabis use.

Limitations of existing drug screens for cannabis

As with alcohol screens, most of the small number of adolescent and adult drug screens originated and were validated among clinical samples in the United States. Experience using existing drug screening instruments in other cultures has often been unsatisfactory (Room, 1995, 1998; WHOAWG, 2002). There is remarkably little evidence, if any, of their sensitivity/specificity, or even acceptability, among general adult and adolescent populations, within or outside of the USA - notwithstanding the many ethnic and cultural subgroups in these populations (ALAC, 1996; Dawe et al., 2002; Knight, Sherrit, Shrier, Harris, & Chang, 2002; Leccese & Waldron, 1994; Martino, Grilo, & Fehon, 2000; McPherson & Hersch, 2000; Winters, 2003; WHOAWG, 2002). As with alcohol, 'off the shelf' screens originating elsewhere may *not* be relevant for dissimilar

cultures (Room, 1995, 1998), a critical consideration for use in New Zealand among Māori, Pacific Peoples, Asian, and the many diverse minority and subcultural groups. Adolescent screens must be developmentally appropriate, psychometrically sound, simple and practical for use in busy social services, educational, medical, or pediatric settings. Items must also be as innocuous as possible to ensure the adolescent's relationship with their counsellor is not compromised (McPherson & Hersch, 2000; Monti et al., 2001; Silber, 1987a, 1987b; Winters, 2003). Existing drug screens vary widely in focus, content, group/s targeted, and score utility. Various operational characteristics further limit the applicability of these instruments as rapid screening devices among cannabis users in health care populations. A brief review of the most widely known screens available for use among adult and adolescent drug users will elucidate the current status of drug screening, highlighting the gap in instrumentation for a brief cannabis-*specific* screen suitable for use in generalist health contexts.

Clinical drug screens

While thought to be useful as brief screening tools, many clinical instruments are too long, complex, and expensive to be practical in busy primary health care settings. Prominent among these is the WHO Composite International Diagnostic Interview-Substance Abuse Module (CIDI-SAM; Robins, Cottler, & Babor, 1990), a standardised, structured interview providing definitive lifetime and 12-month DSM-IV and ICD-10 diagnoses across 10 drug classes, including cannabis (Andrews & Peters, 1998; Cottler et al., 1995). Extensive, expensive training is needed for administration, scoring, and interpretation of this complex, lengthy instrument requiring 30-60 minutes administration time. Another well-known clinical tool is the 149-item Drug Use Screening Inventory (DUSI; Tarter & Hegedus, 1991). Adolescent counterparts include the 139-item Problem Oriented Screening Instrument for Teenagers (POSIT; Gruenewald & Klitzner, 1990; Rahdert, 1991), the 81-item Substance Abuse Subtle Screening Inventory (SASSI; Miller, 1985), and the 149-item adolescent version of the DUSI (DUSI-A; Tarter & Kirisci, 2001; Tarter, Laird, Bukstein, & Kaminer, 1992; Kirisci, Mezzich, & Tarter, 1995). Although described as screening tools, all these protocols assess only one aspect of drug use, and are more appropriately diagnostic instruments for the second stage of assessment, being overly long and complex for rapid

preliminary assessment of problematic or potentially problematic cannabis use (Dawe et al., 2002; McPherson & Hersch, 2000). Rigorous diagnostic criteria are not necessary to efficiently recognize harmful or potentially harmful drug/cannabis use in a generalist health context (Maly, 1993).

Brief generic drug screens

Several standardised drug screens are generic (i.e., not drug-specific). The well known Drug Abuse Screening Test (DAST-28, DAST-20; DAST-10; Gavin, Ross, & Skinner, 1989; Skinner, 1982) provides a quantitative index of drug-related problems in a lifetime or 12-month timeframe. However, the problem severity score gives no indication which drug to target in treatment, and the primary focus is on clinically important drug abuse or dependence, rather than currently problematic or risky use (McPherson & Hersch, 2000). Another variant is the 16-item Simple Screening Instrument for Alcohol and Other Drug Abuse (SSI-AOD; Winters & Zenilman, 1994). A shared drawback of these and most other screens is a dichotomous 'yes/no' response option, limiting score utility by restricting information on the frequency of the behaviours tapped by each item.

Adolescent generic screens include an adapted version of the adult DAST (DAST-A; Martino et al., 2000); the 42- and 30-item Drug and Alcohol Problem Quick Screen (DAP; Klitzner, Schwartz, Gruenewald, & Blasinsky, 1987; Schwartz & Wirtz, 1990); the 12-item (expanding to 53 items) Adolescent Drug Involvement Scale (ADIS; Wisniewski, Glenwick, & Graham, 1985; Moberg & Hahn, 1991); and the 40-item Personal Experience Screening Questionnaire (PESQ; Winters, 1992). A recent model is the 45-item GAIN-Quick Screener (GAIN-Q; Titus & Dennis, 2005). As do their adult counterparts, however, several of these tools fail to query the amount, frequency, recency, type, and nature of adolescents' drug use (e.g., Martino et al., 2000), while others take a lifetime window with no focus on *current* drug-related problems. With reported administration times ranging between 10-20 minutes, these tools are still too long for use in primary care settings (McPherson & Hersch, 2000). Limited, and in some cases no, validity data are yet reported (Leccese & Waldron, 1994; Martino et al.,

2000). Again, indices of severity of drug involvement with a variety of drugs gives no specific indication of the adolescent's current, or potential, cannabis use problem level. Other brief generic screens contain a few embedded items that may, or may not be, applicable to cannabis. These include alcohol screens modified to simultaneously screen for other drugs ('conjoint' screens), such as the CAGE-Adapted to Include Drugs (CAGE-AID), the SMAST-Adapted to Include Drugs (SMAST-AID) (Brown & Rounds, 1995), and the (briefest) Two-Item Conjoint Screening Test (TICS, Brown, Leonard, Saunders, & Papasouliotis, 1997). With diminished sensitivity for the earliest, least severe drug problems (Brown & Rounds, 1995), these 'conjoint' screens hold little promise for detecting early stage cannabis problems and/or risky use. Their adolescent counterparts specifically designed for use in generalist health contexts include the 4-item Drug and Alcohol Problem (DAP) Quickscreen (DAP-4; Knight et al., 2000) and CAGE-AA (Knight et al, 2000). Sensitivity of the CAGE-AA proved unsatisfactory, however, and neither screen is recommended for use until extensive psychometric testing is completed (Knight et al., 2000).

Among adolescent medical patients, the developmentally appropriate 6-item CRAFFT (Knight et al., 1999, 2002), has been shown to reliably and accurately discriminate adolescents requiring further intensive assessment from those at risk and amenable to early intervention. Further validation studies are required on larger, more diverse populations (Knight et al., 2002). Another screen, the 9-item self-administered Substance Misuse in Adolescence Questionnaire (SMAQ; Swadi, 1997) demonstrated good psychometric properties and concordance with DSM-IV diagnosis among a small clinical sample of 12-17 year-olds using cannabis, cocaine, and volatile substances (Swadi, 1997). However, this screen makes no attempt to measure either drug-related social problems (abuse) or sub-clinical drug problems. Subsequently modified to increase its suitability for younger people and drug non-using 11-16 year-old students (ASMA; Assessment of Substance Misuse in Adolescents; Willner, 2000), the 8-item version is considered to have potential for detecting both problem drug use and at risk use among adolescents in the community. Extensive validation research is needed (Willner, 2000).

Screens for multiple drugs and severity indices

Several instruments combine screening for problem use of different drugs used simultaneously, as well as providing drug-specific problem severity indices. Two models intended for use in generalist health care settings internationally are the 8-item Alcohol, Smoking and Substance Involvement Screening Test (ASSIST, Version 3; World Health Organization ASSIST Working Group, 2002) and the 11-item Drug Use Disorders Identification Test (DUDIT), with a companion test (DUDIT-E) for more comprehensive problem assessment (Berman et al., 2003). To varying degrees, both were designed to parallel (DUDIT) or to complement (ASSIST) the AUDIT. Targeting adults and adolescents, the DUDIT assesses all drug categories, but excludes alcohol and tobacco. By contrast, the ASSIST targets alcohol, tobacco, prescription drugs and illicit drugs among adults. Items in both screens encompass consumption, dependence, and problems domains. The DUDIT adopts a 12-month window to screen for both lifetime and current drug problems, while the ASSIST uses a 3-month window. Both incorporate a dimensional scoring system.

While both screens are still only in a preliminary stage of development, several characteristics invite comment. Both screens are subject to the criticisms directed (above) at generic measures attempting to simultaneously screen for multiple drugs. Drug categorization was identified as a "consistent problem" and an area of "confusion" in the international ASSIST reliability study (WHOAWG, 2002), with implications for reliability/validity of findings reported. Given the terminology problems reported, confusion between culture-specific perceptions of 'harmful' cannabis use and medicinal cannabis use was possible. Translation issues (i.e., semantics, literal and idiomatic) apply for use in local languages/cultures. Confusion was also reported between the 'last 3 months' versus the 'lifetime' timeframe. Moreover, the 3-month ASSIST reference period may be inadequate for detection of both a drug disorder and a developing or latent drug problem. Diagnostic systems (DSM-IV, ICD-10) for current PSUDs are based on a 'past 12-month' assessment window. Preliminary reliability data from a small adult sample indicate only fair test-retest (1-3 days) kappas for cannabis ranging from 0.52 (harmful use/ problems with work, home or school) to 0.95 (ever used), with

an average kappa of 0.64. Given the brief test-retest interval, these results are unsatisfactory. Since values greater than 0.7 are considered satisfactory (Bishop et al., 1975; Fleiss, 1991), a screen should aim for higher reliability estimates. A critical prerequisite to use of the ASSIST in primary care settings, however, is evidence of its concurrent and predictive validity. Neither have yet been reported. The 8 final items were selected on the basis of their association with drug use frequency, and *not* with ICD-10 diagnostic criteria (WHOAWG, 2002). Given that results reported derive largely from drug treatment clients, the ASSIST may prove even less reliable and feasible under typical conditions of busy primary health care practices.

In a high-risk sample (n=154) the DUDIT evidenced excellent sensitivity and specificity for DSM-IV and ICD-10 cannabis dependence (n=35), but performed poorly in diagnosing cannabis abuse/harmful use, a result confirmed by ROC curves (Berman et al., 2003). That is, in the high-risk population DUDIT diagnostic validity for cannabis abuse/harmful use was “no better than chance” (Berman et al., 2003). Among a general population sample (n=1099) only 33 (3.1%) respondents scored one or more on the DUDIT, with the remaining 96.9% scoring zero. A selective response bias was apparent (Berman et al., 2003). Given there was no validation interview or follow-up, these data are non-interpretable, and the predictive utility of the DUDIT unknown. The authors claim the DUDIT has “good potential” for screening for drug use and dependence for different drugs in both clinical and general population samples (Berman et al., 2003). In fact, these results suggest the DUDIT potential for identifying cannabis dependence and abuse/harmful use among primary care populations to be minimal. For example, appropriate cut-off scores for cannabis dependence in this population remain unknown. Further - and of paramount importance - given its poor performance in identifying harmful use/abuse, it is difficult to envisage the DUDIT having any relevance whatsoever in detection of risky cannabis use. After all, identification of this alcohol group (‘hazardous’ consumption) was the primary stated aim of the AUDIT (Saunders & Aasland, 1987; Saunders et al., 1993).

Brief dependence screens

Complementing this small arsenal of self-report drug screening tools are several brief dependence screens adaptable to the specific drug of interest. Most well known are the 10-item Leeds Dependence Questionnaire (LDQ; Raistrick et al., 1994) and the 5-item Severity of Dependence Scale (SDS; Gossop et al., 1992, 1995) used for screening for various drugs, including cannabis (Martin, Copeland, Gates, & Gilmour, 2006; Swift et al., 1998a). With their clinical focus on severity of dependence symptoms, however, these screens were not designed for early detection of potentially harmful or risky drug use. Insensitive to low-level misuse, therefore unable to capture the spectrum of cannabis-related problems along the continuum of use with or without dependence symptoms, their utility in identifying both early-stage and more advanced cannabis use problems - the focus of this paper - is minimal.

Summary

In different ways and to varying degrees, in their present form all of the drug screening tools reviewed above are clearly either inefficient or otherwise unsuitable for use in generalist health contexts as quick and accurate screens *specifically* for cannabis use problems (McPherson & Hersch, 2000). Limitations derive from their: (a) complexity and comprehensiveness (b) timeframe (c) generic focus on use of “drugs” (d) insensitivity to low-level misuse (e) mere listing of cannabis among multiple other drugs or (f) reliance on only one or two items about cannabis use, (g) lack of concurrent and/or predictive validity and/or (g) lack of evidence of validity for use among both general adult and adolescent (i.e., developmentally appropriate) populations, and/or various ethnic/cultural subgroups within these populations. Confounded by other drug or alcohol use, scores on these screens are clearly insufficient for expeditious detection of problematic or risky cannabis use among both adult and adolescent users. Albeit, as chapter five shows, individual items carefully selected from among these sources may have potential as candidate items in the pool for such a screen (McPherson & Hersch, 2000).

Chapter Four
Screening For Harmful And Potentially Harmful Cannabis Use

Screening for Harmful (Dependence/Abuse) and Potentially Harmful (Risky) Cannabis Use

Recognition of Cannabis Use Problems: An Area of Historic Neglect

A major consequence of the historical neglect of cannabis use disorders and associated disabilities is a lack of empirically developed measures *specifically* for cannabis use problems (Alexander, 2003; Copeland, Gilmour, Gates, & Swift, 2005; Hannifin, 1990; Paton-Simpson & McKinnon, 2000; Stephens et al., 1993, 1994). Research among cannabis using populations has used either proxy measures of DSM-defined dependence/abuse or tested/adapted other drug measures for cannabis (e.g., Chen et al., 1997; Stephens et al., 1993, 1994, 2000; Swift et al., 1997, 1998a). Over two decades ago, preliminary efforts were directed towards developing a set of diagnostic interview criteria specifically for cannabis abuse analogous to those used to diagnose alcoholism (see Weller & Halikas, 1980). A modification of this cannabis-specific interview was administered as a 25-item postal survey to a random sample of 1000 New Zealand adults to ascertain the frequency of cannabis related problems in the general population (Thomas, 1996). A few consumption questions were added to the original criteria to determine lifetime, frequency, quantity and recency of cannabis use. Thomas considered his questionnaire had "potential as a screening tool in further research" (p. 205).

Other studies investigating the negative consequences of cannabis have developed a range of measures to match the unique characteristics of cannabis-related problems to the current measuring task, and not for general screening. These include the Marijuana Consequences Checklist (Stephens et al., 1993, 1994) and the Marijuana Problems Scale (MPS; Stephens et al., 2000, 2002). The latter is a measure of the number and severity of problems associated with marijuana use during the past 90 days among treatment-seeking adult cannabis users in the United States. Similarly, the 23-item Marijuana Problems Inventory (MPI; Vandrey et al., 2005) was developed for a study of cannabis withdrawal among adolescent treatment-seekers. In Australia, Copeland and colleagues (2001a, 2001b, 2005) reported development of the Cannabis Problems Questionnaire (CPQ), a 53-item global measure of cannabis-related problems designed

specifically for a controlled trial of brief interventions for cannabis use disorder. The 58-item adolescent version (CPQ-A; Martin, Copeland, Gilmour, Gates, & Swift, 2006**)** has since been reported. Both measures were incorporated in the current research for item validation purposes, and their characteristics described in Chapter six. Two further cannabis instruments not intended for general screening but rather to target specific aspects of cannabis use are the 48-item Marijuana Effect Expectancy Questionnaire (MEEQ; Schafer & Brown, 1991) and the 47-item Marijuana Craving Questionnaire (Heishman, Singleton, & Liguori, 2001). An unknown number of cannabis questionnaires have been informally developed within treatment programmes, but remain unpublished and not psychometrically tested. Among these is the 10-item 'What Is Marijuana's Place In Your Life?' or its alternative, "Are You Using Marijuana Sensibly?', developed by Peele and Brodsky for the Cannabis Action Network in the USA, and intended to promote self-identification of users experiencing cannabis-related problems (Stanton Peele, personal email communication, 2002).

Thus, while currently there is a small assortment of potentially useful research tools to measure the various consequences of excessive cannabis use, efforts have largely been context-specific and idiosyncratic, and not part of a systematic programme of instrument development and psychometric evaluation. A comprehensive search of printed publications, reviews, and computer databases, including Cochrane, Medline, PSYCLIT, PubMED, has thus far failed to yield a validated, universally accepted cannabis screening tool comparable to the AUDIT. Authorities in the cannabis field are not aware of either the use, or indeed the existence, of such an instrument (J. Copeland and W. Swift, project advisory committee, personal communication, October, 2002).

In response to the escalating prevalence of cannabis use problems among presentations to New Zealand drug treatment services over the past decade or so, there have been two discrete indigenous attempts to address the conspicuous - and paradoxical - absence of any cannabis instrumentation. These were the Cannabis Abuse Syndrome Screening Test (CASST; Hannifin, 1990) and the Cannabis Use Disorders Identification Test (CUDIT; Adamson & Sellman, 2003). From outside New Zealand a similar rationale prompted the contemporaneous publication of the Marijuana Screening Inventory

(Experimental Version) (MSI-X; Alexander, 2003), completing the small armamentarium of 'new' cannabis-specific screening tools in existence.

The Cannabis Abuse Screening Syndrome Test (CASST)

In 1987, a pioneering attempt to conceptualize a specific clinical measure for detecting cannabis use problems was made, the 'Cannabism Screening Test', subsequently renamed the Cannabis Abuse Syndrome Screening Test (CASST; Hannifin, 1990). Modelled directly on the SMAST alcoholism screen (a binary 'yes/no' response format), the 11-item questionnaire covers problems associated with cannabis use, focusing heavily on cognitive problems. Designed for clinical administration following assessment of the user's historical and current cannabis consumption, the CASST requires 15-45 minutes to complete and 2 minutes to score. Scores can range from 0 to 11. An affirmative answer to three or more questions suggests a diagnosis of 'cannabism'. Given the clinical assessment process in which it is embedded, training is required to administer the CASST (ALAC, 1996).

A pilot study was conducted among consecutive admissions to a New Zealand drug treatment services reporting lifetime cannabis use (n=25) to ascertain the psychometric adequacy of the CASST, using clinician assessments as criterion standard (Hannifin, 1990). Item to total correlations ranged from 0.023 to 0.758. Reliability measures ranged from 0.24 (coefficient alpha) to 0.34 (split-half). When opiate users were excluded, reliability increased to 0.57 (coefficient alpha) and 0.51 (split-half). This latter result does not support use of the CASST with polydrug users. Validity measures also failed to meet adequate standards. No relationship (-0.033) was evident between total scores on the CASST and routine counsellor assessments of cannabis abuse.

Hannifin (1990) suggested factors likely to have influenced the poor results included small sample size (statistical power), heterogeneity of drugs abused (reliability, internal validity), possible inadequacy of counsellors' assessments of cannabis use problems (criterion/convergent validity), and possible problems with wording of particular

CASST items (construct validity). No further validation or developmental research on the CASST has been reported.

The Cannabis Use Disorders Identification Test (CUDIT)

Designed to parallel the AUDIT, the CUDIT is a self-report screen intended for use among all persons reporting any use of cannabis within the past 6 months (Adamson & Sellman, 2003). Apart from the 6-month window, and minor modification of item wording to be appropriate to cannabis (simple substitution of the word "cannabis" for "alcohol") the CUDIT mirrors the AUDIT. In item 2, the number of standard drinks was replaced by number of hours 'stoned' on a typical day. In item 3, frequency of consuming six or more standard drinks (reflecting binge drinking) was replaced with frequency of being 'stoned' for six or more hours. Where the AUDIT asks about frequency of memory blank-outs following drinking (item 8), participants were asked about the frequency of memory or concentration problems after using cannabis. CUDIT questions also cover ICD-10 criteria for substance use disorders from four conceptual domains: cannabis consumption, (items 1-3), using behaviour (items 4-6), adverse psychological reactions (items 7-8) and cannabis-related problems (items 9-10). With a scale-type dimensional response format similar to the AUDIT, the 10-item CUDIT also has a possible score of 40 (Adamson & Sellman, 2003).

Following small pilot studies suggesting the CUDIT had "good face validity", the CUDIT's performance in screening in a high-risk population was tested in a randomized controlled trial for brief interventions in alcohol dependent outpatients (N=122) in Christchurch (Adamson & Sellman, 2003). Fifty-three respondents (46.1%; mean age 31 years) reported 6-month cannabis use. In that study, cannabis users were significantly younger, less likely to be employed, and more likely to be both severely alcohol dependent and have a comorbid diagnosis of conduct or antisocial personality disorder than alcohol dependent individuals not using cannabis (Adamson & Sellman, 2003). Among current users, 28 were identified with a cannabis use disorder (15 current, and 13 past 12-months or lifetime cannabis use disorder). CUDIT scores ranged from 0 to 26 (from a possible 40). Item-to-total correlations ranged from 0.44

(item 3) to 0.75, and Cronbach's alpha was 0.84 (Adamson & Sellman, 2003). The CUDIT's sensitivity, specificity, positive and negative predictive power (parameters critical to diagnostic accuracy and efficiency in a clinical context) were examined. The ability of individual CUDIT items, each possible CUDIT score, and reported cannabis consumption to screen for cannabis use disorders, were also examined. Apart from the first 'frequency of use' item, "all performed poorly" (Adamson & Sellman, 2003, p. 311). The optimal CUDIT score for identifying current cannabis use disorder among this clinical sample was 8 or more. At this cut-point screen sensitivity was 73.3% (11 of 15 individuals with a current cannabis use disorder scored 8 or more) and positive predictive value was 84.6% (11 of the 13 individuals scoring at this level were diagnosed with a cannabis use disorder). Beyond this cut-point, increased sensitivity led to markedly reduced positive predictive power. In short, as in other studies finding a multi-item instrument more effective than simple frequency of use, the CUDIT total score performed better than any one item (Adamson & Sellman, 2003).

Limitations of the CUDIT

Discussing the various limitations inherent in development of the CUDIT by simple "conservative" modification of the AUDIT, the authors raised several conceptual and measurement issues arising from the underlying DSM-IV diagnostic philosophy, i.e., that the phenomenology of substance use disorders is equivalent across different substances (APA, 1994, 2000). Issues included the substitution of number of hours 'stoned' for number of drinks (items 2, 3) due to the absence of sound quantifiable measures of cannabis consumption, and items (4, 5, 6) selected to represent cannabis dependence. Firstly, Room (1998) opines that DSM-IV (1994; DSM-IV-TR, 2000) inclusive framing of dependence and abuse across all drugs (legal or illicit) obscures important differences between drugs. Drugs differ in whether, or to what extent, users report or display particular dependence criteria. Different drugs have diverse abuse/harm liability, and different harms are associated with different drugs (Lader et al., 1992; Room, 1998; WHOAWG, 2002). This questions use of similar criteria for both abuse and dependence across the different substances, particularly cannabis. It can be argued that cannabis is *not* interchangeable with alcohol because of vastly different consumption patterns, different pharmacology, erratic distribution, metabolic, and

excretion kinetics, and substantial individual variability in levels of subjective intoxication and impairment at *similar* consumption levels (see Adams & Martin, 1996). As the authors acknowledge the psychometric properties of a 'number of hours stoned' measure are unknown, and thus "it is unclear how appropriate the grouping of response options are in separating participants" (Adamson & Sellman, 2003, p. 313). This issue is controversial in the drug field. Some authorities consider 'hours stoned' to be a potentially good indicator of level of cannabis involvement (e.g., Thomas Lundqvist, personal communication, May 2003). Others opine that, given (1) the potential for tolerance development, and (2) the subjective, impressionistic nature (unreliability) of self-reports on this measure, responses made to this question may prove ultimately meaningless. For example, unlike alcohol ingestion, the more accomplished, regular smoker habituated to the effects (the 'stone') is not likely to *feel* 'stoned' for long at all. Conversely, higher scores on 'hours stoned' may represent a potentially good indicator of *early stage* cannabis use problems among relatively naïve users (Ashley Koning, project advisory committee, personal communication, May 2003). This notion appears borne out in the CUDIT study where item 3 (days "stoned" for 6 or more hours) produced a "poor result", with over half endorsing such use not meeting criteria for a current cannabis use disorder (see Adamson & Sellman, 2003). Given the lack of attention accorded sub-threshold cannabis use disorder or problems in this research, scores from this pre-clinical (or 'diagnostic orphans') group, the appropriate target for an early cannabis screen, may explain this finding. Thus, although performing poorly in this study, 'hours stoned' may have potential for screening for at risk cannabis users at an *early stage* in problem development. Hence, such an item was incorporated into the item pool in the present research.

Addressing the second (dependence items) issue, the researchers cite Australian data (Swift et al., 2001b) on performance of DSM-IV criteria in discriminating currently dependent from non-dependent cannabis users, noting the lack of correspondence between the 3 best performing diagnostic criteria and those represented in the CUDIT. The criterion with the *lowest* odds ratio in the Australian study (reduction of important activities) was most closely represented by item 5 in the CUDIT (fail to do what was normally expected of you). Conversely, the two dependence criteria with the *highest*

odds ratio in the Australian study (great deal of time spent obtaining, using, and recovering; continued use despite knowledge of physical or psychological problems) were *not* represented in the CUDIT at all. The apparently poor discriminatory performance of CUDIT items representing dependence criteria among that Australian sample suggests that "selection (of items) within the CUDIT may not be optimal" (Adamson & Sellman, 2003, p. 314). Accordingly, "…it is questionable whether or not the conversion of individual items from the AUDIT to the CUDIT has more than face validity…" (Adamson & Sellman, 2003, p. 313)

Findings remarkably similar to Swift's (2001b) were reported in an Australian longitudinal cohort study in which users meeting DSM-IV criteria for cannabis and alcohol dependence had markedly different symptom profiles (Coffey et al., 2002). Symptoms reflecting reduced general functioning (persistent desire to use, spending excessive time obtaining or recovering from use, continued use despite health problems) were more prominent among cannabis dependants than alcohol dependants. While the similarity of withdrawal symptoms in the two dependence groups was also noteworthy (given the continued controversy surrounding the cannabis withdrawal syndrome), alcohol dependants were much more likely to report tolerance. Available data suggests the marked metabolic differences between cannabis and alcohol may result in quite *dissimilar* subjective experiences of tolerance (Coffey et al., 2002). Cannabis users may not recognize tolerance development. Ergo, cannabis dependence is "sufficiently distinct from alcohol dependence to warrant similar research attention" (Coffey et al., 2002, p. 192).

Given all these findings, simply substituting 'alcohol' for 'cannabis' in screen items, and thereby failing to include items which are currently emerging as important early indicators/discriminators of cannabis use disorder, may be an inappropriate way to proceed. Pathways to dependence vary substantially in terms of individuals, behaviours, and substances used (APA, 1994; IOM, 1996). At this early stage in delineation of the natural history of cannabis use and disorders, and the development of instruments to measure these phenomena, an inclusive orientation to content is advisable. This notion is upheld in research exploring the natural history of cannabis dependence (Rosenberg

& Anthony, 2001; Wagner & Anthony, 2002). Wagner and Anthony discovered that cannabis portrays a "more insidious onset of the dependence syndrome" (p. 479) than other drugs, with a subjective loss of control one of the earliest and most frequently observed clinical features. 'Using cannabis in hazardous situations' (not represented in the CUDIT) showed most rapid progression of all the clinical features studied, with approximately 40% of cases reporting this clinical feature within the first year of cannabis use (Rosenberg & Anthony, 2001). Despite historical presumptions that neurodaptive changes occur very early in the course of cannabis use (e.g., Bass & Martin, 2000) subjectively felt tolerance did *not* emerge as the earliest clinical manifestation of cannabis dependence. Rather, the next most common clinical feature of cannabis dependence were spending time getting, using, and recovering from cannabis intoxication, then subjectively felt tolerance (both absent in the CUDIT) (Rosenberg & Anthony, 2001).

These researchers advocate identification of distinctive features of early cannabis dependence to promote earlier differentiation of cannabis users who will - or will not - progress to clinically significant dependence (Rosenberg & Anthony, 2001). In fact, identifying early stage problems (or 'diagnostic orphans'), and asymptomatic users with currently risky levels or patterns of cannabis use, is one of the main aims of the current research not addressed in the CUDIT study. This CUDIT limitation derives directly from its "prototypical" method of construction (vs. traditional systematic empirical construction) among a small (n=53), relatively older (mean 31 years) employed (61%) treatment sample, who may not be representative of those currently developing, or at risk of developing, cannabis use disorder. Given the CUDIT primary clinical focus on cannabis use disorders, data on prevalence of sub-diagnostic cannabis problems and longitudinal (predictive) data have not yet been reported. As earlier discussed, a cut-point that maximizes the hit rate within clinical settings does not provide the minimal threshold for defining when the person has the disorder, which results in many sub-threshold cases (Widiger & Trull, 1991). This may impact dramatically on diagnostic rates among community-based samples where people are likely to exhibit fewer symptoms and be on the diagnostic threshold. Misclassification then becomes possible (Room, 1995). This at risk group is the more appropriate target for a general population

screen that seeks to facilitate early intervention among younger cannabis users at earlier stages of disorder to arrest progression to a more serious stage. The "poor performance" of constituent CUDIT items, the (perhaps) over-representation of dependence items, compounded by absence of abuse or 'problems' items (social, interpersonal, legal, financial) common among youthful cannabis users, suggests that the CUDIT would have limited relevance for screening among this important target population. The authors, moreover, reported ambiguities associated with various other items. Thus, as the researchers themselves caution, it is an "open question" as to just how the CUDIT would perform in other high-risk populations, or in the general population (Adamson & Sellman, 2003).

Finally, questions also arise with regard to the 6-month CUDIT timeframe. Diagnostic rules and procedures based on DSM-IV and ICD-10 criteria used are based on 12-month (and/or lifetime) assessment windows (APA, 1994, 2000; WHO, 1992). As with measurement of cannabis consumption, however, controversy exists over the appropriate timeframe for development/diagnosis of cannabis use disorder. This was a further issue explored in the present research.

The Marijuana Screening Inventory (Experimental Version) (MSI-X)

The 39-item Marijuana Screening Inventory (MSI-X; Alexander, 2003) was designed to be a preliminary screening inventory to assist clinicians in the USA identify problematic marijuana use. Featuring a 'yes/no' response format, this self-completed paper-and-pencil tool purportedly requires approximately 10 minutes administration time. Scoring involves simple addition of positive responses to 31 (only) of the items. Most (5) of the 8 non-scored items are behavioural frequency estimates. Questions were generated to reflect both DSM abuse criteria and clinical perceptions about their relevance to marijuana use. Guided by clinical theory and judgement about what constitutes problematic marijuana use, preliminary clinical cut-off scores were assigned to denote 'at risk problematic', 'suggestive of risk', 'normal or experimental use' and 'no problem' use. The MSI-X performance was first tested on an archival data set collected between 1985-1989 from a convenience sample of military reservists (n=408, mean age

29). Lack of a validatory interview for the criterion standard did not permit determination of sensitivity/specificity. No urinalysis or other corroborative confirmation of self-reports was available. Findings reported included descriptive and internal reliability statistics and exploratory factor analysis. Overall findings were conservative, with only 7.8% scoring within the 'at risk problematic', 6.1% within the 'suggestive risk' and 20.8% within the 'normal' or 'experimental' range. The sample majority (65.1%) scored in the theoretical 'no problem' range. Cronbach's alpha for the 31 scored items was 0.89. Incorporating clinical judgment considerations, principal components analysis derived nine (hypothetical) factor-based scales from the 31 items (Alexander, 2003).

Limitations of the MSI-X

While promoting the MSI-X potential as a marijuana specific screening inventory for use in generalist health care settings, the author identified several deficiencies requiring correction in future MSI versions. These include the non-random sample with "conservative" demographics, the dated archival data, and the lack of a clinical criterion or 'gold' standard to determine psychometric sensitivity, specificity, positive and negative predictive value. Factor subscale reliability, confirmatory factor, and ROC analyses are yet to be conducted (Alexander, 2003). However, some statisticians say dichotomous items should "never be factored" (e.g., Streiner, 1994, p. 140), while others describe them as "dubious" (Kim & Mueller, 1978) or suggest avoiding them wherever possible (Gorsuch, 1983; Comrey & Lee, 1992). Item deficiencies include a lack of detailed, specific quantity and frequency of marijuana use questions, critical in a brief screening tool to allow a rapid indication of use levels. Language issues were identified in several items. However, while in need of psychometric strengthening and item refinements, Alexander suggests the MSI-X is a "useful start" for clinicians to gauge whether their clients' marijuana use pattern is potentially problematic.

Several further MSI-X limitations can be identified. No test-retest reliability data was reported. In contrast to cannabis presentations to New Zealand treatment services (Adamson et al., 2003; Bashford, 2000; Paton-Simpson & MacKinnon, 2000), Alexander notes that clients in the USA "rarely mention marijuana as a primary or

secondary problem" (p. 621). This may provide an alternative explanation for the "conservative" findings. Lack of corroborative data adds to this ambiguity. Many questions are phrased in the lifetime framework ('have you ever…') which, as already discussed, makes it difficult (if not impossible) to distinguish those currently drug-disordered or at risk from those who have either ceased using, or are no longer symptomatic. Language not identified as problematic by the author (e.g., 'Do you ever use marijuana most all day, every day?') appears to need refinement for use among New Zealanders. Further, compared to the scale-type dimensional model, the MSI-X 'yes/no' response format, compounded by lack of scored behavioural frequency indicators, restricts the utility of the scoring plan. More fundamentally, as the foregoing review has made abundantly clear, even with faultless characteristics a 39-item instrument is still impractical for rapid screening in generalist health care settings.

Summary

There *is* no empirically validated and universally accepted cannabis screen suitable for public health and community settings. With their unique focus on cannabis use disorder and/or problems, the screens reviewed above are clearly superior to generic drug screens for cannabis screening purposes. Albeit, while closer to the model required for opportunistic screening among cannabis users, the review has clarified that in their different ways, and to varying extents, these tools were either (1) designed for use, or tested among, clinical or otherwise restricted samples; (2) not developed, or even suitable, for use in generalist health settings; (3) not sensitive to risky, but not dependent, levels of cannabis use; and (4) not suitable for simultaneous use among both adolescent and adult populations, and ethnic/cultural subgroups within these populations. Further idiosyncratic limitations of individual screens were discussed above. Clearly, the preliminary stage of the screens' development, with lack of evidence of their validity for use among cannabis users in the general population, and younger high-risk groups in particular, dictates that further validation (and perhaps developmental) research is required before widespread use of these screens among groups targeted by a SEI/SBI approach.

Specific Aims of this Thesis

There is an absence of empirically verified screening instruments to facilitate rapid detection of both currently risky and problematic cannabis use among consumers of health and social services. Addressing this instrumentation need was the general aim of the research to be reported here. A secondary aim was to examine the cross-sectional and prospective relationships between currently active cannabis use and related problems. This extended to a brief exploration of the characteristics of users that may be important risk factors for cannabis use disorder and problems.

This research incorporated three main objectives:

(a) the systematic, empirical development and initial validation of a brief cannabis screen to identify users whose current pattern of consumption already shows symptoms of, or puts them at risk of developing, cannabis use disorder;

(b) to investigate the prevalence and nature of cannabis use problems among users reporting cannabis use within the past 12 months; and

(c) to examine the relationship between levels/patterns of cannabis consumption and problem severity.

Analyses will specifically examine:

(1) the performance of provisional screen items in reliably discriminating diagnostic subgroups at several discrete points along the cannabis problem severity continuum, i.e., non-problematic use, ‘at risk’ or pre-clinical, and problematic use (abuse and/or dependence diagnoses) (i.e., criterion/ concurrent, convergent and discriminative validity);

(2) the capacity of the cannabis screen for reliably predicting 12-month diagnostic group membership associated with an increase in cannabis consumption and related problem severity relative to baseline (longitudinal predictive validity); and

(3) the predictive power of the provisional cannabis screen and other important correlates of cannabis use (age, gender) with regard to other key endpoints measured in this research.

The literature reviewed in earlier chapters indicates that definitive knowledge about cannabis consumption patterns associated with adverse consequences is still evolving. Research reports evince inconsistencies in use frequency definitions, measurements, and outcomes among heterogeneous subgroups. Secondary aims of this thesis are to explore:

(a) patterns and correlates of cannabis use and associated problems among current users and predictors of cannabis abuse and dependence diagnoses at follow-up, with a comparison between these phenomena among adults and adolescents; and

(b) an investigation of the natural history and longitudinal stability of cannabis use and problems over time, comparing adults and adolescents.

In summary, empirical development of a brief, simple, low-cost screen to reliably assist health and social workers to expeditiously detect cannabis users with use-related problems, or those currently at risk of developing such problems, will promote public health goals to successfully intervene in the early stages of harmful cannabis use. This will contribute to reducing the level and harmful consequences of cannabis in the community and thereby help achieve targets set out in the national harm reduction strategy for New Zealand (MOH, 1998, 1999, 2005a).

Thesis Organization

Chapter 5 documents the systematic, multi-stage process undertaken for generation and initial refinement of candidate items for the brief cannabis screen. The following two empirical chapters present results of analyses investigating the psychometric properties of the candidate screen items at baseline and 12-month follow-up among a sample of adolescents and adult cannabis users from the community. Chapter 6 provides descriptive analyses of the sample's demographic, cannabis use and related problem severity at baseline before a detailed report of the analyses used to derive the screen

subscales. Analyses examining the subscales' cross-sectional psychometric properties follow. Chapter 7 presents descriptive analyses of the follow-up sample's 12-month re-assessment, identifying stability/change on baseline measures. The longitudinal predictive utility of the subscales for diagnostic group membership and other major outcomes, together with the optimal screen cut-off score for reliably identifying respondents' diagnostic status, is explored. Finally, a summary of the thesis research and the conclusions drawn are presented in Chapter 8.

CHAPTER FIVE

GENERATION AND REFINEMENT OF THE ITEM POOL

As Streiner (1993) observes, “Scales, unlike the goddess Athena, rarely spring full-grown out of their creators’ heads” (p. 140). Rather, instrument construction is a “very thoughtful art form” (Reckase, 1996, p. 355) with clear specification of the purpose, target groups, content domains, and rationale for design decisions (Berk, 1984; Guilford, 1954; De Vellis, 1991). Since no existing data-analytic technique can remedy serious deficiencies in the item pool, its creation is a pivotal primordial stage (Clark & Watson, 1995; Embretson, 1985; Guilford, 1954; Loevinger, 1957). Candidate items may be sourced from the theoretical and research literature, existing instruments, expert opinion, clinical observation, and self-reported experiences (Streiner & Norman, 1995). An optimal integration of these complementary approaches was used to compile an item pool for the cannabis screen. This chapter chronicles the systematic stages of that journey.

Methodology

Study Design

Guilford (1954) differentiates two basic approaches to instrument construction: the ‘rational’ and the ‘empirical’. In theory-driven instrument construction content validity rests mainly on rational, rather than empirical, grounds (Nunnally, 1978). The classical empirical linear approach requires huge samples with criterion groups known to have the target disorder and proceeds through factor analysis on the assumption of sampling the whole universe of domain content (Nunnally, 1978; Kline, 1986). This approach is clearly beyond a doctoral student’s resources. Thus, justified on grounds of time and other resources, including cooperation of experts in the field and accessible target

populations for instrument testing, development of the provisional cannabis screen was that traditionally described as the *theoretical-rational* or deductive approach to scale construction (Clark & Watson, 1995; McDowell & Newell, 1987). As outlined in many classic works (e.g., De Vellis, 1991; Embretson, 1985; Guilford, 1954; Loevinger, 1957; Nunnally, 1978; Nunnally & Bernstein, 1994; Popham, 1978) this systematic process encompasses several discrete steps:

(a) conceptualization of the theoretical target construct(s);
(b) literature review to identify the scope and range of the content domains;
(c) creation of an initial item pool to sample all relevant representative content;
(d) review and edit, modify, select the most appropriate items by expert judgment; and
(e) ongoing psychometric evaluation and validation of the provisional instrument among a representative sample of the target population.

With steps (a) and (b) documented in Chapter one outlining cannabis use/problems along the severity continua from non-problematic, through pre-clinical or risky use, to problematic or diagnosable CUD; and review of the literature on health and psychosocial problems associated with cannabis use, this study focused on steps (c) and (d). Featuring a two-tiered hierarchical process of item generation and refinement through open-ended, iterative recursive consultation at two levels (1) a panel of New Zealand experts, followed by (2) a panel of international experts, the item pool for the cannabis screen evolved through several integrated stages:

(1) recruitment of the local expert panel (EP) and international expert panels (IEP);
(2) screen specifications; EP domain/variable survey, and summarized feedback;
(3) item pool development, preliminary reduction and refinement;
(4) EP item pool survey;
(5) cultural consultation;
(6) IEP item pool survey, and summarized feedback; and
(7) final revision.

Expert Panel

Given the paucity of literature specifying a multidimensional model of cannabis use problem severity, an *a priori* approach was critical to ensure adequate problem domain/construct representation and item validity by empanelling subject-matter experts or "content specialists" (Guilford, 1954; Nunnally, 1978). Kline (1986) states that:

> In practice, content validity can only be assured by getting experts in the field to state what they regard as the vital material, converting this into test items and then sending it out to consultant experts again to see if they can see any glaring omissions or items that are concerned with the same problems. (p. 154)

No hard and fast rules govern the use of expert judgements in terms of constituent numbers, basis of selection, and how their different viewpoints are reconciled (Streiner & Norman, 1995). A good mix of clinical, academic and research expertise in the local addictions field was imperative to tap the potential diversity in these complementary perspectives. To augment the local panel, a second group of internationally recognized experts was an explicit strategy to maximize item universality and eliminate skewed opinion or limited experience. Since human judgment methods pervade every stage of instrument construction, it was also crucial to ensure adequate representation of major cultural groups in New Zealand (Durie, 2001; Health Research Council, 1998a, 1998b; NHC, 2003). Hence, consultation was undertaken to incorporate the perspective of Māori and Pacific Peoples and to audit the presence of any bias or demeaning, offensive, discriminating, stereotypical or culturally insensitive content for these important target groups of a cannabis screen.

Resources were a major consideration in convening the expert panels. Discourse that would otherwise be logistically impossible due to geographic distances and time-constrained busy professionals was made viable by electronic communication. This conferred several advantages over *in vivo* discussion, including anonymous, independent responses, avoiding bias that can enter group discussions and encouraging refinement and converging of opinion on critical issues; cost-efficient elimination of

difficulties in organizing acceptable times and venues; and speed and ease of dispatching and receiving documentation.

Procedures

Sampling and recruitment

In the absence of formal 'experts' databases in the cannabis field, an inclusive approach was taken to identify potential Expert Panel and International Expert Panel (EP/IEP) members, including recognized authority, relevant research papers, projects, clinical experience, and collegial nomination. Given time, geographic and resource constraints, a manageable group (n=8-10 maximum in each panel) was vital. In July 2002 (EP) and May 2003 (IEP) prospective panel members identified were approached by email letter explaining the panel process, and issuing an invitation to participate (see Appendix 2). Eight of ten (80%) local experts accepted. Two declined for "other commitments" reasons. All ten IEP invitees (100%) agreed to participate. Consultants for review audit of the item pool's cultural sensitivity to Māori and Pacific Peoples were nominated by supervisory and ALAC recommendation, respectively (HRC, 1998a, 1998b).

Screen specifications and problem domain survey

Following a letter of appreciation with an outline of the process planned, a second memorandum was posted to the assembled EP in August 2002 specifying the purpose of the screen, intended application, and essential psychometric, technical, and operational characteristics (Appendix 3). Guidelines included the aim for a broad range of problem indicators of cannabis-specific pathology across the severity continuum and the need for brief, simple, acceptable items and rapid scoring procedures. Other aspects for panel consideration were optimal scoring format for enhancing discriminatory power and interpretation, the need for items to reflect DSM and ICD criteria for screen validation, and potential issues in validating early stage cannabis use disorder/problems. Instructions for the immediate task (reviewing and commenting on proposed content domains and their subcategories/dimensions) were outlined, and the survey attached (see Appendix 3). Space constraints preclude explication of the detailed, lengthy

memoranda in this study. The reader is referred to the various appendices for the original documents.

Content domains/variables listed in the survey derived from review of the literature on cannabis-related problems (Chapter one), existing drug screens and interviews (Chapter three), and were organized as per the AUDIT around the DSM and ICD tri-dimensional diagnostic criteria: consumption: using behaviour and dependence, and abuse/harmful use (psychological, medical, social problems). Several adjunct domains from the addictions literature were intended to reflect 'problem/risk recognition' and 'readiness to change' indicators, both considered useful for guiding intervention decisions. Columns were provided for respondents to comment on the adequacy, relevance, and importance of each specified domain and representative variables/symptoms, the appropriate response or measurement option, or other comments. A final section was provided for suggested additional variables or further comments. The EP's detailed responses were considered at length, summarized carefully, and fed back in Memorandum 3 in November 2002 (Appendix 4).

Item pool generation

Grouped *a priori* according to the DSM and ICD tri-dimensional diagnostic criteria relevant to screening, and incorporating EP views and suggestions from the survey, a comprehensive inventory of sample items to provide ample coverage for each content domain was compiled. Items and response formats considered to reflect the scale purpose/construct of interest were extracted from existing screens and interviews with demonstrated utility in identification/diagnosis of persons with various drug use disorders in one or more specified populations, the cannabis medical, theoretical, and research literature, and clinical observations. Formal permission was obtained for use of copyrighted measures. The initial draft item pool numbered 90 questions. Guided by extensive consultation with local clinicians, 36 clearly redundant, repetitious or over-represented, unsuitable, ambiguous, poorly worded or culturally inappropriate items, and/or items with limited face validity for cannabis, were winnowed over two systematic revisions (see Appendix 5). Appropriate modifications to phraseology,

terms, length, and response categories in several of the 54 surviving items were made to simplify questions and more authentically reflect cannabis use in New Zealand.

Expert Panel item pool survey

Under cover of Memorandum 4 outlining item pool generation and the preliminary cull, together with reiteration of critical considerations in item selection and explicit instructions, the 54-item pool survey was emailed to EP members in March 2003 (Appendix 6). To ensure receipt, a hard copy was mailed to their postal addresses. Survey items were again organized in sections in a logical sequence according to the tri-dimensional constructs (using behaviour and dependence, psychological problems and health/medical effects, abuse/social consequences) followed by the adjunct items. Respondents were again asked to comment on items (adequacy, relevance and importance to criteria they represent, terminology, response formats and categories), to indicate their preferences for items where sample alternatives were presented, and to identify any perceived omissions in the item pool. Panelists were also asked to indicate the order they considered most appropriate for administration of items. Ample space was allocated to these tasks (Appendix 6).

Cultural perspectives

Before IEP consideration, the 54-item pool was reviewed for cultural appropriateness, sensitivity, and utility for Māori and Pacific Peoples. Consultants nominated for this task (see p. xxvi) received the item pool together with background information about the project via email in April 2003. This review process was completed by mid-May.

International Expert Panel item pool survey

As an email attachment to IEP Memorandum 2, the 54-item pool was next submitted for scrutiny to the IEP in June 2003 (Appendix 7). To provide the international panel with adequate background information about local expert perspectives that informed development of the item pool, the screening specifications and content domain survey and summarized feedback (EP Memos 2 and 3) were also attached. To ensure these documents were received intact, acknowledgment of their receipt was requested. Following return of the IEP survey from all participants, responses were carefully

considered and summarized, and fed back in IEP Memorandum 3 in September 2003 (Appendix 8).

Final revision of the item pool

A further critical item pool review and revision followed. In open-ended, re-iterative consultation with local EP clinicians (in person), thesis supervisors and individual IEP members (email) who raised specific issues in the survey, several items were modified to incorporate carefully considered suggestions from all expert judgments. A final review considered optimal ordering of items, and a prefatory statement was devised.

Results

Response Rates

Although several survey returns were tardy, emailed reminder prompts resulted in all panelists (100%) completing the tasks required at each stage of item pool development. While responses varied in breadth and depth, all expert judgments were incorporated in construction of the item pool.

Characteristics of Expert Panels

Members of both empanelled expert groups came from a spectra of geographic, cultural, professional affiliation, background and specialization in the substance abuse field, producing the desired ‘mix’ of clinical, academic, research, consultative, universally-recognized authority and experience for this study (see p. xxiii-xxv).

Collation/Interpretation of Responses

Space limitations preclude detailed reporting of all comments, perspectives, and suggestions panelists provided during this study. Only major themes and responses to each survey will be briefly summarized and interpreted, followed by a discussion. Detailed memoranda are located in the appendices.

Expert Panel problem domain survey

Six (of 8) panelists considered the cannabis problem domains/variables that were specified to be "comprehensive" and "inclusive". Five suggested further variables (e.g., consumption methods, tolerance, increased cannabis expenditure, reason for use, family drug use). Measuring cannabis consumption (section A) was universally identified as *the* key domain. While 'frequency of use' was unanimously endorsed as a problem indicator, 'quantity' was judged problematic (five panelists), and 'binge' use inappropriate (four panelists), for cannabis. All panelists endorsed the criteria/variables representing cardinal DSM/ICD constructs, 'Using behaviour' and 'dependence' and 'Psychological reactions' (sections B, C). Cultural issues were perceived in some terms (e.g., feeling 'shame' and 'guilt' after using cannabis, inappropriate for Pacific Peoples, was replaced with 'felt bad or regretted using cannabis'). 'Health problems' (section D) such as loss of motivation, energy, memory, and concentration, and use in hazardous situations received universal support, although specificity issues (a cannabis attribution) were acknowledged. Perspectives on 'Social consequences' (DSM-IV) indicators (section E) varied. While concern from others, interpersonal, financial, and legal problems were endorsed, items for these variables required careful development. Consensus around the adjunct items (section F) indicated their perceived utility and importance in generalist health settings. (For more detail see Appendix 4).

Expert Panel item pool survey

Panelists' evaluation of the provisional item pool with response categories was universally positive, supporting initial retention of a broad range of problem indicators. Panelists indicated their preferred versions where alternatively-worded sample items were provided, suggested additional or alternative categories in response options, and

alternative terminology where they saw potential for ambiguity/confusion or evoking resistance (e.g., respondent reluctance to report 'committed a crime', 'needing cannabis', '$ made off cannabis'). Further consideration of cultural appropriateness of some terminology (e.g. 'hallucinations', local terms for cannabis products) was emphasized. There was strong agreement that the proposed Likert-type response format of (most) items would enhance discriminatory power. Panelists favoured 5-point rather than 7-point options, for reasons of simplification and the (questionable) ability of cannabis users to differentiate meaningfully to that level of precision. Consensus supported the existing ordering of item pool sections as being the "most logical" administration sequence. Guided by these recommendations, the item pool was further refined before submission for Māori and Pacific Peoples perspectives.

Cultural review

Consultants for appropriateness/sensitivity of the item pool for administration among Māori and Pacific Peoples reported no apparent problems or reservations. Reviewers evaluated the provisional screen as "very comprehensive", "inclusive", and "impressive". Targeting at risk users, as well as cannabis dependent, was applauded. Feedback confirmed the need for language and format simplicity, for cultural references wherever possible such as 'family/whānau/aiga', and familial participation in the process (see Appendix 9 for review dialogue).

IEP review of the item pool

Responses were diverse in terms of perspective, detail, issues raised, advice and suggestions. Overall support for the "very methodological approach taken to this research" (which) "pretty well covers the waterfront" was considerable, and the item pool "ready to go now". From one expert viewpoint, "Ideally you would retain all or most of these items and sort out which ones are most useful empirically from here". Panelists noted their preferred version for alternatively worded items, varied opinions about redundant or inappropriate items, and suggested changes to language or response categories. Item omissions identified were 'quantity consumed' and 'respiratory problems' measures. Interestingly, while noting its controversial status among local EP, five panelists explicitly opined that the 'time spent stoned' variable *was* an important

cannabis problem indicator, thus should be measured. While most (9; 90%) endorsed the utility of the two multi-response items ('reasons for use', 'use in risky situations'), six (60%) indicated both required further refinement. There was almost universal (9; 90%) support for the Likert-type response categories, with the majority (7; 70%) recommending the options be truncated (from 7 to 5) and standardized, where appropriate, to reduce response burden and enhance reliability. One sole critic, who "strongly advised against using" the "unanchored and abstract Likert-type response categories notorious for low reliability", preferred the binary 'Yes/No' option. Opinion was equally divided on the non-specificity to cannabis of items on loss of energy, concentration and memory, some recommending the items be cannabis-referenced, while others endorsed the non-specific versions. Two experts signaled problems inherent in interpreting responses to the 'amount spent on' or 'amount made off' cannabis. One expert identified a potential issue for predictive ability of items inherent in the 12-month (DSM/ICD) diagnostic timeframe (c/f a shorter window).

Final review/revision of the item pool

After protracted synthesis, further consultation and deliberation on all EP/IEP comments, advice, and suggestions, 14 items were deleted from the pool (listed in IEP Memo, Appendix 8). These included 3 adjunct items (readiness to change) that were not indicative of problem severity and therefore, conceptually anomalous. The 'amount spent on' and 'amount made off' cannabis items were discarded. Other items were reworded and refined as recommended, and Likert-type response categories truncated and standardized, or replaced with 'yes/no', where appropriate. Following IEP recommendations, two new items (quantity used, respiratory/cough or sore chest) were created, and the controversial ('time spent stoned') item was reinstated. Further clinical (AK) and supervisory (JC) input informed the decision to include an item 'use frequency past 90 days' to help attenuate the DSM/ICD predictive validity issue identified. One adjunct item representing two concepts (attitude/knowledge) was separated into two items. Although questioned as being conceptually contentious in a problems screen (i.e., risk factors, rather than severity indicators), the 'reasons for use' (one expert) and 'family drug use/problems' (three experts) items were retained, given overall EP/IEP opinion about their potential predictive and clinical utility. Perceived as

non-confrontational and thus ideal for an initial item, the 'reasons for use' item was re-ordered to become the first question. The end product of this systematic development process was the 43-item draft Cannabis Use Problems Identification Test (CUPIT). These items, together with the DSM-IV/ICD-10 criteria or problem domains they reflect, and the parent instrument sources where relevant, are presented in Table 5.1. The research version appears in Appendix 10.

Table 5.1: Pool of candidate questions for the CUPIT

Domain / Variable	DSM-IV & ICD-10 **Diagnostic Criteria**: Cannabis Dependence/Abuse	Question **"Over the past 12 months…"**	Parent Instrument Source (if any)
A Cannabis Consumption			
Quality/Potency Preference		a). What cannabis products do you prefer to use? **(OR)** b). What type of cannabis do you prefer to use?	
Most Often / Usually Use		a). What cannabis products do you use most often? **(OR)** b). What type of cannabis do you use most often?	
Frequency of Use Days used		a). On how many days have you used cannabis during the past 12 months? b). On how many days have you used cannabis over the past 3 months (90 days)?	AUDIT; CUDIT; DUDIT
Time Stoned		c). How much of the average day do you spend/feel stoned?	
Times Used		d). How many times would you use cannabis on a typical day when you were using?	
Quantity		a). On average, how much would you smoke when you use? Joints …… Cones ……. Spots. …….	
Increased Use		a). Are you using *more* or *less* cannabis now than you were 12 months ago?	

Table 5.1 continued over…

Table 5.1 continued …

Domain / Variable	DSM-IV & ICD-10 **Diagnostic Criteria**: Cannabis Dependence/Abuse	Question **"Over the past 12 months…"**	Parent Instrument Source (if any)
B Using Behaviour / Dependence **Experimental/Social vs. Problem Use**		a). I use cannabis because ……. (Tick **EVERYTHING** that applies to you)	CRAFFT; SMAQ; ASMA; MSI-X
Genetic / Environment		a). Have *any* members of your family / whānau / aiga (including grandparents and other relatives) ever been heavy users of, or had problems with, alcohol, cannabis, or any other drugs?	SSI-AOD
Start Day With Joint		a). Do you like to get stoned in the morning?	CASST; MSI-X
	withdrawal avoidance	b). How often have you used cannabis first thing in the morning?	Thomas, 1996
Tolerance	tolerance	a). Do you need to use more cannabis now to get stoned than you did 12 months ago?	AUDIT; CUDIT; DUDIT; DUSI; MSI-X; SMAQ; ASMA;SSI-AOD
Withdrawal	withdrawal	a). Have you had cravings or felt agitated if you tried to cut down or stop using cannabis?	CASST; DUSI; MSI-X; SMAQ/ASMA
	withdrawal	b). Did you feel restless, irritable, grumpy, anxious or depressed when you could not use cannabis?	DAST-20; MSI-X; SMAQ; ASMA; SDS
Loss Of Control	Inability to abstain	a). Have you been able to stop using cannabis when you wanted to?	AUDIT; CUDIT; DUDIT; DAST-20; DAST-A; Thomas, 1996
		b). Have you felt that you needed cannabis?	
	desire to cut down/stop	c). How often did you wish you could stop using cannabis?	SDS
Longest Period Of Abstinence	Inability to abstain	a). What was the longest time that you went without using cannabis?	

Table 5.1 continued over…

Table 5.1 continued …

Domain / Variable	DSM-IV & ICD-10 **Diagnostic Criteria**: Cannabis Dependence/Abuse	Question **"Over the past 12 months…"**	Parent Instrument Source (if any)
Failed Attempts To Cut Down/Unsuccessful Efforts To Control Use	failed attempts to cut down	a). How often did you try to cut down on your cannabis use, but found you couldn't?	ASSIST V.3; CASST; DUSI; MSI-X; Thomas, 1996
	failed attempts to cut down	b). Have you found it difficult to get through a day without using cannabis?	CASST
		c). How difficult do you think you would find it to stop using or go without cannabis altogether?	SDS
	Inability to abstain	d). Did you ever use cannabis after you had decided not to?	DUSI
Preoccupation / Salience	a great deal of time spent obtaining, using, recovering	a). Have you spent time thinking about cannabis or trying to get cannabis?	SMAQ
		b). Did you ever find yourself thinking about when you would next be able to get stoned?	
Important Activities Given Up Or Reduced	social, recreational, occupational activities reduced	a). Have you given up things you used to enjoy or were important because of cannabis? (e.g., work; school; sports; hobbies; being with family or friends; etc)	
C Psychological Reactions / Problems			
Guilt, Remorse, Shame	psychological problems	a). How often have you felt ashamed or guilty about using cannabis?	AUDIT; CUDIT; DUDIT; DAST-20; SSI-AOD; Thomas, 1996
	psychological problems	b). How often have you regretted using cannabis?	MSI-X
Worry About Use	psychological problems	a). How often have you felt worried about your cannabis use?	CASST; SDS
Paranoia / Anxiety	psychological problems	a). How often did you feel paranoid (suspicious) or anxious after using cannabis?	CASST; MSI-X

Table 5.1 continued over…

Table 5.1 continued …

Domain / Variable	DSM-IV & ICD-10 **Diagnostic Criteria**: Cannabis Dependence/Abuse	Question **"Over the past 12 months…"**	Parent Instrument Source (if any)
D Health Effects			
Composite Item	physical/psychological harm	a). Cannabis has made my health ……	
Nausea / Passed Out	physical/psychological harm	b). Have you felt sick or passed out (had a "whitey") after using cannabis?	DAST-20; Thomas, 1996
	physical/psychological harm	c). Have you had a cough, sore chest, or breathing problems for any length of time?	CPQ
Fatigue / Motivation or Energy Loss	physical/psychological harm	d). Have you lacked the energy to get things done in the way you used to?	CASST
Memory / Cognitive, Concentration, and Distractibility	physical/psychological harm	e). Have you had problems concentrating and remembering things?	CASST; AUDIT; CUDIT; DUDIT; CRAFT; DUSI; MSI-X
	physical/psychological harm	f). How often have you started to do something, and then forgotten what you were going to do?	
	physical/psychological harm	g). Have you ever found it difficult to understand new information or to study?	CASST
Cannabis Use In Risky/ Hazardous Situations	Use in risky/hazardous situations	a). Have you done any of the following things/activities after using cannabis? (Tick **EVERY ACTIVITY** that applies to you)	DUSI
Injuries / Accidents	physical/psychological harm	b). Have you or anybody else been injured after you used cannabis?	AUDIT; CUDIT; DUDIT; DUSI; MSI-X
E **Social Consequences**			
Neglect Commitments, Responsibilities When Stoned	role interference	a). Has anything you had planned, or were expected to do, not happened after using cannabis? (*examples:* a family outing; chores; take care of children; training; an assignment; appointment; school or work; etc)	AUDIT; CUDIT; DUDIT; MSI-X; ASSIST V.3; Thomas, 1996
	role interference	b). Did your use of cannabis ever interfere with (get in the way of) your work at school, your job, or home life?	DAST-20; MSI-X

Table 5.1 continued over…

Table 5.1 continued …

Domain / Variable	DSM-IV & ICD-10 **Diagnostic Criteria**: Cannabis Dependence/Abuse	Question **"Over the past 12 months…"**	Parent Instrument Source (if any)
Concern From Others Advice To Cut Down	social & interpersonal problems caused or exacerbated by use	a). Has a partner, relative, friend, a doctor, or any other health worker been concerned about your cannabis use or suggested you cut down?	ASSIST 3.0; AUDIT; CUDIT; DUDIT; CRAFFT; Thomas, 1996
	social & interpersonal problems caused or exacerbated by use	b). Has your cannabis use ever created problems between you and your partner, parents, other close relative, or friend?	CASST; DAST-20; DUSI; MSI-X; SSI-AOD
Friends/Peer Group		a). Have you spent more time with friends who use cannabis than non-using friends?	
		b). Have you tended to smoke cannabis on your own more than you used to?	SMAQ
	social & interpersonal problems caused or exacerbated by use	c). Have you lost any friends or partners (boyfriend or girlfriend) because you use/d cannabis?	DAST-20; DUSI; MSI-X; Thomas, 1996
Financial/Cost Of Drug		a). How much did you spend on average on cannabis per week? b). On average how much did you make off (how much money have you earned from selling) cannabis per week?	
Financial Problems	social & interpersonal problems caused or exacerbated by use	c). Did you ever spend more than you could afford or get into serious money problems because of cannabis?	CPQ; DUSI; Thomas, 1996
Legal/Criminal	social & interpersonal problems caused or exacerbated by use	a). Have you been arrested, even for a few hours, because of your cannabis use? (*examples:* something you did when stoned, or to get money to buy cannabis; cannabis possession; cannabis supply; etc)	SAST-20; MSI-X; SSI-AOD
F Adjunct Items			
Insight / Acknowledgement Of A Cannabis Use Problem		a). Do you think that you use too much cannabis?	SSI-AOD; Thomas, 1996
		b). Do you think that your cannabis use is ever a problem?	SSI-AOD
		c). Is cannabis use affecting you in ways you do not like?	CASST; Thomas, 1996

Table 5.1 continued over…

Table 5.1 continued …

Domain / Variable	DSM-IV & ICD-10 **Diagnostic Criteria**: Cannabis Dependence/Abuse	Question **"Over the past 12 months…"**	Parent Instrument Source (if any)
Risk Perception; Attitude		a). Do you think that cannabis is addictive or harmful?	
Readiness To Change; Help-Seeking		a). Do you wish you could stop using cannabis? b). Do you want to cut down or quit your cannabis use? c). Would you like some assistance to help you reduce or quit your cannabis use?	SDS

KEY

New Questions and items

Items considered but not used

Discussion

From concept to completion, the principle guiding item pool construction was:

> No data analytic technique can remedy serious deficiencies in an item pool…psychometric analysis can identify weak, unrelated items that should be dropped from the emerging scale but are powerless to detect content that should have been included (Clark & Watson, 1995; Guilford, 1954; Streiner & Norman, 1995).

Hence, in sampling all possible life domains theoretically reflecting the putative trait, the item pool should err on the side of "over-inclusiveness" (Clark & Watson, 1995; De Vellis, 1991; Embretson, 1985; Guilford, 1954; Loevinger, 1957). The nascent literature on cannabis use problem severity and risk factor typology necessitated the multi-component, integrated, re-iterative, open-ended approach to item pool construction taken in this study. Explicit avoidance of premature foreclosure ruled out alternative expert judgment procedures such as ratings, item-domain matching, or selection of a

predetermined number of "best" items (see Berk, 1986). Any constraints to breadth of screen content during item pool construction could mean that the screen reflects the best *perceived* selection from a finite group of items, rather than the best items *possible.* The aim was to ensure sufficient breadth and depth of content areas to adequately sample both currently problematic cannabis use and early-stage or risky problem use, and to select good precursors or early-stage indicators with logical intuitive/empirical relationship to each other. De Vellis (1991) avers, "redundancy with respect to content is an asset, not a liability" (p. 60). However, desirability of an "over-inclusive" baseline item pool for subsequent reduction and analytic techniques had to be traded-off against resource constraints and the realities of conducting research in 'real world' settings among cannabis users. Kline (1998) notes the dilemma, "…it is often difficult to obtain the requisite samples, or to measure all the variables one might desire…There are limits on the testing time that subjects can endure" (p. 64). Although perspectives vary (see Guadagnoli & Velicer, 1988; Kline, 1986, 2000; Nunnally, 1978), Guilford (1954) opines that when carefully selected, no more than 50 per cent more items should be needed in the preliminary form than are desired in the final version. Aiming for an adequate yet manageable number of the most important predictors with the most discriminative range of levels for each of these variables, was the challenge. In conjunction with the cannabis literature, the knowledge, experience, and intuitive wisdom brought to this research by recognized experts augured well for this task:

> If the experts are chosen carefully, they probably represent the most recent thinking in that area…the scale developer has access to the accumulated knowledge and experience of others who have worked in the field (Streiner & Norman, 1995, p. 20).

Ergo, the diversity in empanelled experts' characteristics was expected to counteract any inadequacies that might otherwise inhere in any single approach to item pool development (Berk, 1986; Kline, 1986; Streiner, 1993).

Overall level of expert support for the concept, aims, and systematic procedures of this study was high, one international expert commenting, "it will set the standard for screening measures". Endorsement of content domains/variables for the item pool was

similarly favourable. Opinion converged on strong agreement for the majority of items presented. That very few further domains/items were suggested confirms the meticulous approach taken to item generation to "cover the terrain". Opinion generally concurred on item preferences where alternative versions were provided, facilitating item elimination. Items perceived as conceptually anomalous, inappropriate, or otherwise questionable for a cannabis screen, were further considered in consultation and either discarded or retained, at least for preliminary testing, based on expert recommendation.

Operational characteristics were a critical consideration (McDowell & Newell, 1987; Pett, Lackey, & Sullivan, 2003; Streiner & Norman, 1995). Given the likelihood of marginal reading and/or comprehension skills or cannabis-induced cognitive deficits (concentration, attention span, motivation) among target groups aged from 13 years, the need for conceptually simple, concrete, non-ambiguous, non-judgmental, culturally inclusive terms and phraseology, simple layout and instructions was vital for self-administration (Lessler, 1995; Oppenheim, 1992). Use of vernacular, jargon, or colloquial terms can damage face validity and credibility, and cross-cultural understanding, invoking respondent resistance (Davies, 1987; Lessler & O'Reilly, 1997; Oppenheim, 1992). Panelists identified where improvements could be made to vocabulary, grammar or question structure, and acknowledged the temporal and geographic/cultural dimensions of language (see Room, 1995, 1998). Meanings change, and quickly become outdated in the drug area (Clark & Watson, 1995; Streiner, 1993; Room, 2000). Cultural disparity was evident in some cannabis terminology ('stoned' NZ cf. versus 'high' USA) and the ongoing emergence of new cannabis variants ('skunk/hydro', 'bush/heads', 'gold oil'). Experts from the USA reported being unfamiliar with some of these local terms. However, the need to use terms appropriate to cannabis in New Zealand, at least for preliminary item validation, was consensual.

Consistent with the literature (De Vellis, 1991; Guilford, 1954; Kline, 1986, 1998; Nunnally, 1978; Streiner & Norman, 1995; Suissa, 1991) there was almost universal support for the proposed Likert (1932) scale format and response categories to maximize possible score distributions/variance along the problem severity continuum, minimize error, and enhance reliability. This maximizes statistical power, thus

predictive utility/validity. Kline (1998) avers that from a measurement viewpoint "only Likert scales come even close to being capable of providing scientific measurement" (p. 77). If the intention is to use a summation score, as intended in the cannabis screen, "the Likert approach is the one to follow" (Guilford, 1954, p. 462). Only one IE panelist considered the binary 'yes/no' more appropriate for a brief screen. However, the correlational analyses planned for this research required continuous scores. Comrey (1988) argues, "multiple-choice item formats are more reliable, give more stable results, and produce better scales" (p. 758). Dichotomizing continuous variables results in reduced reliability, loss of instrument efficiency, information, and correlation with other measures (Gorsuch, 1997; Nunnally, 1978; Streiner & Norman, 1995). A dichotomous measure is, at best, only 67 per cent as efficient as a continuous one, and more binary items are required to achieve adequate variation in scores (Cox, 1980; Suissa, 1991). Hunter and Schmidt (1991) demonstrated that a dichotomous 50-50 split in subject responses reduces the correlation of that instrument with another by 20%. Different splits result in even greater attenuation. Gorsuch (1983) cautions that in a factor analytic solution such endorsement variation can produce "difficulty factors" not due to the underlying construct. Indeed, as Floyd and Widaman (1995) assert, inclusion of dichotomous (and trichotomous) variables in factor analysis is "fraught with problems" and they should be included "only with great caution" (p. 288). Others (Cronbach 1946; Cohen, 1983) specifically recommend avoiding dichotomization. Finally, and of utmost importance, binary 'yes/no' response options are inimical to Māori experience (Durie, 2001). While acknowledging a possible loss in precision, IEP consensus was that truncating from 7 to 5-point and standardizing the Likert-type response formats to pre-defined pre-anchored dimensions would reduce respondent confusion and response burden, simplifying scoring and interpretation. Clark and Watson (1995) emphasize that providing too many response alternatives can lead to random responding, attenuating reliability and validity.

A related issue was a lone criticism of the "unanchored, abstract" Likert-type response categories (e.g., 'never, sometimes, quite often, very often, always/all the time'), a topic of ongoing debate (see Bass, Cascio, & O'Connor, 1974; Schaeffer, 1991; Streiner & Norman, 1995). Nevertheless, as Matt and Wilson (1994) cogently argue, using

"fuzzy" verbal expressions to indicate the frequency or magnitude of events and behaviours is standard practice in health and drug fields. People engage in mental averaging and recall experiences in more general terms. Over a 12-month window, cannabis users would find it impossible to reliably recall how many times or joints they used in a particular day, week, month (how many things they gave up, how often they felt sick after using cannabis, and so on). Forcing responses to numeric categories would yield little more than subjective "guess-timates". Rather than "unrealistic" point estimates for such high frequency events, heuristics are employed and "fuzzy" frequency expressions are "appropriate verbal descriptors for an individual's recollection and associated uncertainty" (Matt & Wilson, 1994, p. 367). Bass and associates (1974) have clearly shown that when operating as the various steps in 4-to 9-point scales, magnitude estimations using specific expressions of frequency and amount do bear integer relations with each other. Percentage of overlap in adjacent judgment increases as the number of anchor points increases.

A major concern in item selection was incorporation of DSM-IV and ICD-10 criteria as criterion standard for screen validation purposes. Issues included the 12-month item/diagnostic timeframe (predictive validity), appropriateness of diagnostic criteria/problems for adolescents, adequacy of items reflecting the various diagnostic criteria (content, concurrent, or convergent validity), and sensitivity of DSM/ICD criteria to pre-clinical, 'at risk' problem status. As yet, there is no *incontrovertible* standard for diagnosing established cannabis use disorders in New Zealand among adults or adolescents, and by extension, no standard for a pre-pathological point or threshold along the problem severity continuum. The theoretical approach underlying DSM and ICD requires a 12-month window for a diagnosis of cannabis dependence or abuse/harmful use. Panelists cautioned that a respondent reporting considerably reduced (or no) cannabis use/problems within the past 6 months would still look impaired (get a 12-month diagnosis) using this criterion standard, yielding 12-month convergent validity but compromising predictive validity of items.

In addition, rather than being a fundamentally scientific concept, a 'problem' is a culture- and time-bound "shifting, amorphous, and socially loaded concept" (Lader et

al., 2002, p. 200). Hence, when measuring problems various cultural, age/developmental, and self-report issues arise (Carroll, 1995; Lader et al., 1992; Room, 2000; Smart, 1992). Drug use problems are multidimensional, and whether a specific physical, psychological, or social event *is* a problem depends on the observer and the context (Smart, 1992). Behaviour which would be thought normal and not medically significant in one place would be regarded as diagnostic and pathognomic in another (Room, 1998; Room et al., 1996). The need for concrete, objective problem indicators was highlighted in studies reporting poor reliability estimates of alcohol-related harms (Bondy & Lange, 2000; Rehm, Frick, & Bondy, 1997). General population samples appear more reluctant, or less likely, to report drug-related problems than clinical samples (Anthony & Petronis, 1989).

While acknowledging this multi-faceted dilemma, panelist opinion supplemented by wider consultation was mixed. Nevertheless, consensus was that DSM/ICD criteria and their 12-month diagnostic windows "with all their numerous faults" were necessary for screen validation, and the diagnostic timeframe issue (12 vs. 6 months) could be explored in this research. While some advice was to "stick as rigidly as possible to the criteria" others advised "reasonable" approximation, with incorporation of new items to represent adolescent cannabis problems not specifically contained in DSM-IV and ICD-10. Thus, following this recommendation, and providing concrete referent examples of cannabis-related problems to encourage accurate self-report for enhanced reliability and validity estimates, was the best approach.

Feedback from the Māori and Pacific Peoples consultants' review of the item pool was positive and constructive, affirming the overall aim of the cannabis screen, the user groups targeted, the content domains and items incorporated in the question pool. The need for simplicity of language and format/graphics, and for cultural references or adaptability specifically to Pacific Peoples, was endorsed. The critical importance of the 'process' in which the screen was embedded and inclusion of family (whānau/aiga) in assessment and intervention activities, was emphasized. Commending the thoroughness of the approach taken to screen development, these consultants acknowledged "how hard it is to find the right words" for cross-cultural administration.

Chapter Five
Generation and Refinement
of the Item Pool

As Nunnally (1978) succinctly observes, “a test can be no better than the items of which it is composed” (p. 259). Since adequacy and propriety of important content is built into test construction and *not* a standard applied later by statistical techniques, the pivotal role of a comprehensive approach to initial item generation cannot be overstated (Clark & Watson, 1995; Comrey & Lee, 1992; Embretson, 1985). However, the quest for internal consistency always comes at the expense of breadth, a phenomenon variously labelled the “bandwidth versus fidelity” dilemma (Cronbach, 1990) or “attenuation paradox” (Loevinger, 1954). On the one hand, the cost of a greater degree of specificity is a reduction in generalizability (Clark & Watson, 1995; Streiner & Norman, 1995). On the other hand, content irrelevancy must be avoided (Cook & Campbell, 1979). Thus, simply *because* items in the cannabis screen pool were either endorsed or contributed by empanelled experts, they cannot be assumed to reflect the content universe, or complete spectrum of ideas.

De Vellis (1991) aptly advises, “pay careful attention to all the suggestions you receive from content experts…then make your own informed decisions about how to use their advice” (p. 76). Accordingly, following authoritative recommendations for instrument development to maximize what Loevinger (1957) labels the “substantive validity” of the cannabis screen, this iterative recursive item pool generation and refinement has ensured a systematic, inclusive, open-ended, careful process. As reported in the next two chapters, the ‘acid’ test of its “structural validity” (Loevinger, 1957) and performance in identifying users currently with or at risk of developing cannabis-related problems, was to follow.

CHAPTER SIX

PRELIMINARY VALIDATION OF CANDIDATE SCREEN ITEMS

Introduction

Chapter five described the development of the CUPIT question pool to reflect expert opinion on the relevance of candidate items drawn or adapted from the research literature, existing screens or assessment instruments, or devised specifically for this research. Partially modeled on the AUDIT, items subsumed DSM and ICD tripartite dimensions for drug disorders: consumption, using behaviour/dependence, and abuse/harmful use. Given the exploratory nature of this research, however, while items were expected to cluster in meaningful ways to aid interpretation of the factorial structure, there was no *a priori* assumption that these constructs would emerge as factors themselves. Likewise, because of (1) cannabis' unique characteristics and harm liability, (2) the heterogeneity of users and vulnerability to its potential effects, and (3) the aim to differentiate diagnostic groups, no hypotheses were specified about how individual candidate items would or should perform.

The appropriate approach to instrument construction and validation is debated (Clark & Watson, 1995). As a powerful method for determining the most salient variables in a field when constructing a univariate test, factor analysis "is the pivotal statistical method of psychometrics" (Kline, 1998, p. 68). When applied after a systematic rational analysis to guide item selection, factor analysis "tends to give some of the advantages of pure factor scales and pure rational scales" (Gorsuch, 1983, p. 358). Hence, having incorporated authoritative input for careful selection of *a priori* item content and measurement, preliminary validation of the candidate items included traditional reliability/validity evaluation, factor-analytic and regression operations (Comrey, 1988;

Comrey & Lee, 1992; Cortina, 1993; Cronbach, 1990; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Gorsuch, 1997; Kline, 1994).

Controversy persists over both the absolute minimum sample size and subjects-to-variables (STV) ratio required for factor analytic solutions. Traditional "more is better" recommendations ranged from 100 to 1000 respondents, and an STV ratio of 3:1 to 10:1, or more (see Velicer & Fava, 1998). Misconceptions underlying these arbitrary rules of thumb, however, have recently been exposed (see Gorsuch, 1997; MacCallum, Widaman, Zhang, & Hong, 1999). Consistent with revised guidelines for effective recovery of population factors, an index sample of at least 200 participants (STV of 5:1) was targeted for this research. Representative sampling optimizes generalizability (Messick, 1995). Nunnally (1978), however, considers reasonably representative samples from the target population acceptable, and exactly representative samples unnecessary. Given the aim for a single screen applicable across heterogeneous cannabis-using subgroups, an inclusive sampling strategy targeting cannabis users from across the spectra of age, settings, consumption, and problem severity continua was implemented to maximize representativeness, and hence replicable population estimates (Comrey & Lee, 1992; Gorsuch, 1997; Fabrigar et al., 1999; Velicer & Fava, 1998).

Design

The one group, preliminary validation design subsumed both within-subjects and between-subjects comparisons (Cook & Campbell, 1979) in cross-sectional (the present study) and prospective analyses (next chapter). Following item pool administration, respondents were interviewed and assessed on a comprehensive range of domains potentially correlated with, or reflective of, cannabis-related pathology, employing DSM-IV/ICD-10 diagnoses of Cannabis Use Disorders as criterion standard. Test-retest reliability of candidate items was conducted. Item analysis and Principal Components Analysis were employed for data reduction purposes. Following sample classification into 3 groups according to a diagnostic typology representing a progression towards increased cannabis problem severity, the psychometric properties of the component

scales were investigated to determine the ability of items/components to reliably discriminate between diagnostic groups.

Aims

The major aim of this study was to examine the performance of individual candidate items as potential constituents in a brief cannabis screen. A secondary aim was to investigate the cannabis use and related problems of the sample, and the feasibility of screening for these problems. Specifically, the objectives were:

(1) to investigate the prevalence, nature, severity, and correlates of cannabis-related problems reported by past 12-month users;

(2) to explore the factor structure and psychometric properties of items (*test-retest and internal consistency reliability*) in reliably discriminating diagnostic subgroups along the cannabis problem severity continuum (*criterion/concurrent, convergent and discriminant validity*); and

(3) to evaluate the acceptability and feasibility of screening for these problems among adult and adolescent cannabis users.

Methods

Participants

Lack of a sampling frame of cannabis users in the community ruled out assembly of a random, representative sample from this "hidden population" (Griffiths, Gossop, Powis, & Strang, 1993). Offsetting the desire to adequately represent the heterogeneity of cannabis user profiles, logistical and resource constraints precluded recruitment of a sample systematically stratified by demographic, consumption, or 'problems' dimensions. Instead, a purposive sampling strategy targeting high risk users to minimize the high rate of 'negative' cases likely in a general population sample was necessitated (Anastasi & Urbina, 1997; Shrout & Fleiss, 1981; Swift et al., 1998a). A screen has poor predictive or diagnostic accuracy when prevalence of the disorder is low, even

with high sensitivity and specificity, and is closest when prevalence is around 50 percent (Anastasi & Urbina, 1997; Fowler & Austoker, 1997; Meehl & Rosen, 1955).

Inclusion/exclusion criteria

Liberal inclusion criteria helped boost sample heterogeneity. Participants were required to have used cannabis at least once in the past 12 months, be at least 13 years of age, and to be English-literate to year eight level (Form 2) for self-administered instruments. Exclusion criteria included illiteracy, acute psychiatric or cognitive impairment or acute intoxication, given the attendant diminished capacity to participate satisfactorily. Exclusion on grounds of other drug use or comorbid problems was neither appropriate nor realistic. Polydrug use is now the 'norm' among drug users, and 'pure' cannabis use is rare (Wilkins et al., 2002).

Over a 21-month period a multi-pronged recruitment strategy (see Procedures) successfully accumulated a convenience sample of 212 from several diverse New Zealand community settings: specialist drug treatment services (n=36, 17%); Police Youth Aid, alternative schools and community programmes for 'at risk' adolescents (n=48, 23%); Community Corrections (n=7, 3%); general community (n=38, 18%); tertiary-aged students and jobseekers (n=31, 15%); and secondary school students (n=52, 24%). The multiplicity of recruitment sites, personnel, procedures, and self-selection precluded a reliable record of declined invitations, exclusions through ineligibility, or forms taken but later discarded. This obviated statistical comparisons of eligible non-participants' characteristics with respondents for selection bias. Sample characteristics are reported in the Results section.

Measures

Draft Cannabis Use Problems Identification Test (CUPIT)

Participants independently completed the 43-item pool of questions evaluated in this study. The CUPIT development and characteristics were detailed in Chapter 4 (see Appendix 10 for research version).

Clinician Diagnosis/Rating Form

Drug treatment clinicians recorded their client participants' lifetime and 12-month primary drug problem, probable secondary or comorbid drug problem/s, and the client's own view of his/her current problem. "Blind" (Cook & Campbell, 1979) to responses made to the SQ, clinicians then rated their client participants along the cannabis problem severity continuum. Subjective clinical ratings were on a 5-point descriptor-anchored scale (1= non-problematic use, 2= some problems/'risky' use, 3= harmful use/abuse, 4 = dependence/mild to moderate symptom level, 5= severely dependent/serious problems). To elicit carefully considered ratings, definitions and the 11 criteria for delineating Cannabis Use Disorders (APA, 1994, 2000) were provided in a checklist format (see Appendix 11). Consistent with the respected LEAD clinical diagnostic standard (**L**ongitudinal, **E**xperts, **A**ll **D**ata; Spitzer, 1983), ratings were also informed by self-report and multifaceted records. The checklist provided a further diagnostic measure (scored 1 to 11 possible symptoms) for correlation and validation purposes.

Incontrovertible "gold standards for validity do not exist in psychiatry" (Peters, Clark, & Carroll, 1998, p. 900). Clinical diagnoses and rating scales are used extensively in the validation of almost every type of test, representing a valuable, if not principal, source of criterion information (Anastasi & Urbina, 1997; Spitzer, 1983; Streiner & Norman, 1995). Often employed as a criterion measure in the development of drug disorder detection methods (Saunders & Aasland, 1987), clinician ratings have been more sensitive in detecting substance use disorder than self-report. Despite the prevailing perception that clinical diagnoses are unreliable, much research demonstrates that clinicians in drug treatment programmes *do* make valid disorder diagnoses (Spitzer, 1983). Moreover, "clinicians who pay attention to specific diagnostic criteria do agree much of the time" (Andrews & Peters, 1998, p. 80; Peters & Andrews, 1995). For many types of clinical (and treatment) research clinicians *must* be used as diagnosticians, and "…themselves are often regarded as gold standards" (Streiner & Norman, 1995, p. 12). Indeed, authoritative consultation on this specific aspect avouched: "in validation studies the clinician's opinion is usually used as the 'gold' standard" (Aleksandar Janca, personal email communication, September, 2002). Clinician ratings of the severity of

their clients' cannabis problems were used as a supplementary standard for screen validation in this research because of their access to clinical records, their cannabis and other drug education and training, and their specific skills developed through daily interfacing, identifying, and treating persons with cannabis use problems.

Biochemical measures/urinalysis

Urinalysis provided an objective verifier of self-reported cannabis use only among the drug treatment subgroup. Following on-site collection at the drug clinics, urine samples were screened at the Canterbury Health Laboratories for cannabinoid metabolites and the cannabinoid/creatinine ratio with an enzyme multiplied immunoassay technique, using the Dimension Xpand supplied by Dade Behring. Metabolites detected were: 8-beta-11-dihydroxy-delta9-tetrahydrocannabinol, 8-beta-11-hydroxy-delta9-tetrahydrocannabinol, 11-hydroxy-delta8-tetrahydrocannabinol, 11-hydroxy-delta9-tetrahydrocannabinol, and 9-carboxy-11-nor-delta9-tetrahydrocannabinol-glucuronide. The threshold used (50 ng/mL) excludes the effect of side-stream (passive) exposure to cannabis (Grant Moore, CHL, personal communication, September, 2002). The ratio of cannabinoid to creatinine (an endogenous substance not affected by highly osmolar liquids, and thus intentional adulteration) is used to increase the screen's sensitivity and specificity (Lafolie et al., 1991; Mikkelsen & Ash, 1988).

Although yielding a cross-sectional semi-quantitative result only, the Syva EMIT ll 5B3 is a comparatively accurate screen for cannabis (Rehnstrom, Briner, & Frazier, 1989; Schwartz et al., 1991). The technique employed is a variation on the more rigorous GC-MS THC level and ratio against creatinine, as this more accurate indicator "becomes prohibitively expensive" (Grant Moore, CHL, personal communication, September, 2002). In the current study, two numeric values were reported: urinary cannabinoid metabolites (up to 3000 nmol/L; and >3000 nmol/L), and the cannabinoid/creatinine ratio (nmol/mmol).

The Interview Schedule

Baseline assessment of all participants comprised a structured, interviewer-administered schedule compiled from miscellaneous health and drug assessment questionnaires, using instruments with known psychometric properties where possible. Three short self-contained, self-completed measures were embedded (see Appendix 12). Items were predominantly quantitative. Responses to several open-ended questions, included to explore respondents' cannabis-related experiences and perceptions, were subsequently quantified for analysis. Interview components encompassed the following domains:

Demographic characteristics: Participants' age, gender, ethnicity, referral source (treatment clients only), education, current employment, occupation, income, living situation, relationship, children under 16 years in the home, were recorded.

Drug use history*:* Lifetime use, age first used, ever regular use (at least weekly), age last used, and use past 90 days of alcohol, tobacco, ecstasy, opiates, cocaine, stimulants, benzodiazepines, hallucinogens, inhalants, nitrous oxide, and 'party pills' (BZP) were assessed using the Drug History Questionnaire (DHQ; Sobell et al., 1995; see Appendix 12). Providing time-efficient, standardized data collection on important drug variables, the structured one-page DHQ has demonstrated good reliability/validity among drug users assured of confidentiality (Sobell et al., 1995). Respondents were also asked about problematic use of and details of any treatment received for, other drugs, and whether they had a familial history of drug problems.

Cannabis use: Cannabis use history questions included age of first use, ever regular (at least weekly) use, age commenced and duration of, regular use. Consumption in the past 3 months was assessed using the Timeline Followback (TLFB; Sobell & Sobell, 1992), a semi-structured interview that employs a calendar, with memory triggers to prompt recall of substance use. Key dates (public and school holidays, newsworthy events), and other personalized memory prompts (e.g., birthdays, sports, exams, sick, accident, arrests/court, pay, or 'party days') provided salient anchor points. Starting with the most recent month, days on which cannabis was used and the quantity consumed on each use day, were systematically recorded for the past 90 days (13 weeks). If the participant

verified this was his/her typical use pattern, the remaining (60) days were completed accordingly; if not, use in the next past month was examined, and so on over the 90 days.

Consistent with other cannabis research (e.g., Copeland et al., 2001a; Martin, Copeland, & Swift, 2005; Swift et al., 1998a, 2000), the 'cone' (bongs), a highly prevalent method of consumption readily understood by users, was selected as the basic unit of measurement (see Appendix 13 for discussion). Cannabis use days, number of cones consumed in each of the past 13 weeks, and past 30 days, were tallied on the TLFB Summary Form (Appendix 14). Shown to be clearly superior to other estimation approaches, the TLFB has demonstrated excellent psychometric properties and ability to yield a relatively accurate retrospective portrayal of cannabis use among males and females aged from 14 years in both general population and clinical samples (Adamson & Sellman, 2003; Fals-Stewart et al., 2000; Levy et al., 2005; Martin et al., 2005; Sobell, Sobell, Buchan, Cleland, & Leo, 1996; Waldron, Slesnick, Brody, Turner, & Peterson, 2001). Several questions followed that were intended to provide supplementary 'proxy' measures of *quantity/potency* of cannabis consumption. These included typical patterns of use, ingestion methods, products used (listed in increasing potency), source, and cost of use.

***Cannabis Use Disorder*:** As criterion standard in this research, 12-month cannabis dependence and abuse diagnoses were obtained using cannabis (only) questions in the 24-item Drug Use module (Section L) of the CIDI-Auto (Version 2.1; WHO, 1997b). This computerized version of the standardized, paper-and-pencil Composite International Diagnostic Interview (CIDI) maps the self-reported symptoms elicited onto DSM-IV and ICD-10 diagnostic criteria and, by means of automated scoring algorithms, provides output of the criteria satisfied and diagnostic status. Designed for respondents aged from 16 years in a variety of cultures and settings, the CIDI is the most highly-regarded, reliable and valid, fully-structured diagnostic interview suitable for use by both clinicians and trained laypersons in both epidemiological and clinical research and practice (Andrews & Peters, 1998; Cottler & Compton, 1993). With a detailed manual, inflexible format, pre-coded, pre-formulated questions with built-in

skip patterns and probe flowchart decisions to minimize interviewer error, the CIDI-Auto faithfully represents the paper-and-pencil format (Peters & Andrews, 1995; Rubio-Stipec, Peters, & Andrews, 1999).

The CIDI's good to excellent psychometric properties for substance use disorders (see Andrews & Peters, 1998; Cottler & Compton, 1993; Hall et al., 1999; Wittchen, 1994) generalized to the drug abuse modules in the CIDI-Auto (version 1.1) in a WHO reliability and validity study across diverse cultural contexts (Rubio-Stipec et al., 1999). Test-retest Kappa values for 12-month cannabis dependence (mean 9.15 days, *SD*=0.39) ranged from k =0.79 (ICD-10) to k =0.72 (DSM-III-R). Consistent with much research (see Ustun et al., 1997), lower agreement was obtained for harmful use/abuse. Reliability estimates for ICD-10 harmful use of cannabis ranged from adequate (k= 0.45, lifetime) to fair (k= 0.62, past year), while those for DSM-III-R abuse (k = 0.40 lifetime and k=59, past year) were "adequate" (Rubio-Stipec et al, 1999). Hence, given the cultural diversity, the CIDI-Auto drug modules produced reliable classification and good coverage of different manifestations of drug disorders (Rubio-Stipec et al, 1999). This classification was, however, based on antecedent DSM nosology (DSM-III-R and computer version 1.1), and the performance of DSM-IV-based CIDI-Auto 2.1 is not yet known. Compared to simple symptom endorsement, symptom dating (the salient feature of DSM-IV diagnostic criteria) tends to reduce reliability. Hence, DSM-IV abuse reliability *may* be lower. By contrast, ICD-10 harmful use is a highly reliable category in the etiology of dependence, thus ideal for a screening context (Rubio-Stipec et al., 1999).

Peters & Andrews (1995) report validity of the CIDI-Auto 1.1 to be "acceptable". Although validity of the interviewer-administered CIDI-Auto 2.1 is yet to be determined, performance similar to (or better than) the paper-and-pencil version is expected (Andrews & Peters, 1998). Meanwhile, respondent acceptance of the computerized interview appears universal. Collectively, these credentials bode well for a good performance by the WHO-supported CIDI-Auto 2.1 in detection of past year harmful and risky (pre-pathological or sub-clinical) cannabis use as well as cannabis use disorders, a primary aim in this research.

Chapter Six
Preliminary Validation of
Candidate Screen Items

Several operational and empirical considerations further substantiated the CIDI-Auto 2.1 measure for criterion standard. Given the multi-component interview in which it was embedded, simplicity and brevity were paramount. Clinical diagnostic instruments are overly long, complex schedules, and not legitimately usable by non-clinicians. With a "no extras" structure, the CIDI-Auto is the briefest, most respected DSM/ICD standard available to licensed laypersons (Andrews & Peters, 1998). The empirical *sine qua non* was one highly reliable and valid criterion standard for use over time (for follow-up), for exploring the adult/adolescent diagnostic issue, for planned statistical operations (item/factor analysis and reduction), and for developing *one* screen with *one* scoring system across diagnostic subgroups. Appropriate authorization was obtained for use of the CIDI-Auto 2.1 in the abbreviated format described above (G. Andrews, email communications, 8, 9, 13 May 2002). Use of the CIDI-Auto among adolescents (13 through 15) to enable the empirical aims and questions to be addressed was supported by authoritative (email) consultation (K. Conigrave, J. Copeland, M. Lynskey, project IEP, March 2005).

A second dependence measure was the Severity of Dependence Scale (SDS), a simple five item scale developed to assess degree of psychological dependence (or compulsive use) of various types of illicit drugs over a 12-month (adaptable) period (Gossop et al., 1992). Each item is scored on a four-point scale (0-3), yielding a total possible score of 15 (see Appendix 15). The psychometric properties of the SDS are well established among alcohol and illicit drug users, with reliability coefficients ranging from .81 to .90 (Gossop et al., 1995, 1997, 2002). Cut-off scores indicative of dependence have been empirically established for adult amphetamine, benzodiazapine and cocaine use (De La Cuveas, Sanz, De La Feunte, Padilla, & Beringuer, 2000; Topp & Mattick, 1997; Kaye & Darke, 2002; Lawrinson et al., in press). Swift and associates (1998a, 2000) found a cut-off of 3 on the SDS was the optimal indicator of dependence (sensitivity 64%, specificity 82%) among adult long-term cannabis users. As noted earlier, more liberal or more conservative cut-points will be appropriate in different settings (e.g., specialist drug treatment vs. opportunistic screening in a medical population). Optimal cut-points for *degree* of dependence (mild, moderate, severe) have yet to be determined (Swift et al., 1998a, 2000).

Among two populations of adult users from Sydney (Swift et al., 1997) and the rural north Coast (Swift et al., 1998c) Swift reported Cronbach alphas of .85 and .72, respectively, for the SDS performance. Martin and associates (2006) examined the SDS performance among a sample of 100 Australian adolescent cannabis users aged 14-18 years using a 3-month window. High internal consistency (a= 0.83) and one week test-retest (ICC=0.88) coefficients, with a cut-off score of 4 optimally discriminating cannabis dependence (63.6% sensitivity, 94.2% specificity) were reported. In this research, using a 6-month window the Cronbach alpha among the entire sample was 0.72, among those aged over 18 years (n=73) a = 0.77, and in the 13-18 years age-band (n=138) a = 0.67. With good credentials and brief, simple format the SDS offered an additional validated dependence severity measure for assessing convergent validity of candidate items and exploring two important empirical questions in this research: the 6-month vs. 12-month diagnosis timeframe issue (arising from the screening literature review and the IEP study); comparison of adolescent/adult dependence severity profiles.

Health: Items in this research addressed aspects of physical and psychological health. Derived from assorted drug and health surveys, several questions assessed medical conditions and health service utilization. These included: general health status and doctor/specialist consultations in past 3 months, occurrence of long-term medical conditions, and current problems/concerns about respiratory health. Respondents were asked if they had *ever* sought help, been hospitalised, or prescribed medication, for psychological problems. Participants' beliefs about cannabis causing any medical, psychological or cognitive problems were then sought.

Current psychological health (last 7 days) was assessed using the Brief Symptom Inventory 18 (BSI 18; Derogatis, 2000), a short form of its widely-used parent instruments, SCL-90-R and BSI (Derogatis, 1994). The BSI is validated and widely used in adolescent community and drug treatment samples aged from 13 years. Significant psychological distress among cannabis users has been found to be a factor in treatment-seeking among long-term users (e.g., Budney et al., 1998; Copeland et al., 2001a; Swift et al., 2000). The BSI 18 (see Appendix 16) was specifically designed to be a highly sensitive screen for the most prevalent psychiatric disorders (anxiety,

depression, somatization) in community and medical populations (see Derogatis, 2000; Derogatis & Savitz, 2000, for review).

Five-point rated items yield three sub-scales plus a global severity index (GSI), a simple combination of the 3 sub-scale scores to measure overall intensity of psychological distress. 'Caseness' criteria include standardized GSI scores or any 2 sub-scales meeting recommended clinical cut-off values (Derogatis, 2000). The simple graphics and extreme brevity (4-5 minutes) of administration/scoring rendered the BSI18 an ideal self-administered measure of psychological distress among this heterogeneous sample, given time and anticipated respondent constraints (attention, endurance, ability, cognitive deficits) (Derogatis, 2000; Derogatis & Savitz, 2000). Derogatis reports internal consistency estimates of .74 (Somatization), .84 (Depression), .79 (Anxiety), and .89 (GSI). In the current study corresponding Cronbach alphas were remarkably similar: .76 (Somatization), .85 (Depression), .80 (Anxiety), and .88 (GSI).

Cannabis-related problems: Participants were asked if cannabis had *ever* caused them any problems, and if so, the type of problem and timeframe. Problems arising directly from cannabis use during the past 6 months were then assessed using either the 53-item (adult) or 56-item (adolescent) Cannabis Problems Questionnaire (CPQ; Copeland et al., 2001a, 2001b, 2005; CPQ-A; Martin et al., 2006; see Appendix 17 and 18). The CPQ was developed as a global measure of cannabis-related problems using an index sample of cannabis treatment clients (see Copeland et al., 2005, for characteristics). When factor analyzed among a convenience sample of 100 adult users stratified by age, gender, and frequency of cannabis use during the past 90 days, a three-factor solution (acute/physical, psychological, and social consequences) was derived from a 22-item subset. Demonstrating high test-retest (0.92-1.00) and inter-rater reliability (0.74-1.00) coefficients (mean 7, range 5-14 days), significantly inter-correlated and internally consistent factor scales (0.78, 0.71, 0.55, respectively), and diagnostic accuracy (total score classified DSM-IV dependence with 84% sensitivity and specificity), the 22-item CPQ appears to be a valid, reliable, and sensitive measure of cannabis-related problems (Copeland et al., 2005).

Using identical methodology, the psychometric properties of the CPQ-A were also explored using a stratified convenience sample of 100 adolescents aged 14-18 years (Martin et al., 2006**).** As did the adult version, the CPQ-A yielded three, significantly inter-correlated factors (financial/psychosocial, physical, acute negative consequences) from a 27-item subset. Producing excellent item test-retest (0.92, range 0.71-0.9; mean 6.85, range 5-14 days) reliability coefficients, internally consistent factor scales (0.88, 0.72, 0.73, respectively), diagnostic accuracy (total score classified DSM-IV cannabis dependence with 90% specificity and 78% sensitivity), and a significant correlation (0.74) with the SDS score, the 'core' CPQ-A also appears to be a reliable, valid measure of cannabis related problems among this adolescent population (Martin et al., 2006). Using the original 'core' 29 (adult) and 30 (adolescent) items, the Cronbach alpha in the present study was .81 and .80, respectively. The authors emphasized the need for further validation of both versions through (1) replication using larger samples of similarly heterogeneous cannabis users, (2) confirmatory analyses to assess factor structure stability and (3) follow-up periods longer than the 3 and 6 month reference periods used in these studies (Copeland et al., 2005; Martin et al., 2006). Thus, given the heterogeneity of participants with regard to age (13-61), cannabis use and related problems, recruitment setting, the different geographical and cultural context, and the 12-month follow-up period, the CPQ/CPQ-A represented a timely validation instrument. A further variation was self-administration (interviewer-administered in the Australian studies) of the age-appropriate CPQ.

Problem or risk perception/future use: This section first assessed previous attempts to cut down or quit cannabis use, type of help/treatment sought, health professionals' questioning participants about their use, and perception of self as currently having, or being at risk of developing, a cannabis use problem. Personal intentions for use over the next year were then elicited using response statements approximating four (of 6) stages in the Stages of Change Model (Prochaska & Di Clemente, 1983) through which a person moves in an attempt to resolve a drug use problem: *Precontemplation* (no thought of quitting/reducing use), *Contemplation* (thought of quitting/reducing use, but not sure if ready), *Preparation* (preparing to quit/reduce use), *Action* (actually quitting/cutting down) (Prochaska, 2004; Prochaska, Di Clemente, & Norcross, 1992).

Chapter Six
Preliminary Validation of
Candidate Screen Items

The Stages of Change model has demonstrated excellent reliability, construct validity, and predictive utility for smoking cessation outcomes (Crittenden, Manfredi, Warnecke, Cho, & Parsons, 1998; Morera et al., 1998; Prochaska, Velicer, Prochaska, & Johnson, 2004). This 'readiness to change' item was included for correlation with reported changes in cannabis use and other outcomes at 12-month follow-up (predictive utility; see next chapter). It concomitantly provided a basis for exploring factors respondents attribute to achieving (or not achieving) their expressed goals for quitting or reducing cannabis use. Finally, participants were asked if they would like some assistance to help them cut down/quit their cannabis use.

***Feasibility/acceptability**:* Modeled on a research debriefing interview (WHOAWG, 2002), acceptability and feasibility of cannabis screening among the sample was evaluated with the interviewer-administered 'Participant Feedback Questionnaire' designed for this purpose (Appendix 19). Soliciting frank and honest opinion, the interviewer first asked respondents if they had enjoyed participating, found it helpful, experienced any difficulty answering, or were offended by any questions. As is recommended (Streiner & Norman, 1995; Sudman & Bradburn, 1982) two questions asked respondents to estimate the discomfort and dishonesty other people are likely to experience when answering such questions from their health practitioner, to measure potential response bias. Respondents who believe other people are likely to experience these states when answering such questions are themselves more likely to under-report or be dishonest. Participants were then asked to rate how important it was for their health care provider to know about their cannabis use during health consultations. Finally, participants were invited to make suggestions for improvement to the questionnaire or interview process. Ample time and space was allocated for comments and suggestions.

Procedures

Ethical considerations

Institutional approval for this study was obtained from the Massey University Human Ethics Committee. The progressive incorporation of sample subgroups from diverse settings necessitated multiple applications over a 3-year period commencing August 2002. Health and Disability Ethics Committee (HADEC) approval was gained for participation of publicly funded treatment services. An integral component of the ethical review process was the researcher's comprehensive consultation with all seven regional Māori iwi (tribes) seeking their support, and to address any potential cultural issues in the protocol. Receiving widespread support from iwi kaumatua (elders) and kaupapa Māori organizations for this project was a noteworthy research highlight.

Given the legality issue, the sensitivity of information collected, the heterogeneity of participant characteristics and problem profiles, collaborating sites and recruitment personnel, this research was subject to the whole spectrum of ethical considerations in human research (APA, 1992; HRC, 1998a, 1998b). Ethical, political, legal, and practical constraints precluded universal urinalysis among subgroups. Issues carefully addressed during negotiations with collaborating institutions included: informed consent (particularly for minors under 16 years), participant and institutional confidentiality/anonymity, cultural sensitivity, minimization of harm to participants. Non-coercive recruitment was explicitly stressed. Letters of institutional permission and support, formalizing assurance of confidentiality and no harm/repercussions to befall voluntary participants, including security of completed questionnaires awaiting researcher collection, were received from all collaborating sites.

Recruitment

Participants were recruited over a 21-month period commencing December 2003 (Pilot study), utilizing procedures apposite for population subgroups and recruitment settings. The temporally staggered recruitment strategy featured initial invitation to participate by: clinicians to eligible drug treatment clients; Youth Aid and Probation Officers to at-risk adolescents and adult offenders, respectively; counsellors or campus nurse to

tertiary, work training, and secondary school students, and on-campus A4 invitation poster displays (see Appendix 20). To preserve recruitment integrity among specific subgroups, the researcher provided brief training and checklist-type guidelines for recruitment personnel (see Appendix 21). Additionally, a chain-referral 'snowball sampling' (Biernacki & Waldorf, 1981; Watters & Biernacki, 1989) technique, in which the researcher seeks contacts or referrals from participants to other cannabis users in their social networks, was employed among general population participants. This has been used successfully to access similar "hidden populations" (Biernacki & Waldorf, 1981; Griffiths et al., 1993).

Participation was voluntary. Those interested or seeking further information were provided a package containing an Information Sheet, Consent Form, Annex/Contact Form, the Screening Questionnaire, and a seal-able envelope. Potential participants were fully informed of the research purpose and procedures by their recruiting counsellor and/or were provided this written information in language and format carefully designed for each subgroup (see Appendix 22). The information sheet summarized the study aims and procedures, outlined participants' rights to decline or withdraw, and emphasized participant anonymity and data confidentiality. Volunteer participants were required to sign the appropriate consent form, with clinician certification of competence or recruitment officer and parental/guardian signatures also required for participants under 16 years (Appendix 23). On the annex form participants provided their contact details and those of several locator persons to expedite follow-up tracking and minimize attrition (Cottler, Compton, Ben-Abdallah, Horne, & Claverie, 1996; Desmond, Maddux, Johnson, & Confer, 1995; Walton, Chathapuram, & Reischl, 1998; Wutzke, Conigrave, Kogler, Saunders, & Hall, 2000). Thereafter, code numbers allocated by the researcher were the *only* form of identification used (Appendix 24).

After independently completing the CUPIT, participants sealed it in the envelope and returned it to their counsellor or other designated secure depository for researcher collection. At this juncture, drug treatment clinicians made their diagnoses and ratings, and collected urine samples from their client participants. Laboratory results were posted directly, and remained confidential, to the researcher only. Shortly thereafter the

researcher made contact to arrange interviews at participant-elected times and venues. Interviews were conducted at drug treatment clinics, various interview or counselling rooms, participants' homes, a youth support facility and, occasionally, cafes.

The interview

CUPIT test-retest

Interviews were conducted a mean of 6.30 days (*SD* 1.63; range 4-14) after recruitment. Upon meeting, the researcher reiterated the research aims and procedures, thanked respondents for participating, reviewed adequacy and accuracy of contact details, and provided a copy of the signed consent form. To foster rapport and allay mistrust (especially among younger participants) the purpose of a test-retest exercise was carefully clarified before participants were asked to again complete the draft CUPIT. A sub-sample (n=197, 93%) completed the retest. Time constraints and other commitments prevented the remainder (n=14) completing this component.

Various factors can inflate test-retest estimates, e.g., respondent characteristics and maturity, retest interval, recollection of previous answers, differences in the testing situation, sample size, construct being tested, response bias, difficulty of the items (Kline, 2000; Nunnally, 1978). Any of these may (conceivably) have impacted this test. To minimize practice effects and desire to provide identical information, participants were urged to respond candidly without trying to recall their previous responses, to be as accurate and honest as possible, and to ensure all questions were answered. Reassured of data confidentiality, participants were told that untruthful or careless responses were of little value to the research *or* themselves (Comrey & Lee, 1992). Thirteen younger participants asked the researcher to administer the questionnaire, revealing recruitment personnel had done so at baseline. Another requested his accompanying girlfriend administer the items. Despite being encouraged to do so, others (n=183) did not seek clarification of any item or term meaning, suggesting no difficulties in comprehending and responding to screen items, subsequently confirmed by feedback (see 'Feasibility/Acceptability' section). The researcher scanned completed questionnaires for any missing data before administering the interview schedule. The multiplicity of recruitment subgroups and privacy in which the CUPIT was first

completed obviated recording the time required. A re-administration time of approximately 8-16 minutes, irrespective of respondent subgroup, was observed.

Interview Schedule

The interview schedule took a mean of 60.19 (*SD* = 6.52; range: 50-80) minutes. Respondents were again thanked, and reminded to expect follow-up contact in 12 months. Ample time was allowed for participants' perspectives, requests for further information on the current study, or to share personal cannabis experiences. Those responding "yes" or "don't know" when asked if they would like assistance with reducing their cannabis consumption were provided appropriate brochures and information about services and counsellors available at drug treatment facilities. Completed questionnaires, interview, annex/contact, and consent forms were detached, then locked in separate secure storage to which only the author had access.

Pilot Study

An Ethics Committee stipulation was a satisfactory pilot of the protocol among drug treatment participants to assess protocol viability before the main study. *Every* component in a research protocol must be systematically piloted (Oppenheim, 1992). Observing Nunnally's (1978) tenet that administration conditions simulate or closely resemble those eventually intended ensured this pilot conformed to standardized procedures planned for the main study. The objectives were to:

(1) ensure the instructions, wording, and formatting of questions in all measures were appropriate to, and easily understood by, cannabis users;
(2) obtain preliminary information about respondent reactions to, and views on, procedures and measures;
(3) familiarise clinicians with the process, particularly the rating task;
(4) test that the timeframe required was acceptable;
(5) solicit feedback from clinicians and other staff on any possible ambiguities or flaws in procedures;
(6) invite clinician and respondent suggestions for any modifications for improvement

(Clark & Watson, 1995; Kline, 1998; Oppenheim, 1992; Streiner & Norman, 1995); and

(7) satisfy HADEC requirements.

Over a 3-month period commencing December 2003, nine participants (5 male, 4 female; mean age 33.2 years, range: 20-48) were recruited. Clinician diagnoses included cannabis as the primary lifetime, 12-month, or probable secondary drug problem in all cases, with relatively high (4 or 5) problem severity ratings. While numbers obviate meaningful analysis, clinician and researcher observations, in conjunction with participant feedback, provided more than sufficient evidence of protocol acceptability and viability. Although as anticipated some invitations to participate were declined, there was no missing data, no confusion or difficulties reported in completing the CUPIT, and no objections to providing urine samples, indicating a general willingness to divulge the sensitive information germane to this research.

The interview was similarly problem-free. Although these early interviews exceeded the estimated 45-55 minutes (mean of 68.9, range: 65-80 minutes), familiarity and 'practice' reduced timeframes to an acceptable 60 minutes average. Despite memory prompts provided, one participant reported difficulty with *precise* recall of his 90-day cannabis use in the TLFB component, attributing his memory deficit directly to cannabis. In accordance with the literature, this signaled a phenomenon that arose frequently. Participants unanimously applauded the research aims, and thought data collection "thorough" and potentially "very helpful", particularly for younger users naïve about cannabis' harm liability. No offence whatsoever arising from either screen questions or the interview was reported. Further feedback is discussed in a later section. Clinicians likewise reported no foreseeable difficulties arising with their diagnostic/rating role, involving minimal demands on their time.

The early trend towards lagging recruitment was, however, noted. Recruitment momentum is typically slow in drug research, and the planned multi-site recruitment strategy was expected to attenuate this trend. Hence, given all indications of an

acceptable, viable protocol, the researcher submitted the required Pilot report to the HADEC, receiving final approval for the main study February 2004. Given no protocol changes whatsoever, and the ethical duty to prevent wastage of valuable human and other resources, the main study followed on without hiatus and Pilot data were merged in subsequent analyses.

Main Study

Staggered, overlapping incorporation of participants from all collaborating sites continued over the following 18 months, ending 31 August 2005. Criteria for recruitment termination at this juncture included thesis time constraints (given the 12-month follow-up), overall sample size, and adequate numbers in the subgroups required for planned analyses.

Data Analysis

Analyses were conducted using the commercially available statistical software SPSS for Windows Version 12.0 (SPSS Inc, 2003). Analyses proceeded in 3 continuous stages. First, descriptive statistics and univariate comparisons on participants' demographic, cannabis and other drug use characteristics, CUPIT responses, diagnostic group assignment and cannabis-related problems were generated along with bivariate tests for assessment of reliability and agreement between measures. Second, Principal Component Analysis (PCA) was employed to investigate the factorial structure of the CUPIT, and results used to produce component subscales for use in multivariate analyses. Third, a series of multivariate analyses were conducted to evaluate the psychometric properties of the component subscales and their performance in concurrently discriminating diagnostic group assignment along the cannabis problem severity continuum together with other key outcome measures.

Results

Prior to analysis, all data listings were screened for outliers that may have resulted from missing, mis-keyed, or extreme responses, and the fit between variable distributions and assumptions of multivariate analyses examined using the SPSS Explore procedure (Coakes & Steed, 2003; Hair, Anderson, Tatham, & Black, 1998; Tabachnick & Fidell, 2001).

The vigilant monitoring strategy to ensure no missing data in completion of the CUPIT, the interview, and the self-administered forms, achieved this desired outcome. As earlier noted, those most likely to return missing data (younger, potentially reading-impaired) were either assisted in completing, or had their screens administered, by their recruitment counsellor (e.g., in alternative schools, programmes, or Youth Aid). Others had unfamiliar terminology clarified. Accordingly, missing data was confined to one drug treatment recruit who, declaring he was “sick of talking about drugs in my life”, withdrew before the interview and was appropriately deleted from the main analyses, leaving 211 cases. Analyses-specific screening is reported in subsequent sections.

Results are presented and discussed in two sections that largely correspond with the study’s main objectives: (1) descriptive analyses of sample demographics, item pool responses, cannabis consumption, and prevalence, nature, correlates of cannabis-related problems, and the acceptability/feasibility of screening for these problems, (2) development of the CUPIT, i.e., factorial structure and psychometric properties of candidate screen items and constituent subscales. The chapter is then briefly summarized.

Chapter Six
Preliminary Validation of
Candidate Screen Items

Participant Demographic and Cannabis Use Characteristics, Related Problems and Correlates

Demographics

Major sociodemographic characteristics of the sample are presented in Table 6.1. Participants were 56% male. A marked clustering in age distribution was evident (mean of 20.5; median =16 years; SD = 9.08; range: 13-61). Almost two-thirds (n=138) were 18 years and under (76% of females, 57% of males) while 84% (87% of females, 81% of males) were 30 years or younger. Only 16% (n=34) were over 30.

Most participants (70%) identified as NZ European/Pakeha, 25% as Māori, 5% as both Māori/Pakeha, and one (0.5%) as a Pacific Person. Interestingly, 40% of the sample reported Māori ancestry.

Educational status (47% in school or courses), living arrangements (68% with parents), income source (49% supported by family), and being unemployed (43% of those unemployed or receiving benefits were 18 years or younger) largely reflected the predominantly youthful sample. When occupational status of adult (19+ years) participants (n=74) was classified, 32% were between levels 1-5 (specialty professional, executive, technical, skilled and semi-skilled trades) on the Elley-Irving SES index (1985). The majority (68%) were between level 6 (unskilled labour) and additional levels (7= student; 8= homemaker; 9=unemployed) created for this study. Half of the adults and 42% of adolescents were currently in a relationship. A substantial proportion of those having been in a marital or regular relationship for the past 6 months (38% of adults; 55% of adolescents) claimed their partner used cannabis regularly.

Table 6.1: Sociodemographic characteristics (n=212)

Variable	Total	Males	Females
Gender (%)	100	118 (56)	94 (44)
Age in years (%)			
13 – 14	48 (23)	16 (8)	32 (15)
15 – 16	64 (30)	35 (16)	29 (13)
17 – 18	26 (12)	16 (8)	10 (5)
19 – 20	13 (6)	10 (5)	3 (1)
21 – 30	27 (13)	19 (9)	8 (4)
31 – 61	34 (16)	22 (10)	12 (6)
Mean	20.52	21.97	18.7
Median	16	18	15
SD	9.08	9.90	7.58
Range	(13 – 61)	(13 – 61)	(13 – 41)
Ethnicity (%)			
NZ European/Pakeha	149 (70)	82 (39)	67 (31)
Māori	52 (25)	31 (15)	21 (10)
Māori/Pakeha	10 (5)	5 (2)	5 (2)
Pacific Peoples	1		1
Income (%)			
Student (student allowance, partner/family)	96 (45)	42	54
Full-time employment	27 (12)	18	9
Part-time employment	20 (9)	14	6
Unemployed/government benefits	69 (34)	44	25
Highest education level (%)			
Primary school	13 (6)	9	4
Secondary 1 year	59 (28)	25	34
Secondary 2 years	49 (20)	22	21
Secondary 3 years	49 (50)	34	16
Secondary 4 – 5 years	9 (22)	28	19
No post-secondary qualification	65	24	41
Polytech/trade certificate	58	38	20
Postgraduate degree	3	2	1
Currently in a relationship (%)	95 (45)	54	41
Living with (%)			
Alone	14 (7)	2	12
Alone with children	13 (6)	4	9
Partner with children	19 (9)	10	9
Parents, guardian, relatives	144 (68)	76	68
Flatmates	22 (10)	17	5

Draft CUPIT

Responses to the CUPIT question pool are presented in Table 6.2. Descriptive statistics include percentages for dichotomous items, and mean, standard deviation, and range for continuous items. As evident, the most common 'positive' reasons given for using cannabis included: "cool/fun" (70%), for relaxation/sleep (75%), happiness/laughter (71%), and boredom (66%). Around half reported using for negative reasons: to cope

with problems and stress (52%), relieve negative mood states (49%), or control anger (45%), and a quarter (26%) endorsed 'I can't stop using'. Adolescents were significantly more likely than adults to endorse positive reasons: "cool/fun" (83% vs. 46%), boredom reduction (76% vs. 46%), and because "everyone" used (53% vs. 34%). Nearly three quarters (72%) of the sample indicated using used cannabis on at least 2 days per week over the past 90 days (12-month consumption was comparable), with 36% adolescents and 61% adults using daily/almost daily. Most (84%) respondents reported they typically used at least twice per day (17% used 5-10 or more times), and 70% felt 'stoned' *at least* 3 hours per day.

Items indicative of dependence are noteworthy. Remarkably similar proportions of adolescents and adults indicated that, at least sometimes, they: felt they needed cannabis (87%); had spent time obtaining it (86%); would find it difficult to quit (77%); had used after deciding not to (77%), had smoked more on their own lately (71%), felt irritable and anxious when they could not use (61%), found it difficult to get through a day without cannabis (58%), were unable to stop using (54%) or cut down (47%) when they wanted to. A larger proportion of adolescents (47%) than adults (32%) indicated they 'possibly' or 'definitely' needed more now to get stoned (tolerance).

Cannabis-related problem indicators were also notable. While most (88%) indicated they had combined other drugs with cannabis (93% adults, 86% adolescents), seventy percent (96% adults, 57% adolescents) had driven a vehicle, at least half (67% adults, 51% adolescents) engaged in recreational activities, and over a third (62% adults, 22% adolescents) had operated machinery, while stoned. The majority (76% adolescents, 66% adults) had gone to school or work stoned. At least a third (33% adolescents, 53% adults) reported unprotected sex, and nearly one-fifth (15% adolescents, 23% adults) had used a weapon, after cannabis.

Equal proportions of adolescents and adults endorsed health problems: concentration/memory (88%) and energy loss (82%), paranoia/anxiety (76%), respiratory problems (61%), nausea/passing out (37%) and deteriorated general health (33%). Similar numbers indicated cannabis-induced social problems, such as disrupted

role expectations (61%), regretted using (57%), problems with (55%) and concern expressed by, significant others (51%), neglecting other pastimes (49%), financial problems (35%), and losing friends/partners (30%). Greater proportions of adolescents than adults indicated cannabis-related school/work problems (69% vs. 46%) and injuries (31% vs. 22%), while more adults reported cannabis-related arrests (39% vs. 25%).

Nevertheless, despite independently acknowledging such problems, 39% believed cannabis was neither addictive, nor harmful (33%), and only approximately one-third thought their use level too high (27% adolescents, 46% adults), was ever a problem (33.3% adolescents, 50% adults), or put them at risk (24% adolescents, 35% adults).

Table 6.2: Responses to the draft CUPIT: Percentages, Means, SDS, Range, and Test –Retest Reliability. (n = 212 unless otherwise stated)

	Questions	**Dichotomous Items**		**Continuous Items**			**Test-Retest Reliability***
	Over the past 12 months……	**% Yes**	**% No**	**Mean**	**SD**	**Range**	**(n = 197)**
1.	I use cannabis because ……						
	it's cool/fun; I like the 'buzz'	70	30				0.93
	my friends/everyone uses it	46	54				0.85
	it's easy to get/obtain	45	55				0.78
	it's safer than alcohol	47	53				0.90
	it makes me feel good/better about myself	36	64				0.84
	it helps me fit in, feel part of the group, and relate to others better	17	83				0.82
	it makes me happy / laugh	71	29				0.87
	it helps me cope with problems and stress	52	48				0.84
	I can't stop using it	26	74				0.94
	it makes me hallucinate	14	86				0.85
	it improves my creativity/enjoyment (films, music, crafts, etc)	49	51				0.94
	it makes sex better/more enjoyable	30	70				0.95
	it stops/reduces pain	38	62				0.87
	it helps me relax/sleep	75	25				0.86
	it calms/controls my anger	45	55				0.94
	it reduces boredom / fills in time	66	34				0.87
	it helps me forget/escape bad feelings (loneliness, anxiety, depression)	49	51				0.89
	it helps my appetite	29	71				0.86
2.	On how many days have you used cannabis? (1 = 1-6; 2 = 7-12; 3 = 13-36; 4 = 37-52; 5 = 53-104; 6 = up to 208; 7 = up to 312; 8 = up to 365)			5.47	2.00	1 - 8	0.98
3.	Now please think about your **recent** cannabis use. On how many days have you used cannabis over the past 3 months (90 days)? (0 = no days; 1 = 1-2; 2 = 3-4; 3 = 5-9; 4 = 10-15; 5 = 16-26; 6 = 27-52; 7 = 53-78; 8 = 79-90)			5.76	2.07	0 - 8	0.99

Table 6.2 continued over…

Table 6.2 continued …

	Questions	Dichotomous Items		Continuous Items			Test-Retest Reliability*
	Over the past 12 months……	% Yes	% No	Mean	SD	Range	(n = 197)
4.	How many times would you use cannabis on a typical day when you were using? (1 = once; 2 = twice; 3 = 3-4; 4 = 5-6; 5 = 7-9; 6 = 10 or more)			2.59	1.16	1 - 6	0.91
5.	How much of the average day do you spend/or feel stoned? (0 = 0 hours; 1 = 1–2 hours; 2 = 3–4 hours; 3 = 5–6 hours; 4 = 7–8 hours; 5 = 9 or more hours)			2.22	1.28	0 - 5	0.90
6.	What type of cannabis do you use most often?						
	cabbage/leaf	6	94				0.92
	bush/heads	59	41				0.92
	commercial oil	7	93				0.91
	hash	9	91				0.94
	skunk/hydro	77	23				0.93
	gold oil	21	79				0.72
	head oil	7	93				0.61
7.	On average, how much cannabis would you smoke when you use? (0 = none; 1 = 0-1; 2 = 2-3; 3 = 4-5; 4 = 6-7; 5 = 8 or more)						
	Joints			1.58	1.06	0 – 5	0.81
	Cones			2.38	1.46	0 – 5	0.88
	Spots			2.10	1.81	0 – 5	0.94
8.	Do you need to use more cannabis now to get stoned/high than you did 12 months ago? [A]			1.93	1.51	0 - 4	0.96
9.	Have **any** members of your family / whānau / aiga (including grandparents and other relatives) **ever** been heavy users of, or had problems with, alcohol, cannabis, or any other drugs? (0 = no, not one; 1 = don't know; 2 = yes, at least one; 3 = yes, several)			1.98	1.08	0 - 3	0.96
10.	How often have you used cannabis first thing in the morning? (0 = never; 1 = once or twice; 2 = less than monthly; 3 = monthly; 4 = one day a week; 5 = several days a week; 6 = daily/always)			2.40	2.06	0 – 6	0.95
11.	Did you feel restless, irritable, grumpy, anxious or depressed when you could not use cannabis? [B]			0.92	1.02	0 – 4	0.88
12.	Have you been able to stop using cannabis when you wanted to? [B]			1.73	1.33	0 – 4	0.89
13.	Have you felt that you needed cannabis? [B]			1.54	1.12	0 – 4	0.88
14.	What was the longest time that you went without using cannabis? (1 = 6 months or longer; 2 = 3–5 months; 3 = 1–2 months; 4 = 2–3 weeks; 5 = one week; 6 = 4–6 days; 7 = 2–3 days; 8 = one day; 9 =no days at all)			3.84	1.96	1 – 9	0.91
15.	How often did you try to cut down on your cannabis use, but found you couldn't? [B]			0.69	0.93	0 – 4	0.86
16.	Have you found it difficult to get through a day without using cannabis? [B]			1.03	1.21	0 – 4	0.92
17.	How difficult do you think you would find it to stop using or go without cannabis altogether? (0 = not at all difficult; 1 = a bit difficult; 2 = quite difficult; 3 = very difficult; 4 = impossible)			1.54	1.24	0 – 4	0.91

Table 6.2 continued over…

Table 6.2 continued …

	Questions	Dichotomous Items		Continuous Items			Test-Retest Reliability*
	Over the past 12 months……	**% Yes**	**% No**	**Mean**	**SD**	**Range**	**(n = 197)**
18.	Did you ever use cannabis after you had decided not to? [B]			1.34	1.19	0 – 4	0.93
19.	Have you spent time thinking about cannabis or trying to get cannabis? [B]			1.65	1.17	0 – 4	0.91
20.	Have you given up things you used to enjoy or were important because of cannabis? (e.g., work, school, sports, hobbies, being with family or friends, etc.) (0 = none at all/nothing; 1 = one or two things; 2 = quite a few things; 3 = lots of things; 4 = everything)			0.76	0.97	0 – 4	0.90
21.	How often have you felt bad about or regretted using cannabis? [B]			0.81	0.89	0 – 4	0.94
22.	How often did you feel paranoid (suspicious) or anxious after using cannabis? [B]			1.17	0.95	0 – 4	0.89
23.	Cannabis has made my health …….. (0 = much better; 1 = a bit better; 2 = no effect/no change; 3 = a bit worse; 4 = much worse)			2.16	0.94	0 – 4	0.95
24.	Have you felt sick or passed out (had a "whitey") after using cannabis? [B]			0.39	0.52	0 – 2	0.88
25.	Have you had a cough, sore chest, or breathing problems for any length of time? [B]			0.83	0.87	0 – 4	0.89
26.	Have you lacked the energy to get things done in the way you used to? [B]			1.23	0.97	0 – 4	0.90
27.	Have you had problems concentrating and remembering things? [B]			1.64	1.13	0 – 4	0.92
28.	Have you done any of the following things/activities after using cannabis? (Tick everything that applies to you):						
	driven a vehicle	70	30				0.97
	operated machinery (e.g., power tools, drills, saws, etc)	36	64				0.96
	used alcohol or other drugs	88	12				0.90
	sports/recreation (boating, climbing, swimming/diving, cycling, etc)	57	43				0.93
	gone to work, school	74	26				0.93
	hung out in town	79	21				0.81
	had unprotected sex	40	60				0.97
	used a weapon (knife, firearm, etc)	18	82				0.95
29.	Have you or anybody else been injured after you used cannabis? (0 = no; 1 = yes, once; 2 = yes, several times)			0.35	0.62	0 – 2	0.93
30.	Has anything you had planned, or were expected to do, not happened after using cannabis? (*e.g.,* a family outing, chores, taking care of children, an assignment/homework, appointment, job interview, training, attending school or work, etc) [B]			0.98	0.90	0 – 4	0.89
31.	Did your use of cannabis ever interfere with (get in the way of) your work at school, your job, or your home life? [B]			0.99	1.04	0 – 4	0.90
32.	Has a partner, relative, friend, a doctor or other health worker been concerned about your cannabis use or suggested you cut down?	51	49				0.92
33.	Has your cannabis use ever created/caused problems between you and your partner, parents, other close relative, or friend? [B]			0.88	1.05	0 – 4	0.89
34.	Have you spent more time with friends who use cannabis than non-using friends? [A]			2.56	1.45	0 – 4	0.89

Table 6.2 continued over…

Table 6.2 continued …

	Questions Over the past 12 months……	Dichotomous Items % Yes	 % No	Continuous Items Mean	 SD	 Range	Test-Retest Reliability* (n = 197)
35.	Have you tended to smoke cannabis on your own more than you used to? [A]			1.96	1.59	0 – 4	0.95
36.	Have you lost any friends or partners (boyfriend/girlfriend) because you use/d cannabis? [A]			0.76	1.34	0 – 4	0.95
37.	Did you ever spend more than you could afford or get into serious money problems because of cannabis? [B]			0.63	1.05	0 – 4	0.96
38.	Have you been arrested, even for a few hours, because of your cannabis use? (e.g., for something you did when stoned, or to get money to buy cannabis; for cannabis possession, cannabis supply, etc). (0 = no; 1 = yes, once; 2 = yes, twice or more)			0.43	0.71	0 – 2	0.97
39.	Do you think that cannabis is addictive?	61	39				0.93
40.	Do you think that cannabis can be harmful?	68	32				0.92
41.	Do you think that you use too much cannabis?	34	66				0.93
42.	Do you think that your cannabis use is ever a problem?	39	61				0.87
43.	Do you think you are at risk of getting into problems if you keep on using cannabis as you are now? [A]			1.57	1.40	0 – 4	0.84

KEY

***** Pearson Product – moment correlation coefficients. All correlations were significant at the 0.01 level (2-tailed).

A Item scored on a five-point scale (0 = no, definitely not; 1 = probably not; 2 = not sure/don't know;
3 = possibly/maybe; 4 = yes, definitely)

B Item scored on a five-point scale (0 = never; 1 = sometimes; 2 = quite often; 3 = very often;
4 = always/all the time)

Test-retest reliability

Pearson correlation coefficients between independent responses to the CUPIT at approximately one week interval (mean of 6.30 days; SD =1.63; range 4-14) ranged from a high of .99 (Q. 3, consistency of reporting number of days used cannabis during the past 3 months) to a low of .61 (Q. 6, most often use head oil). A result of at least 0.75 to 0.8 would be expected (Coolican, 1990), with 0.7 regarded as a minimum (Kline, 1998). Hence, item reliabilities were generally in the range of good to excellent. Item-specific reliabilities are presented in Table 6.2.

Cannabis Use

Cannabis use history

The median age of cannabis use initiation was 14 years for the adult and 12 for the adolescent group (see Table 6.3). All the adolescents had tried cannabis by age 16. Regular use (at least weekly) had commenced for most (89%) adolescents and all (100%) the adults at a median of 13 (adolescents) and 17 years (adults), and had persisted for a median of 1.25 years (range: <1-12) and 10 years (range: <1-37), respectively. Adolescents were significantly younger than adults when they first tried cannabis, t (209) = -5.60, p =<. 001, and when they began using regularly, t (194) = -7.76, p = <.001.

Current cannabis use: frequency, quantity, potency

In the TLFB measure of the past 90 days, adolescents reported using cannabis on a median of 45.5, and adults on a median of 80 (both ranges: 0-90) days (see Table 6.3). During this period adolescents reported having consumed a median of 250 'standard' cones (range: 0-3430), and adults a median of 366 cones (range: 0-5365) (see Appendix 13 for discussion of quantification issues). Similarly, over the past 30 days adolescents reported consuming a median of 82 cones on a median of 15 days, while adults consumed a median of 131 cones on a median of 29 days. Adult respondents had used on significantly more days over both 90-day, t (209) = -4.40, p <. 001, and 30-day windows, t (209) = -4.63, p< .001.

Current use was typical of 75% (n=158) respondents' use pattern, with 56% (including 38 adolescents), having used it this way for at least 12 months to more than 5 years, 29% for 6-12 months, and 15% (n= 25, largely adolescents) for up to 6 months. Current use was less frequent than usual for 17% and more frequent for 8% of the sample.

More potent products were commonly used, with 38% reporting 'skunk/hydro' only (42% of adolescents), 15% 'heads'/buds only (15% of adolescents), and the remainder reporting various combinations of these and other products (hash, commercial, and head oil). Few used less potent 'leaf'. Respondents universally considered cannabis "easy" or

"very easy" to obtain. While 26 percent (25% of adolescents) reported buying it from a dealer ('tinny' house) and thirteen percent (15% of adolescents) from friends/relatives, 19 percent (22% of adolescents) were gifted it from friends/relatives. A minority (12%, including 4 adolescents) reported growing their own, and the remainder obtained cannabis from combined sources ('tinny' house and gifted, 34% of adolescents) or "stole it" (adolescents).

Table 6.3: Patterns of cannabis use (n=211 unless specified)

Variable	**Total Sample**	**Adolescents** (<=18 yrs, n=138)	**Adults** (>18 yrs, n=73)
Age of first use (yrs)			
Mean	12.93	11.95	14.53
Median	13.00	12.00	14.00
SD	3.23	1.83	4.49
Range	4 - 32	4 – 16	5 - 32
Every regular use? (weekly +) (%)	196 (92)	123 (89.1)	73 (100)
Age of first regular use (weekly +) (yrs)			
Mean	15.04	13.52	17.60
Median	14.00	13.00	17.00
SD	4.06	1.71	5.40
Range	8 – 40	8 – 17	10 - 40
Number of years regular use (n=195)			
Mean	5.31	1.8	11.19
Median	2.50	1.25	10.00
SD	6.66	1.45	7.85
Range	0 – 37	0 – 12	0 – 37
Days of use past 90 days (TLFB)			
Mean	52.74	46.24	65.04
Median	53.00	45.50	80.00
SD	30.80	29.23	30.09
Range	0 – 90	0 – 90	0 – 90
Days of use past 30 days (TLFB)			
Mean	17.82	15.43	22.36
Median	18.00	15.00	29.00
SD	10.83	10.28	10.46
Range	0 – 30	0 – 30	0 – 30
Quantity used past 90 days (cones)			
Mean	491.58	358.54	743.08
Median	282.00	250.00	366.00
SD	689.22	432.92	964.79
Range	0 – 5365	0 – 3430	0 – 5365
Quantity used past 30 days (cones)			
Mean	171.51	124.62	260.15
Median	97.00	82.00	131.00
SD	247.63	173.08	331.16
Range	0 - 1800	0 - 1590	0 - 1800

Reliability of self-reports of consumption

As universal urine testing was non-viable, respondents' independent reports of frequency of cannabis use over the past 90 days (CUPIT) were triangulated with the same measure elicited via the TLFB interview method (n=211). The correspondence evident in the Pearson correlation coefficient (r=.95, p=<.001) provided further strong support for the validity of self-reports and particularly frequency of cannabis use, a primary predictor in a cannabis screen.

Other Drug Use

In this sample, polydrug use was the norm (see Table 6.4). Alcohol (99.5%) and tobacco (91.5%) had been almost universally tried, the majority (76.8% alcohol and 88.2% tobacco) had used regularly, and most participants (91% alcohol and 92.4% tobacco) had used them in the past month. There were no significant adult/adolescent differences in these use patterns. Over half (57%) of the adolescents reported drinking on at least 1-3 days per week, and most (83.3%) smoking tobacco daily/several times daily, over the past month.

Regular use

Experimentation with other drugs was common, but regular use was not. While sizeable proportions had tried hallucinogens (60%), stimulants (49%), inhalants (41%), 'noss'/nitrous oxide (47%), and 'party pills'/BZP (benzylpiperazine) (48%), use frequency was typically less than one day per week. A notable exception was BZP ('party pills'), with 34% sample reporting using almost weekly, and 7% at least weekly, in the past month. Also noteworthy, adolescents accounted for all past month inhalant/solvent (n=29) and most nitrous oxide (86%, n=43), hallucinogen (79%, n=50), BZP (77%, n=66), and stimulant (67%, n=39) consumption.

Drug problems history

Most (84%) of the sample reported having felt dependent or experiencing a problem with drugs other than cannabis. Interestingly, 63% of this group were adolescents (n=113). The drug most commonly reported (63%) was tobacco (97% of all adolescent

problems), then alcohol (10%), opiates (5%), and stimulants (3%). Problems with remaining drug classes were rarely reported. One in five (20%) reported a problem with more than one drug. Eighteen percent had received treatment for drug/polydrug problems, predominantly alcohol (9%) and opiates (6%).

Family history

Family histories of alcohol and other drug use problems were common, with 83% of the sample (86% of all adolescents) reporting at least one family member had experienced such a problem. More than half (51%) reported a maternal drug problem, two-thirds (65%) a paternal problem, and 62% had a sibling with drug problems. These problems were most likely to be alcohol or cannabis, or both. Almost one-third of adolescents (30%) reported their parent/s used cannabis regularly.

Table 6.4: Other drug use (n-211)

Substance	**Ever Used %**	**Ever Regular Use %** (at least weekly)	**Used Past Month %**
Alcohol	99.5	76.8	91.0
Tobacco	91.5	88.2	92.4
Ecstasy	20.4	4.3	5.7
Opiates	17.5	8.1	7.6
Cocaine/Crack	10.9	1.4	0.9
Stimulants	49.8	13.3	17.5
Benzodiazepines	18.5	9.5	7.1
Hallucinogens	60.2	14.2	19.4
Inhalants/Solvents	41.2	15.2	13.7
Nitrous Oxide/'Noss'	47.4	15.6	23.7
BZP/'Party Pills'	47.9	14.7	40.8

Clinician Assessment of Drug Treatment Participants

Drug treatment recruits (n=36) were aged 18-61 years. Clinicians also assessed two female students (both 15 years) at school and 2 males (aged 20 and 22) at youth facilities, yielding a subgroup of n=40 (27 male, 13 female).

Primary drug problems

Past year primary drug problem was assessed as 52.5% cannabis, 20% alcohol, and 17.5% opiate dependence. The remainder (7.5% each) had comorbid problems: cannabis and opiates, alcohol and hallucinogens, opiates and benzodiapezines. According to clinician reports, probable secondary drug problems (n=25) were also primarily cannabis (52%), then tobacco (20%) alcohol (16%), and benzodiazepine (8%) dependence. Similarly, lifetime drug problems (n=34) were largely cannabis (44%), followed by alcohol (18%), opiates (15%), and the remaining 23% were polydrug. Clients' own view of their primary problem, however, was 32% cannabis, 26% alcohol, 26% opiates, and 10% polydrug. Six percent (n=2 males) considered they didn't have a drug problem.

DSM-IV criteria checklists and severity ratings

On the DSM-IV criteria checklists, clinicians scored participants (n=40) a mean of 2.28 (*SD*=1.26, range: 0-4) cannabis abuse, and a mean of 4.13 (*SD*=2.16, range: 0-7) cannabis dependence criteria satisfied. Overall, participants were scored a mean of 6.40 (*SD*=3.26, range: 0-11) symptoms. On the cannabis problem severity scale, clinicians rated almost all this group (92.5%) as at least having some problems or using in risky ways. Specific ratings were:

1=	non-problematic use	7.5%
2=	risky use/some problems	5.0%
3=	harmful use/abuse	12.5%
4=	mild to moderate dependence	45.0%
5=	severely dependent/problematic	30.0%

Reliability of self-reported cannabis use

Spearman correlation coefficients were calculated to assess the correspondence between treatment participants' self-reports of cannabis consumption over the past 30 days (TLFB frequency/quantity measures) and the biochemical verifiers (n=40). As discussed earlier, these laboratory tests are screening procedures only and, because of wide inter-individual variation in physiology, provide only a preliminary indication of recent cannabis use from urinary cannabinoids. The mean of urinary cannabinoid

metabolites detected was 2174.75nmol/L (*SD*=1324.92nmol/L, range: 0- 4500nmol/L). The laboratory reported two cases of creatinine concentration levels indicative of intentional specimen adulteration (dilution). Nonetheless, results showed good correspondence between the biochemical test and self reports of number of days used (Υ_s = .43, *p* =.01) and number of cones consumed (Υ_s =.37, *p* =.02). Notwithstanding possible underestimates, this parity suggests a low likelihood of under-reporting consumption or other bias, lending credence to the reliability of self-reports.

Cannabis Use Disorder

The CIDI-Auto 2.1 interview

DSM-IV and ICD-10 12-month diagnostic information generated by the computerized scoring algorithm is presented in Table 6.5. Seventy-two percent of the sample qualified fora 12-month DSM-IV diagnosis of cannabis dependence, while 19% were diagnosed with cannabis abuse. Sixty-eight percent obtained both diagnoses. As Table 6.5 shows, similar sample and subgroup proportions qualified for a 12-month ICD-10 diagnosis of cannabis dependence, harmful use, and both categories. Convergence of the two systems' criteria results in multiple (overlapping) diagnostic combinations. Only 17 participants (8%) had no diagnosis. Of these, 12 adolescents (6%) were 'diagnostic orphans' (met one or two dependence criteria only) while 5 (2%) reported no symptoms.

The sample mean of total (dependence/abuse) symptoms was 6.4 (*SD*= 3.26, range: 0-13). Adolescents endorsed a mean of 6.2 (*SD*=3.5, range: 0-13), while adults endorsed a mean of 6.6 (*SD*=2.9, range: 0-13) symptoms. The most frequently endorsed criterion overall (78% sample) was use in hazardous situations. Almost three quarters (73%) endorsed using more or over longer periods than intended and two thirds (66%) endorsed a great deal of time spent obtaining, using or recovering. Similar proportions (63%) reported a persistent desire, or unsuccessful efforts, to cut down or control use. More than half endorsed continued use despite psychological problems and tolerance development. Other criteria of interest include: 47% reporting a strong desire (compulsion) to use, and 34% withdrawal symptoms. With the exception of recurrent

cannabis-related legal and medical problems (as expected), all other criteria were endorsed by at least one third of the sample.

Most of these symptoms were current: 76% had experienced their most recent symptom within the past month, 16% within 6 months, and the minority (8%) 6-12 months ago. There were no adult/adolescent differences in the likelihood of having experienced any criteria other than adolescents being more likely to report cannabis interfered with their work at school, job, or home than adults (47% vs 24%), $\chi^2(1, N=211) = 9.16$, $p=.002$, while adults were more likely to report withdrawal symptoms (45% vs 28%), $\chi^2(1, N=211) = 5.37$, $p=.021$.

In terms of a potential trajectory to clinically relevant cannabis use disorder, criteria endorsed by the 12 ‘diagnostic orphans’ are of interest (Rosenberg & Anthony, 2001). Most (n= 9) endorsed ‘persistent desire or unsuccessful efforts to quit/reduce use’ (indicative of impaired control over use), with three of these also endorsing ‘periods of heavier or longer use than intended’. The remaining 3 diagnostic orphans endorsed the latter criterion only.

Table 6.5: Proportions (%) of adolescents and adults meeting 12-month DSM-IV/ICD-10 diagnoses, and each of the criteria, for Cannabis Use Disorder on the CIDI-Auto (n=211 unless specified)

Variable	Total Sample (n=211)	Adolescents (<=18 years) (n=138)	Adults (>18 years) (n=73)
12-month DSM-IV diagnoses			
Cannabis Dependence (n=151)	72	68	78
Cannabis Abuse only (n=40)	19	20	18
Cannabis Dependence and Abuse (n=144)	68	66	73
12-month ICD-10 diagnoses			
Dependence Syndrome (n=147)	70	67	75
Harmful Use only (n=14)	7	4	11
Dependence Syndrome & Harmful Use (n=131)	62	57	60
No diagnosis (n=17)	8	12	1
'Diagnostic orphans' (n=12)	6	9	0
No symptoms/criteria (n=5)	2	3	1
Dependence Criteria Met (n=207)			
Tolerance: need more to achieve desired effect (or) same amount has less effect.	53	54	51
Withdrawal symptoms when cut down (or) use to avoid/relieve symptoms.	34	28	45
Used more, or over longer periods, than intended.	73	70	79
Strong desire to use/compulsive use.	47	43	54
Persistent desire, or unsuccessful efforts to cut down or control use.	63	62	65
Great deal of time spent using, obtaining, or recovering.	66	62	72
Important social, occupational, or recreational activities given up or reduced because of cannabis use.	32	32	32
Continued use despite persistent cannabis-related medical problems.	26	22	32
(or)			
Continued use despite persistent cannabis-related psychological problems.	55	50	64
Abuse/Harmful Use Criteria Met			
Interfered with role obligations at work, school or home.	39	47	24
Recurrent use in physically hazardous situations.	78	75	83
Recurrent legal problems.	26	28	23
Recurrent social/interpersonal problems caused or exacerbated by cannabis use.	44	49	35
Most Recent Symptom(s) (n=194)			
Within the past month.	76	80	71
1 to <6 months ago	16	16	15
6 – 12 months ago/within past 12 months.	8	7	8

Concordance between CIDI-Auto and clinician assessments

A Pearson correlation coefficient calculated to determine agreement between total number of DSMIV/ICD10 symptoms elicited by the CIDI-Auto interview and symptoms clinicians accorded treatment participants (n=39) indicated good correspondence (r=.63, p=<.001). One (only) drug treatment participant was assigned to the 'no diagnosis' group by the CIDI-Auto algorithim. A Student's *t*-test was thus appropriate to examine concordance between 5-point clinical ratings of cannabis problem severity and CIDI-Auto diagnostic assignment of the 'abuse/harmful use' (mean of 1.50, *SD*=1.00) and 'dependence' groups (mean of 4.12, *SD* =0.84). Results confirmed a significant difference in mean clinical ratings across the groups in the expected direction (abuse/harmful use<dependence), t (36) = -5.77, p =<.001.

The Severity of Dependence Scale (SDS)

The sample's mean SDS score was 4.26 (*SD*=2.73, range: 0-14). Calculated by age-group, adolescents' mean was 4.05 (*SD*=2.42, range: 0-12) and adults' mean was 4.64 (*SD*= 3.23, range: 0-14). Applying the cut-off of 3 found to optimally discriminate cannabis dependence among adult users (Swift et al., 1998a, 2000) classified 63% of adults (n=46) as dependent. Similarly, the cut-off of 4 found to optimally discriminate cannabis dependence among Australian adolescents (Martin et al., 2006) classified 53% of adolescents (n=73) as dependent. There were no differences in SDS score by adolescents/adults, or gender (mean of 4.56 for males, range: 0-12; mean of 3.87 for females, range: 0-14).

Item-specific responses were noteworthy. Similar proportions of adolescents and adults (42%) had at least sometimes thought their cannabis use was out of control over the past 6 months, or felt anxious at the prospect of not having cannabis (54%). Almost three quarters (73%) had worried about their cannabis use at least a little (74% of adolescents), had wished they could stop (69%; 72% of all adolescents), or believed they would find it at least 'quite difficult' to stop or go without (72% of adults and adolescents).

Health

General health

The majority (75%) rated their general health between 'good' to 'excellent' over the past 3 months, and 25% as 'fair' or 'poor'. In this period, over half (55%) had consulted their doctor or health specialist for medical (43%), psychiatric (8%) or injury (4%) reasons.

Half the sample (51%) reported a long-term medical condition. One in five (21%) had respiratory problems (asthma, allergies), 7% other medical conditions (epilepsy, heart, cancer), and 5% injury-related chronic pain. Eleven percent acknowledged psychiatric conditions (anxiety, depression, ADD/ADHD) and 3% schizophrenia. A small minority (4%) reported AIDS, HIV, or Hepatitis C. A larger proportion (60%) reported *current* respiratory problems or concerns, such as asthma/bronchial congestion (43%), cough/phlegm (34%) tight/wheezy chest (21%) and persistent chest infections (2%).

Psychological health

More than two-thirds (70%) had *ever* consulted a psychologist or other mental health professional, with 31% hospitalised or prescribed medication, for a psychological condition. Treatment/medication for affective disorders (anxiety, depression, bipolar, PTSD, and suicidal ideation) was most commonly reported (59%), followed by ADHD/ADD (23%), schizophrenia (11%), methadone maintenance (6%), and drug detoxification (1%). A sizeable minority (17%) of the sample was currently taking medication for a psychological condition; 55% were affective disorders, 19% ADHD/ADD, and 11% schizophrenia. Around one in seven particpnats (15%) were on a methadone maintenance programme.

Current psychological health was assessed by the BSI 18, which presents information on three primary symptom subscales (somatization, depression, anxiety) and one summary measure (Global Severity Index) of past week functioning (Derogatis, 2000). Standardized scores were converted into T-scores before applying the general formula for 'caseness': GSI T-score =>63, or any 2 subscales T-score=>63 (Derogatis, 2000).

Twenty-five had GSI scores and one 2 subscales meeting the clinical cutoff, suggesting 12% (n=26; 13 adolescents, 13 adults) of this sample were cases. A further 8% (n=16) scored in the clinical range on individual dimension scales: somatization (4%), depression (2%) and anxiety (1%). Thus cumulatively, score profiles suggested 20% (23 adolescents, 19 adults) met Derogatis' (2000) definition of 'caseness' or positive risk for psychiatric problems that warranted intervention.

Cannabis-Related Problems

Current problems

When asked to identify medical, psychological, or cognitive/thinking problems they *directly* attributed to cannabis use over the past 12 months, almost all (87%) respondents spontaneously reported problems, most (80%) reporting multiple sequelae. Problem categories most frequently reported were cognitive/thinking (specifically memory and/or concentration) impairments (84% of all cases), followed by paranoia (62%), amotivation and energy loss (59%), depression (15%), medical problems (lungs/chest, nausea, seizure) (13%), and anxiety (9%). Less frequently reported were anger and aggression (5%), psychosis (4%), low self-esteem (5%), and 'supported other drug use' (2%).

Problems ever experienced

A similar pattern emerged in cannabis-related problems *ever* experienced, with 83% acknowledging problems. A third (32%) reported more than one problem. In decreasing frequency, unprompted reports included: couldn't stop using (26% of all cases); trouble with the police (26%); interpersonal (family, partner) problems (23%); school problems, expelled or suspended (17%); educational impairment (13%); financial problems (9%); medical (respiratory, seizure) problems (8%); imprisonment for cannabis offences (6%); injured while stoned (5%); psychiatric (schizophrenia, depression) problems (3%), and caused aggression/fighting (3%).

Chapter Six
Preliminary Validation of
Candidate Screen Items

Cannabis Problems Questionnaire

The 53-item CPQ (adults) and 58-item CPQ-A (adolescents) assessed cannabis-related problems over the past 6 months (see Appendix 17, 18). Scored dichotomously, both feature 29 (30) 'core' items, and 24 (28) further items grouped into three (four) age-appropriate topic areas i.e., marital, children, work issues (adolescent: parental, relationship, school performance, work issues). Two adolescents aged 18 years completed the adult version (n=75), and the remainder the CPQ-A (n=136).

All participants completed a 'core' scale. Adults scored a mean of 11.75 (*SD*=5.18, range: 0-23) and adolescents a mean of 11.76 (*SD*=5.30, range: 0-23). Problems most commonly reported were driving while 'stoned' (92% adults, 56% adolescents), spending more time with smoking friends (76% adults; 81% adolescents), and feeling paranoid/antisocial after smoking (83% adults; 68% adolescents). At least half endorsed health problems, e.g., pains in chest/lungs after smoking (53% adults; 50% adolescents), energy loss (69% adolescents), and 44% reported poorer general health. Approximately one-third of adolescents reported persistent chest infections/cough (38%), being sick/passing out after smoking (33%) and weight loss (36%). Psychological/motivational concerns included loss of concentration (72% adolescents), motivation (58% both groups) and interest/enjoyment in usual activities (34% adults; 47% adolescents). While more than a third (43% adults; 34% adolescents) had felt depressed for more than a week, one in five (20%) had felt like doing away with themselves.

Social problems reported were smoking more on their own now (55% adults; 43% adolescents), losing touch with family/friends (32% both groups), and being criticized by friends for smoking (30%). Approximately a third of participants (37% adults; 30% adolescents) reported having been in trouble with the police for smoking cannabis. Similar proportions reported cannabis-related money problems. A sizeable minority reported having had accidents while stoned (16% both groups), and having been in prison (20% adults; 9% adolescents) for cannabis-related offences.

Smaller subgroups completed the topic-specific scales where applicable. Adult respondents scored a mean of 2.88 (*SD*=1.95, range: 0-7, n=26) on the 'marital problems' scale, and a mean of 1.62 (*SD*=1.56, range: 0-5, n=21) on the 'children problems' scale. Spouse complaints (58%) and arguments (50%) over cannabis use were most common. Of interest, 39% reported their spouse used cannabis regularly. One-third (33.3%) reported their children criticized, argued with, and avoided them when smoking. Similarly, adolescents (n=129) scored a mean of 2.78 (*SD*=1.45, range: 0-5) on the 'parental issues' scale. Approximately 60% of parents had complained, argued about, and tried to stop them using cannabis. Most (73%) avoided their parents after smoking. Nearly one-third (27%) reported having a parent/s who used cannabis regularly. Adolescents in a relationship (n=73) scored a (lesser) mean of 1.53 (*SD*=1.23, range: 0-5) on the 'partner issues' scale. Not unexpectedly, more than half (54%) reported having partners using cannabis regularly.

Cannabis-related school issues (n=117) were of particular interest: a mean of 5.50 (*SD*=2.39, range: 0-9) problems were endorsed. Adolescents reported attending classes stoned (82%); losing interest/motivation in schoolwork/study (78%) and ability to concentrate (79%); smoking on school premises (64%); teachers complaining about their work (57%); getting lower marks/grades (55%); being unable to complete homework (51%) or attend classes (44%) because of smoking cannabis. More than a third (35%) had been suspended or disciplined because of cannabis.

Finally, adults (n=38) reported a mean of 2.63 (*SD*=1.81, range: 0-8, n=38) and adolescents (n=26) a mean of 3.15 (*SD*=1.67, range: 0-6) cannabis-related employment problems. Going to work 'stoned' (74% adults, 85% adolescents) was most commonly reported. More than a third of adults and adolescents reported being late/absenteeism, (up to 46% adolescents), less interested in their work (39% adolescents), and impaired performance (up to 37%), because of cannabis. A substantial minority had been formally warned by their employer (23%), dismissed (12%), or had accidents at work (12% adults, 5% adolescents) after smoking.

Problem or Risk Perception and Future Use

While most respondents (68%) had previously attempted to moderate or quit their cannabis consumption, the majority (83%) had not sought professional help to achieve this. Help-seekers (17%, n=25) primarily attended drug treatment or school counselling services. Not one help-seeker approached their doctor. Furthermore, less than half (42%) of the sample had been questioned about or discussed their cannabis use with a practice nurse, doctor, or counsellor.

When asked if they thought their cannabis use was *currently* a problem for them, 45% of the sample responded "no, definitely not", 24% "probably not", 16% "possibly/maybe" and 15% "yes, definitely". However, when asked if they thought they were *at risk* of developing a cannabis use problem if they maintained current use levels, response patterns shifted. More than a third (36%) perceived they were "possibly/may be", or 23% "definitely", at risk. Smaller proportions perceived they were "probably not" (19%) and "definitely not" (21%) at risk. One respondent was "unsure".

Predicting 12-month use

Respondents were asked to describe their personal goals or intentions for their cannabis use over the next year from a list of statements approximating the Stages of Change Model (Prochaska & DiClemente, 1983). Responses were used to assign respondents to their current (theoretical) stage of 'readiness to change', as follows: Action 24%; Preparation 19%; Contemplation 24%; and Precontemplation 33%.

Stage designations suggest the majority (57%) were either not considering stopping or cutting down (33% 'Pre-contemplators'), or would like to stop or cut down but were ambivalent about their readiness to do so (24% 'Contemplators'). While almost one in five were currently preparing to reduce their consumption (19% Preparation), nearly a quarter claimed to be actively reducing their use when interviewed (24% Action). There were no significant differences in stage designation by adolescent/adult age group, $\chi^2(3, N=211) = 6.9$, $p=0.07$ or gender, $\chi^2(3, N=211) = 6.6$, $p=0.09$.

Finally, when asked if they would like some assistance to help them cut down or quit cannabis use most participants (79%) said they did not desire assistance. A sizeable minority (18%, n=39) indicated they would like some help, and 3% (n=6) were unsure.

Acceptability/Feasibility of Cannabis Screening

The debriefing interview (n=201) indicated virtually all respondents (97%) enjoyed participating in this research, and 98% found it beneficial. Those reporting otherwise attributed this to discomfort from raised awareness of their cannabis problem. Notably, all respondents (100%) considered the questions acceptable, appropriate, and non-offensive. While most (92%) reported no difficulty understanding and answering the questions, not one respondent among those reporting some difficulty cited any CUPIT items or terminology. Rather, terms specified (particularly by younger participants) derived from various interview components, e.g., the SDS ("prospect"), the CPQ/CPQ-A ("debts", "pawned", "personal isolation and detachment") and the BSI-18 ("nausea", "keyed up", "worthlessness"). Others (n=8) reported problems recalling their cannabis intake over 90 days (TLFB procedure), directly attributing this to cannabis-induced memory loss. As heretofore signaled, this phenomenon was pervasive in this research.

Responding to the two projective items measuring potential response bias (denial or problem minimization), 67% thought most people would be "very comfortable" or "quite comfortable" when answering similar questions from their health care provider. One third were "unsure" (31%) or thought others would experience discomfort (2%). Similarly, 59% thought most people would be either "quite honest" or "very honest" when answering such questions. A sizeable group (38%, n=70) were "unsure" and only 3% (n=6) thought most people would be "quite dishonest". Researcher probes clarified that virtually all "unsure" respondents perceived the legality issue as *the* major barrier to honest, open dialogue between users and health professionals. Interestingly, several opined that "it depends on the individual", citing such factors as "guilt", "denial", "lack of awareness/education", "underestimate own use levels" for dishonest reporting. The majority (92%) rated it "very" or "quite important" that the user's health care provider knows about their cannabis use, with only 12 (6%) being "unsure" how important, and 3

(2%) rating “not very important”. A one-way multivariate analysis of variance investigated possible age-group differences in responses to these 3 questions using a Bonferroni adjusted alpha level of .017. Respondents aged <=16 years rated others less likely to be “comfortable” F (1, 200=7.27, p. 008) or “honest” F (1, 200= 11.08, p<.001) when answering questions about their cannabis use than did older respondents. However, there were no significant age-group differences in perceived importance of health care providers knowing about their cannabis use.

Although invited to do so, most (95%) of the sample offered no suggestions for possible improvements to the questionnaire or research process. Moreover, rather than the research *per se*, suggestions for ‘improvement’ (n=8) targeted the prohibition context wherein an “unjust law denies users the right to our own drug of choice”. “Decriminalize!” (or) “legalize cannabis!” characterized this group. Another suggestion (n=3) was that harm reduction education/technology (such as vaporizers) should be freely available through primary health care. Half the sample (n=105) made overwhelmingly positive comments, saluting the research aims and expressing personal satisfaction in contributing to this “exciting project”. They considered the overall content “thorough” or “very comprehensive”. It “asked all the right questions” and “pretty much has it sussed”. Only one “found it a bit repetitive”.

The content, graphics, and layout of the CUPIT gained wide approval (e.g., “cool”, “sweet as”, “great”, “fun” “so *true*!” and “spot on”), particularly from adolescents. Respondents frequently offered their “thanks for the invitation to participate” in such an “enjoyable”, “worthwhile” “helpful”, “therapeutic” interview - an “intervention in itself”- that (typically) had “made me reflect/introspect, and evaluate where cannabis is taking my life - *nowhere*!” (These questions) “are certainly *telling* me something!” Nine long-term users lamented that it was “the first time *ever* someone has questioned me about my cannabis use in such detail”. Had their GP “asked me these questions and intervened *years* ago, I would be in better health today” (or) “I might not have developed the chronic use pattern/problems that I did”. These older respondents stressed the need for *early* intervention (e.g., raising awareness, education) among “too cocky kids” who “don’t fully appreciate cannabis’ harm/dependence liability”: the “health

aspects *must* be emphasized". One respondent's exhortation captures the urgency: "Get this screen *out there*!" (*sic*).

Discussion

Over a 21-month period this study ultimately succeeded in recruiting a heterogeneous group of past year cannabis users from across the spectra of age (13-60+ years), use and problems continua, and settings. Although Māori were over-represented compared to the general population (25% vs. 14.6% Māori; 2006 Census of the New Zealand Population, Statistics New Zealand, 2006), this is reflective of generally higher cannabis use among Māori (Dacey & Barnes, 2000). NZ/European (70% vs. 78.7%) and Pacific Peoples (0.5% vs. 6.9%) were under-represented and Asian and 'other' ethnic groups not represented. The youthful sample profile, particularly females (76% under age 18), accords with at risk cannabis user demographics identified in drug use surveys (Wilkins et al., 2002, 2005; MOH, 2002b), the youth focus advocated for targeted screening (Anthony, 2000; NHC, 1999, Smart, 1992; MOH, 2002c; Spooner, 1999) and the aims of this research. Studies have shown more rapid development ("telescoping") of dependence problems in adolescents (particularly females) than in adults, even at relatively low use levels (Chen et al., 1997; Coffey et al., 2000; Perkonigg et al., 1999; Reid et al., 2000). With 44 percent using daily/near daily, this sample over-represents the very small proportion of the population who use cannabis regularly (3%) or daily (1%) (Wilkins et al., 2002).

While not directly comparable, this sample was considerably younger than in other screen development research reviewed (e.g., CASST, CUDIT, MSI-X), with two-thirds under 18 and a median of 16 years (mean 20.5 vs. 31.0 CUDIT). Other dissimilarities include increased ethnic (40% with Māori ancestry vs. 21% CUDIT) and gender (44% female vs. 41% CUDIT) representation, less well-educated and employed participants (21% vs. 61.5% CUDIT) with predominantly low socioeconomic status (79% on benefits/allowances or dependent on family).

Chapter Six
Preliminary Validation of
Candidate Screen Items

With all these characteristics and the non-viability of probablity sampling in this population, this sample was arguably reasonably representative of at risk cannabis users in New Zealand. The cannabis and other drug use patterns, diagnostic status, and the volume and magnitude of use-related health and social problems compellingly portray a high risk, cannabis use-disordered sample. Familial drug problems often involving cannabis (86% adolescents), and regular parental use (30%), suggest that many of these young people were/ are raised in "cannabis environments" where cannabis use is "normalized" (Durie, 2001). In this study, an inter-generational use pattern was evident in familial referrals from the 'snowballing' recruitment strategy and in several cases of recruitment of parents *and* their offspring, albeit independently and without each others' knowledge. Reflecting the universal trend towards younger initiation, regular use and dependence, compared to New Zealand general population (Willkins et al., 2002, 2005), birth cohort (Fergusson & Horwood, 1997; Fergusson et al., 2006; Poulton et al., 1997, 2001) and other adolescent (AHRG, 2003; Regional Public Health, 2000) samples, as well as their adult counterparts in this research, adolescents had initiated cannabis earlier (mean of 12 years, range: 4-16), begun using regularly earlier (mean of 13 years, range: 8-17), and become dependent earlier.

Currently using more potent products on at least 2 days (53%) and up to 5 or more days (36%) per week, and feeling 'stoned' *at least* 3 hours per day (65%) puts adolescents clearly at risk of manifold harms, a vulnerability amplified by other drug use. Most adolescents (83%) reported smoking tobacco several times daily and over half (57%) were concurrently 'binge' drinking on at least 1 to 3 days per week, a combination that synergistically increases cannabis' potency and harm potential (Eggington & Parker, 2002; Reid et al., 2000). One 14-year-old female's memo exemplifies the hazards, "I do it mainly when I drink or wen Im drunk" (*sic*). Furthermore, while adolescents accounted for most other drug use reported (inhalants, hallucinogens, stimulants), 'party pills'/BZP (benzylpiperazine) use was substantially higher in this sample than rates recently reported in the general population (48% vs. 20%; Wilkins, Girling, Sweetsur, Huckle & Huakau, 2006). Whereas 61 percent of the population sample had since stopped using BZP, 41 percent of this sample (77% were adolescents) were currently using BZP regularly.

Not surprisingly, these risky consumption patterns were coterminous with highly prevalent diagnoses of DSM/ICD cannabis use disorders, with the majority (72%) satisfying dependence, a further 19 percent abuse/harmful use, and two-thirds both diagnoses. Moreover, 12 of the 17 with no diagnosis were 'diagnostic orphans' (Hasin & Paykin, 1998, 1999; Pollock & Martin, 1999), hence just under the diagnostic threshold. Only 5 participants were symptom-free. Given no significant differences by age or gender in either number of criteria endorsed or severity of dependence (SDS), adolescents in this sample appeared equally (and perhaps even *more*) disordered than their older, longer-using counterparts. This is consistent with adolescents' compressed development of dependence noted above, with the symptoms constellation (felt needed cannabis, would find it difficult to quit, felt anxious when couldn't use) indicative of the compulsivity of consumption.

With grave societal implications, the most commonly endorsed DSM/ICD criterion, 'recurrent use in hazardous situations' such as driving, highlights adolescents' (78%) exposure of self and others to potentially serious harm (Adlaf, Mann, & Paglia, 2003; AHRG, 2003; Fergusson & Horwood, 2001). Non-licensed adolescents confided causing "cool crashes" then fleeing the scene, when stoned. Equally vexatious was almost universal reporting of loss of memory/concentration (88%) and motivation and energy (82%), jeopardizing adolescents' educational and employment prospects (Fergusson et al., 2003; Lynskey & Hall, 2000). Regrettably, these detrimental forces were already manifest in ubiquitous cannabis-related school (up to 82%) and work problems reported, poignantly captured in one 13-year-old female respondent's plight, "cannabis has made me dumb…and I can't stop using it!" An unemployed 15-year-old school leaver wanted to cut down so she could attend a (drug-tested) course, but was "finding it too difficult". Several unemployed youth reported cannabis use was making it impossible for them to get a job, with workplace drug screening and random testing an obstacle to their employment prospects. More than one-third (35%) reported cannabis-related school suspensions, often multiple. These adolescents are particularly vulnerable, since exclusion from school represents the first step in exclusion from society for many young people (Blyth & Milner, 1993; Hayden, 1994; Powis, Griffiths,

Gossop, Lloyd, & Strang, 1998). As participating school counsellors typically commented, "cannabis use is a *huge* problem in our secondary schools". Role disruption, neglect of other pastimes, family/partner, and financial and legal problems exacerbated cannabis users' 'problems' profiles.

Health problems (Hall et al., 1999, 2001; Kalant et al., 1999; WHO, 1997a) were similarly pervasive, with 55 percent of the sample reporting recent health care consultations. Fifty and 14 percent, respectively, had a chronic medical or psychological condition. Alarmingly albeit not surprisingly, the majority (61%) reported respiratory concerns and many adolescents (44%) deteriorated general health. Psychiatric problems were also relatively common. Consistent with "emotional anaesthesia" implicit in self-medication user reports (Lundqvist, 1995; Stephens et al., 1994), over half reported using cannabis to relieve negative mood states or cope with personal problems/stress. Finally, the BSI 18 (Derogatis, 2000) classified one in five as having clinically-relevant psychiatric problems requiring treatment.

Of utmost concern, however, despite voluntarily acknowledging all these problems many younger participants appeared to have little knowledge or insight (and frequently none whatsoever) into cannabis' dependence/harm liability *or* its role in their life problems. Fortunately, however, encouragement can be drawn from respondents' overwhelmingly positive reception and commendation of this research, an unambiguous indication of the acceptability and feasibility of screening for cannabis use problems among this heterogeneous population. Moreover, respondents' overt acceptance of, and identification with, candidate CUPIT questions augured well for item reduction and further development of the screen that followed. These developmental analyses are reported in the next section.

Development of the CUPIT

Following hierarchical steps in authoritative guidelines (Clark & Watson, 1995; Comrey & Lee, 1992; Floyd & Widaman, 1995; Gorsuch, 1983; Kline, 1998; Nunnnally & Bernstein, 1994; Pett et al., 2003; Streiner & Norman, 1995), screen development procedures incorporated preliminary item analysis (IA) followed by Principal Component Analysis (PCA) for item selection and reduction. In tandem, this analytic strategy aimed to: (a) eliminate from initial analyses poorly distributed or otherwise unsuitable items (b) establish the underlying structure of surviving items (c) extract maximum variance from the items (d) identify the most parsimonious solution (fewest possible constructs/factors needed) to reproduce the original data, and (e) select homogeneous, discriminating items (empirical indicators) most related to the factor/s. The psychometric properties of the component scales were then determined.

Exploratory Factor Analysis (EFA): A rationale

As earlier noted, in addition to an (optimal) heterogeneous sample, this research also met both sample and minimum subject/variables ratio (STV 5:1) required (see MacCallum et al., 1999; Velicer & Fava, 1998). Without *a priori* model specification, PCA is typically employed for data condensation and prediction purposes, representing all the variance of the observed variables while addressing collinearity (Cortina, 1993; Fabrigar et al., 1999; Floyd & Widaman, 1995; Gorsuch, 1997; Hair et al., 1998; Kline, 2000; Nunnally, 1978). Despite considerable debate over which exploratory factor model (component vs. common factor) is the more appropriate (Cattell, 1965; Gorsuch, 1997; Fabrigar et al., 1999; Mulaik, 1990; Pedhazur & Schmelkin, 1991) both arrive at essentially identical substantive conclusions in most applications using 30+ variables (Nunnally, 1978; Stevens, 2002; Velicer & Jackson, 1990). Moreover, factor 'indeterminancy' and other complications associated with CFA rendered PCA the appropriate approach (Comrey & Lee, 1992; Hair et al., 1998; Nunnally, 1978). Some (e.g., Cattell, 1965; Gorsuch, 1997; Pedhazur & Schmelkin, 1991) claim PCA 'inflates' correlations among variables by utilizing all variance available. Albeit, in this research the different direction of skewness for different variables (some + some -) results in a

weakened analysis due to attenuated correlations (Gorsuch, 1997; Tabachnick & Fidell, 2001).

A schism also characterizes choice of orthogonal vs. oblique rotation (see Cattell, 1978; Fabrigar et al., 1999; Gorsuch, 1997; Pedhazur & Schmelkin, 1991). In orthogonal rotations the axes maintain their 90-degree separations and their independence after rotation, maximizing simplicity and conceptual clarity (Nunnally, 1978). Determinate component scores can be computed for each case and used as IVs (predictors) or DVs (e.g., diagnostic group membership) in regression and other prediction models, or factor structure in groups compared (Floyd & Widaman, 1995; Tabachnick & Fidell, 2001). In oblique rotations, axes are rotated separately without regard to maintaining independence, and can be rotated through their own angle. This makes possible a greater number of "cleaner" (zero) loadings. Simple structure (Thurstone, 1947) is easier to achieve. Interpretability is diminished, however, and factors may be sample-specific (Floyd & Widaman, 1995; Tabachnick & Fidell, 2001). Again, if factors *are* truly uncorrelated, orthogonal and oblique rotation produce nearly identical results (Floyd & Widaman, 1995; Gorsuch, 1983; Costello & Osborne, 2005; Tabachnick & Fidell, 2001). Accordingly, as recommended both techniques were used in tandem and solutions compared to ascertain any altered interpretation (Cortina, 1993; Floyd & Widaman, 1995; Tabachnick & Fidell, 2001).

Screening

As earlier noted, there was no data missing on the CUPIT. Z-scores generated for each response identified only a few (n=14) scores exceeding the 'outlier' 3.29 criterion (Tabachnick & Fidell, 2001). These ranged between 3.34 and 3.67 with only one exceeding 4.0, presenting no concerns (Hair et al., 1998). A few outliers are expected in larger (200+) community samples. Six cases were identified as multivariate outliers using the $p<.001$ criterion for Mahalanobis distances. Five of these (four 13 to 16 year-old males, and one 32 year-old female) had extreme scores on consumption variables and items indicative of compulsive use. The remaining outlier (female, also 32 years) had extreme negative scores on these variables, indicative of recent abstinence/problem minimization. All six were deleted from impending analyses, leaving 205 cases.

Several positively skewed and kurtosed continuous items evidenced some violation of the assumptions of multivariate normality, homoscedasticity, and linearity, commonly encountered in real world samples (Hair et al., 1998; Tabachnick & Fidell, 2001). However, for interpretive reasons, transformations are *not* universally recommended (Orr, Sackett, & DuBois, 1991; Tabachnick & Fidell, 2001) and logarithmic transformations are preferable (Bland & Altman, 1996; Osborne, 2002). Twenty-five items manifesting varying degrees of (predominantly moderate positive) skewness and kurtosis were transformed, using the appropriate square root or logarithmic (reflected where negatively skewed) transformation (Tabachnick & Fidell, 2001). Transformations reducing skewness to nearest zero were selected for use in factor analyses to compare with analyses using only original, unadulterated variables.

Item analysis

Item response distributions were examined (Table 6.2). Dichotomous (and trichotomous) variables are "dubious" (Kim & Mueller, 1978), "fraught with problems" (Floyd & Widaman, 1995), best avoided (Comrey & Lee, 1992; Gorsuch, 1983; Nunnally & Bernstein, 1994), or even proscribed (Streiner, 1994), while truncated Likert-scaled distributions are unsuitable, for factor analyses. Accordingly, items 9 (family drug problems), 24 (felt sick), 29 (been injured), 32 (others expressed concern), 36 (lost friends/partners), 38 (been arrested), were removed prior to PCA. The 'Adjunct' items (39-43), included to assess participants' insight into cannabis' harm potential and not intended for FA, were also omitted. The two multi-response dichotomously scored items (Reasons for Use, Hazardous Use) were transformed into composite continuous variables. HazardUse (q. 28) was created by combining the physically hazardous activities (driven, operated machinery, played sports, unprotected sex, used a weapon). Reasons for Use (q. 1) was computed into 5 variables (ReasFun=fun, pleasure; ReasSens=sensory enhancement; ReasHealth= health maintenance; Reashelp= social facilitation; Reaspsych=can't stop, to avoid negative mood states) by grouping together progressively pathological reasons for using cannabis. Raw scores were inverted on item 12 ('have you been able to stop using cannabis when you wanted to'), scored negatively to reduce variance related to response bias, ensuring all items were scored in

the same positive direction. Deletions and creation of composite variables resulted in 39 surviving items of appropriate metric scaling for factor analyses.

Principal Components Analysis (PCA)

The factorability of the data was first assessed by examination of the correlation matrix for sufficient correlations of .3 and above (Comrey & Lee, 1992; Nunnally, 1978), Bartlett's test of sphericity, and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. A significant Bartlett's test (χ^2, 741df =40199. 38, p=<.001) and satisfactory KMO statistic (.90) indicated data factorability. Analyses then proceeded in two stages: (1) PCA was conducted on the original (no transformed) 39 variables, first with Varimax, then Oblique, rotation; (2) this process was then repeated using 14 original variables together with the 25 transformed variables. At each stage, PCA began with the statistical criterion specified at .30, (then .35, .40, .45, .50, .55, .60, .65), suppressing lower loadings for simplification and specifying 2, 3, 4, then 5 factors, in successive runs. Results were then compared.

Heuristics from the 'rules of thumb' rubric (Gorsuch, 1983; Kim & Mueller, 1978) applied for factor retention and rotation included Cattell's (1966) scree test, substantive importance (% variance accounted for), comprehensibility, and number of variables with significant loadings on a factor. A minimum of 3 highly-loading indicators per factor are necessary for over-determined, stable factors (Fabrigar et al., 1999; Kim & Mueller, 1978; Nunnally, 1978). More improve factor stability (Floyd & Widaman, 1995). Since either over- or under-factoring is to be avoided (Comrey & Lee, 1992; Fabrigar et al., 1999) the Kaiser-Guttman criterion (eigenvalue >1.00), which can greatly overestimate the optimal number to retain (Gorsuch, 1983), was bypassed as it often militates against the most parsimonious solution.

The correlation matrix of the 39 items is displayed in Appendix 25. Results of the scree test matched the eigenvalue criteria. Early indications were that solutions using a >.60 statistical criterion and submitting 2 factors to orthogonal rotation produced the 'cleanest', univocal (simple) structure with no cross-loadings, and more than 3 high-loading variables on both factors. Sixteen items loaded on the two components,

explaining 38.62% of the total variance. A lower statistical criterion (.55) and 2 factors produced several ambiguously loaded variables (orthogonal rotation) or increased complexity (cross-loadings in oblique rotation). Of note, as the literature suggests results were remarkably similar whether the original variables only, or the transformed-original combination, were used, and whether followed by orthogonal, or oblique, rotation. As the factor correlation matrices revealed, however, factors consistently correlated between .25 and .29, representing less than 10% overlap in variance. Hence, following guidelines for identifying the solution with the greatest scientific utility, consistency, replicability, and least complexity apropos of research objectives (e.g., Comrey & Lee, 1992; Fabrigar et al., 1999; Nunnally, 1978; Tabachnick & Fidell, 2001), the orthogonal solution using the original (untransformed) variables was selected for interpretation and further analyses.

This decision was based on several empirical and pragmatic considerations. First, despite the improved normality (hence correlations) of the transformed variables, interpretability of the transformed-original variable merger was at best compromised and at worst, unfeasible. After rotation, moreover, several transformed items had substantial negative loadings, the antithesis of the "positive manifold" (Comrey & Lee, 1992) characteristic of good structure. Second, Gorsuch (1983) observed that in actuality, normalizing data does not greatly increase many correlation coefficients: "it appears that normalizing is *not* needed as a standard procedure for estimates of factor loadings" (p. 302). Third, small factor correlations (<.32) warrant the assumption of orthogonality (Gorsuch, 1983; Nunnally, 1978; Tabachnick & Fidell, 2001). Fourth, the primary objective of item reduction and prediction analyses (and not exploration of underlying latent constructs) required determinate factor scores derived from orthogonal components. Finally, and perhaps most compellingly, given the virtually identical results generated by the alternative variable-technique combinations, only minor differences (if any) would ultimately emerge in subsequent analyses, whichever the solution used. Clear evidence of the stability of the solution manifested in its constant appearance, regardless of which extraction technique was employed (Tabachnick & Fidell, 2001).

Table 6.6 presents the 16 items and their loadings on the two primary components after rotation, component eigenvalues, and amount of variance explained. As evident, several variables loaded above that deemed "excellent" (>.71, denoting 50% variance shared with that component) while most of the remaining loadings met the criterion (>.63, reflecting 40% shared variance) considered "very good" (see Comrey & Lee, 1992). Given the .30 (Comrey & Lee, 1992) or .35 (Nunnally & Bernstein, 1994) cut-off typically recommended as the minimum loading for variables used to define a factor, all these representative variables qualified for interpretive purposes. Component 1 had significant loadings of ten items: five of these were consumption variables, and the remaining 5 suggested 'compulsivity' or 'impaired control' over use. Component 2 comprised six items reflecting consequences of, or problems caused by, cannabis use. From this point on, the component scales will be known by these factor labels.

Table 6.6: Impaired Control and Problems subscales after Orthogonal Rotation: Eigenvalues, Percentage of Variance Explained, and Item Loadings

Item	Impaired Control	Problems
Number of days used past 12 months	.789	
Number of days used past 3 months	.758	
Times used on a typical day of use	.748	
Times used first thing in the morning	.726	
Hours a day stoned	.706	
Would find it difficult to stop using altogether	.679	
Longest time without cannabis	.648	
Felt the need for cannabis	.625	
Able to stop using when wanted to	.612	
Found it difficult to get through a day without cannabis	.608	
Cannabis interfered with work at school, job, or home		.753
Lacked energy to get things done		.731
Given up important/enjoyable things for cannabis		.706
Things planned or expected not happened after using cannabis		.669
Concentration and memory problems		.649
Used after deciding not to		.606
Eigenvalue	8.199	6.861
Percentage of Variance Explained	21.024	17.592

Psychometric properties of the component scales

Internal consistency reliability

The internal consistency of the components was first examined. Table 6.7 displays the descriptive statistics and standardized reliability estimates for the two component scales for the whole sample, and for age-groups. As shown, Cronbach's alphas (Cronbach, 1951) ranged from .79 to .92. A benchmark of .80 (Nunnally, 1978), or .70 for exploratory research (Nunnally, 1978; Hair et al., 1998), is commonly recommended. Coefficient alpha is a function of the number of items, their average inter-tem correlations and dimensionality, however, and not a measure of unidimensionality (Cortina, 1993; Schmitt, 1996). To ensure univocal components, items should be only moderately (average .15 -.50) intercorrelated (Clark & Watson, 1995; Cortina, 1993; Streiner & Norman, 1995). Differentiated items yield far more information. As shown, mean inter-item correlations in both components ranged from .40 to .59. Thus, across the whole sample and age groups these results were (more than) adequate on both indices. The favourable internal consistency results suggest proper sampling of content domains. In addition, the moderate significant component scale intercorrelation (r=.47, p=<.001) suggests that the components, with good discriminant validity (share 22% of their variance) are separate (unidimensional), but related, axis of an overarching construct (Cronbach, 1990; Dawe et al., 2002; Schmitt, 1996).

Table 6.7: Reliability Estimates and Descriptives for the CUPIT subscales

Group/Variable	Impaired Control	Problems
Whole sample (n=212)	.92	.83
Mean	28.14	6.96
SD	11.78	4.58
Mean inter-item correlation	.53	.46
Age groups		
Adolescents (n=138)	.92	.79
Mean	26.98	7.36
SD	11.40	4.51
Mean inter-item correlation	.55	.40
Adults (n=74)	.92	.90
Mean	30.30	6.20
SD	12.23	4.63
Mean inter-item correlation	.52	.59

Construct validity

Component scores were generated for all respondents using the simple summation of raw scores method (see Comrey & Lee, 1992; Floyd & Widaman, 1995; Pedhazur & Schmelkin, 1991). This technique generates readily interpretable scores (cf. estimates) that are comparable across studies (Pett et al., 2003). The universally high loadings, item-total correlations, Likert-type scale metric, and mean inter-correlations of items made differential proportional weighting unnecessary (Floyd & Widaman, 1995; Gorsuch, 1983; Guilford, 1954; Nunnally, 1978; Streiner & Norman, 1995). As Nunnally (1978) points out, the correlation of weighted and unweighted items is generally so high that "it is almost always a waste of time to seek differential weights for items" (p. 296). Scores were then used in correlation analyses with other key outcome measures to establish the construct validity of component items.

Pearson correlations first assessed the relationship between the components and age as a continuous variable. While age was significantly correlated with Impaired Control, age was not significantly associated with Problems. Descriptive statistics revealed age was significantly skewed and kurtosed. A Student's t-test comparing age-groups (adolescents/adults) on the components revealed significant differences on Impaired Control, t (201) = -2.13, p. 03, and Problems, t (201) = 2.00, p. 047. Adults had significantly higher mean scores on Impaired Control, while adolescents scored more highly on Problems. Thus, where indicated, use of age-groups in subsequent validation analyses was warranted.

Convergent/discriminant validity

Constituent scales of a measure should possess good convergent and discriminatory validity (Campbell & Fiske, 1959). Following satisfactory testing of multivariate assumptions, Pearson correlations were calculated to assess the relationship between the components and the 12-month CIDI-Auto 2.1 (WHO, 1997), the criterion standard; the Timeline Follow Back (TLFB; Sobell & Sobell, 1992) measures of 90- and 30-day cannabis consumption; the 6-month Severity of Dependence Scale (SDS; Gossop et al., 1995), Cannabis Problems Questionnaire for adults (CPQ; Copeland et al., 2001a, 2005) and adolescents (CPQ-A; Martin et al., 2006); and the BSI-18 (Derogatis, 2000)

measure of psychological distress. Pearson correlations were first computed for the sample, followed by a t-test by age-groups. If significantly different, analyses were repeated by age-groups. Results appear in Table 6.8.

Table 6.8: Correlation between the CUPIT subscales and Key Validation Measures

Measure/Variable	Impaired Control			Problems		
	Sample (n=211)	Adolescents (n=138)	Adults (n=73)	Sample (n=211)	Adolescents (n=138)	Adults (n=73)
CIDI-Auto						
Number of DSM/ICD symptoms	.63***	.68***	.51***	.57***	.61***	.50***.
Severity of Dependence Scale (SDS)	. 71***	.72***	.70***	.59***	.61***	.63***
TLFB interview:						
Days used past 90 days	.80***	.81***	.76***	.25**	.42**	.08
Cones used past 90 days	.60***	.60***	.65***	.19**	.23**	.27*
Days used past 30 days	.77***	.80***	.72***	.24***	.40**	.10
Cones used past 30 days	.60***	.55***	.67***	.19**	.21*	.28*
CPQ for Adults						
Core scale (n=76)			.53***			.62***
Spouse scale (n=26)			.26			.36
Children scale (n=21)			.43		.	-.04
Work scale (n=38)			.46**			.48**
CPQ for Adolescents						
Core scale (n=135)		.59***			.63***	
Parent scale (n=129)		.35***			.26**	
Partner scale (n=64)		.46***			.25*	
School scale (n=117)		.54***			.48***	
Work scale (n=26)		.46*			.47*	
BSI-18						
GSI score	.18*	.21*	.09	.42***	.36***	.56***

**p<.05, **p<.01, *** p<.001, all tests two-tailed.*

Mean scores and standard deviations for the key validation measures tabulated have been detailed (section one, this chapter). As reported there, adults scored significantly higher than their younger counterparts (<.001) on all four TLFB consumption variables. Adults also scored significantly more highly on the BSI (<.05). *T*-tests revealed no significant age-group differences on the SDS or total number of symptoms elicited in the CIDI-Auto interview. Nonetheless, given the mixed patterns that emerged,

component correlations with all key validation measures are tabulated by age groups for the interested reader.

As expected, both components exhibited highly significant, conceptually consistent moderate to strong positive correlations with total DSM-IV/ICD-10 symptoms, the SDS, and all subscales of the CPQ for adolescents. Both components also showed varying moderate to strong correlations with the adult CPQ core and work scale. The weak nonsignificant relationships with the spouse and children subscales were largely explained by their limited applicability to respondents (Copeland et al., 2005). Impaired Control was also strongly correlated with all four TLFB consumption measures. Problems showed somewhat weaker significant correlations with these measures, most of which was accounted for by the adolescents. An interesting pattern of association emerged for the GSI (BSI). This measure's significant but weak correlation with Impaired Control over the whole sample was again largely accounted for by the adolescents. In contrast, the GSI's highly significant, moderate positive correlation with Problems held over the whole sample.

Concurrent/criterion-related validity

Three independent DSM-IV/ICD-10 diagnostic groups were created from the CIDI-Auto algorithim output: no diagnosis (n=17), abuse and/or harmful use (n=36), and dependence, with or without abuse/harmful use diagnoses (n=158). A one-way ANOVA was conducted to test for any differences in component scores as a function of diagnostic group. Component scores for adolescents/adults in the diagnostic groups were then compared. Distributions revealed adult diagnostic groups were unequal (1; 12; 60), abrogating between-group ANOVAs. Hence, Student's *t*-tests were conducted to compare adult 'abuse/harmful use' and 'dependence' groups (only). With their adequate group distributions (16; 24; 98), ANOVAS were appropriate to test for adolescent diagnostic group differences. Given the importance of consumption measures in drug screening, ANOVAs were also used to investigate any significant differences on the TLFB variables across sample diagnostic groups, and then by age groups (*t*-tests for adults). All ANOVAs were followed by post hoc pairwise comparisons using Tukey's HSD. Results appear in Table 6.9.

Table 6.9: CUPIT subscale and Consumption scores by DSM-IV/ICD-10 Diagnostic Group

Variable	Diagnostic Group							
	No Diagnosis		Abuse/Harmful Use		Dependence			
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*F*	Significance
Impaired Control								
Whole sample (n=211)	14.12	7.32	17.75	7.03	32.08	10.37	51.74	<.001
Adolescents (n=138)	13.13	6.27	19.04	6.85	31.18	10.07	37.07	<.001
Adults (n=73)			15.17	6.95	33.55	10.76	- 5.666*	<.001
Problems								
Whole sample (n=211)	3.18	2.77	4.56	2.80	7.91	4.68	16.10	<.001
Adolescents (n=138)	3.19	2.86	4.75	2.89	8.68	4.38	19.04	<.001
Adults (n=73)			4.17	2.69	6.63	4.90	-1.689*	.096
Cannabis Consumption								
Whole sample (n=211)								
Days used past 90 days	15.71	19.57	29.89	23.71	61.94	27.40	40.16	<.001
Cones used past 90 days	69.35	73.63	139.94	145.99	617.13	752.70	11.56	<.001
Days used past 30 days	5.06	6.92	10.53	9.15	20.86	9.71	34.54	<.001
Cones used past 30 days	21.71	22.80	50.67	53.78	215.16	271.34	10.77	<.001
Adolescents (n=138)								
Days used past 90 days	11.31	7.66	30.00	22.75	55.92	26.72	28.81	<.001
Cones used past 90 days	57.25	55.91	140.33	116.05	461.16	472.90	11.10	<.001
Days used past 30 days	3.50	2.66	10.17	8.26	18.66	9.54	25.47	<.001
Cones used past 30 days	18.81	20.06	50.50	49.32	160.04	192.87	7.98	<.01
Adults (n=73)								
Days used past 90 days			29.67	26.58	71.77	25.79	-5.14*	<.001
Cones used past 90 days			139.17	199.15	871.87	1016.64	-2.47*	<.05
Days used past 30 days			11.25	11.09	24.45	8.94	-4.48*	<.001
Cones used past 30 days			51.00	64.16	305.18	348.54	-2.50*	<.05

* Student's *t*-test, 70df. All tests two-tailed.

As Table 6.9 shows, across the whole sample and for adolescents only, mean scores on both components were significantly different across diagnostic groups, and in the expected direction (no diagnosis mean scores < abuse/harmful use mean scores < dependence scores). That is, mean scores plotted against diagnostic groups displayed an

orderly increase in scores as a function of diagnostic severity (see Fig. 6.1 and 6.2). For the whole sample, and also for adolescents, post hoc pairwise comparisons using Tukey's HSD revealed that the 'dependent' group mean was significantly different to the 'no diagnosis' (p =<.001) and 'abuse/harmful use' group (p=<.001) means on both components. The two latter groups did not differ significantly on either component across the sample, and among adolescents. Similarly, consumption variable scores reflected an orderly increase as a function of diagnostic group severity (see Fig. 6.3 and 6.4). Again, Tukey's HSD test clarified that while the 'dependent' group mean differed significantly from both the 'no diagnosis' and 'abuse/harmful use' group means on all four TLFB consumption measures (to at least p=<.01 level for the whole sample, and p<.05 for adolescents), the 'no diagnosis' and 'abuse/harmful use' groups did not differ significantly on any of these measures both in the whole sample or among adolescents only.

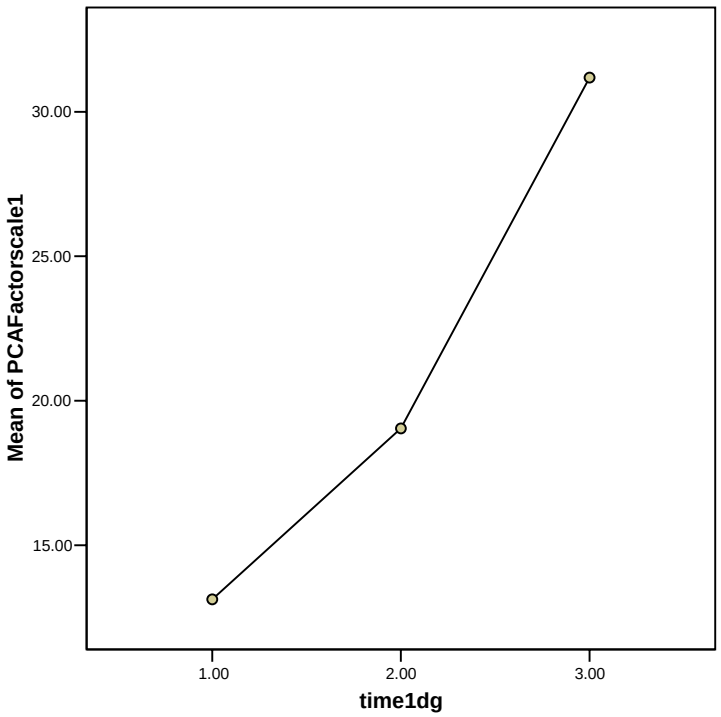


Figure 6.1: *Impaired Control: Mean scores by diagnostic group*

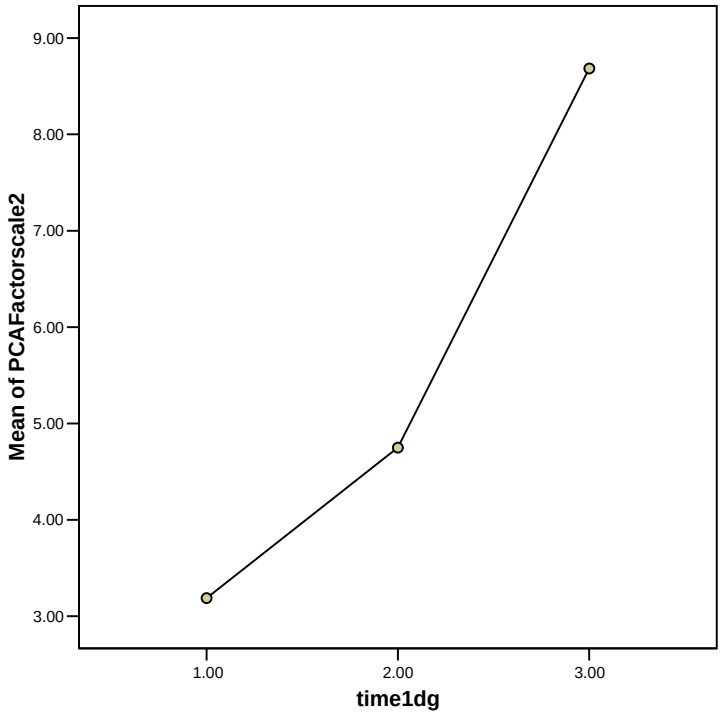


Figure 6.2: *Problems: Mean scores by diagnostic group*

Appropriately, no values are shown for the adult 'no diagnosis' group (n=1) for between-groups analyses. *T*-tests showed that while adult 'abuse/harmful use' and 'dependence' groups' means were significantly different on Impaired Control, there were no significant differences on their mean Problems scores. However, the two groups scored significantly differently on all TLFB consumption variables (to at least the p=<.05 level).

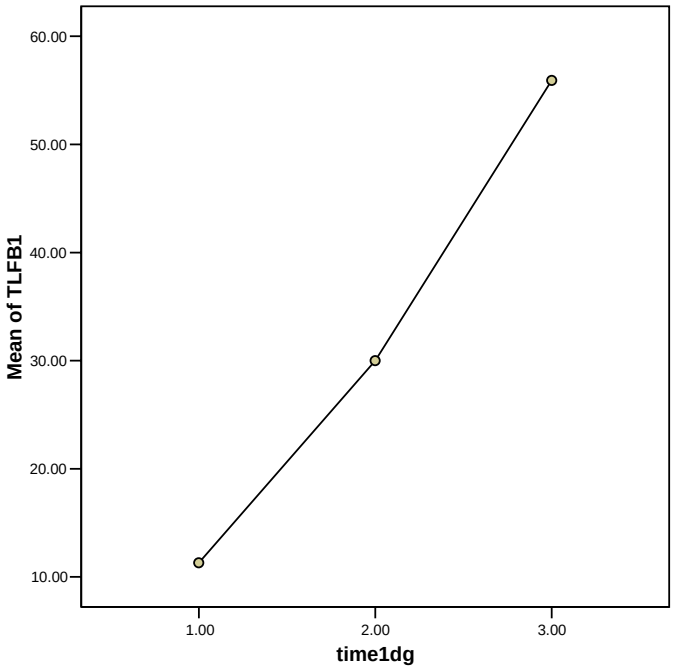


Figure 6.3: *Mean days used past 90 days by diagnostic group*

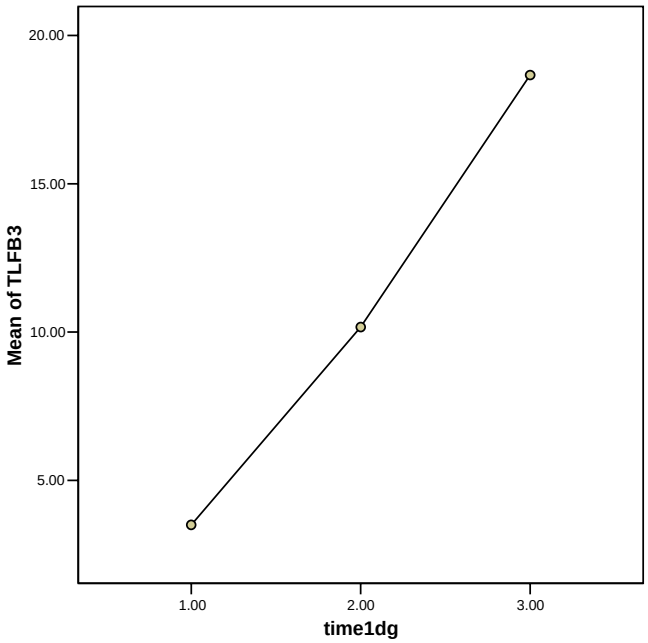


Figure 6.4: *Mean days used past 30 days by diagnostic group*

Discussion

With theoretical, nosological, empirical, and rational (Expert Panels) considerations incorporated in item selection, PCA of data from this heterogeneous sample of past year cannabis users produced a high-loading parsimonious two-component solution explaining 38.6 percent of the variance. Sixteen of the 39 surviving items were retained after orthogonal (Varimax) rotation, 8 loading on or above that considered "excellent" (.71), and 5 on or above that deemed "very good" (.63) (Comrey & Lee, 1992). Notably, all items loaded >.60, thus qualified for interpretative purposes (Nunnally & Bernstein, 1994).

Interestingly, described as a "poetic, theoretical and inductive leap" (Pett et al., 2003, p.210), naming of the remarkably stable factors in this research was relatively straightforward as both item clustering and loadings rendered the predominant conceptual theme underlying the items transparent. As evident in Table 6.6, Impaired Control (component 1) had significant strong loadings of ten items, 5 consumption variables and 5 suggesting impaired control over or compulsive use, almost all being archetypal DSM/ICD dependence criteria or hallmark features in both systems (APA, 1994, 2000; WHO, 1992; and see Appendix 1). By contrast, Problems (component 2) comprised six items reflecting the consequences of or problems caused by cannabis use (interference with role/commitments and work, neglect other activities, loss of memory/concentration and motivation), consistent with abuse/harmful use criteria and the literature generally (Brook et al., 2002; Budney et al., 2002; Dennis et al., 2002b; Fergusson et al., 2002; Hall & Babor, 2000; Hall et al., 2001; Lynskey & Hall, 2000; Solowij & Grenyer, 2002). Although strictly speaking the sixth-ranking item 'used after deciding not to' appears to better fit the conceptual dimension underlying Impaired Control (compulsive use or dependence), in this research adolescents endorsed (and anecdotally verified) this item in terms of peer pressure to use, hence a social consequence of cannabis-using peer group association. Likewise, adolescents endorsed the higher loading 'given up important/enjoyable things for cannabis' (a DSM/ICD dependence criterion) to represent activities such as sports and other previously enjoyed social group activities foregone for "hanging out" with their cannabis-using peer group.

Interpretive convention allows some latitude in inclusion/exclusion considerations in varimax factor analytic loading models for better "fit" of lower-loading or more "minor" variables (see Kim & Mueller's discussion, 1978, p. 71-72).

In view of the landmark conceptual distinction between the DDS and drug-related problems or disabilities (Edwards et al., 1981) and the unidimensional vs. multidimensional debate that followed (see Swift, 1999), the emergence of 2 major components in the PCA is of interest. Although PCA is a procedure mathematically favouring the reduction of items to one major component (Cattell, 1965; Gorsuch, 1997), the two-dimensional solution in this sample appears to support the two distinct syndromes conceptualization operationalized in DSM-IV (APA, 1994, 2000) and ICD-10 (WHO, 1992). Further support derives from the only moderate significant intercorrelation (discriminatory validity) of the components, and the different mean score distributions by age group. While adolescents scored significantly more highly on 'Problems' adults scored significantly more highly on 'Impaired Control' over use, which seems to make intuitive sense given adults' longer use histories and more frequent use, and adolescents' heightened vulnerability to adverse psychosocial consequences even at relatively low use levels (Ellickson et al., 2005; Fergusson et al., 2002; Hall, 1995b; McGee et al., 2000; Solowij & Grenyer, 2002). From a theoretical (dimensional) perspective, an individual with high dependence may not have problems in other realms, while another individual with low dependence may have severe problems in these other areas (Edwards et al., 1981; and see Appendix 1).

Preliminary validation analyses of the component scales demonstrated good to excellent psychometric properties, with clear test-retest and internal consistency reliability, and criterion/concurrent, and convergent/discriminatory validity. Item test-retest and the scales' favourable internal consistency reliability suggest the item pool was constructed through good sampling of the content domains (content validity), not surprising given the systematic iterative Expert Panels process. Moreover, a large proportion of both young and older participants spontaneously commented on the accuracy and thoroughness with which screen items captured their experience of cannabis use and problems (face validity/content validity), and their appreciation of participating.

Accordingly, as evident in Table 6.2, test-retest estimates generally exceeded the high reliability expected (at least .70) in the relatively short timeframe (Coolican, 1990; Fabrigar et al., 1999; Fleiss, 1991; Kline, 1998). Given that reliability "sets the cap" on validity (Streiner & Norman, 1995), although very high reliability is not rigidly sought for screening purposes (Guilford, 1954; Loevinger, 1954, 1957; Nunnally, 1978) the internal consistency estimates (0.92 and 0.83 for subscales 1 and 2, respectively) were extremely encouraging.

The construct validation data provide reassuringly good evidence of the subscales' specific validity properties across the sample, both adolescents and adults. Demonstrating highly significant discriminative power (Campbell & Fiske, 1959), the subscales correlated in conceptually consistent patterns with criterion measures, namely the DSM-IV/ICD-10 diagnostic assignment (CIDI-Auto), total symptoms (CIDI-Auto), severity of dependence (SDS), and consumption (TLFB), and converged significantly with alternate measures of cannabis use problems, such as the CPQ and CPQ-A, and psychological distress (GSI). In particular, Impaired Control showed an exceptionally consistent, strong monotonic relationship with all measures, which supports the dimensionality of the dependence syndrome and its existence in a broad spectrum of users before they come to clinical attention (Saunders & Aasland, 1987).

While the significant differences observed between both the 'no diagnosis' and 'abuse/harmful use' diagnostic groups and the 'dependence' group were clearly expected, the pattern of non-difference between the 'no diagnosis' and abuse/harmful use' groups that emerged in post hoc analyses was readily explained by the 12 'diagnostic orphans' classified into the former group. As previously discussed (Chapter two), in both alcohol and cannabis-using samples 'diagnostic orphans' formed a separate group from 'dependent' groups, but evinced similar use patterns and problem profiles to 'abuse' groups (Deas et al., 2005; Dennis & McGeary, 1999; Dennis et al., 2002b). DSM/ICD diagnostic criteria appear inadequate to capture all those having significant problems with their cannabis use (Degenhardt et al., 2002; Tims et al., 2002; Winters et al., 1999). Hence, with incubating disorder/problems just under the diagnostic threshold, these 12 participants are an appropriate target for screening and

early intervention to arrest progression to more advanced morbidity. Diagnostic criteria endorsed by these diagnostic orphans provided important variables for examining longitudinal predictive power in transition from sub-threshold to clinically-relevant disorder in the planned follow-up (see Rosenberg & Anthony, 2001).

The exceptionally high rate of DSM/ICD diagnoses in this sample, particularly adolescents, raises two previously-reviewed related issues: reliability/validity of self-reports (Chapter four), and appropriateness of DSM/ICD diagnostic frameworks for adolescents (Chapter two). Both merit comment. First, comprehensive reviews found self-reported drug use generally reliable and valid, with greater consistency for cannabis than other drugs among adults and adolescents (and see Dennis et al., 2002b; Gignac et al., 2005; Lynskey et al., 1998; Winters et al., 1991). In the current research, substantial evidence of reliable/valid self-reports derived from: good to excellent test-retest reliabilities of CUPIT items and triangulated TLFB consumption measures; correspondence between treatment participants' past 30-day consumption and biochemical verifiers; good agreement between clinician assessments, ratings, and the CIDI-Auto outcomes, and the strong correlation between independent reports (CUPIT) and diagnostic assignment. Thus, assured of confidentiality and expressing appreciation of the research experience, participants were understandably more likely to be frank and honest.

Second, research generally supports the reliability/validity of DSM-IV criteria for adolescent substance use disorders (e.g., Bailey et al., 2000; Clark, 2004; Martin et al., 1995; Mikulich et al., 2001; Winters et al., 1999). Given apparent reliability/validity of self-reports in this research, the consistency of participants' independent CUPIT responses with all major validation measures implemented ("quasi-triangulation") such as cannabis consumption levels (CUPIT and TLFB), severity of dependence (CUPIT, CIDI-Auto, SDS), and cannabis-related problems (CUPIT and CPQ/CPQ-A, GSI) cumulatively provide considerable support for the reliability/validity of DSM-IV/ICD-10 diagnoses generated by the CIDI-Auto 2.1 (WHO, 1997b). That is, aggregated evidence from key indices affords confidence in CIDI-Auto diagnostic assignments. By necessity, however, all measures in the present study share the same non-independent

sources of information, i.e., participants' self-reports, which may have inflated estimates of accuracy (Kraemer, 1988). Nevertheless ultimately, as Seligman (1995) succinctly concluded, self-reports are "the blood and guts of a clinical diagnosis" (p. 972).

In practice, perfect reliability never occurs (Cortina, 1993). Moreover, "quite often the 'gold standard' is not as good as the term suggests, since it is unreliable in its own right" (Streiner & Norman, 1995, p. 160; and see Rey, Plapp, & Stewart, 1989; Winokur, Zimmerman, & Cadoret, 1988). This puts a ceiling over the performance of any screening test, with the maximum obtainable correlation possible being the product of the square roots of the reliabilities of each index (Kraemer, 1988; McDowell & Newell, 1987). General criticism of DSM-IV and ICD-10 statistical reliability and validity, and the instruments used to operationalize them, does exist (see e.g., Crowe, 2000; Frances et al., 1995; Kutchins & Kirk, 1997; Lemperiere, 1995; Widiger & Clark, 2000; Winokur et al., 1988; Winters et al., 1999; Zimmerman, 1988). As controversies, criticisms, and revisions of these systems continue, the same issues will apply to the instruments used to operationalize them. These issues are, however, beyond the scope of the present focus.

In summary, these analyses have demonstrated that the CUPIT in development has utility as a reliable and valid tool for use by health care professionals to rapidly identify those among the heterogeneous cannabis-using population who are using in harmful or potentially harmful ways and could benefit from an intervention to arrest progression to more serious harm. Arguably, however, longitudinal predictive validity is the pivotal property of any screen for reliable early detection of an incubating disorder, facilitating efforts to 'nip it in the bud'. The longitudinal properties of the cannabis screen are explored in the chapter that follows.

CHAPTER SEVEN

PREDICTIVE VALIDITY OF THE CUPIT

Introduction

The nascent literature on the natural history of cannabis use and disorder (Chapter one) depicts a trend towards mid-adolescence cannabis initiation, increased use in late adolescence, with a maturational remission or decline in consumption from the mid-twenties. Accruing evidence of pre-adolescent initiation, low remission rates, escalating incidence and persistence of abuse and dependence among users internationally, however, suggests cannabis use may be less transient than hitherto thought. These new trends embody a compelling ethical mandate to intervene at the earliest possible stage of problem development to arrest progression to more advanced health and social harms (Anthony, 2000; Copeland et al., 1999, 2001a, 2005; Hall & Swift, 2006; Shrier et al., 2003; Spooner, 1999).

As argued throughout this thesis, *longitudinal predictive validity* is the pivotal property of any screening tool designed to expedite a timely intervention for an incubating disorder to prevent progression to a more serious - perhaps irreversible – stage. However, there are "relatively few instances where the predictive capacity of a screening procedure to predict further harm has been determined" (Conigrave et al., 1995, p. 1483). Longitudinal research on cannabis use disorder is relatively rare (Swift et al., 2000). To the best of the author's knowledge, there have been no studies of any screen's longitudinal ability to predict cannabis-related harm. With rigorous prospective designs lacking in previously reviewed cannabis screening research (CASST, CUDIT, MSI-X, DUDIT), empirically-verified longitudinal properties of these screens remain unknown. Furthermore, in contrast to the AUDIT (the model upon which some of these tools are purportedly based), there has been little - if any - attention devoted to pre-clinical ('diagnostic orphans') and other at risk users, primary target

groups of a population-based SEI approach (Conigrave et al., 1995). This study is an initial attempt to address the paradoxical neglect of these critical aspects of a cannabis screen.

Chapter six documented the preliminary validation analyses of the draft CUPIT. As reported there, the constituent subscales showed good to excellent test-retest and internal consistency reliability. The CUPIT subscales also demonstrated good criterion and convergent validity, with highly significant power for discriminating diagnostic groups along the severity continuum among a heterogeneous cannabis-using sample. The potential utility of the screen items for cross-sectional assessment and prediction is clear. This chapter presents data on the longitudinal predictive utility of original scores on the CUPIT subscales for diagnostic group membership and other related outcomes 12 months later. The optimal dichotomous cut-point/s on the CUPIT for classification of diagnostic groups (at risk, sub-threshold, and cases/diagnoses) is also explored. The data simultaneously provides much-needed information about the natural history and stability of cannabis use and problems over time among this local sample.

Design

Employing a repeated measures design within a prospective paradigm, participants were located at their individual baseline 12-month anniversaries and re-assessed on (appropriately modified) baseline measures to ascertain the extent of measurable change in cannabis and other drug use, symptoms, diagnostic status, use-related problems and correlates. At this juncture, the between-subjects analytic strategy examined: (a) the predictive properties of the screen subscales for discriminating diagnostic trajectory groups; (b) the subscales' ability to improve prediction of other major adverse endpoints measured in conjunction with other important predictors (age, gender) with regard to these outcomes; and (c) the optimal dichotomous cut-point/s on CUPIT scores providing the best balance between sensitivity and specificity for classifying diagnostic groups.

Aims

The aims of the longitudinal component reported in this chapter were to:

(1) measure any changes over the 12 month interval in participants' cannabis use, diagnoses, use-related problems and correlates relative to baseline levels;

(2) evaluate the performance of subscale items in reliably predicting these changes and thus their utility for inclusion in a brief cannabis screen; and

(3) determine the optimal cut-off score/s for reliably identifying cannabis users currently with, or on a trajectory to developing, cannabis use disorder or problems.

Method

Participants

All baseline participants (n=211) were re-contacted approximately 12 months later. Ninety-five percent (n=200) were located and ninety-two percent (n=194) re-interviewed. Reasons for those lost to follow-up (n=17) included failure to return multiple phone calls or declined interview (n=6), in prison/juvenile detention (n=3), or had left the region/gone overseas (n=8). Participants lost to attrition were 10 adolescents and 7 adults spread across all recruitment settings and age groups. Seventy percent were male (24% Māori). One adult (only) had part-time employment, and 8 (47%) were secondary students. As might be expected, all were daily/near daily cannabis users.

Measures

The interview schedule

Measures of change should be identical at assessment waves (Dennis et al., 2000). Hence the follow-up interview employed a modified version of the baseline structured interview to gather information on respondents' cannabis use and related experiences

one year later, omitting historical items and framing questions "over the past 12 months" (see Appendix 26). This enabled assessment of changes over this period.

Re-administration of the CIDI-Auto (Version 2.1; WHO, 1997) interview to measure 12-month Cannabis Use Disorder, the self-completed Severity of Dependence Scale (SDS; Gossop et al., 1995), Brief Symptom Inventory (BSI 18; Derogatis, 2000) and Cannabis Problems Questionnaires (Copeland et al., 2001a, 2001b, 2005; Martin et al., 2006) was identical to baseline. The Participant Feedback Questionnaire was not re-administered.

Procedures

Interviews were conducted between December 2004 and August 2006, a mean of 366 days (*SD*=10.09, range: 318-407) after baseline interviews. Given the well-documented obstacles to tracking drug users, the researcher utilized every contact resource and strategy recommended (Cottler et al., 1996; Desmond et al., 1995; Scott, 2004; Walton et al., 1998; Wutzke et al., 2000). This included writing letters, emails, making phone calls, contacting participants' nominated locator person/s and systems personnel, and visits to clinics, schools, work training, popular recreational venues, homes, and occasionally, workplaces. Researcher perseverance achieved a 92% follow-up interview rate (n=194) from an average 3.8 (*SD*=2.17, range: 1-12) contact attempts. Again, participants were assured of confidentiality and researcher-only access to their data.

Interviews took on average 52 minutes (*SD*=6.06, range: 40-65). Most (77%) were conducted face-to-face, and the remainder by telephone (20%) or post/email (3%) from geographically remote participants. Personal interviews were conducted in a variety of locations including dwelling places (houses, motels, house buses, caravans), health and treatment clinics, school counselling rooms, cafes, bars, cars, and more rarely, prison cells. Telephone interviews encompassed virtually every region of New Zealand, while email/postal interviews included Australia, Canada and Asia. Participants were again thanked for their contribution to the project. Many asked when they should expect the next contact, expressing disappointment their participation was complete. Again, a

small number were informed about appropriate counsellors or treatment services available should they desire or require them.

Data Analysis

Analyses proceeded in 3 stages. First, descriptive statistics with selected univariate comparisons on participants' demographic, cannabis and other drug use characteristics, diagnostic group assignment, symptoms, dependence severity, cannabis-related problems and correlates were generated. Longitudinal multivariate analyses investigated changes on outcome measures in the intervening year. Second, longitudinal multivariate analyses examined the predictive ability of baseline screen subscale scores and cannabis consumption to predict diagnostic group membership 12 months later. The ability of the SQ subscales to improve prediction of key outcome measures, over and above what the baseline score of that measure in conjunction with other important correlates predicts, was then investigated. Finally, Receiver Operating Characteristic (ROC) analysis was employed to select the optimal dichotomous cut-off on subscale scores for distinguishing 'cases' from non-cases at both temporal points, together with that for including sub-threshold and other at risk users on a trajectory towards becoming a case. This analysis compared the performance of the SQ subscales against the 'gold' standard measure of DSM-IV/ICD-10 cannabis use disorder obtained from the CIDI-Auto 2.1. Chi-square values generated for each score indicated which provided the best balance between sensitivity and specificity.

Results

Again, results are presented in three major sections corresponding with the study aims. The first section describes and discusses participants' cannabis use, diagnostic status, related problems and correlates at follow-up, including baseline comparisons to identify change/s at the later endpoint. The next two sections encompass validation of the predictive properties of the baseline SQ subscales. The SQ subscales' ability to prospectively predict diagnostic group membership and capacity to improve prediction

of other key outcomes at follow-up was investigated. The final section presents results of the ROC analyses. These latter analyses are then discussed.

Demographics, Cannabis Use, Related Problems and Correlates, with 12-month Comparisons

Demographics

Major demographic characteristics of the follow-up sample (n=194) are presented and compared to the baseline sample in Table 7.1. While just over half were male (54%), their decreased proportion in the follow-up sample (56% at baseline) reflects the predominantly male attrition noted above. As expected, the mean age was 21.7 years (participants approximately one year older than baseline). The roughly proportional attrition across age groups produced little change in baseline age group and ethnic ratios.

Thirty-eight percent were currently in full or part-time employment, compared to 21% at baseline, reflecting in part the reduced proportion of students (22%) from baseline (45%). Conversely, the proportion of unemployed/beneficiaries (39%) had increased from 34%, particularly among males. More than half (53% vs. 45% baseline) were currently in a relationship. Of interest was participant transience. More than half (52%) had moved residence in the 12 months interval (median number of moves=1, range: 0-10). The most mobile shifted more than three times.

Table 7.1: Demographic Characteristics of the Follow-Up (n=194) and Baseline (n=212) Samples

	Follow-Up Sample			
Variable	**Male**	**Female**	**Total**	**Baseline Sample**
Gender (%)	54	46	100	56% male
Age (years) (%)				
13 – 18	59 (30)	69 (36)	128 (66)	138 (65)
19 – 30	27 (14)	10 (5)	37 (19)	40 (19)
31 – 61	19 (10)	10 (5)	29 (15)	34 (16)
Mean	19.14	13.21	21.20	20.52
Range	14 – 62	14 – 46	14 – 62	13 – 61
Employment status (%)				
Student	9	38	22	45
Full-time employment	26	15	21	12
Part-time employment	19	16	17	9
Unemployed/government benefits	45	31	39	34
In a relationship (%)	49	57	53	45
Times moved past 12 months (%)				
0 times	46	51	48	
1-2	37	40	39	
3 or more	17	9	13	

Cannabis Use

Together with baseline comparisons, measures of cannabis consumption over the past 90 days from the TLFB interview appear in Table 7.2. Given the positively skewed distribution of the 'quantity' (cones used) measures, the apparent trend towards increased use on all indicators was investigated using Wilcoxon Matched-Pairs Signed-Ranks Tests, and age group comparisons by Student's *t*-tests. Wilcoxon z scores indicated a significant increase over all four variables: days used past 90 days z = -3.62, $p<.001$; cones consumed past 90 days, z = -5.36, $p<.001$; days used past 30 days, z = -2.45, *p*. 014; cones consumed past 30 days, z = -4.85, $p<.$ 001. However, *t*-tests by age group clarified this increase was almost entirely explained by the adolescents. While adults recorded no significant increase from baseline on any consumption measure, adolescents reported highly significant increases on all indicators: days used in the past 90, t (127) = -4.45, $p=<.001$ and 30 days, t (127) = -3.00, $p=.003$; cones consumed in the past 90, t (127) = -4.20, $p =<.001$ and 30 days t (127) = -3.44, $p =<.001$.

Table 7.2: Cannabis Use among the Follow-Up (n=194) and Baseline Samples (n=211)

	Follow-Up Sample			
Variable	**Adolescents (n=128)**	**Adults (n=66)**	**Total (n=194)**	**Baseline Sample (n=211)**
Days used past 90 days				
Mean	53.46	58.33	55.12	52.74
Median	55.00	70.00	61.00	53.00
SD	32.50	32.50	32.57	30.80
Range	0 – 90	0 – 90	0 - 90	0 - 90
Days used past 30 days				
Mean	17.65	19.43	18.26	17.82
Median	18.50	22.00	20.00	18.00
SD	11.05	11.01	11.04	10.83
Range	0 - 30	0 - 30	0 - 30	0 - 30
Cones used past 90 days				
Mean	478.38	602.53	520.61	491.58
Median	332.50	332.50	332.50	282.00
SD	495.08	719.72	582.42	689.22
Range	0 - 2180	0 - 3065	0 - 3065	0 - 5365
Cones used past 30 days				
Mean	167.22	210.91	182.08	171.51
Median	117.00	111.00	114.50	97.00
SD	173.30	264.39	209.13	47.63
Range	0 - 750	0 - 1150	0 - 1150	0 - 1800

Respondents' subjective beliefs about their use patterns over the past 12 months were also elicited. Roughly one third each reported no change (35%), increased use (37%), now using less (20%; n=40) or had quit (8%; n=15). In descending frequency reasons given for increased use were: pleasure, peer group/family use, relaxation, stress or depression relief, had developed tolerance, availability and affordability. Reasons for decreased use/quitting included health concerns (depression, schizophrenia, liver, cancer), work/study demands, "got sick of it", change of circumstances or social networks. Six abstainers at follow-up had become pregnant during the past year.

Following Swift (1999), respondents' perceived changes were checked against "real" changes in cannabis use reported since the baseline TLFB interview. Global perceptions of reduced use/having quit and TLFB retrospective measures were reasonably concordant (28% vs. 24%), suggesting 24% (46) had actually reduced or quit consumption at follow-up. Conversely, discrepancies between subjective perceptions and TLFB measures suggested considerable *under*estimation of past 90-day

consumption. While only 12% (8) of those who believed their cannabis consumption had not changed (n=68) were now using less, 66% (45) were now using more. Eleven percent (6 of 55) of those who claimed they were now using less (4) or had quit (2) were still using at the same level, while 5% (3) were actually using more.

Similar discrepancies existed between 12-month Stages of Change goals expressed at baseline and cannabis consumption at follow-up. Of those who had declared no intention of changing their consumption ('Precontemplators', n=62), similar proportions had either cut down/quit (19%) or were still using at the same level (19%), but the largest proportion (62%) were now using more often. Furthermore, of those who had stated they wanted to cut down ('Contemplators', n=49), were preparing ('Preparation', n=35), or were actively cutting down ('Action', n=48) at baseline, 9% (12) were still using at the same, and 58% (77) at *increased*, levels.

Other Drug Use

Most participants (94%) had continued to use other drugs over the follow-up interval. Again, these drugs were most frequently alcohol (93% vs. 91% at baseline) and tobacco (84% vs. 92% at baseline), with the majority of users currently drinking at least one day per week (68%), and smoking several times per day (93%). The apparent reduction in tobacco use occurred among adults and adolescents. By contrast, while virtually all adolescents (98%) had used alcohol in the past year, two thirds (65% vs. 57%) reported drinking on at least one, and up to every day per week, significantly more often than at baseline, t (123) = -2.36, p=.02.

Consistent with baseline, smaller proportions had used hallucinogens (35%), stimulants (32%), 'noss'/nitrous oxide (25%), ecstasy (11%), opiates (9%), benzodiazepines (9%), cocaine (4%), and inhalant/solvents (11%) over the past 12 months, with regular use rare. Again, however, the notable exception was 'party pills'/BZP (benzylpiperazine). Seventy-five percent of respondents (83% of adolescents; 61% of adults) reported using BZP during the past 12 months, up markedly from baseline (41%). In addition, a significant dramatic increase in regular use (at least weekly) of BZP since baseline

(52% vs. 15%) was reported, t (79) = -5.56, p=<.001. And again, over the past 90 days adolescents accounted for all inhalant/solvent (n=21), and most nitrous oxide (75%, n=36), BZP (73%, n=105), stimulant (69%, n=42), and hallucinogen (55%, n=37) consumption.

More than a quarter (28%, n=55) reported a problem with, or had sought treatment for, a drug other than cannabis within the past year (47% of adults; 19% of all adolescents). This drug was most commonly alcohol (52%), followed by opiates (14%, reflecting drug treatment participants), then stimulants (11%, including BZP). More than half (n=31) had been to a treatment facility, predominantly community-based treatment services. The remainder (n=24, mostly adolescents) had not received any professional assistance for their drug problem/s.

Cannabis Use Disorder

The CIDI-Auto 2.1 interview

As baseline/follow-up sample comparisons indicate (see Table 7.3), a larger proportion qualified for a 12-month DSM-IV dependence diagnosis (76% vs. 72%), a similar proportion for an abuse diagnosis (17% vs. 19%), and a larger proportion for both diagnoses (74% vs. 68%). Similar results emerged in the ICD-10 diagnostic categories. Changes within age groups are presented in Table 7.3.

As anticipated, there was some minor movement between diagnostic categories. Overall change calculations indicated that 86% (n=166) had remained stable (same diagnostic group), 9% (n=17) had deteriorated (e.g., no symptoms to ‘diagnostic orphan’, no diagnosis to abuse, ‘diagnostic orphan’ to abuse or dependence, abuse to dependence, dependence with abuse now), while 5% (n=11) had “improved” (e.g., dependence to abuse, dependence without abuse now, abuse to no diagnosis) over the follow-up period. Four of the 12 adolescent ‘diagnostic orphans’ at baseline qualified for a diagnosis at follow-up (three were diagnosed with DSM-IV abuse, and one with DSM-IV dependence/abuse and ICD-10 dependence). Three from the original ‘no diagnosis/no symptoms’ group (n=5) had moved to ‘diagnostic orphan’ status at follow-

up, while one obtained a DSM-IV abuse diagnosis. The 'no diagnosis/no symptoms' group at follow-up (n=3 females) comprised the one adolescent remaining from the baseline 'no diagnosis' group, together with one baseline 'diagnostic orphan' and one diagnosed with cannabis abuse at baseline, both of whom claimed abstinence since the initial interview.

A corresponding upturn was evident in total number of symptoms endorsed, with 80% (n=155) of the sample reporting more (64%; n=123) or the same number (16%; n=32). Only 20% (n=39) reported reduced symptoms which, as the previous paragraph clarified, did not necessarily equate with reduced diagnoses. Overall, participants reported a mean of 7.52 (*SD*=3.47, range: 0-13) symptoms compared to a baseline mean of 6.4 (*SD*= 3.26, range: 0-13). Adolescents endorsed a mean of 7.66 (*SD*=3.70, range: 0-13) and adults 7.22 (*SD*=3.00, range: 0-12) symptoms, reflecting a significant increase among both adolescents, t (127) = -7.52, p=<.001, and adults, t (65) = -2.94, p =.004.

As at baseline, the most frequently endorsed criterion was use in hazardous situations (80% vs. 78% baseline). Reflecting a marked increase, tolerance development closely followed (79% vs. 53%), then using more or over longer periods than intended (79% vs. 73%), and a persistent desire, or unsuccessful efforts, to cut down or control use (71% vs. 63%). Also substantially up from baseline were social/interpersonal problems (68% vs. 44%), continued use despite psychological problems (62% vs. 55%), school/work role interference (53% vs. 39%), and compulsive use (54% vs. 47%). Except for cannabis-related legal and medical problems, remaining criteria were endorsed by a larger sample proportion than at baseline (almost 50% vs. 33%). Most of these symptoms were current: 76% were experienced within the past month, 16% within 6 months, and the minority (8%) 6-12 months ago. Adolescents were significantly more likely than adults to report cannabis use interfered with their work at school, job, or home (66% vs. 27%), χ^2(1, N=194) =27.44, p=<.001, or caused social/interpersonal problems (78% vs. 47%), χ^2(1, N=194) =19.46, p=<.001. Adults were significantly more likely to report use in hazardous situations (92% vs. 74%), χ^2(1, N=194) =10.39, p=<.001, than were adolescents.

Table 7.3: Proportion (%) of adolescents and adults meeting 12-month DSM-IV/ICD-10 diagnoses, and each of the criteria, for Cannabis Use Disorder on the CIDI-Auto among Follow-Up (n=194) and Baseline (n=211) Samples

Variable	Adolescents (<=18 years; n=128)	Adults (19+years; n=66)	Total Sample (n=194)	Baseline Sample (n=211)
12-month DSM-IV Diagnoses				
Cannabis Dependence (n=147)	73	82	76	72
Cannabis Abuse only (n=33)	18	15	17	19
Cannabis Dependence & Abuse (n=144)	73	77	74	68
12-month ICD-10 Diagnoses				
Dependence Syndrome (n=145)	72	80	75	70
Harmful Use only (n=9)	3	8	5	7
Dependence Syndrome & Harmful Use (n=119)	59	65	61	62
No Diagnosis (n=14)	6	1.0	7.2	8
'Diagnostic orphans' (n=11) (1 or 2 dependence criteria)	8	0.5	6.0	6
No symptoms/criteria (n=3)	1.5	1.5	1.5	2
Dependence Criteria Met (n=191)				
Tolerance: need more to achieve desired effect (or) same amount has less effect.	80	76	79	53
Withdrawal symptoms when cut down (or) use to avoid/relieve symptoms.	48	44	47	34
Used more, or over longer periods, than intended.	77	83	79	73
Strong desire to use/compulsive use.	52	58	54	47
Persistent desire (or) unsuccessful efforts to cut down or control use.	66	79	71	63
Great deal of time spent using, obtaining, or recovering.	52	64	56	66
Important social, occupational or recreational activities given up or reduced because of cannabis use	55	30	47	32
Continued use despite persistent cannabis-related medical problems (or)	20	21	20	26
Continued use despite persistent cannabis-related psychological problems	61	64	62	55
Abuse/Harmful Use Criteria Met				
Interfered with role obligations at work, school, or home	66	27	53	39
Recurrent use in physically hazardous situations	74	92	80	78
Recurrent legal problems	36	38	37	26
Recurrent social/interpersonal problems caused or exacerbated by cannabis use	78	47	68	44
Most Recent Symptom(s) (n=191)				
Within the past month	77	74	76	76
1 to <6 months ago	16	16	16	16
6-12 months ago/within past 12 months	7	9	8	8

The Severity of Dependence Scale (SDS)

The sample's mean SDS score was 5.52 (*SD*=2.96, range: 0-13). Adolescents' mean was 5.50 (*SD*=3.05, range: 0-13) and adults' mean 5.56 (*SD*=2.81, range: 0-12). Applying the cutoff of 4 for discriminating cannabis dependence among adolescents (Martin et al., 2006) and 3 among adults (Swift et al., 1998a) classified 69% (n=88) adolescents and 76% (n=50) adults as dependent compared to 53% and 63%, respectively, at baseline. Indicative of increased severity, follow-up scores were significantly higher than at the initial interview, *t* (193) =-8.93, *p*=<.001. While as previously there were no significant differences in scores by age groups, males scored significantly higher than females at follow-up (mean of 6.10 for males vs. 4.83 for females), *t* (192) = -3.05, *p*=.003.

Item-specific responses accounted for this upward trend. Compared to the initial interview, over the past 6 months 56% (vs. 42%) had at least sometimes thought their cannabis use was out of control, or felt anxious at the prospect of not having cannabis (73% vs. 54%). Increased proportions had worried about their cannabis use (86% vs. 73%), had wished they could stop (73% vs. 69%), or believed they would find it at least 'quite difficult' to stop or go without (79% vs. 72%). As previously, there were no significant adolescent/adult differences on any item.

Health

General medical health

Compared to baseline, a larger proportion of interviewees rated their general health as 'fair' or 'poor' (30% vs. 25%), and had consulted their health professional (62% vs. 55%) for medical (52% vs. 43%) or psychiatric (10% vs. 8%) concerns within the past 3 months. A significantly larger proportion (75% vs. 60%) acknowledged current respiratory problems, *t* (193) = -3.95, *p*=<.001. These included asthma/bronchial congestion (56% vs. 43%), cough/phlegm (54% vs. 34%), persistent chest infections (20% vs. 2%), and tight chest/pain (21% vs. 21%).

Psychological health

Forty-one percent (n=79; 38% adolescents, 47% adults) acknowledged having received counselling or medication for mental health problems over the past 12 months. While problems of treated adults (n=31) were mostly affective disorders (65%), then methadone maintenance (20%) and psychosis (10%), adolescents' problems (n=48) were noteworthy. The largest adolescent treatment category was for anger/violent behaviour (54%), followed by depression (40%), anxiety (27%), ADHD/Conduct Disorder (17%), and schizophrenia (6%). Several adolescents reported multiple problems being treated.

Current psychological health was again assessed by the BSI 18 (Derogatis, 2000). Scores for both adults and adolescents on the index of overall severity (GSI) were significantly higher than scores at baseline, t (192) = -5.798, p=<.001. Converted into standardized T-scores, the clinical cut-off (T>63; Derogatis, 2000) on the GSI and three symptom subscales suggested 10% of follow-up interviewees (n=19; 10 adolescents, 9 adults) were cases. A further 13% (n=25) scored within the clinical range on individual dimension scales: somatization (3%), depression (6%) and anxiety (4%). Thus cumulatively, score profiles suggested 23% (vs. 20% at baseline) of the follow-up sample (24 adolescents, 20 adults) met Derogatis' definition of 'caseness' or were at positive risk for psychiatric distress requiring intervention.

Cannabis-Related Problems

When asked directly if they believed their cannabis use had created any problems over the past year, the vast majority (91% vs. 80% at baseline) volunteered multiple adverse consequences. Remarkably similar proportions to baseline reported: impaired memory, concentration, or thought processing (88%), amotivation or energy loss (60%), paranoia or (unwanted) hallucinations (59%), health problems, e.g., respiratory, nausea, seizures (18%), caused or exacerbated depression (20%) anxiety (11%), anger/violent behaviour (8%), and psychosis (3%). Five participants (3%) confided cannabis use eroded their self-esteem.

Cannabis Problems Questionnaire

The multi-scale CPQ (Copeland et al., 2001a, 2005) and CPQ-A (Martin et al., 2006) again assessed cannabis-related problems over the past 6 months. Three adolescents aged 19 years at follow-up completed the CPQ (n=69) and the remainder, the CPQ-A (n=123).

All respondents completed a 'core' scale. Adults scored a mean of 13.65 (*SD*=6.49, range: 0-27) compared to their baseline mean of 11.75 (*SD*=5.18, range: 0-23), and adolescents a mean of 16.8 (*SD*=7.02, range: 0-27) compared to 11.76 (*SD*=5.30, range: 0-23). This represented a significant increase in cannabis-related problems reported by both adults, t (67) = -4.20, p =<.001 and adolescents, t (122) = -8.78, p = <.001. As previously, problems most commonly reported were driving while 'stoned' (93% adults; 71% adolescents vs. 56% at baseline), spending more time with smoking friends (86% adults; 89% adolescents), and feeling paranoid/antisocial after smoking (84% adults; 86% adolescents vs. 68% baseline). Of concern was a marked increase in health problems reported, particularly among adolescents. These included pains in chest/lungs after smoking (70% adults; 78% adolescents vs. 50% baseline), less energy (77% adolescents vs. 69% baseline), and poorer general health than usual (63% adolescents vs. 44% baseline). Adolescents also reported increased chest infections/cough (53% vs. 38%), being sick/passing out after smoking (64% vs. 33%) and unintended weight loss (44% vs. 36%). Psychological/motivational problems included: reduced concentration (83% adolescents vs. 72% baseline), motivation (69% adults; 71% adolescents vs. 58% baseline), and interest/enjoyment in usual activities (59% adults; 63% adolescents vs. 47% baseline). A considerably larger proportion (63% vs. 43% adults; 56% vs. 34% adolescents) reported feeling depressed for more than a week, and 17% had felt like doing away with themselves.

Increased reporting of social problems was also noteworthy, such as smoking more on their own now (69% adults; 65% adolescents vs. 43% baseline), having given up recreational activities for smoking (41% adults; 65% adolescents), losing touch with family/friends (47% adults; 35% adolescents), feeling personally isolated (47% adults; 25% adolescents) and being criticized by friends for smoking (42% adolescents). More

than a third (37% adults; 41% adolescents vs. 30% baseline) had been in trouble with the police for smoking cannabis. Similar proportions to baseline reported cannabis-related money problems (33% adults; 45% adolescents), having had accidents while 'stoned' (17% both groups), and having been in prison/juvenile detention within the past 6 months (11% adults; 13% adolescents).

As previously, the topic-specific scales applied to smaller subgroups. Adults scored a mean of 3.00 (*SD*=2.32, range: 0-7, n=24) on the 'marital problems' scale, and a mean of 2.21 (*SD*=1.84, range: 0-5, n=19) on the 'children problems' scale. Increased proportions reported spousal complaints (63% vs. 58% at baseline) and arguments (75% vs. 50%) over cannabis. Over half (52%) reported their spouse had tried to stop them using, and they had avoided their spouse after smoking. Similar proportions to baseline (42% vs. 39%) reported their spouse used cannabis regularly. Larger proportions reported their children criticized, argued with, tried to stop them smoking (53% vs. 33%), or avoided them (42% vs. 33%), when they smoked.

Adolescents (n=114) scored a mean of 3.21 (*SD*=1.52, range: 0-5) on the 'parental issues' scale compared to 2.78 at baseline. More parents (70% vs. 60%) had complained, argued about, and tried to stop them using cannabis, while 86% (vs. 73% at baseline) had avoided their parents after smoking. Similar subgroup proportions (24%) had a parent who used cannabis regularly. Adolescents in a relationship at follow-up (n=64) scored a (relatively unchanged) mean of 1.72 (*SD*=1.28, range: 0-4) on the 'partner issues' scale. Not surprisingly, a larger proportion at follow-up (66% vs. 54%) reported their partner also used cannabis regularly.

As at baseline, cannabis-related school issues (n=72) were of particular concern. Relatively unchanged from the initial interview, a mean of 5.79 (*SD*= 5.79, range: 0-9) problems were endorsed. With increases noted on some variables, comparable proportions of both samples reported attending classes stoned (75% vs. 82%); losing interest/motivation in schoolwork/study (74% vs. 78%) and ability to concentrate (83% vs. 79%); smoking on school premises (64% both interviews); teachers complaining about their work (65% vs. 57%); getting lower marks/grades (55% both interviews);

being unable to complete homework (60% vs. 51%) or attend classes (59% vs. 44%) because of smoking cannabis. A larger proportion (46% vs. 35%) had been suspended or disciplined because of cannabis in the intervening year.

Finally, adults (n=36) reported a mean of 3.94 (*SD*=2.57, range: 0-8) and adolescents (n=41) a mean of 4.07 (*SD*=2.20, range: 0-8) cannabis-related employment problems, reflecting increased problems experienced by both groups. While similar proportions to baseline reported going to work 'stoned' (72% adults; 85% adolescents), increased proportions reported cannabis-related lateness/absenteeism (up to 56% vs. 46% adolescents), less interest in their work (58% adults; 45% adolescents vs. 39% baseline), and impaired job performance (56% vs. 37% baseline, both groups). A marked increase in formal warnings from employers (58% adults; 44% adolescents vs. 23% baseline), no change in accidents at work (11%), and a reduced proportion dismissed (6%) after smoking, was also reported.

Problem or Risk Perception and Future Use

More than half (55%, n=107) claimed they had attempted to quit or reduce their use in the follow-up interval, most (n=77) trying to do so unassisted. Treatment seekers (n=30) had been to community drug treatment services (70%), school counsellors (20%), or residential rehabilitation (10%). As at baseline, not one had approached their doctor. While eighteen found treatment helpful, twelve did not.

Nevertheless, as at baseline two-thirds (68%) believed their use was 'definitely not' or 'probably not' a problem at follow-up, while 32% thought it 'possibly' or 'definitely' was. A shift away from baseline perception of being at risk at current use levels was apparent, with 52% (vs. 40%) believing they were 'definitely' or 'probably' *not* at risk, while 48% (vs. 60%) thought they 'definitely' or 'possibly' were. Interestingly, however, when again asked their personal intentions for their cannabis use in the next 12 months, responses indicated remarkably consistent stages of change with baseline: Action 24% (unchanged); Preparation 14% (19% baseline); Contemplation 25% (24%); and Precontemplation 37% (33%).

Stage designations suggest the majority (63%) were currently at least thinking about cutting down, with the remainder (37%) not considering any change in their consumption. While there were no significant differences in stage designation by gender, adolescents were more likely than adults to be Precontemplators ('no change') or Contemplators ('want to but not ready'), χ^2, 3df=12.82, p=0.005.

Finally, as at baseline most (86%) said they did not desire any assistance to help them cut down or quit cannabis use. Eleven percent (n=22) indicated they would like some help, and 3% (n=6) were unsure.

Discussion

Despite the well-documented challenges of tracking drug research participants, with miniscule resources beyond those recommended (good planning, initiative, enthusiasm, dedication, patience, persistence, time, travel) vital to maximizing tracing/location success (see Cottler et al., 1996; Desmond et al., 1995; Robles, Flaherty, & Day, 1994; Scott, 2004; Walton et al., 1998; Wutzke et al., 2000) the researcher ultimately achieved a 92% sample completion rate (94% follow-up) by the pre-determined calendar deadline. This uncommonly high 12-month re-location/interview rate among a drug-using population also reflects an extremely high level of respondent cooperation attributable to data confidentiality and their enjoyment and perception of the project's social worth. Once contact was made, the researcher met with very few refusals (2.7%). Notably high transience, homelessness, school and job dropout, criminal behaviour, and participant or familial evasiveness were tracking obstacles encountered. The researcher interviewed several participants on remand or court-ordered curfew, and others in cells awaiting sentence. Several further interviews were conducted immediately prior to participants' court appearance and subsequent incarceration. Telephone interviews included adolescents currently detained in geographically remote Juvenile Justice Detention or court-mandated Residential Rehabilitation. The highest possible re-interview rate was assiduously pursued to ensure validity of the longitudinal data (Bootsmiller et al., 1998; Robles et al., 1994; Walton et al., 1998). Although more males

than females were lost to follow-up, the roughly proportional attrition across age groups produced very little change in baseline age group and ethnic ratios. With no selective attrition apparent, the risk of data bias and loss of statistical power was minimal (Ahern & Brocque, 2005; Sherman, 2000; Twitchell, Hertzog, Klein, & Schukit, 1992).

Consistent with the theorized progressive nature or 'natural history' of cannabis use and disorder (APA, 1994, 2000), the results reported above depict an overall sample profile of significantly increased cannabis use, symptoms, and use-related health and social problems since baseline, most pronounced among adolescents. More specifically, consistent with local (Fergusson & Horwood, 2000b; Poulton et al., 1997, 2001) and international (Compton et al., 2004; Eggington & Parker, 2002; Perkonigg et al., 1999; Sydow et al., 2001, 2002; Williams & Parker, 2001) prospective research, rather than remission or a tailing-off in use there was clear evidence of generally persistent cannabis-using behaviour among the adults (as in Swift et al., 2000), and significantly increased use and problem severity among adolescents. The marked increase in reported social/interpersonal problems (68% up from baseline 44%) was largely accounted for by adolescents (78%) who, consistent with other research (Fergusson et al., 2002, 2003; Lynskey & Hall, 2000; McGee et al., 2000), were also more likely than adults to report cannabis use interfered with their functioning at school, job, or home.

There is conflicting evidence for a natural progression and temporal patterning of drug dependence symptoms (Nelson, Little, Heath, & Kessler, 1996; Smart, 1994). Given the embryonic stage of research on the natural history of cannabis dependence, both prevalence and constellation of symptoms endorsed at the 12-month follow-up, particularly by baseline 'diagnostic orphans' and 'no diagnosis/symptoms' groups, were of empirical interest in this study. Wagner and Anthony (2002) discovered a subjective loss of control to be one of the earliest and most frequently observed clinical features of cannabis dependence. Rosenberg and Anthony (2001) reported 'use in hazardous situations' showed the most rapid progression of all, with approximately 40% of cases reporting this within the first year of cannabis use. The next rank-ordered feature was 'time spent getting, using, and recovering' from cannabis intoxication, followed by subjectively felt tolerance. Remarkably similar findings emerged in this study. 'Use in

hazardous situations' retained its status as the most frequently endorsed (DSM-IV) criterion overall (80%). Given the ongoing controversy about cannabis' physical dependence liability (Chapter two), the sharp increase in both reported tolerance (79% up from baseline 53%) and withdrawal symptoms among adolescents (48% up from baseline 28%) is noteworthy. In addition, 'persistent desire or unsuccessful efforts to cut down or control use' (71% up from baseline 63%), attests to loss of control or compulsiveness of using behaviour.

Among the earliest clinical features in Wagner and Anthony's research, subjective loss of control was the *only* dependence feature endorsed by all of the 12 adolescent diagnostic orphans in this study. Specifically, six endorsed 'persistent desire or unsuccessful efforts to cut down or control use' alone, and 3 endorsed this criterion in combination with 'used more or over a longer period than intended'. The remaining 3 endorsed the latter criterion only. At follow-up diagnostic orphans endorsed similar symptoms, with 3 also reporting having developed tolerance over the 12 months. While 8 remained just under the diagnostic threshold (i.e., satisfying 1 or 2 dependence criteria), one had progressed to DSM-IV/ICD-10 dependence and abuse diagnoses, and the remaining three to DSM-IV abuse.

Of parallel interest, 3 participants in the baseline 'no diagnosis/symptoms' group had graduated to diagnostic orphans by follow-up. All endorsed 'persistent desire or unsuccessful efforts to cut down or control use', with 2 also endorsing subjectively felt tolerance. In short, albeit modest in magnitude these findings provide support for the predictive validity of Wagner and Anthony's research among at risk users on a trajectory to supra-threshold cannabis use disorder. These researchers advocate identification of distinctive features of early cannabis dependence to promote earlier differentiation of cannabis users who will - or will not - progress to clinically significant dependence (Rosenberg & Anthony, 2001; Wagner & Anthony, 2002; and see Degenhardt et al., 2002).

Apart from an apparent small reduction in tobacco use across the whole sample, baseline patterns of concurrent use of other drugs persisted throughout the follow-up

period with two notable exceptions - adolescent alcohol and 'party pill'/BZP (benzylpiperazine) use. Raising serious health and safety concerns (see Adlaf et al., 2003; Reid et al., 2000; Shillington & Clapp, 2002) two-thirds of adolescents were also drinking on significantly more days per week at follow-up, often (anecdotally) at binge levels. This cannabis/alcohol combination significantly increases the risk of overdose or "greening out". Evoking similar alarm in the context of recent research and sensationalized media reports was a dramatic increase in concurrent (75% up from baseline 41%) and regular (52% up from baseline 15%) use of BZP. While these use prevalence rates are well in excess of those recently reported among a general population sample (see Wilkins et al., 2006), the health and safety risks among the present sample are arguably far greater given that cannabis-using adolescents accounted for most (73%) regular BZP use reported.

Deteriorated health among the sample (particularly adolescents) was a further vexatious finding, reflected in increased self-ratings of 'fair' or 'poor' general health, responses to specific health-related questions, and recent health care utilization for medical and psychiatric problems. Giving cause for concern was a significant increase in current respiratory problems (75% up from baseline 60%). A large minority (41%) had received treatment for mental health problems within the follow-up period, including anger/aggression (adolescents only), depression, anxiety, and psychosis. Not unexpectedly, both adolescents and adults scored significantly higher than at baseline on the BSI 18 (Derogatis, 2000) overall index of psychological distress, with an increased proportion (23% vs. baseline 20%) classified as having clinically-relevant psychiatric problems requiring treatment.

Given all these indices of increased problem severity, it was not surprising that most (86%) had worried about, almost three-quarters (73%) had wished they could stop, and more than half (55%) claimed they *had* attempted to quit or reduce their cannabis use within the follow-up period. Discrepancies between real changes in consumption and subjective impressions of change, however, highlight the extent to which many users underestimate their cannabis intake. Although the Stages of Change has been a good predictor of smoking cessation outcomes (e.g., Crittenden et al., 1998; Morera et al.,

1998; Prochaska et al., 2004), in this study the stages framework had poor predictive utility (see West, 2005, for critique of the SOC model). Cumulatively, of those declaring no intention of changing their consumption levels, and those wanting, preparing, or stating they *were* actively cutting down at baseline ('Precontemplators', 'Contemplators', 'Preparation', and 'Action', respectively), the majority (74% of the whole sample) were using at *increased* levels 12 months later. In other words, despite evidence that many in this sample consciously aspired to reduce or quit, generally persistent or increased cannabis consumption attests to the resistance of that behaviour to change, confirming the "intractability" of problematic cannabis use to be a "formidable problem requiring treatment, and perhaps multiple attempts to quit" (Stephens et al., 1993, p. 216; and see Copeland, 2004; Hall et al., 2001; Moore & Budney, 2003; Stephens et al., 1994). This dilemma was poignantly encapsulated in a younger participant's reflection, "I thought cutting down would be *so easy*…now I see it is going to be very, *very* difficult" (*sic*). These words were echoed by many.

However, while most (72%) of those claiming to have attempted to reduce or quit their consumption had tried to do so unaided, not one participant among the small group who sought help approached their GP for help. Moreover, a GP's response to a chronic user who opportunistically asked for help to quit his cannabis use, "you are just malingering to stay on the benefit" (*sic*), replicates Copeland and her team's (1999) findings of inappropriate GP responses. Likewise, with further similar anecdotal reports confided to her, the writer endorses Copeland's (and others) conclusion that there is an acute need for incentives, training, resources and support for health care and other social services workers on the effects of cannabis use and the SEI approach to ensure timely, appropriate responses to help-seeking users (Adams et al., 1997; Anthony, 2000; Copeland et al., 1999, 2001b; Dennis et al., 2002a; Fleming, 2002; Gerada, 2003; Hall & Swift, 2006; Keen, 1999; McCormick et al., 1999; Penrose-Wall et al., 2000; WHO, 1998).

Again, perhaps the most worrisome finding was participants' own continuing lack of insight into cannabis' role in their rather chaotic lives. Notwithstanding the significant increase in consumption and problem severity at follow-up, a larger proportion of the

sample perceived themselves *not* at risk, and self-reported Stages of Change designations (Prochaska & DiClemete, 1983) remained remarkably similar, to baseline. At follow-up, however, adolescents were significantly more likely than adults to be Precontemplators ('no change') or Contemplators ('want to but not ready'). Thus, in the interests of safeguarding adolescents' health and wellbeing, the writer evokes Spooner's (1999) warning:

> …not all cannabis initiates will 'mature out' successfully, and simply waiting to see who will grow out of it is shirking our societal responsibility to those who are having difficulty in their maturation process (p. 464).

Spooner's exhortation provides ample justification for screening and early intervention to help dispel adolescents' ambivalence and arrest this seemingly inexorable progression towards even further use-related pathology. Given that intervention in the *earliest possible* stage of problem development has the most potential to 'nip it in the bud', the longitudinal capacity of the draft CUPIT to detect users currently incubating, or at risk of developing, a cannabis use disorder is critical. These properties are examined in the next section.

Longitudinal Validity of the CUPIT Subscales

A series of longitudinal multivariate analyses were conducted to investigate the CUPIT subscales' predictive capacity for diagnostic group membership and other key outcomes at follow-up. First, the ability of baseline scores on the subscales (developed in Chapter six) to reliably predict participants' DSM/ICD diagnostic status 12 months later was investigated. In tandem, the predictive ability of baseline cannabis consumption for diagnostic outcomes was examined. The predictive relationship between original subscale scores and all key validation measures re-administered at follow-up was then assessed. This extended to exploration of the subscales' ability to reliably improve prediction of scores on these outcomes measures beyond that afforded by baseline scores on the respective measures.

Longitudinal Predictive Validity of the CUPIT

Diagnostic group membership

As at baseline, the CIDI-Auto algorithm generated three independent DSM-IV/ICD-10 diagnostic groups: no diagnosis (n=14), abuse and/or harmful use (n=33), and dependence, with or without abuse/harmful use diagnoses (n=147). A one-way ANOVA was conducted to test for any differences in baseline CUPIT subscale scores as a function of follow-up diagnostic group. Scores for adolescents and adults within the diagnostic groups were also compared. As previously, unequal adult diagnostic group distributions (2, 10, 54) ruled out between-group ANOVAs, hence Student's *t*-tests were conducted to compare adult 'abuse/harmful use' and 'dependence' groups (only). Given their group distributions (12, 23, 93), ANOVAS were appropriate for examining adolescent diagnostic group differences. The same statistic was also used to investigate any significant sample differences on baseline cannabis consumption variables across follow-up diagnostic groups, and again repeated by age groups (*t*-tests for adults). All ANOVAs were followed by post hoc pairwise comparisons using Tukey's HSD. Results are presented in Table 7. 4.

Table 7.4: Baseline CUPIT Subscale Scores and Cannabis Consumption by DSM/ICD Diagnostic Group at Follow-Up (n=194 unless specified)

Variable	Diagnostic Group: No Diagnosis		Abuse/Harmful Use		Dependence			
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*F*	Significance
Impaired Control								
Whole sample	13.14	6.78	17.55	7.58	31.54	10.40	44.75	<.001
Adolescents (n=128)	12.17	5.01	18.57	7.96	30.63	10.17	30.72	<.001
Adults (n=66)			15.20	6.39	33.11	10.69	- 5.11*	<.001
Problems								
Whole sample	3.29	2.49	4.06	2.70	7.94	4.72	16.24	<.001
Adolescents (n=128)	2.92	2.27	4.26	2.93	8.71	4.46	18.88	<.001
Adults (n=66)			3.60	2.17	6.61	4.90	-1.89*	.062
Cannabis Consumption								
Whole sample								
Days used past 90 days	15.00	21 14	24.03	22.10	60.54	26.93	41.66	<.001
Cones used past 90 days	54.07	63.49	121.18	139.30	528.28	550.04	13.93	<.001
Days used past 30 days	4.93	7.48	8.15	8.44	20.46	9.58	37.09	<.001
Cones used past 30 days	16.21	17.22	43.67	55.76	187.00	221.87	11.72	<.001
Adolescents (n=128)								
Days used past 90 days	10.33	5.05	25.22	23.13	54.42	26.43	25.93	<.001
Cones used past 90 days	41.17	18.65	143.35	159.79	426.94	454.86	8.50	<.001
Days used past 30 days	3.25	1.91	8.65	8.86	18.06	9.41	21.80	<.001
Cones used past 30 days	13.25	8.56	51.47	64.64	149.65	189.80	5.99	<.01
Adults (n=66)								
Days used past 90 days			21.30	20.40	71.09	24.61	-6.02*	<.001
Cones used past 90 days			70.20	49.35	702.81	652.09	-3.05*	<.01
Days used past 30 days			7.00	7.69	24.57	8.47	-6.01*	<.001
Cones used past 30 days			25.70	18.07	251.33	235.87	-3.00*	<.01

* Student's *t*-test, 62df. All tests two-tailed.

As Table 7.4 shows, across the whole sample and also for adolescents, mean scores on both subscales at baseline were significantly different across diagnostic groups at follow-up, and in the expected direction (no diagnosis mean scores < abuse/harmful use mean scores < dependence mean scores). That is, baseline mean subscale scores plotted against diagnostic groups at follow-up displayed an orderly increase in scores as a function of diagnostic severity. As at baseline, for the whole sample and also for adolescents post hoc pairwise comparisons using Tukey's HSD revealed that the 'dependent' group mean was significantly different to the 'no diagnosis' (p =<.001) and 'abuse/harmful use' group (p=<.001) means on both subscales. The two latter groups

did not differ significantly on either subscale across the sample and among adolescents. Baseline TLFB consumption variables scores performed in a similar pattern, reflecting an orderly increase as a function of diagnostic group severity at follow-up. Again, Tukey's HSD test clarified that while the 'dependent' group mean differed significantly from both the 'no diagnosis' and 'abuse/harmful use' group means on all four baseline TLFB consumption measures (to at least p=<.01 level for the whole sample and for adolescents), the 'no diagnosis' and 'abuse/harmful use' groups did not differ significantly on any of these measures, either in the whole sample or among adolescents.

As appropriate, no values are shown for the adult 'no diagnosis' group (n=2) for between-groups analyses. *T*-tests showed that while adult 'abuse/harmful use' and 'dependence' follow-up groups' baseline subscale 1 score means were significantly different, mean differences in their baseline subscale 2 scores did not reach significance level (.062). As shown, however, the two adult follow-up diagnostic groups scored significantly differently on all baseline TLFB consumption variables (to at least the p=<.01 level).

In summary, as these results clearly convey for the entire sample and for adolescents, scores on both subscales at baseline had highly significant power for predicting diagnostic group membership 12 months later. The predictive capacity of adults' scores on subscale 1 was comparable. In addition, among the whole sample and also among both age groups, baseline consumption variables (and particularly days used) showed highly significant ability to prospectively predict diagnostic group assignment. That is, CUPIT subscale scores (particularly Impaired Control) and cannabis consumption measures at baseline were significant predictors of diagnostic status 12 months later.

Other key outcome validation measures

Pearson correlations were calculated to assess the relationship between baseline CUPIT subscale scores and other key construct validation measures re-administered at follow-up. These were: DSM/ICD symptoms generated by the 12-month CIDI-Auto 2.1 interview (WHO, 1997b); 90- and 30-day cannabis consumption measures from the

TLFB interview (Sobell & Sobell, 1992); the 6-month Severity of Dependence Scale (SDS; Gossop et al., 1995), Cannabis Problems Questionnaire for adults (CPQ; Copeland et al., 2001a, 2005) and adolescents (CPQ-A; Martin et al., 2006); and the GSI (BSI 18; Derogatis, 2000) measure of current psychological distress.

Mean scores and standard deviations on the key validation measures at follow-up were detailed in section one. As reported there, in contrast to baseline there were no significant differences between adolescents and adults on any of the TLFB consumption variables or the BSI. Also as at baseline, there were no significant adolescent/adult differences on the SDS or total number of symptoms elicited in the CIDI-Auto interview. As at baseline, however, given the mixed patterns that emerged and the focus on adolescents as a primary target group for a cannabis screen, Pearson correlations were first computed for the whole sample, then repeated by age-groups. Results are presented in Table 7.5.

Table 7.5: Longitudinal Correlation between Baseline CUPIT Subscale Scores and Key Outcome Measures

Measure/Variable	Impaired Control			Problems		
	Sample (n=194)	**Adolescents (n=128)**	**Adults (n=66)**	**Sample (n=194)**	**Adolescents (n=128)**	**Adults (n=66)**
CIDI-Auto						
Number of DSM/ICD symptoms	.61***	.66***	.55***	.51***	.55***	.41***
Severity of Dependence Scale (SDS)	.70***	.78***	.55***	.56***	.61***	.46***
TLFB interview:						
Days used past 90 days	.51***	.58***	.38**	.20**	.35**	-.07
Cones used past 90 days	.48***	.52***	.42***	.14*	.26**	.03
Days used past 30 days	.49***	.54***	.40**	.17*	.32**	-.08
Cones used past 30 days	.46***	.49***	.42***	.12	.23*	.01
CPQ for Adults						
Core scale (n=64)			.31*			.29*
Spouse scale (n=21)			.12			.08
Children scale (n=18)			.08		.	-.17
Work scale (n=31)			.45*			.34
CPQ for Adolescents						
Core scale (n=122)		.63***			.49***	
Parent scale (n=112)		.46***			.37***	
Partner scale (n=63)		.44***			.28*	
School scale (n=72)		.56***			.49***	
Work scale (n=40)		.51***			.37*	
BSI-18						
GSI score	.19**	.34***	- .04	.33***	.35***	.33**

**p<.05, **p<.01, *** p<.001, all tests two-tailed.*

As displayed in Table 7.5, at follow-up respondents' original scores on both CUPIT subscales exhibited highly significant, conceptually consistent moderate to strong positive correlations with DSM-IV/ICD-10 symptom count, the SDS, and the subscales of the adolescent CPQ. Of note, consistent with the significant increase in cannabis consumption and interpersonal, social, and work-related problems reported by adolescents at follow-up, compared to baseline associations (see Table 6.8) the correlations of the CUPIT subscales with the SDS and most of the CPQ-A subscales (particularly core, parent, and work) were notably stronger. Both subscales also showed significant, somewhat weaker positive correlations with the adult CPQ core scale. Similar to baseline, Impaired Control showed a significant moderate positive correlation with the adult CPQ work subscale while the weaker nonsignificant relationships with the spouse and children subscales were (again) largely explained by their limited applicability to respondents. Also consistent with the baseline interview, Impaired Control exhibited a highly significant (albeit attenuated) positive correlation with all four TLFB measures. This pattern repeated for the Problems subscale. As anticipated, the generally significant but weaker correlation of Problems with all TLFB variables was (again) almost entirely accounted for by the adolescents, reflecting the significant increase in adolescents' consumption and use-related problems. Finally, an interesting pattern of association was again found with the GSI. This measure's significant but relatively weak correlation with Impaired Control over the whole sample was (as previously) largely explained by the adolescents, and somewhat more strongly associated than at baseline. By contrast, the highly significant moderate correlation apparent between Problems and the GSI held constant over the whole sample.

To summarize, generally consistent with baseline and hence anticipated, a mixed pattern of longitudinal associations between scores on the CUPIT subscales at baseline and key outcome measures emerged. Overall, Impaired Control exhibited a generally strong and significant association with most measures. Slightly weaker but significant correlations were also found for the Problems subscale over the sample and for adolescents on number of symptoms and severity of dependence. In addition, the significant correlations between consumption and problems and baseline Impaired Control scores, and the generally significant correlations of Problems with these measures, largely

reflected adolescents' increased consumption and problem severity. Finally, while at follow-up Problems continued to show a significant moderate correlation with psychological distress (GSI) across the whole sample, the association between adolescents' original scores on Impaired Control and psychological distress had increased in strength and significance since baseline.

Predictive contribution of the CUPIT subscales on key outcome measures

A series of hierarchical multiple regression analyses were then conducted to examine the ability of subscale scores to account for significant variability on each of these key outcome continuous measures at follow-up while controlling for baseline outcomes. In each model, the relevant baseline outcome was entered on the first step along with demographic predictors of theoretical and empirical importance (age group, gender). Baseline subscale scores were then entered on step two.

Prior to each analysis, variables were screened for assumptions of multivariate analyses (Pedhazur, 1997; Tabachnick & Fidell, 2001). One outcome variable, GSI, was (similarly) positively skewed at baseline and 12-month follow-up. Although a log10 transformation significantly improved both distributions it did not alter the substantive findings. Hence, the regression equation for the original GSI variables is reported to maintain consistency and simplify interpretation (Orr et al., 1991; Osborne, 2002; Tabachnick & Fidell, 2001). One case with a Z-score >4 on the BSI was identified as the only univariate outlier on these variables. Two cases on the SDS, five cases on the BSI-18, one case on DSM/ICD symptoms, and one case on the CPQ were identified as multivariate outliers using the $p<.001$ criterion for Mahalanobis distances. In turn, all ten were deleted prior to the specific analysis.

Results of the regression analyses are presented in Table 7.6 (for DSM/ICD symptoms), Table 7.7 (for the SDS), Table 7.8 (for the CPQ-A), and Table 7.9 (for the BSI 18). Each table displays the standardized regression coefficients (beta), R, R^2 (coefficient of determination), adjusted R^2, and change in R^2 (R^2_{change}) (Schafer, 1991). The discrepancy between R^2 and adjusted R^2 reflects adjustment made for expected inflation in the sample R as a function of sample size, number of independent variables, and the

value of R^2, in order to circumvent "overfitting" the data (Hair et al., 1998; Tabachnick & Fidell, 2001). Results of the regression analyses for the TLFB variables and the CPQ are not shown, as baseline CUPIT subscale scores did not significantly improve the predictive utility of baseline outcomes on their respective follow-up outcomes.

Table 7.6: Hierarchical Multiple Regression of Baseline DSM/ICD Symptoms, Age Groups, Gender, and Baseline CUPIT Subscale scores on DSM/ICD Symptoms at Follow-Up, showing Standardised Regression Coefficients, *R*, $R^{2,}$ and adjusted R^2, and R^2_{change} for all respondents (n=194)

Predictor	Step 1	Step 2
Number of symptoms at baseline	.77***	.58***
Age Groups	-.12*	-.13**
Gender	.10*	.12*
Impaired Control		.24***
Problems		.07
R	.79***	.82***
R^2	.63	.67
Adjusted R^2	.62	.66
R^2_{change}	.63***	.04***

* $P < .05$, ** $P < .01$, *** $P < .001$

First, with symptoms at follow-up as the DV, after step 1 with baseline symptoms, age groups (adolescent/adult) and gender in the equation, the *R* for regression was significantly different from zero, $F(3, 189) = 105.25$, $p<.001$. Symptoms at baseline, age group and gender reliably predicted symptoms 12 months later, with 63% (62% adjusted) of the variability in number of symptoms predicted by knowing scores on these control and demographic variables. After step 2, with the addition of CUPIT subscale scores to the equation, $R^2 = .67$ (.66 adjusted), $F(5, 187) = 75.15$, $p < .001$. As shown, addition of Impaired Control baseline scores to the equation resulted in a significant increment in R^2 ($R^2_{change} = .04$, $p<.001$).

Table 7.7: Hierarchical Multiple Regression of Baseline SDS scores, Age Groups, Gender, and Baseline CUPIT Subscale scores on SDS scores at Follow-Up, showing Standardised Regression Coefficients, *R*, $R^{2,}$ and adjusted R^2, and R^2_{change} for all respondents (n=194).

Predictor		Step 1	Step 2
SDS at baseline		.78***	.47***
Age groups		-.06	-.05
Gender		-.11	.13**
Impaired Control			.29***
Problems			.19***
	R	.80***	.84***
	R^2	.64	.71
	Adjusted R^2	.63	.71
	R^2_{change}	.64***	.08***

** *P*< .01, *** *P*< .001

As displayed in Table 7.7 with SDS scores at follow-up as the DV, after step 1 the *R* for regression was significantly different from zero, F (3,188) =110.05, p <.001. Baseline SDS scores contributed significantly to prediction of SDS scores at the 12-month follow-up, with 64% (63% adjusted) of the variability in SDS scores at follow-up predicted by knowing scores on this control variable. After step 2, with the addition of CUPIT subscales to the equation, R^2 =.71, F (5, 186) =92.35, p <.001. The addition of both subscale scores to the equation significantly improved prediction, R^2 (R^2_{change} =.08, p <.001). As can be seen, gender showed suppression effects that complicate interpretation (Tabachnick & Fidell, 2001).

Table 7.8: Hierarchical Multiple Regression of Baseline CPQ-A Core scores, Gender, and Baseline CUPIT Subscale scores on CPQ-A Core scores at Follow-Up, showing Standardised Regression Coefficients, *R*, $R^{2,}$ and adjusted R^2, and R^2_{change} for adolescents (n=123)

Predictor		Step 1	Step 2
CPQ-A core at baseline		.62***	.35***
Gender		.17*	.17*
Impaired Control			.38***
Problems			.07
	R	.64***	.72***
	R^2	.41	.51
	Adjusted R^2	.40	.50
	R^2_{change}	.41***	.11***

* *P*< .05, *** *P*< .001

As Table 7.8 shows, with CPQ-A scores at follow-up as the DV, after step 1 the *R* for regression was significantly different from zero, *F* (2, 120) =40.95, *p* <.001. Adolescents' baseline CPQ-A core scores and gender contributed significantly to prediction of CPQ-A outcomes at follow-up, together predicting 41% (40% adjusted) of the variability in scores. After step 2, with the addition of CUPIT subscale scores to the equation, R^2 = .51 (.50 adjusted), *F* (4, 118) =31.05, *p* <.001. Addition of Impaired Control effected a significant increment in R^2 (R^2_{change} = .11, *p* <.001).

Table 7.9: Hierarchical Multiple Regression of Baseline GSI Scores, Age Groups, Gender, and Baseline CUPIT Subscale scores on GSI Scores at Follow-Up, showing Standardised Regression Coefficients, *R*, R^2, and adjusted R^2, and R^2_{change} for all respondents (n=194)

Predictor	Step 1	Step 2
GSI scores at baseline	.65***	.58***
Age Groups	-.03	-.00
Gender	.08	.07
Impaired Control		.06
Problems		.18*
R	.65***	.68***
R^2	.42	.46
Adjusted R^2	.41	.44
R^2_{change}	.42***	.04**

* *P*< .05, ** *P*< .01, *** *P*< .001

Table 7.9 shows that after step 1, with GSI scores at follow-up as the DV, the *R* for regression was significantly different from zero, *F*(3, 184) =44.72, *p*<.001. Baseline GSI scores contributed significantly to prediction of GSI scores at follow-up, with 42% (41% adjusted) of the variability predicted by knowing scores on this control variable alone. After step 2, with the addition of the CUPIT subscales to the equation, R^2 = .46 (.44 adjusted), *F*(4, 183) =38.09, *p* <.001. The addition of Problems to the equation resulted in a significant increment in R^2 (R^2_{change} = .04, *p* <.001).

In summary, as Tables 7.6 to 7.9 indicate, the pattern of results that emerged was one where at the 12-months follow-up the Impaired Control subscale accounted for significant variability in key outcome measures (DSM/ICD symptoms, problems measured by the CPQ-A Core), the Problems subscale accounted for significant

variability in psychological distress, and both subscales accounted for significant variability in severity of dependence. Either individually or jointly, therefore, both subscales reliably improved prediction of key outcomes over that predicted by the respective control variables either alone or in conjunction with age and/or gender.

Classification Accuracy of the Draft CUPIT

Rapid, reliable, accurate classification of cannabis users currently with a cannabis use disorder, and those at risk and on a trajectory to developing such problems, is the hallmark of a useful screen. Hence, using the CIDI-Auto 2.1 diagnostic assignment as the criterion standard, the ROC Curve technique from the SPSS 12.0 programme was used to determine the optimal dichotomous cut-point on respondents' original CUPIT subscale scores for distinguishing those with, from those without, a diagnosis at baseline and at the 12-month follow-up. The optimal cut-point for including those at risk in the screening net was simultaneously explored.

Receiver Operating Characteristic (ROC) Analysis

ROC analysis (Hanley & McNeil, 1982; Kraemer, 1992; Metz, 1978; Swets, 1964, 1979) is a method used to estimate the accuracy of ordinal and continuous tests relative to a dichotomous true disease state that enables the visualization of the entire distribution of *sensitivity/specificity* combinations of possible cut-off values and prevalences. Enabling the selection of a criterion threshold based on substantially more information than other existing quantitative methods, ROC represents a relatively precise and much more sophisticated clinical decision process. First developed in World War II in the context of radar signal detection paradigms in psychophysics (Swets, 1964), the technique has been integrated with information theory to optimize the performance of psychiatric screening and diagnostic tests (see Hsiao, Bartko & Potter, 1989; Fombonne, 1991; Kraemer, 1988, 1992; Murphy et al., 1987; Rey et al., 1992; Somoza & Mossman, 1990, 1992; Somoza, Steer, Beck, & Clark, 1994; Zou, Hall, & Shapiro, 1997). The only technique available to provide an overall index of diagnostic

accuracy not dependent on prevalence (as is positive predictive value), or on the cut-off score (as are sensitivity and specificity), ROC places the performance of a variety of systems on a common, easy to interpret scale (Swets, 1988). ROC is used to compare screening tests' performance, aid in the validation of new tests, compare different scoring methods for a given test, and contrast the screening performance of a test in different populations (Rey et al., 1992).

Typically, a ROC curve is generated by plotting corresponding values of a test's *sensitivity* (proportion of true positives) on the vertical axis against the complement of its *specificity* (proportion of true negatives) on the horizontal axis for the entire range of possible cut-off scores (the curve coordinates). The ROC curve demonstrates the discriminative capacity of the screen at each possible cut-off score. If the discriminative capacity of the screen is no better than chance, the curve will follow a diagonal straight line from the origin of the graph (lower left) to its uppermost right corner (termed the 'line of no information'). The ROC summary statistic or 'index of detectability' that describes the discriminatory capacity of the screen is the 'area under the curve' (AUC; Swets, 1979). Representing the probability estimate that at each cutoff score a randomly chosen positive (or case) will demonstrate a higher score than a randomly chosen negative (non-case) the AUC is the percentage of randomly drawn pairs for which this is true. A larger value of the AUC represents less diagnostic overlap, greater predictive efficacy, greater sensitivity (Metz, 1978; Rey et al., 1992). When the ROC curve follows the 'line of no information', the AUC = 0.50. In the situation of optimal discrimination, the AUC = 1.0 (those with a diagnosis always score higher than those without).

For all tests, however, there is a trade-off between sensitivity and specificity where increased specificity is obtained at the expense of decreased sensitivity. Misclassification has *very* different consequences in different settings (e.g., epidemiologic, primary care, specialist services) and when used for different purposes (e.g., population screening, epidemiological research, selecting cases for specialist interventions) (Dawe et al., 2002; Swift et al., 1998a). Selecting the optimum cut-point is determined by 'costs-benefits' considerations (Erdreich & Lee, 1981). For screening

tests it is usual to sacrifice specificity for the sake of sensitivity, since false positives are usually of less consequence than false negatives (Dawe et al., 2002; Rey et al., 1992). Thus, to cast a wide net initially, preliminary screening procedures select a more liberal criterion "oversensitive" to possible cases (Erdreich & Lee, 1981; Fleming, 2002; McLellan & Dembo, 1993). While this may impact on *positive predictive power* (the proportion of screen-positives who actually have the disorder), this parameter is not as important in preliminary screening as in a clinical setting where treatment decisions are made (see Fig. 3.1 for the 'screening pathway').

The analyses

Descriptive statistics for the two constituent CUPIT subscales were presented in Chapter six (Table 6.7). When the subscales were combined additively to comprise the CUPIT, the normality assumption underlying empirical ROC analysis (Swets, 1986; Rey et al., 1992) was satisfactorily met. The sample mean CUPIT score was 35.1 (*SD*=4.52; range: 5-72). Adolescents (n=138) scored a mean of 34.3 (*SD*=14.46; range: 5-68) and adults (n=74) a mean of 36.5 (*SD*=14.61; range: 8-72). Given no significant differences in scores by age group, ROC analyses were conducted on CUPIT data for the whole sample.

The analyses required 2 values for the 'gold' standard CIDI-Auto 2.1 measure. Accordingly, the baseline (n=211) and follow-up (n=194) samples were divided into 2 groups: obtaining a diagnosis (DSM-IV/ICD-10 cannabis dependence or abuse/harmful use) defined a 'case', while no diagnosis defined a 'control' or non-case. For the CUPIT and then for each of its constituent subscales, the AUC was calculated along with the significance, standard error, and confidence intervals around this value, and the sensitivity and specificity for every potential cut-off score when distinguishing cases from non-cases compared to the 'gold' standard CIDI-Auto 2.1 measure in this population. Chi-square values were generated for each score to determine which provided the best balance between sensitivity and specificity, as indicated by the largest chi-square value. Finally, the AUC of the screen was plotted with that of the SDS to visually compare diagnostic efficacy. This procedure was followed for both baseline and follow-up data.

Chapter Seven
Predictive Validity of the CUPIT

The ROC curves for the CUPIT at baseline and follow-up, and the CUPIT plotted with the SDS, are presented in Figures 7.1 to 7.4. These are plots of the probability of a true positive (obtaining a diagnosis) against the probability of a false positive (incorrectly assigning a diagnosis when it was absent) at every score respondents obtained on the respective measure (the curve coordinates). The corresponding sensitivity, specificity, and chi square values for a range of CUPIT scores each side of the optimal cut-off value that best discriminates cases from non-cases are presented in Tables 7.10 and 7.11. For the reader's interest the ROC curves for the individual CUPIT subscales, with corresponding sensitivity/specificity and chi square values for successive cut-off scores, are appended (Appendix 27).

Baseline assessment

At the initial assessment, the CIDI-Auto assigned 194 participants a positive DSM-IV/ICD-10 diagnosis, and 17 a negative diagnosis. The area under the ROC curve for CUPIT scores when discriminating between these diagnostic groups was 0.88 (95% CI =0.80, 0.97) (see Figure 7.1). This represents very good diagnostic performance when discriminating respondents qualifying for a diagnosis within the past 12 months from those who did not, at a level substantially better than chance. A visual examination shows that the CUPIT performed better than the SDS (Fig. 7.3), which also discriminated those with and without a diagnosis at a level better than chance, producing an AUC of 0.84 (95% CI=0.78, 0.90). Testing for statistically significant differences between the AUC of the CUPIT and the SDS (see Hanley & McNeil, 1983), however, was not a current research objective. Moreover, focusing solely on psychological aspects of dependence with no social problems incorporated, the 5-item SDS was neither designed nor is suitable as a screening tool for use among the general population.

The test performance indicators presented in Table 7.10 suggest that the optimal CUPIT cut-off score was 20, yielding the largest chi square value (47.92), 89% sensitivity, and 76% specificity. This cut-point had a positive predictive value of 98% (the proportion of those scoring on or above 20 who actually had a diagnosis). A score of 20 classified 172 of the 194 (89%) true positives as cases (qualified for a DSM/ICD diagnosis), and

13 of the 17 (76%) true negatives as non-cases. That is, 22 (11%) of true positives in this sample were under-classified while 4 (24%) of true negatives were (ostensibly) "over-classified". Those "over-classified" were two of the 12 baseline 'diagnostic orphans' and two from the 'no diagnosis/symptoms' (n=5) group who scored at or above this cut-point. Potentially on a trajectory to supra-threshold cannabis use disorder, these respondents represent an important 'at risk' group, the appropriate target of a cannabis screen for an early intervention.

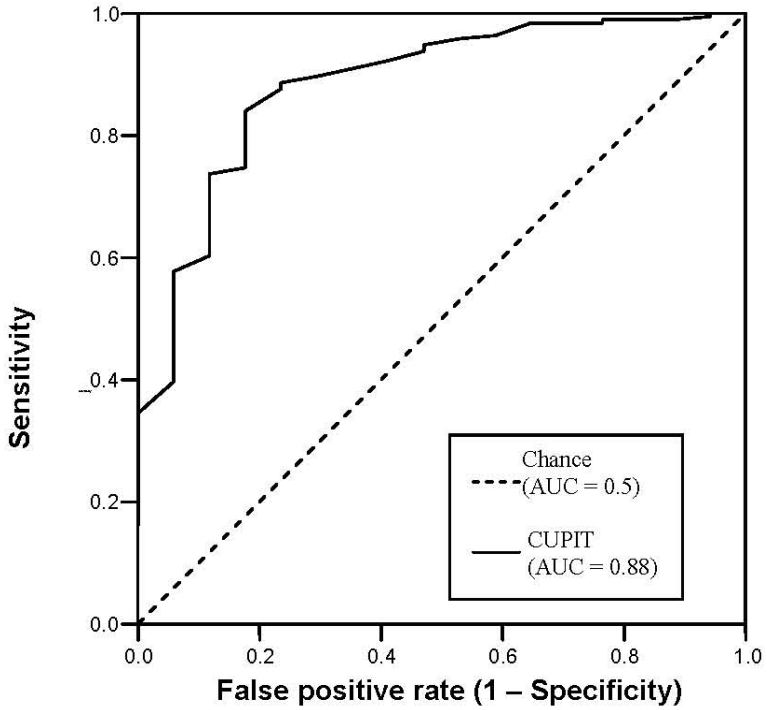


Figure 7.1: *ROC Curve for the CUPIT at Baseline*

Table 7.10: Sensitivity, Specificity and χ^2 Values of the CUPIT at Potential Cut-off Scores, when Discriminating Between Cannabis Users with and without a DSM-IV/ICD-10 Diagnosis of Cannabis Dependence or Abuse/Harmful Use at Baseline (n=211).

CUPIT score	Sensitivity	Specificity	χ^2
5	1.00	.06	11.47
6	1.00	.06	11.47
7	.99	.06	4.80
8	.99	.12	9.68
9	.99	.24	28.64
10	.98	.24	23.55
11	.98	.29	33.27
12	.98	.35	43.59
13	.96	.41	35.61
14	.96	.47	41.12
15	.96	.47	41.12
16	.95	.53	43.56
17	.94	.53	38.13
18	.92	.59	39.06
19	.90	.71	44.14
20	.89	.76	47.92
21	.88	.76	44.41
22	.84	.82	41.04
23	.81	.82	34.15
24	.78	.82	28.72
25	.75	.82	24.33
26	.74	.88	27.90
27	.71	.88	24.68
28	.70	.88	22.95
29	.68	.88	21.36
30	.67	.88	20.37

Inspection of alternative CUPIT cut-off scores exemplifies the costs-benefits and sensitivity/specificity trade-off considerations integral to decision-making in any screening enterprise for any specific context, purpose, and population. At a less conservative cut-off score of 16 and a relatively small reduction in the chi square (43.56), 184 of 194 true positives were classified as cases (95% sensitivity) and 9 of 17 true negatives as non-cases (53% specificity). This cut-off had a positive predictive value of 96%. Ten (5%) true positives were under-classified while 8 (47%) true negatives were (seemingly) “over-classified”. However, this cut-point captured six of

the 12 baseline 'diagnostic orphans' and 2 from the 'no diagnosis/symptoms' group in the screening net. Nine of those at risk scored less than 16.

At a more liberal cut-off of 12 with an almost identical chi square value (43.59), 191 of 194 true positives in this sample were classified as cases (98% sensitivity), and 6 of 17 true negatives as non-cases (35% specificity) with very little reduction in positive predictive value (94.5%). That is, while correctly classifying almost all of those obtaining a diagnosis, this cut-off "over-classified" 11 (65%) as having a diagnosis. This CUPIT score captured 8 of the 12 baseline 'diagnostic orphans' and 4 of the 'no diagnosis/symptoms' group in the screening net. Five at risk users scored less than 12. As these alternative cut-points clearly demonstrate, when the point of attempted detection is earlier stages to incorporate those at risk or any *possible* cases the trade-off between sensitivity/specificity comes becomes pronounced.

Twelve-month follow-up

At the 12-month follow-up assessment, 180 participants received a positive DSM-IV/ICD-10 diagnosis and 14 a negative diagnosis. The AUC for respondents' original CUPIT scores when discriminating between these diagnostic groups was 0.89 (95% CI=0.82, 0.96) (see Figure 7.2). This represents good longitudinal predictive ability to discriminate between those who will qualify for a diagnosis 12 months later and those who will not, at a level substantially better than chance.

Again, as Figure 7.4 depicts, the CUPIT's predictive performance appeared to have an edge over the SDS, which produced an AUC of 0.85 (95% CI=0.77, 0.92). The test performance indicators suggest the optimal cut-off CUPIT score to (again) be 20, which produced the largest chi square value (38.90), 87% sensitivity, and 79% specificity (Table 7.11). As at baseline, this cut-off had a positive predictive value of 98%, with 157 of 180 (87%) true positives predicted to be cases, and 11 of the 14 (79%) true negatives predicted to be non-cases. Hence, 23 (13%) true positives in the follow-up sample were under-classified, while 3 (21%) true negatives were "over-classified". Those (seemingly) "over-classified" were one baseline diagnostic orphan who remained

so, and two from the no diagnosis/symptoms group who had graduated to diagnostic orphan status, at follow-up.

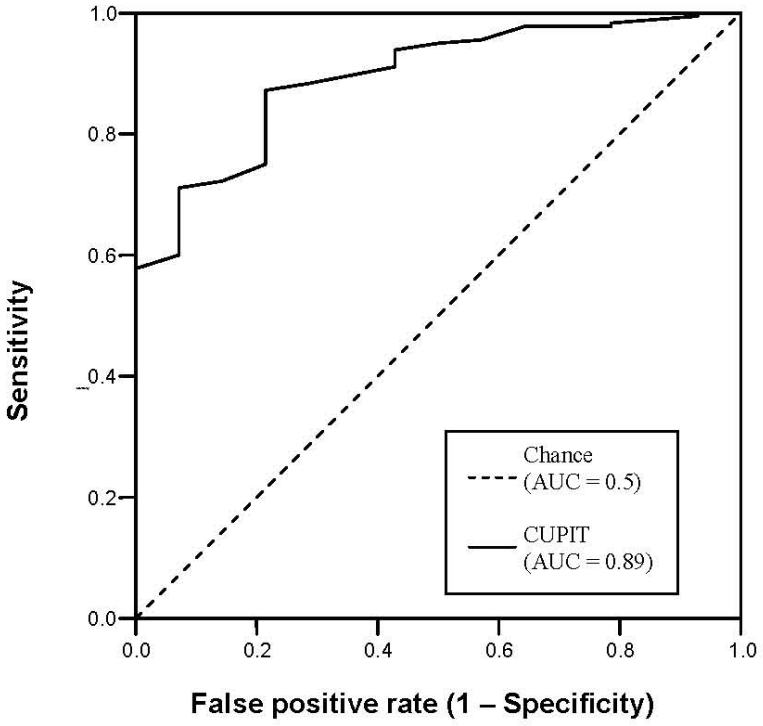


Figure 7.2: *ROC Curve for the CUPIT at Follow-Up*

Table 7.11: Sensitivity, Specificity and χ^2 Values of the CUPIT at Potential Cut-off Scores, when Discriminating Between Cannabis Users with and without a DSM-IV/ICD-10 Diagnosis of Cannabis Dependence or Abuse/Harmful Use at Follow-up (n=194)

CUPIT score	Sensitivity	Specificity	χ^2
5	1.00	.07	12.92
6	1.00	.07	12.92
7	.99	.07	5.52
8	.99	.14	11.17
9	.98	.21	16.93
10	.98	.21	13.78
11	.98	.29	22.81
12	.98	.36	32.94
13	.96	.43	28.63
14	.95	.50	34.76
15	.95	.50	34.76
16	.94	.57	38.29
17	.93	.57	35.79
18	.91	.57	27.90
19	.88	.71	34.55
20	.87	.79	38.90
21	.86	.79	35.96
22	.82	.79	26.88
23	.78	.79	21.99
24	.75	.79	18.16
25	.72	.86	20.05
26	.71	.93	23.86
27	.69	.93	21.61
28	.68	.93	21.09
29	.67	.93	19.61
30	.66	.93	18.69

Once again, scrutiny of alternative thresholds illuminates the considerations associated with cut-point selection in screening, in this instance specifically for *longitudinal predictive* utility. At follow-up, the less conservative cut-point of 16 on original CUPIT scores yielded a remarkably similar chi square value of 38.29 and a positive predictive value of 97%. At this cut-off score 169 of 180 true positives were predicted to be cases (94% sensitivity), and 8 of 14 true negatives to be non-cases (57% specificity). Hence, 11 (6%) true positives were under-classified, and 6 (43%) true negatives "over-

classified". A cut-off of 16 on original CUPIT scores included 3 of the 12 baseline 'diagnostic orphans' and 1 from the 'no diagnosis/symptoms' group who had progressed to a diagnosis at follow-up. It also included 4 original diagnostic orphans who remained, and 3 from the no diagnosis/symptoms group who had graduated to, diagnostic orphans. However, this cut-off score excluded 5 of the original 12 diagnostic orphans remaining so at follow-up and one with no diagnosis/symptoms who had since graduated to diagnostic orphan status, all who had scored below this cut-off and escaped the screening net.

As at baseline, a more liberal CUPIT cut-off of 12 yielded a more inclusive catch in the screening net, enhanced sensitivity with corresponding loss of specificity, but very little reduction in positive predictive power (95%). With a chi square value of 32.94, a cut-off of 12 predicted 176 of 180 true positives as cases (98% sensitivity) and 5 of 14 true negatives as non-cases (36% specificity). That is, while only 4 (2%) true positives were under-classified, 9 (64%) true negatives were (ostensibly) "over-classified". In addition to the 3 original diagnostic orphans and 1 with no diagnosis/symptoms who had progressed to a diagnosis at follow-up, this cut-point also netted 5 who remained diagnostic orphans, together with the 3 without diagnoses/symptoms at baseline who had become diagnostic orphans at follow-up (this latter group being the "over-classifieds"). Four diagnostic orphans scored less than 12, evading the screening net. Of these, one (only) went on to obtaining a DSM-IV abuse diagnosis 12 months later. The others remained diagnostic orphans. Three further participants scored less than 12. These were one adult (scored 8) and two adolescents (7, 10), all of whom received diagnoses at both baseline and follow-up.

In sum, while predicting almost all of those who were to receive a diagnosis 12 months later, a CUPIT cut-off score of 12 also netted most of those at risk: 8 of the 12 original diagnostic orphans and 4 of the 5 without a diagnosis/symptoms, all of whom had either graduated to a DSM-IV/ICD-10 diagnosis, had since become or remained a diagnostic orphan, 12 months later.

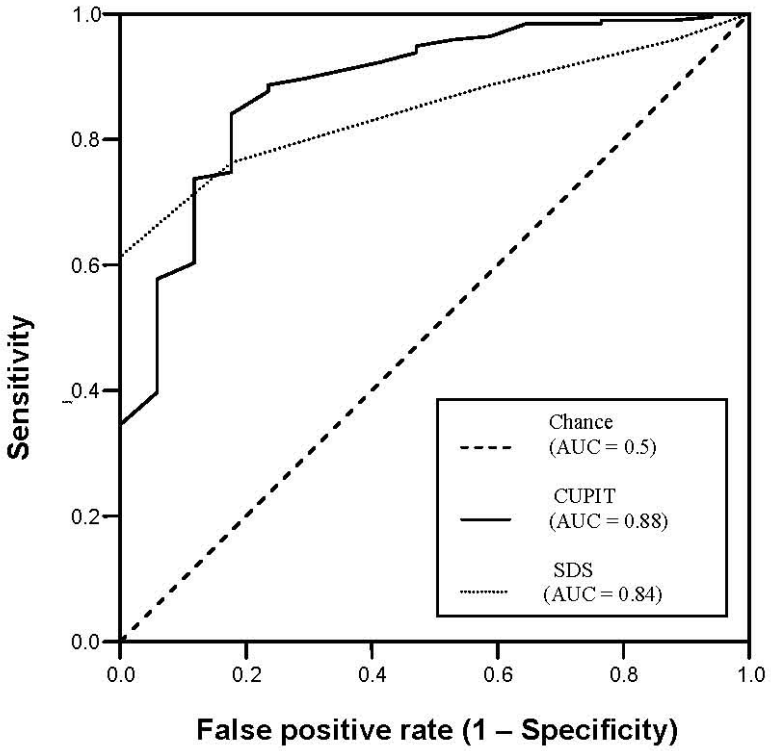


Figure 7.3: *ROC Curves for the CUPIT and the Severity of Dependence Scale at Baseline*

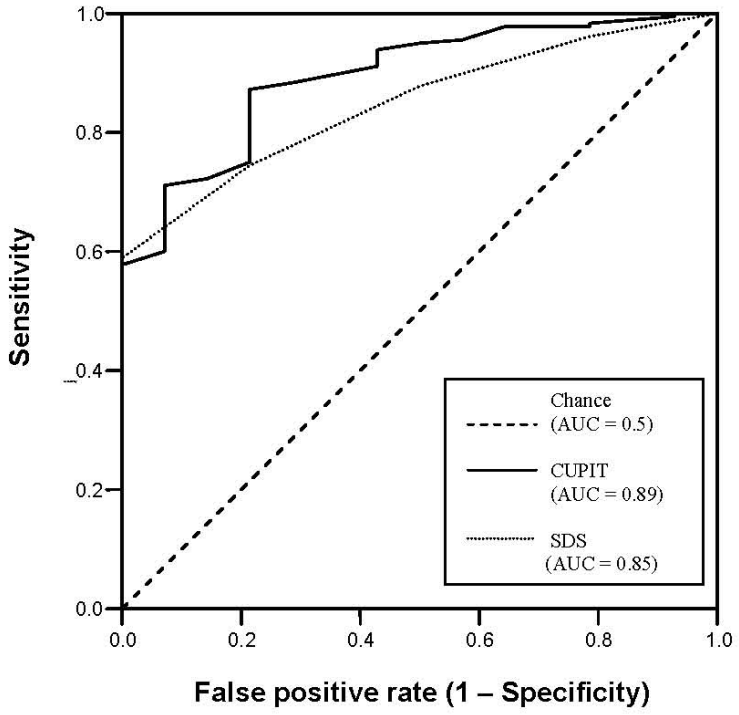


Figure 7.4: *ROC curves for the CUPIT and the Severity of Dependence Scale at Follow-Up*

Discussion

The first section of this chapter highlighted a significant increase in reported cannabis consumption, symptoms, dependence severity and use-related health and social problems in this sample since baseline, most pronounced among adolescents. The primary aim of the analyses presented in this chapter was to determine the *longitudinal predictive utility* of original scores on the CUPIT subscales with regard to these outcomes. The cross-sectional *diagnostic utility* of CUPIT scores was examined in tandem. The optimal dichotomous cut-point/s for distinguishing cases (qualifying for a diagnosis of cannabis dependence or abuse) from non-cases (no current diagnosis) at both temporal points, together with that for including those at risk users potentially on a trajectory towards qualifying for a diagnosis, was explored.

As the longitudinal analyses reported above demonstrate, original scores on the CUPIT subscales were highly significant predictors of respondents' diagnostic status, number of symptoms, dependence severity, cannabis consumption and related health and social problems 12 months later. Similar to baseline, Impaired Control showed an exceptionally consistent, strong performance. In addition, either individually or jointly both subscales reliably improved prediction of most major 12-month outcomes measured in this research beyond that afforded by their baseline scores in conjunction with other theoretically important predictors, such as age and gender. These included number of DSM/ICD symptoms (CIDI-Auto), severity of dependence (SDS), cannabis-related health and social problems (CPQ for adolescents), and psychological distress (GSI). That is, incorporating respondents' original CUPIT subscale scores with baseline scores on these outcome measures in combination with respondents' age and gender added significant *unique* predictive power for predicting outcomes on the specific measure 12 months later. The only exceptions to this significant contribution to predicting outcomes beyond that predicted by the control variables themselves were consumption (TLFB measures) and the adult cannabis-related problems scale (CPQ core).

The stronger association of adolescents' original CUPIT subscale scores with dependence severity (SDS) and most of the problem subscales (CPQ-A core, parent, work) at follow-up, synchronous with the significant increase in reported consumption, was disquieting. Equally perturbing was the stronger, significant correlation observed between adolescents' Impaired Control subscale scores and psychological distress (GSI) at follow-up. Although theoretically and intuitively consistent with adolescents' increased consumption and problem severity, a causal association between these latter variables cannot definitively be assumed. Nevertheless, these outcomes themselves are "red flags" (AACAP, 1997; McLellan & Dembo, 1993; Spooner at al., 1996; Swadi, 1997), signaling the urgent need for some screening tool to expedite the rapid, reliable identification of these and many other vulnerable adolescents so that a timely, creative age-appropriate intervention can be implemented to promote problem recognition and try to arrest (hopefully reverse) their escalating cannabis use and attendant morbidity (Anthony, 2000; Bukstein, 1995; Dennis & McGeary, 1999; Dennis et al., 2002a; Gilvarry, 2000; Hall & Swift, 2006; Kamon et al., 2005; Martin et al., 2005; Mental Health Council of Australia, 2006; NHC, 1999; Spooner, 1999).

Clearly, as evident in its ROC performance, having both *cross-sectional* and *longitudinal* diagnostic utility for detecting/predicting users with both supra- and sub-threshold DSM-IV/ICD-10 diagnoses of cannabis use disorder at levels substantially better than chance, the CUPIT has good potential for filling this void in cannabis screening instrumentation. Rigorous, complex, lengthy diagnostic interviews and criteria are not necessary to efficiently recognize harmful or potentially harmful cannabis use in a generalist health context (Fleming, 2002; Maly, 1993; McPherson & Hersch, 2000). Being currently much shorter than the 'gold' standard CIDI (or any) structured clinical interview, simple, widely-accepted among all ages, requiring no training for interviewer- or self-administration, rapidly scored (and potentially interpretable), augments the CUPIT's preliminary statistical credentials. Moreover, the ROC assumption that all possible combinations of items perform equally well has proven erroneous (Clarke & McKenzie, 1994; McKenzie, Clarke, & Low, 1992), and future research exploring the prognostic utility of various CUPIT item subsets may lead to even further shortening, item truncation or refinement. Requiring a large dataset,

these complex analyses are beyond the scope of this preliminary study (see Kessler, Andrews, Mrozecek, Ustun, & Wittchen, 1998; Obuchowski, 1998, 2000).

The findings exemplified the sensitivity/specificity trade-off inherent in 'cost-benefit' considerations when selecting a criterion cut-off for any specific screening purpose, population, and setting (Conigrave et al., 1995; Erdreich & Lee, 1981; Swift et al., 1998a). An important cost consideration is the base rate of a disorder which can have a powerful effect on the ability to detect it accurately in a particular population with different prior probabilities for the disorder (see Derogatis & Lynn, 2000; Erdreich & Lee, 1981; Meehl & Rosen, 1955; Rey et al., 1992). The predictive power of a screen is low when the disorder prevalence is low (Anastasi & Urbina, 1997; Murphy et al., 1987). A cut-point that maximizes the hit rate within clinical settings does not provide the minimal threshold for defining when the person has the disorder, resulting in many subthreshold cases (Deas et al., 2005; Degenhardt et al., 2002; Dennis et al., 2002b; Tims et al., 2002; Widiger & Trull, 1991; Winters et al., 1999). This may impact dramatically on diagnostic rates among community samples where people are likely to exhibit fewer symptoms and be on the diagnostic threshold. These at risk cases amenable to early intervention thus evade detection (Room, 1995). It is therefore *essential* that the population studied in the screen development trial is typical of that encountered in the intended screening situation (Cochrane & Holland, 1971; Murphy et al., 1987; Rey et al., 1992).

Another related cost reiterates the criterion reliability-validity issue previously raised (end of Chapter 6). Reliance on an external ('gold') standard such as the CIDI for ROC analysis means that its ability to discriminate between those with and without a cannabis use disorder, and especially sub-threshold 'at risk' users, will affect any analysis of the performance of comparison measures (Clarke & McKenzie, 1994; Pilkonis et al., 1995; Rey et al., 1992). The screening ability of instruments can never exceed the validity of the diagnostic criteria upon which they are based. Hence, notwithstanding the CIDI's good psychometric properties (Wittchen, 1994), its lack of *perfect* discrimination will depress the performance of any ROC analysis on comparison instruments (Swift et al., 1998a).

The cost of particular types of decision errors will differ according to the intended use of the instrument (Erdreich & Lee, 1991; Fombonne, 1991). The critical importance of an SEI approach demands that preliminary screening procedures are "oversensitive" to both actual and *possible* drug use problems (Conigrave et al., 1995; Degenhardt et al., 2001, 2002; Fleming, 2002; McLellan & Dembo, 1993; Rey et al., 1992). The cost of under-classifying or missing an actual or potential cannabis mis-user (Type II error) in community-based screening has potentially far more serious repercussions than "over-classifying" (Type I error) an individual who further assessment reveals to be neither disordered nor at risk (Dawe et al., 2002; Degenhardt et al., 2001; Swift et al., 1998a). The need to 'err on the side of caution' is clear.

The results graphically depict that when the criterion threshold is lowered to include at risk users incubating a disorder in the screening net the trade-off between sensitivity and specificity becomes marked. Among this sample, the screen performance indicators suggested the optimal CUPIT cut-off to be 20 at both baseline (Table 7.10) and follow-up (Table 7.11), with a sensitivity of 89% and 87%, and specificity of 76% and 79%, respectively, and positive predictive power of 98%. However, despite the statistically optimized *sensitivity/specificity* balance, with 22 (baseline) and 23 (follow-up) true cases undetected (or under-classified), and capturing only 4 from both baseline at risk groups (n=17) in the screening net, this criterion threshold is clearly neither adequate nor even acceptable for a public health SEI approach, at least among this high-risk sample.

Furthermore, despite retaining good positive predictive power (96% baseline; 97% follow-up), although the less conservative CUPIT cut-off of 16 enhanced sensitivity at baseline (95%) and follow-up (94%) at the expense of specificity (53% and 57%, respectively), 10 (baseline) and 11 (follow-up) true cases still remained undetected, and only half (8) from the baseline at risk groups were caught in the screening net. Nevertheless, since the optimal cut-point is context-, population-, and purpose-dependent, these alternative CUPIT cut-points may prove to be optimal when applied in other contexts or settings (e.g. specialist services, primary care, epidemiologic research), among various other cannabis-using populations with different prior

probabilities for the disorder (general population, primary care, clinical), and for different purposes (e.g., preliminary screening, assessment referral, treatment planning). Being dependent on base rate prevalence of cannabis use disorders, the performance parameters (sensitivity, specificity, positive predictive value) generated at the various CUPIT cut-points among the highly-disordered sample in this research may vary in other cannabis-using populations.

Selecting the more liberal cut-off of 12 on original CUPIT scores maximized the screen's sensitivity at both baseline (98%) and follow-up (98%) at the cost of reduced specificity (35% and 36%, respectively), while maintaining positive predictive power (95%). *Any* screen is likely to generate some classification errors (Degenhardt et al., 2001; Derogatis & Lynn, 2000; Rey et al., 1992). Albeit minimal, this study was no exception. On the one hand, with the caveat that *any* Type II errors in screening are to be avoided wherever possible, a cut-off of 12 minimized under-classifications among this sample at both baseline (3) and follow-up (4, including one diagnostic orphan). Of these respondents scoring less than 12 one adult user reported reduced, while 2 adolescents reported increased, symptoms at follow-up. On the other hand, the 11 baseline and 9 follow-up respondents ostensibly "over-classified" were either sub-threshold cases (diagnostic orphans) or other at risk cannabis users who, while asymptomatic at baseline, had become diagnostic orphans at follow-up. In short, all these "over-classifications" were actually appropriate primary targets of a SEI approach. The residual 4 diagnostic orphans scoring less than 12 eluded the screening net entirely.

Accordingly, setting the statistical performance indicators *vis-à-vis* cost-benefit considerations, the liberal CUPIT cut-off score of 12 appears the optimal criterion threshold for preliminary screening for SEI purposes among this high-risk population sample. The high base rate of disorder maximized the screen's detection potential at this threshold, with a comparable performance likely among other similar high-risk cannabis-using populations (Cochrane & Holland, 1971; Murphy et al., 1987; Rey et al., 1992). The nature and scale of manifest cannabis-related pathology, and the human and economical costs of failing to identify and intervene to arrest progression when compelling evidence exists that left to their natural courses such disorders will result in

chronic compound physical, psychological and social morbidity, *far* outweighs the (negligible) costs involved in relatively benign assessments required to confirm presence/absence of an actual or incubating cannabis use disorder. Furthermore, as cannabis screening advocates (Anthony, 2000; Copeland et al., 1999, 2001a, 2005; Fleming, 2002, French et al., 2003; Hall & Swift, 2006; MOH, 2002c, 2005; Monti et al., 2001; NHC, 1999; Shrier et al., 2003; Spooner, 1999) argue, follow-up assessment of cannabis screen-positives may opportunistically detect another underlying psychiatric syndrome such as anxiety, depression or schizophrenia, adding further benefit to screening programmes. Ergo, given the extremely low rate of *true* false-positives in this sample, the affordability, viability, and demonstrated acceptability of the cannabis screen against the human and economical burden of cannabis-related disorder/problems among adolescent and adult users, this cost-benefit ratio is, in the writer's view, ethically non-negotiable.

In summary, this chapter presented the final series of analyses conducted for preliminary validation of the psychometric properties of the brief CUPIT in this thesis. The data also afforded valuable insight into the natural history and stability of cannabis use and problems over time among a heterogeneous New Zealand sample. Augmenting the subscales' good to excellent cross-sectional psychometric properties documented in Chapter 6, this chapter demonstrated the provisional CUPIT to have longitudinal predictive utility for both supra- and sub-threshold cannabis use disorder. The issues involved in selection of an appropriate screen cut-off for a particular purpose, population, and setting were discussed, and the optimal cut-off score among this high-risk sample identified. Given the dearth of screening tools in existence with demonstrated capacity to predict further harm, the analyses reported in this chapter - however modest - have contributed to redressing the need for such instrumentation. More specifically, furthermore, this research has helped swell the numbers in the small but expanding armamentarium of new cannabis-specific screening tools.

CHAPTER EIGHT

SUMMARY AND CONCLUSIONS

Introductory chapters of this thesis identified the absence of empirically verified screening tools to expedite detection of both currently problematic *and* potentially problematic cannabis use among consumers of community health and social services. Addressing this instrumentation need was the primary aim of the research conducted for this thesis. Other aims included examining the relationships between cannabis consumption and related problems, and the nature, prevalence, severity, correlates, natural history and longitudinal stability of such problems, with adult/adolescent comparisons on these phenomena. Three nosological issues that arose during research planning became ancillary empirical questions: (1) do adolescents and adults exhibit different symptom and dependence severity profiles in such a way as to affect appropriateness of DSM-IV/ICD-10 diagnostic criteria for use among adolescents? (Chapter 2); (2) what assessment window (6-month vs. 12-month) is appropriate for the development/diagnosis of cannabis use disorder? (Chapters 4 and 5); and (3) what are the early symptoms endorsed by 'diagnostic orphans' and other at risk cannabis users who subsequently develop supra-threshold cannabis use disorder? (Chapters 2 and 4).

This summary chapter synthesizes findings from the series of studies conducted to accomplish these objectives. The first section summarizes cannabis use and related problems among this heterogeneous sample, addressing the ancillary questions where appropriate. The next section encompasses the CUPIT: after brief overview of the developmental research design, the psychometric and operational characteristics of the draft CUPIT are delineated, and then compared with existing cannabis screens. Limitations of this research are outlined, and directions for further research follow. The chapter ends with a brief recount of notable challenges and rewards of the research experience prior to chapter conclusions.

Chapter Eight
Summary and Conclusions

Cannabis Use-Related Problems

In a one group, pre/post repeated measures design incorporating both within- and between-subjects comparisons (Cook & Campbell, 1979) in cross-sectional (n=212) and 12-month longitudinal analyses (n=194), a heterogeneous sample of adolescent and adult cannabis users were recruited from the community and assessed on a comprehensive range of domains potentially correlated with, or reflective of, cannabis-related pathology. DSM-IV/ICD-10 diagnoses of Cannabis Use Disorders were employed as criterion standard.

Prevalence, Nature, Severity and Correlates

The ubiquity, multiplicity, and magnitude of cannabis-related health, cognitive, psychiatric, and social problems reported in this research portray a highly-disordered sample, most pronounced among younger participants. The high levels of cannabis consumption reported reflected in almost universal diagnoses (92% sample) of 12-month DSM/ICD cannabis use disorder. A further 6% were adolescent 'diagnostic orphans' just under the diagnostic threshold. Five only participants were asymptomatic. Most participants reported *multiple* past year cannabis-induced problems, including omnipresent cognitive (memory, concentration/thinking) impairments, energy and motivation loss, hazardous use (driving 'stoned'), and pervasive psychological (anxiety, paranoia, depression, suicidal ideation) problems. Twenty percent evidenced clinical psychiatric disorder. Physiological problems (respiratory, cough, chest infections, weight loss, deteriorated general health) were also substantial, particularly among adolescents. Cannabis-related school (up to 82% adolescents), work, interpersonal (increasing isolation, parental, marital, role disruption) and other social (legal/criminal, financial) problems, exacerbated the 'dysfunctional' profile. More than a third of adolescents reported cannabis-related expulsions or suspensions - often multiple - from school (Field & Casswell, 2001; Lynskey & Hall, 2000; Powis et al., 1998).

Adolescent and adult comparisons

Consistent with international trends, adolescents had initiated cannabis use earlier (median 12 years) than adults (median 14 years). Adults had used on significantly more days than their younger counterparts over the past 3 months (Table 6.3). With no age group differences in concurrent hazardous alcohol and tobacco use (Table 6.4), adolescents accounted for most BZP ('party pills'), inhalant/solvents, nitrous oxide, hallucinogens, and stimulants use in the past 90 days.

Do adolescents and adults exhibit different symptom and dependence severity profiles?

Responding to the CUPIT question pool, the CIDI-Auto, the CPQ/CPQ-A, and the BSI-18, similar proportions of both age groups reported physical, psychological, and social (interpersonal, legal, financial) problems. There were no significant adult/adolescent differences in the likelihood of having endorsed any DSM-IV/ICD-10 criteria, other than adolescents being more likely to report cannabis impaired their functioning at school, work or home, and adults more likely to report withdrawal symptoms. There were also no significant differences in Severity of Dependence Scale (SDS) scores by age group or gender. No significant differences in Stages of Change designations by age group or gender were apparent. Juxtaposed with their physical and psychological developmental vulnerability, however, these indices collectively suggest that despite shorter using histories, adolescents in this sample were equally (arguably *more*) disordered as their older, longer-using counterparts.

Are DSM-IV/ICD-10 diagnostic criteria appropriate for use among adolescents?

The foregoing paragraph, and the researcher's observations and experiences while interacting with adolescents throughout the lengthy research period, suggest that the DSM-IV/ICD-10 diagnostic criteria and the research instruments in which they were operationalized were appropriately used among adolescents in this sample. Adolescents readily identified with the classic symptoms of dependence, and the internal audit ('quasi-triangulation') procedure suggests their responses were reliable and valid. The researcher's strict adherence to the interview guidelines outlined in the CIDI-Auto 2.1 manual (WHO, 1997b), and cautious use of diagnostic concepts and terminology among

adolescents (Kaminer, 1994; Leccese & Waldron, 1994), affords assurance of the appropriateness and integrity of both the process, and the data generated, in this research.

Natural History and Longitudinal Stability

Consistent with the progressive nature or 'natural history' of cannabis use and disorder (APA, 1994, 2000), 12 months after baseline assessments the sample (n=194) reported significantly increased cannabis consumption and use-related problems, largely attributable to the adolescents. This was accompanied by significantly increased hazardous alcohol and 'party pill'/benzylpiperazine (BZP) consumption, exposing these young New Zealanders to even greater risk of serious harms.

Adolescent and adult comparisons

At the 12-month follow-up, re-administration of the standardized outcome measures revealed significantly increased cannabis consumption (adolescents), symptoms, dependence severity, psychiatric, and general health and social problems among adolescents *and* adults. While again there were no significant differences in dependence severity (SDS) by age groups, males scored significantly higher than females (this contradicts usual findings). Once again, adolescents were significantly more likely than adults to report cannabis interfered with their work at school, job, or home, or caused interpersonal and social problems while adults were significantly more likely to report hazardous use (driving stoned). The striking increase in adolescent reports of tolerance development, impaired control over cannabis use, deteriorated general health, respiratory problems, psychological (motivation, concentration, depressed mood), and continuing school and work problems, was most disturbing. This concern became even more serious in that, at the 12-month follow-up, adolescents were significantly more likely to be Precontemplators ('no change') or Contemplators ('want to but not ready') than adults.

More than half of the sample had attempted to reduce or quit without success, and the vast majority (86%) reported they had worried about their cannabis use. Nevertheless,

as at baseline two-thirds of this highly-disordered sample believed their cannabis consumption was *not* a problem in their ostensibly troubled lives. As discussed (chapter 4), immaturity or lack of insight, normal adolescence attributes (e.g., anti-authoritarianism, defiance), and peer pressure to conform can interfere with an adolescent's ability or motivation to introspect objectively (Buchan et al., 2002; Dennis et al., 2002b; Frances et al., 1995; Reid et al., 2000). This poses a conundrum for clinicians and policymakers alike. The need to offer a creative, brief intervention with screening that is not onerous, judgmental or confrontational, is crucial. A range of innovative strategies is currently emerging (Kamon et al., 2005; Martin et al., 2005; Monti et al., 2001; Waldron, 1997).

What assessment window (6 or 12months) is appropriate for the development/diagnosis of cannabis use disorder?

The vast majority (92%) of symptoms reported at both temporal assessment points in this research were experienced within the past 6 months, and the remainder (8%) within 6-12 months. Hence, depending on the screening context, purpose, population, and choice of 'gold' standard criteria, with the exception of DSM-IV (12-month criteria) a 6-month window appears appropriate for use among similar at risk populations.

What are the early symptoms endorsed by 'diagnostic orphans' and other high-risk cannabis users who progress to supra-threshold cannabis use disorder?

'Diagnostic orphans' (n=12) in this sample endorsed symptoms indicative of 'impaired control over cannabis use' criteria. They endorsed similar criteria 12 months later, in conjunction with 'subjectively felt tolerance'. Four had progressed to a DSM-IV/ICD-10 cannabis use disorder. Others remained 'diagnostic orphans'. Similarly, symptom-free participants at baseline (n=3) who had graduated to 'diagnostic orphan' at follow-up endorsed 'impaired control over cannabis use' and subjectively felt tolerance (n=2). These findings support Wagner and Anthony's (2002) research identifying at risk users on a trajectory to cannabis use disorder.

Chapter Eight
Summary and Conclusions

The CUPIT

Derivation and Development

Modeled on the AUDIT template as closely as resource constraints permitted, construction and preliminary validation of the CUPIT proceeded in a 3-phase developmental design.

1. Item pool generation and initial reduction (Chapter 5)
Emphasizing *early* detection of a broader clinical spectrum of cannabis-related disorders and harms (as does the AUDIT) with over-inclusiveness to circumvent premature foreclosure, generation and initial veto of 90 candidate screen items began with comprehensive review of the medical, theoretical, and research literature, and extensive clinical consultation. Guided by theoretical, nosological, empirical, measurement, operational and logistical considerations, further revisions for item reduction/refinement proceeded via reiterative open-ended international Expert Panel surveys and deliberation, incorporating cultural review for Māori and Pacific Peoples. This protracted, careful process yielded a 43-item pool of candidate screen questions consistent with the AUDIT's tri-dimensional conceptual framework (consumption, dependence, problems).

2. Subscale development and preliminary validation (Chapter 6).
The internal structure and preliminary psychometric properties of candidate items were then tested among a heterogeneous sample of 212 cannabis users (aged 13-61 years) voluntarily recruited from diverse community settings using participants' independent responses to the pool questions, a comprehensive battery of validated measures of cannabis-related pathology, and DSM-IV/ICD-10 diagnoses of cannabis use disorders as criterion ('gold') standard. Following Item and Principal Components analyses for item selection/subscale development the sample was classified into 3 diagnostic groups according to problem severity, and the ability of the (two) subscales to reliably discriminate between groups was investigated.

3. Longitudinal validation (Chapter 7).

At individual baseline 12-month anniversaries respondents were reassessed, and the longitudinal predictive capacity of the original subscale scores for diagnostic and other follow-up outcomes explored. The two constituent subscales were combined to form the final version of the CUPIT, and the optimal cut-off score for predicting diagnostic group membership at both temporal junctures determined.

Psychometric Properties

Within the above-outlined parameters the psychometric properties of the draft CUPIT were systematically evaluated. Conditions that must be satisfied for a screen for supra- and sub-threshold cannabis use problems to be valid include face validity/acceptability, content validity, reproducibility, internal consistency reliability, construct validity, predictive validity, and sensitivity.

Face validity/acceptability and content validity

The thoroughgoing question pool construction process and almost universal identification of heterogeneous at risk users with pool questions attest to the propriety, representativeness, and completeness of candidate items. Spontaneous comments, typically made by younger respondents, e.g., “cool questions”, “spot on!”, “this screen is *so true*!” exemplify feedback content. Tributes made in the debriefing/feedback component to the “thoroughness” of overall content (e.g., “has it sussed”, “very comprehensive”) that captured participants’ *experience* of cannabis use and consequences provided further support. These qualitative indicators were in turn buttressed by favourable item test-retest and subscale internal reliability estimates, suggesting proper sampling of content domains.

Reproducibility, internal structure and internal consistency reliability

One-week reproducibility/stability of responses to the 16 items surviving structural analysis as subscale constituents (Table 6.6) ranged between a high of 0.99 and a low of 0.88 (Table 6.2). Substantially better than the result expected in this timeframe (0.70 –

0.80; Coolican, 1990; Kline, 1998), these item *test-retest reliability* estimates were in the range considered excellent (Comrey & Lee, 1992; Guilford, 1954).

The *internal structure* of the candidate screen items was determined by principal components analysis with orthogonal (Varimax) rotation. Two high-loading primary components emerged, explaining 38.6% of the total variance. Ten items reflecting impaired control over cannabis use ('Impaired Control') loaded on the first, and 6 items reflecting adverse consequences of use ('Problems') loaded on the second, component. The Cronbach's alphas calculated to assess *internal consistency reliability* or *coherence* of the subscales among adolescent and adult subgroups ranged from .79 to .92, clearly exceeding the benchmark (.70) recommended for exploratory research (Nunnally, 1978). The only moderate inter-item and inter-scale correlations indicated subscale *unidimensionality* and *discriminative validity*, respectively (Cronbach, 1990; Schmitt, 1996).

Construct validation: criterion/concurrent and convergent/discriminatory

Correlating in conceptually consistent patterns with *criterion* measures, including DSM-IV/ICD-10 diagnoses and symptoms (CIDI-Auto interview), dependence severity (SDS), and consumption (TLFB), and *convergent* with alternative measures of cannabis-related problems including the CPQ/CPQ-A and the GSI (BSI-18), the two subscales evinced highly significant (<.001) *discriminative* power (Campbell & Fiske, 1959) for distinguishing between diagnostic subgroups along the problem severity continuum (no diagnosis, abuse/harmful use, dependence). The particularly consistent, robust performance of 'Impaired Control' supports the *dimensionality* of the dependence syndrome and its existence in a broad spectrum of cannabis users before they come to clinical attention (Saunders & Aasland, 1987).

Longitudinal predictive validity and sensitivity

Twelve months later, across the sample participants' original scores on the subscales demonstrated highly significant (<.001*) longitudinal predictive utility* for respondents' diagnostic status, symptoms, dependence severity, cannabis consumption and psychological distress. The subscales were also highly significant predictors of

adolescent, and somewhat weaker but significant predictors of adult, cannabis-related health and psychosocial problems. Again, 'Impaired Control' exhibited a strong performance. Either individually or jointly, subscale sores also significantly improved the *predictive power* of most key outcome measures beyond that predicted by the various control variables along with other important correlates, such as age or gender. These included DSM/ICD symptoms, dependence severity (SDS), adolescent health and psychosocial problems (CPQ-A Core), and psychological distress (GSI). Among this high-risk index sample, a CUPIT score of 12 was the optimal cut-point for maximizing *sensitivity* (98%) for both currently diagnosable cannabis use disorder and those 'at risk'. Alternative cut-offs may be more apposite for different settings, purposes, and populations.

Operational Characteristics

Selection of items for the provisional CUPIT was determined on the dual basis of statistical parameters and important operational considerations. These were acceptability/feasibility of questions for screening, the need for all questions to be simple, readily understandable, and valid across heterogeneous adult and adolescent cannabis users, face and content validity. As in the AUDIT, the final items in the two sub-scales represent the tri-dimensional concept of risky consumption (items 1 and 2), dependence/using behaviour (3-10) and health and social problems (11-16). Designed as a self-report measure and requiring a reading level of approximately seven/eight years of schooling, the CUPIT currently takes approximately 4-6 minutes to administer. Scoring involves simple summation of the values associated with the 16 response alternatives. Items are scored on various Likert (1932) scale-type formats, and scores can range from 0 (no use at all) to 78 (daily/more than daily use, severely problematic). Different cut-off points will be appropriate for different purposes. In each instance, the trade-off between sensitivity and specificity which best addresses the context and cost of use (e.g., consequences of missing a true positive case) must be considered.

Being much shorter than the 'gold' standard CIDI (or any) structured interview, simple, rapidly scored and interpreted, widely-acceptable among all ages, and self- or

interviewer-administered by an interviewer with minimal training (not necessarily a health worker), the CUPIT has clear potential for epidemiologic, research, clinical and personal applications. These include: as a population screener, a research tool to define groups on the basis of high/low scores, pre- and post-treatment outcome assessment, a stand-alone screen or a component embedded in a lifestyle health interview. The CUPIT is also adaptable for computerized self- or interviewer-administration and scoring.

Comparison with Existing Cannabis Screens

The present research represents a departure in several respects from cannabis screen development research (CASST, CUDIT, DUDIT, MSI-X) previously reviewed (Chapter 4). Prominent among these are the sampling strategy, the systematic longitudinal development process, and the essential focus on a broad spectrum of cannabis use-related problems, not just those associated with a dependence diagnosis.

A unique feature was an inclusive sampling strategy incorporating cannabis users from across the spectra of age (13 to 60+ years), use and problems continua, community settings and programmes. This maximized the screen's potential generalizability compared with sampling limitations of these antecedent designs (Chapter 4). Implementing identical measures and universal procedures across the sample facilitated direct comparison of adults/adolescents and other valuable between-group analyses (Deas et al., 2005). Incorporation of clinically assessed users diagnosed according to DSM-IV and ICD-10 criteria also suggests the CUPIT has theoretical and practical relevance to both clinical and general population respondents. As yet, while purported to have relevance for both, no other screen (CASST, MSI-X, CUDIT, DUDIT) has demonstrated generalizability to both populations or, moreover, to both adults and adolescents *within* these populations. There is no other cannabis screener in the published literature to incorporate a large (n=138) at risk adolescent sample subgroup in screen developmental research. Another innovation was the prospective follow-up component, either not yet undertaken or reported in the other cannabis screen studies. This enabled examination of the natural history and stability of cannabis use-related problems and disorder, and the heterogeneity and severity of these problems and other

correlates that may predict or impact on diagnostic outcomes, among a heterogeneous sample.

The CUPIT development featured various measurement advances over other screens. These include the use of Likert scale-type items as opposed to dichotomous 'yes/no' scales in, for example, the CASST and the MSI-X (Chapter 4). Besides enhancing reliability Likert-scaled items provide behavioural frequency indicators for quantifying and discriminating the underlying disorder (Streiner & Norman, 1995). Thus, problem severity or 'level of risk' groups were delineated. Authorities (Cronbach 1946; Cohen, 1983) specifically recommend avoiding dichotomization. Binary responses restrict the utility of the scoring plan and more items are required for acceptable reliability (Nunnally, 1978). This may have reflected in the CUPIT's parsimonious two-component solution, compared to the MSI-X's 12-component solution (Chapter 4). In addition, strongly encouraged by IEP opinion (Chapter 5), the CUPIT incorporated exploration of dose-related questions, vital in any screen and not specifically addressed in these other instruments. However, as outlined (Chapter 4), absence of quantity and frequency guidelines for risky use, and potentially infinite individual variation in THC dose levels, renders quantity assessment fraught with difficulties (APA, 2000). Therefore it was not surprising that 'quantity' items failed to perform (discriminate) strongly enough to survive item reduction analyses.

A major strength of the CUPIT development resides in its systematic development and empirical validation. This contrasts with the prototypical CUDIT/DUDIT item derivation (simple substitution of 'alcohol' with 'cannabis' in the AUDIT) and the clinical opinion methodology (the MSI-X and CASST). Cannabis is not directly interchangeable with alcohol because of vastly different consumption patterns, pharmacology, distribution, metabolic and excretion kinetics, as well as individual variability in impairment (Chapter 4). Different harms are associated with different drugs (Room, 1998). Furthermore, the premature foreclosure of item content in both screen construction methods raises questions with regard to adequate representation (content validity) of all potentially problematic life domains (Nunnally, 1978). A related issue concerns employment of DSM-IV/ICD diagnostic criteria as criterion ('gold')

standard in the CUPIT item pool derivation and validation (Chapter 5). Neither the CASST nor the MSI-X incorporated such validated and universally respected measures, leaving their construct validation an open question. Moreover, given the moot sensitivity of DSM-IV/ICD-10 diagnostic criteria to capture all those having significant problems with their cannabis use (Degenhardt et al., 2002; Tims et al., 2002; Winters et al., 1999), with items limited to representing these criteria, and not abuse or problems common among younger at risk users, the CUDIT and DUDIT may have limited relevance for screening among this primary target population.

The foremost advantage of the CUPIT is its demonstrated ability to reliably identify both currently problematic *and* risky cannabis use among both adolescent and adult users. With incubating disorder or problems just under the diagnostic threshold ('diagnostic orphans'), or currently asymptomatic but demonstrating use patterns that render them vulnerable, younger at risk cannabis users are the appropriate target for a public health SEI approach to arrest progression to more advanced morbidity. While having suggested their potential relevance for such screening, none of the instruments heretofore discussed have either addressed or empirically demonstrated this longitudinal capability. Moreover, their various index sample characteristics (Chapter 4) and primary clinical focus suggest these screens may not be adequately representative of all those currently incubating, or at risk of developing, cannabis use disorders.

The dilemma of 'diagnostic orphans' has vast implications given that these adolescents are likely to 'fall through the diagnostic cracks' and may not be afforded opportunities to prevent progression of their incubating disorder. Sub-threshold use levels and symptoms suggest a trajectory of escalating drug use and related problems that "should alert practitioners to potentially serious problems" (Bailey et al., 2000, p.1800-1801). Rosenberg and Anthony (2001) advocated identification of distinctive features of early cannabis dependence to promote earlier differentiation of cannabis users who will - or will not - progress to clinically significant dependence (Chapter 4). Thus, both in screen development incorporating this high-risk group and in identifying the specific symptoms reported (summarized above), this research has contributed to this important knowledge base.

Limitations and Further Research

This research faced a number of possible sampling and methodological limitations that need to be taken into account when interpreting findings. External validity concerns the ability to generalize both *to* and *across* exemplars of a particular to the entire class of a particular (Lucas, 2003; Shadish, Cook, & Campbell, 2002). This includes universes of persons, settings, context, procedures, measures, relevant 'history', and time. Clearly, any one of these facets can affect the extent to which results of this research support generalizability to other cannabis users in different settings at different times. This, in turn, suggests potential areas for further investigation.

Sampling

Lack of a 'cannabis user' sampling frame and limited resources necessitating recruitment of a non-random, non-stratified, purposive at-risk sample for this research may impose limitations on its generalizability. The CUPIT index sample possibly over-represents those who "got caught" or otherwise came to the attention of authorities, and conduct-disordered individuals with antisocial or criminal behaviour syndromes, including cannabis and other drug use. A sizeable constituent were Youth Justice referrals or attendees of education and work training programmes for young people, either excluded from secondary school or unemployed. However, the size and diversity of other subgroups from multiple community settings should have countervailed any potential bias. More importantly, these youthful at risk participants are among society's more marginalized and vulnerable (Blyth & Milner, 1993; Powis et al., 1998), and thus epitomize the primary target subgroup/s of a SEI approach.

Shadish et al (2002) argue that generalizing inferences about persons, procedures and settings can be tentatively justified in the absence of random sampling by identifying the *proximal similarity* (Campbell, 1986) of the sample and its referent universe. According to this model of generalizability, several features of the sampling procedure are strengths of this research and its findings (Trochim, 2001): (a) recruitment across the spectra of age, consumption, clinical and non-clinical community settings and programmes to maximize heterogeneity, thus representativeness or *population validity* and *ecological* ('real world') *validity*; (b) *ecological validity* of on-site recruitment

procedures and personnel (e.g., school, youth, and employment training counsellors, Maori health and social workers, Youth Aid officers, drug treatment clinicians) identical to intended screening invitation procedures (c) the continuous research duration over 33 months, spanning any possible seasonal fluctuations or historic (public) events; (d) large sample size (e) minimal attrition (f) core attributes and at-risk status of the majority of the index sample typifies those of the intended recipients of the SEI approach.

However, the universe of generalisation cannot be known in advance. Ultimately, the most credible robust strategy for demonstrating external validity is *replication* among other persons, in different places, at different times (Lucas, 2003; Shadish et al., 2002; Trochim, 2001). Although attention was devoted to maintaining standardization of procedures across participants and settings, other possible aspects of this research (e.g., 'researcher effects', reactive or 'Hawthorne'/John Henry [under-reporting/exaggerating] effects', and 'pre-interview/interview interaction' from the preliminary independent completion of the draft CUPIT), may have impacted generalizability to other ecological contexts (e.g., workplace, health centre, social services, judicial or specialist drug clinic screening) or where different contingencies are operating (e.g., epidemiological survey, in-person health or clinical assessment, specialist treatment planning decisions, criminal justice outcomes). On the one hand, participants in this study understood their responses were for research purposes and essentially anonymous, and did not expect any repercussions or obligation to accept treatment if they admitted to problematic cannabis use. On the other hand, however, the researcher was not their counsellor or health care provider, so there was not a strong incentive to 'please' them by reporting non-risky consumption.

One limitation to generalizability is the base rate of the disorder in the population under study which, as earlier noted (p. 39), impacts substantially on screening results (Fowler & Austoker, 1997; Morrison, 1992; Rey et al., 1992). Even if sensistivity and specificity are high a screen has poor predictive or diagnostic accuracy when prevalence of the disorder is low, and is closest when prevalence is around 50 percent (Anastasi & Urbina, 1997; Meehl & Rosen, 1955). The high rates of disorder among the present index sample optimized the detection rate and maximized the positive predictive power

of the various CUPIT cut-points (Conigrave et al., 1995). A comparable performance is likely among other similar high-risk cannabis-using populations (Cochrane & Holland, 1971; Murphy et al., 1987; Rey et al., 1992). However, the performance parameters (sensitivity, specificity, positive predictive value) generated at the various CUPIT cut-points in this research may vary in other cannabis-using populations (e.g., general population, primary care, drug clinic populations) with different prior probabilities of having the disorder (e.g. low use/low-risk, moderate use/risk, high use/high risk) and for different purposes (e.g., preliminary screening, assessment referral, drug treatment planning decisions). As discussed (Chapter 7), since the optimal cut-point in any screen is context-, population-, and purpose-dependent, among such groups amended cut-points may be more appropriate for both diagnostic (cross-sectional) and predictive (longitudinal) utility (Baldessarini, Finkelstein & Arana, 1983).

ROC analysis provides a strategy for identifying the optimal empirical cut-points when using a screen in different settings for different base rate prevalences (e.g., Fombonne, 1991; Mossman & Somoza, 1989) when no specific risks, costs or benefits are involved. However, in any cannabis problems screening situation (non-clinical, clinical) the optimal cut-off will differ according to applicable cost-benefit considerations (Chapter 7) such as the cost or potential repercussions of missing a true positive, the availability of treatment services and resources, the potential individual health benefits and public health savings. In epidemiological research, where the aim is to obtain an accurate estimate of prevalence, it is usual to employ a criterion that strikes a balance between sensitivity and specificity. In community-based screening, “oversensitive” (Type I error) screening procedures are vital given the potentially serious costs or repercussions of missing (Type II error) an actual or potential cannabis misuser (Degenhardt et al., 2001, 2002; Fleming, 2002; McLellan & Dembo, 1993; Rey et al., 1992). In a clinical setting, the choice of cut-off point is influenced by the relative importance of sensitivity and specificity. Sensitivity and positive predictive value are the most important parameters for ensuring true positives receive appropriate treatment, while false-positives will be eliminated by further diagnostic assessment before unnecessary treatment is allocated (Conigrave et al., 1995; Fombonne, 1991; Swift et al., 1998a).

Measurement/Analysis

Several possible measurement limitations arise from this research. First, the uncontrolled pre-post repeated measures design together with the self-report data collection method raise possible reliability/validity issues. However, with anonymity and confidentially repeatedly assured, respondents in this research were their own control group and all indicators or internal audits utilized (including toxicology reports and "quasi-triangulated" measures) suggest possible over- or under-report bias to be minimal. The literature on reliability of cannabis users' self-reports (Chapter 4) supports this assertion. This indirectly suggests that the results are fairly accurate, and DSM-IV/ICD-10 diagnostic or problems assignment not overly liberal. Second, some items were either derived from (shared with), or very close to, the measures used for CUPIT validation purposes. This may have inflated correlations with these measures and hence CUPIT validity estimates. Third, the two-component solution obtained in this study was dependent on the question pool, the procedures, and the particular at risk sample. Thus the draft CUPIT may not represent *all* possible cannabis use-related problems. This is inherent in all instrument development research. Nonetheless, the thoroughgoing overinclusive item pool generation, systematic validation procedures, followed by respondents' spontaneous identification *with*, and appreciation of, the questions suggests the content validity of the CUPIT to be comprehensive, at least for high-risk users. A related limitation concerns the use of exploratory, rather than the more powerful confirmatory, factor analytical procedures. While clearly desirable, such procedures require huge samples and other resources for cross-validation purposes. Given the preliminary nature of this research, with no *a priori* specified structure, hypotheses, or expectations, the exploratory approach taken was entirely appropriate (Fabrigar et al., 1999; Gorsuch, 1983, 1997).

Further research

Researchers often comment that a study generates more questions than it answers. This research, it seems, is no exception. Coupled with the above-outlined issues the preliminary nature of this research has stimulated the need for further empirical studies for confirmation of findings (Trochim, 2001). Hence, replication of this research among a broader range of populations stratified by age, gender, consumption levels (if

possible), and more proportionally representative of New Zealand's ethnic demographic, would be useful to verify both *population* and *ecological validity* and extend the present findings on the CUPIT's psychometric properties. Testing the screener's performance among populations of cannabis users in other Western and non-Western cultures is also required to determine the CUPIT's *cross-cultural validity.* Concomitantly incorporating some form of control strategy, and utilizing multiple information sources (cf. reliance on self-report), different standardized criteria and/or validation standard/s, and testing the CUPIT performance across a variety of both clinical and non-clinical settings, may prove fruitful in clarifying some of the generalizability issues outlined. Perhaps the most pressing research need, however, is for further CUPIT validation studies using the more powerful confirmatory analytic procedures among diverse cannabis-using populations of adolescents and adults.

Further refinement of the CUPIT is potentially another area for research attention. First, several multi-point items (e.g., 1, 2, 4, 7) may be truncated to enhance brevity and speed of scoring, and thus make the CUPIT even more user-friendly. Second, given that the ROC assumption that all item subsets perform equally well has proven erroneous (Clarke & McKenzie, 1994; McKenzie, Clarke & Low, 1992), research directed towards exploring the prognostic utility of various item subsets, and to ensuring that the equal weighting of (Likert-type) items assumption is well-founded, is recommended. This may lead to even further shortening of the CUPIT, or various item refinements. These complex analyses require a large dataset (Kessler et al., 1998; Obuchowski, 1998, 2000). Finally, given the importance of 'quantity' questions in any screen, and the failure of these measures to survive item reduction analyses in this research, continued work should be devoted to devising dose-related ('quantity') questions as part of the broader ongoing quest for more robust measures of cannabis (THC) consumption.

Challenges and Rewards

The research experience presented the researcher with several challenges which were subsequently mitigated by unexpected rewards. The enthusiastic reception and support with which recruitment personnel embraced the cannabis screen concept from the outset

was a direct reflection of their perception of the urgent need for such a screen and the project's worth. Assurances that "it's wonderful to be part of such a worthwhile project" (*s*ic) and "we are so pleased to take part", and "we are so glad somebody is actually *doing something at last* in this area!" (*sic*), and being accorded "high priority for support, on merit" (*sic*) by schools with already-extensive commitments, were veritable research highlights that inspired and nurtured researcher motivation. Indeed, the commendable encouragement and collaborative assistance received from all participating organizations and personnel throughout the project's lengthy duration was reflected in favourable recruitment and follow-up rates, notwithstanding the daunting prospect that tracking and locating drug-using study participants inevitably represents. This ongoing support and cooperation was even more remarkable in light of the researcher's lack of resources for organization and participant reimbursement - or even incentives - and clearly a major factor in the project's success.

Also rewarding were the expressions of approval, identification with, and appreciation of both the screen questions and the research experience by the vast majority of volunteer participants, their cooperation at follow-up, and (unexpected) disappointment that their participation was complete. The sad reality is that several of these young cannabis-using participants have been incarcerated, or in trouble with the law, in the post-research period. That this was "the first time *ever* anyone has ever asked me such questions" (*sic*) speaks to both lack of adequate environmental support and functional caring relationships, *and* to the urgent need for systematic implementation of cannabis SEI among such vulnerable young users.

Conclusions

Cannabis "is everywhere, and spreading" (World Drug Report, UNODC, 2006, p. 26). A world leader in per capita use, cannabis in New Zealand is currently adversely affecting the health and social functioning of a large cohort of adults, adolescents, and increasingly - children. Cannabis-related harms are predicted to increase with growth in the youth population, ever-younger initiation, rising consumption, availability and

'normalisation' of cannabis, coterminous with its engineering for higher-potency products. Adolescence is a critical period of rapid development and life transitions when cannabis use disorder can powerfully impact a young person's health and life chances. Research currently emerging indicates health risks of cannabis have been hitherto *under*estimated (UNODC, 2006), foreshadowing grave repercussions for many young New Zealanders. As confirmed in this research, younger regular users are at greatest risk of dependence and the whole spectrum of cannabis-induced health, psychiatric and social disabilities, problems, and harms. Adolescents' apparent lack of insight as to cannabis' harm liability, pattern of increasingly frequent use, persistence of dependence and abuse, and increased problem severity invites peculation as to just how many will maintain - or further increase - their current use patterns with potential for even *more* serious sequelae. However, Spooner's timely (1999) warning that not all cannabis initiates will "mature out" successfully, and "simply waiting to see who will grow out of it is shirking our societal responsibility" (p. 464) conveys a clear ethical mandate for precipitating intervention. Unquestionably, cannabis use ranks among New Zealand's most pressing medical and social concerns (Field & Casswell, 2001; MOH, 1998, 2002b, 2002c; NHC, 1999).

The present research is especially timely as it has coincided with calls for stronger international investment in public health initiatives of prevention and SEI for cannabis (MHCA, 2006; UNODC, 2006; WHO, 2004). In a convergence of the two screening approaches (Safer, 1986), a shift from traditional clinic-based, symptom-focused casefinding to rehabilitate or cure, to *proactive* opportunistic recruitment to prevent, minimize, or arrest progression of use-related harm, is required. As has been argued throughout this thesis, to prevent efforts must be applied *pre*-event, engaging the whole population. To reiterate Foege's (1997) injunction:

> It is not enough to predict the future. Public health faces an enormous challenge in protecting the future. The other side of possessing a window on the future is the requirement to look through that window and respond appropriately (p. 413).

Chapter Eight
Summary and Conclusions

Data reported by a heterogeneous sample of users in this research provide a compelling rationale for cannabis screening and a matching continuum of intervention responses, ranging from minimal (advice, education) through brief motivational counselling to intensive, specialized psychological treatments (Hall & Swift, 2006). While research consistently shows individuals at early stages of drug use problems have better prognoses, the vast majority of those with drug problems do not access specialist services. As the present research confirmed, moreover, the vast majority of those who need help are either unaware, or do not feel, they need assistance (SAMHSA, 2006). That several participants *did* express regret that their GP had *not* intervened, or even questioned, their cannabis use at an early stage in an attempt to arrest escalation to the chronic use patterns and problems that subsequently developed is ample incentive and justification for implementing such humane objectives, and thus better meet consumer needs.

A major tenet of this thesis was that community generalist health and social services are *the* environment for SEI for both currently problematic and risky cannabis use. Accordingly, health and social services providers, policy makers and funders are urged to promote and support their workers' proficiency in opportunistic detection of early-stage problem cannabis use at the first point of contact, and delivery of an age- and stage-appropriate intervention among their consumers. Given the high rate of attrition that occurs in the referral process, the key to the best possible outcomes is to maximize the potential of such contacts by *routine* screening. Several diverse intervention approaches have shown promise, and others are currently in development (Copeland, 2004; Denis, Lavie, Fatseas, & Auriacombe, 2006; Dennis et al., 2002b; Henry-Edwards et al., 2003; Kamon et al., 2005; Martin et al., 2005; McCambridge & Strang, 2004; Waldron, 1997; Waldron et al., 2001).

To this day, lack of a brief screen suitable for use across generalist health care and social services settings has been a - if not the - major obstacle to widespread implementation of SEI for cannabis use problems in New Zealand. This instrumentation need catalyzed the research in this thesis and, as foregoing chapters testify, this primary aim was systematically achieved. Besides the timely extension to the limited

longitudinal database on the natural history of cannabis use and disorder among local users with the wealth of information this research generated, the unique contribution of the CUPIT is the screen's empirically verified cross-sectional and longitudinal ability to reliably detect currently problematic, as well as *potentially* problematic, cannabis use among heterogeneous adolescent and adult users.

Thus, facilitated by the CUPIT, rapid reliable detection of currently problematic and risky cannabis use among consumers of New Zealand community-based health and social services is now feasible. Effective, cost-efficient screening and timely, responsive, appropriate intervention for early-stage cannabis use problems has clear potential for enormous cumulative impact on public health gains and the individual's quality of life. It is unquestionably time to implement routine cannabis screening in the community. This notion was succinctly encapsulated in one long-term user's exhortation: "Get this screen *out there*!" (*sic*).

REFERENCES

Aarons, G., Brown, S., Stice, E., & Coe, M. (2001). Psychometric evaluation of the marijuana and stimulant effect expectancy questionnaires for adolescents. *Addictive Behaviors, 26,* 219-236.

Abel, E.I. (1980). *Marihuana: The first twelve thousand years.* New York: Plenum Press.

Abel S., & Casswell, S. (1998). Cannabis policy: issues and options. *The New Zealand Medical Journal, 111 (1074),* 367-369.

Adams, I.B., & Martin, B.R. (1996). Cannabis: pharmacology and toxicology in animals and humans. *Addiction, 91 (11),* 1585-1614.

Adams, P.J., Powell, A., McCormick, R., & Paton-Simpson, G. (1997). Incentives for general practitioners to provide brief interventions for alcohol problems. *New Zealand Medical Journal, 110,* 291-294.

Adamson, S., & Sellman, J.D. (2003). A prototype screening instrument for cannabis use disorder: The Cannabis Use Disorders Identification Test (CUDIT) in an alcohol dependent clinical sample. *Drug and Alcohol Review, 22(3),* 309-315.

Adlaf, E.M., Begin, P., & Sawka, E. (Eds.). (2005). *Canadian Addiction Survey (CAS): A national survey of Canadians' use of alcohol and other drugs. Prevalence of use and related harms. Detailed report.* Ottawa: Author.

Adlaf, E.M., Mann, R.E., & Paglia, A. (2003). Drinking, cannabis use and driving among Ontario students. *Canadian Medical Association Journal, 168 (5),* 565-566.

Adolescent Health Research Group (2003). A health profile of New Zealand youth who attend secondary school. *New Zealand Medical Journal, 116 (1171).*

Agosti, V., & Levin, F.R. (2004). Predictors of treatment contact among individuals with cannabis dependence. *American Journal of Drug and Alcohol Abuse, 30 (1),* 121-127.

Ahern, K., & Brocque, R.E. (2005). Methodological issues in the effects of attrition: Simple solutions for social scientists. *Field Methods, 17 (1),* 53-69.

Akinci, I.H., Tarter, R.E., & Kirisci, L. (2001). Concordance between verbal reports andurine screen of recent marijuana use in adolescents. *Addictive Behaviors, 26 (4),* 613-619.

References

Alcohol and Liquor Advisory Council (1996). *Guidelines for alcohol and drug assessment: Review of alcohol and drug screening, diagnostic and evaluation instruments.* Wellington, ALAC.

Alexander, D. (2003). A Marijuana Screening Inventory (Experimental Version): Description and preliminary psychometric properties. *American Journal of Drug and Alcohol Abuse, 29 (3),* 619-646.

American Academy of Child and Adolescent Psychiatry (1997). Practice parameters for the assessment and treatment of children and adolescents with substance use disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 36 (10 Suppl.),* 140S-156S.

American Academy of Pediatrics (1999). Marijuana: A continuing concern for pediatricians. *Pediatrics, 104 (4),* 982-985.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th edition). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders, 4th edition, text revision, (DSM-IV-TR).* Washington, DC: Author.

American Psychological Association. (1992). Ethical principles of psychologists and code of conduct. *American Psychologist, 47,* 1597-1611.

Anastasi, A., & Urbina, S. (1997). *Psychological testing.* New Jersey: Prentice-Hall.

Andrews, G. & Peters, L. (1998). The psychometric properties of the Composite International Diagnostic Interview. *Soc Psychiatry Psychiatric Epidemiology, 33,* 80-88.

Anthony, J.C. (2000). Putting epidemiology and public health in needs assessment: drug dependence and beyond. In G. Andrews & S. Henderson (Eds.), *Unmet need in psychiatry: problems, resources, responses* (pp. 302-308). Cambridge: Cambridge University Press.

Anthony, J.C., & Petronis, K.R. (1989). Cocaine and heroin dependence compared: Evidence from an epidemiologic field survey. *American Journal of Public Health, 79 (10),* 1409-1410.

Anthony, J.C., & Petronis, K.R. (1995). Early-onset drug use and risk of later drug problems. *Drug and Alcohol Dependence, 40,* 9-15.

Arseneault, L., Cannon, M., Poulton, R., Murray, R., Caspi, A., & Moffitt, T. (2002). Cannabis use in adolescence and risk for adult psychosis: longitudinal prospective study. *British Medical Journal, 325,* 1212-1213.

Ashton, C.H. (2001). Pharmacology and effects of cannabis: a brief review. *British Journal of Psychiatry, 178,* 101-106.

References

Australian Institute of Health and Welfare. (2005). *2004 National drug strategy household survey: first results.* Canberra: AIHIW (Drug Statistics Series No. 13).

Babor, T.F. (1992). Substance-related problems in the context of international classificatory systems. In M. Lader, G. Edwards & D.C. Drummond (Eds), *The nature of alcohol and drug related problems* (pp. 83-97). New York: Oxford University Press.

Babor, T.F. (1995). Commentary: The road to DSM-IV: confessions of an erstwhile nosologist. *Drug and Alcohol Dependence, 38,* 75-79.

Babor, T.F., & Del Boca, F.K. (1992). Just the Facts. In R.Z. Litten and J.P. Allen (Eds.), *Measuring alcohol consumption: Psychosocial and biochemical methods* (pp. 3-19). Totowa, NJ: The Humana Press Inc.

Babor, T.F., & Higgins-Biddle, J.C. (2000). Alcohol screening and brief intervention: dissemination strategies for medical practice and public health. *Addiction, 95,* 677-686.

Babor, T.F., Higgins-Biddle, J.C., Saunders, J.B., & Monteiro, M.G. (2001). *AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for use in primary care* (2nd ed.). Geneva: World Health Organization.

Babor, T.F., Steinberg, K., McRee, B., Vendetti, J., & Carroll, K.C. (2002). Treating marijuana dependence in adults: a multi-site randomized clinical trial. *New Directions in Evaluation, 94,* 17-30.

Bachman, J.G., Wadsworth, K.N., O'Malley, P.M., Johnston, L.D., & Schulenberg, J.E. (1997). *Smoking, drinking, and drug use in young adulthood: the impacts of new freedoms and responsibilities.* Mahwah, NJ: Lawrence Erlbaum Associates.

Bailey, S., Martin, C., Lynch, K., & Pollock, N. (2000). Reliability and concurrent validity of DSM-IV subclinical symptom rating for alcohol use disorder among adolescents. *Alcoholism Clinical and Experimental Research, 24 (12),* 1795-1802.

Baldessarini, R.G., Finkelstein, S., & Arana, G.W. (1983). The predictive power of diagnostic tests and the effect of prevalence of illness. *Archives of General Psychiatry, 40,* 569-573.

Barry, K., & Fleming, M. (1990). Computerized administration of alcoholism screening tests in a primary care setting. *Journal of the American Board of Family Practice, 3 (2),* 93-98.

Bartlett, M. S. (1950). Tests of significance in factor analysis. *British Journal of Psychology (Statistical Section), 3,* 77-85.

Bashford, J.L. (2000). *Effectiveness of treatment for cannabis use disorder in New Zealand.* Unpublished Masters thesis. Rehabilitation Department, School of Health Sciences, Massey University, Palmerston North, New Zealand.

References

Bass, B.M., Cascio, W.F., & O'Connor, E.J. (1974). Magnitude estimations of expressions of frequency and amount. *Journal of Applied Psychology, 59,* 313-320.

Bass, C.E., & Martin, B.R. (2000). Time course for the induction and maintenance of tolerance to Delta(9)tetrahydrocannabinol in mice. *Drug and Alcohol Dependence, 60,* 113-119.

Bates, M.N., & Blakely, T.A. (1999). Role of cannabis in motor vehicle crashes. *Epidemiological Review, 21,* 222-232.

Beautrais, A., Joyce, P.R., & Mulder, R.T. (1999). Cannabis abuse and serious suicide attempts. *Addiction, 94 (8),* 1155-1164.

Berk, R.A. (Ed.). (1984). *A guide to criterion-referenced test construction.* Baltimore, Maryland: The John Hopkins University Press.

Berman, A.H., Bergman, H., Palmstierna, T., & Schlyter, F. (2005). Evaluation of the Drug Use Disorders Identification Test (DUDIT) in Criminal Justice and Detoxification settings and in a Swedish population sample. *European Addiction Research, 11 (1),* 22-31.

Biernacki, P., & Waldorf, D. (1981). Snowball sampling: problems and techniques of chain-referral sampling. *Sociological Methods and Research, 10,* 141-163.

Bishop, Y.M., Feinberg, S., & Holland, P. (1975). *Discrete multivariate analyses.* Cambridge: MIT Press.

Bland, J.M., & Altman, D.G. (1996). Education and debate. Statistics notes: Logarithims. *British Medical Journal, 312,* p. 700.

Blyth, E., & Milner, J. (1993). Exclusion from school: a first step in exclusion from society? *Children and Society, 7,* 255-268.

Bohn, M.J., Babor, T.F., & Kranzler, H.R. (1995). The Alcohol Use Disorders Identification Test (AUDIT): Validation of a screening instrument for use in medical settings. *Journal of Studies on Alcohol, 56,* 423-432.

Bondy, S.J., & Lange, P. (2000). Measuring alcohol-related harm: Test-retest reliability of a popular measure. *Substance Use and Misuse, 35 (9),* 1263-1275.

Bootsmiller, B.J., Ribisl, K.M., Mowbray, C.T., Davidson, W.S., Walton, M.A., & Herman, S.E. (1998). Methods of ensuring high follow-up rates: Lessons from a longitudinal study of dual diagnosed participants. *Substance Use and Misuse, 33 (13),* 2665-2685.

Boyer, C.B., Shafer, M-A., Teitle, E., Wibbelsman, C., Seeberg, D., & Schachter, J. (1999). Sexually transmitted diseases in a health maintenance organization teen clinic. *Archives of Pediatrics and Adolescent Medicine, 153 (8),* 838-844.

References

Braun, B.J., Tekawa, I.S., Gerberich, S.G., & Sidney, S. (1998). Marijuana use and medically attended injury events. *Annals of Emergency Medicine, 32 (3),* 353-360.

British Lung Foundation. (2002). *A smoking gun? The impact of cannabis smoking on respiratory health.* London: British Lung Foundation.

British Medical Association. (1997a). *The misuse of drugs.* London: Harwood Academic.

British Medical Association. (1997b). *Therapeutic uses of cannabis.* Amsterdam: Harwood Academic.

Brook, J.S., Adams, R.E., Balka, E.B., & Johnson, E. (2002). Early adolescent marijuana use: Risks for the transition to young adulthood. *Psychological Medicine, 32,* 79-91.

Brook, J.S., Kessler, R.C., & Cohen, P.C. (1999). The onset of marijuana use from preadolescence and early adolescence to young adulthood. *Developmental Psychopathology, 11 (4),* 901-914.

Brown, R.L., & Fleming, M.F. (1998). Training the trainers: Substance abuse screening and intervention. *International Journal of Psychiatry in Medicine, 28 (1),* 137-146.

Brown, R.L., Leonard, T., Saunders, L. A., & Papasouliotis, O. (1997). A two-item screening test for alcohol and other drug problems. *Journal of Family Practice, 44 (2),* 151-160.

Brown, R.L., & Rounds, L.A. (1995). Conjoint screening questionnaires for alcohol and other drug abuse: criterion validity in a primary care practice. *Wisconsin Medical Journal, 94,* 135-140.

Buchan, B.J., Dennis, M.L., Tims, F.M., & Diamond, G.S. (2002). Cannabis use: consistency and validity of self-report, on-site urine testing and laboratory testing. *Addiction, 97 (Suppl 1),* 98-108.

Budney, A.J., & Moore, B.A. (2002). Development and consequences of cannabis dependence. *Journal of Clinical Pharmacology, 42 (S11),* 28S-33S.

Budney, A.J., Radonovich, K.J., Higgins, S.T., & Wong, C.J. (1998). Adults seeking treatment for marijuana dependence: a comparison with cocaine-dependent treatment seekers. *Experimental and Clinical Psychopharmacology, 6 (4),* 419-426.

Bukstein, O.G. (1995). *Adolescent substance use: Assessment, prevention and treatment.* New York: John Wiley & Sons, Inc.

Bukstein, O., & Kaminer, Y. (1994). The nosology of adolescent substance abuse. *The American Journal on Addictions, 3 (1),* 1-13.

References

Calman, K.C., & Downie, R.S. (1997). Ethical principles and ethical issues in public health. In R. Detels, W.W. Holland, J. McEwen & G. S. Omenn, (Eds.), *Oxford textbook of public health* (3rd edition). Volume 1, Section IV, 'Laws, ethics and challenges', (pp. 391-402). Oxford: Oxford University Press.

Campbell, D.T. (1986). Relabelling internal and external validity for applied social scientists. In W.M.K. Trochim, (Ed.), *Advances in quasi-experimental design and analysis.* San Francisco: Jossey-Bass.

Campbell, D. T., & Fiske, W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 36,* 81-105.

Carey, K.B., & Simons, J. (2000). Utility of collateral information in assessing substance use among psychiatric outpatients. *Journal of Substance Abuse, 11 (2),* 139-147.

Carroll, K. (1995). Methodological issues and problems in the assessment of substance use. *Psychological Assessment, 7 (3),* 349-358.

Carroll, K. (1998). Treating drug dependence. Recent advances and old truths. In W.R. Miller & N. Heather (Eds.), *Treating addictive behaviors* (2nd ed., pp. 217-229). New York: Plenum Press.

Casswell, S. (1997). Editorial: How do we respond to recreational drug use in the southern hemisphere? *Drug and Alcohol Review, 16,* 381-382.

Cattell, R.B. (1965). Factor analysis: An introduction to essentials. I. The purpose and underlying models. *Biometrics, 21,* 190-215.

Cattell, R.B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research, 1,* 245-276.

Cattell, R.B. (1978). *The scientific use of factor analysis in the behavioral and life sciences.* New York: Plenum.

Center on Addiction and Substance Abuse. (CASA) (2000). *Missed opportunity: National survey of primary care physicians and patients on substance abuse.* New York: Author.

Chan-Pensley, E. (1999). Alcohol Use Disorders Identification Test: a comparison between paper and pencil and computerized versions. *Alcohol Alcohol, 34,* 882-885.

Chen, K., & Anthony, J. (2003). Possible age-associated bias in reporting of clinical features of drug dependence: epidemiological evidence on adolescent onset marijuana use. *Addiction, 98,* 71-82.

Chen , K., & Kandel, D.B. (1995). The natural history of drug use from adolescence to mid-thirties in a general population sample. *American Journal of Public Health, 85,* 41-47.

References

Chen, K., & Kandel, D.B. (1998). Predictors of cessation of marijuana use: an event history analysis. *Drug and Alcohol Dependence, 50,* 109-121.

Chen, K., Kandel, D.B., & Davies, M. (1997). Relationships between frequency and quantity of marijuana use and last year proxy dependence among adolescents and adults in the United States. *Drug and Alcohol Dependence, 46,* 53-67.

Cherpitel, C.J. (1995). Analysis of cut points for screening instruments for alcohol problems in the emergency room. *Journal of Studies on Alcohol, 56,* 695-700. (a)

Cherpitel, C.J. (1995). Screening for alcohol problems in the emergency department. *Annals of Emergency Medicine, 26,* 158-166. (b)

Cherpitel, C.J. (1997). Brief screening instruments for alcoholism. *Alcohol Health and Research World, 21 (4),* 348-351.

Cherpitel, C.J. (1998). Differences in performance of screening instruments for problem drinking among blacks, whites and Hispanics in an emergency room population. *Journal of Studies on Alcohol, 59,* 420-426.

Cherpitel, C.J., & Borges, G. (2000). Screening instruments for alcohol problems: a comparison of cut-points between Mexican American and Mexican patients in the emergency room. *Substance Use and Misuse, 35,* 1419-1430.

Christie, B. (2001). "The capability of saving lives" moves to primary care. *British Medical Journal, 323,* p. 592.

Chung, T., Colby, S.M., Barnett, N.P., Rohsenow, D.J., Spirito, A. & Monti, P.M. (2000). Screening adolescents for problem drinking: Performance of brief screens against DSM-IV alcohol diagnosis. *Journal of Studies on Alcohol, 61 (4),* 579-587.

Chung, T., Colby, S.M., O'Leary, T.A., Barnett, N.P., & Monti, P.M. (2003). Screening for cannabis use disorders in an adolescent emergency department sample. *Drug and Alcohol Dependence, 70 (2),* 177-186.

Clark, D.B. (2004). The natural history of adolescent alcohol use disorders. *Addiction, 99 (Suppl. 2),* 76-92.

Clark, D., Pollock, N., Mezzich, N.K., Cornelius, J., & Martin, C. (2001). Diachronic substance use assessment and the emergence of substance use disorders. In R.E. Tarter & M.M. Vanyukov (Eds.), *Etiology of substance use disorder in children and adolescents: Emerging findings from the Center for Education and Drug Abuse Research* (pp. 13-22). New York: The Haworth Press, Inc.

Clark, L.A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7 (3),* 309-313.

References

Clarke, D.M., & McKenzie, D.P. (1994). A caution on the use of cut-points applied to screening instruments or diagnostic criteria. *Journal of Methods in Psychiatric Research, 28 (2),* 185-188.

Claussen, B., & Aasland, O.G. (1993). The Alcohol Use Disorders Identification Test (AUDIT) in a routine health examination of long-term unemployed. *Addiction, 88,* 363-368.

Coakes, S.J., & Steed, L.G. (2003). *SPSS analysis without anguish. Version 11.0 for Windows.* Milton, Queensland: John Wiley & Sons, Australia Ltd.

Cochrane, A.L., & Holland, W.W. (1971). Validation of screening procedures. *British Medical Bulletin, 27 (1),* 3-8.

Coffey, C., Carlin, J.B., Degenhardt, L., Lynskey, M., Sanci, L., & Patton, G.C. (2002). Cannabis dependence in young adults: an Australian population study. *Addiction, 97,* 187-194.

Coffey, C., Carlin, J.B., & Lynskey, M. (2003). Adolescent precursors of cannabis dependence: findings from the Victorian Adolescent Health Cohort Study. *British Journal of Psychiatry, 182,* 330-336.

Coffey, C., Lynskey, M., Wolfe, R., & Patton, G.C. (2000). Initiation and progression of cannabis use in a population-based Australian adolescent longitudinal sample. *Addiction, 95 (11),* 1679-1690.

Cohen, J. (1983). The cost of dichotomization. *Applied Psychological Measurement, 7,* 249-253.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). New York: Lawrence Erlbaum Associates.

Compton, W. M., Grant, B.F., Colliver, J.D., Glantz, M.D., & Stinson, F.S. (2004). Prevalence of marijuana use disorders in the United States 1991-1992 and 2001-2002. *Journal of the American Medical Association, 291 (17),* 2114-2121.

Comrey, A.L. (1988). Factor-analytic methods of scale development in personality and and clinical psychology. *Journal of Personality and Social Psychology, 56,* 577-585.

Comrey, A.L., & Lee, H.B. (1992). *A first course in factor analysis.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Cone, E.J., & Johnson, R.E. (1986). Contact highs and urinary cannabinoid excretion after passive exposure to marijuana smoke. *Clinical and Pharmacological Therapy, 40 (3),* 247-256.

Conigrave, K.M., Hall, W., & Saunders, J.B. (1995). The AUDIT questionnaire: choosing a cut-off score. *Addiction, 90,* 1349-1356.

References

Conigrave, K.M., Saunders, J.B., & Reznik, R.B. (1995). Predictive capacity of the AUDIT questionnaire for alcohol-related harm. *Addiction, 90,* 1479-1485.

Cook, D.T., & Campbell, D.T. (1979). *Quasi-experimentation. Design and analysis issues for field settings.* Chicago: Rand McNally.

Coolican, H. (1990). *Research Methods and Statistics in Psychology.* London: Hodder and Stoughton.

Cooney, N.L., Zweben, A., & Fleming, M. (1995). Screening for alcohol problems and at-risk drinking in health-care settings. In R.K. Heather & W.R. Miller, (Eds.), *Handbook of alcoholism treatment approaches: Effective alternatives* (2nd ed., pp. 45-60). Boston: Allyn & Bacon.

Copeland, J. (2004). Interventions for cannabis use disorder. *Current Opinions in Psychiatry, 17 (3),* 161-167.

Copeland, J., Gerber, S., & Swift, W. (2006). *Evidence-based answers to cannabis questions: A review of the literature.* Report to the Australian National Council on Drugs, Canberra.

Copeland, J., Gilmour, S., Gates, P., & Swift, W. (2005). The Cannabis Problems Questionnaire: factor structure, reliability and validity. *Drug and Alcohol Dependence, 80 (3),* 313-319.

Copeland, J., Rees, V., & Swift, W. (1999). Health concerns and help-seeking among a sample entering treatment for cannabis dependence. Letter to the Editor. *Australian Family Physician, 28,* 540-541.

Copeland, J., Swift, W., & Rees, V. (2001a). Clinical profile of participants in a brief intervention for cannabis use disorder. *Journal of Substance Abuse Treatment, 20 (1),* 45-52.

Copeland, J., Swift, W., Roffman, R., & Stephens, R. (2001b). A randomized controlled trial of brief cognitive-behavioral interventions for cannabis use disorder. *Journal of Substance Abuse Treatment, 21,* 55-64.

Cortina, J.M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78 (1),* 98-104.

Costello, C.G. (1992). Research on symptoms versus research on syndromes: arguments in favour of allocating more research time to the study of symptoms. *British Journal of Psychiatry, 160,* 304-308.

Costello, A.B., & Osborne, J.W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation, 10 (7),* 1-9.

References

Cottler, L.B., & Compton, W.M. (1993). Advantages of the CIDI family of instruments in epidemiological research of substance use disorders. *International Journal of Methods in Psychiatric Research, 3,* 109-119.

Cottler, L.B., Compton, W.M., Ben-Abdallah, A., Horne, M., & Claverie, D. (1996). Achieving a 96.6 percent follow-up rate in a longitudinal study of drug abusers. *Drug and Alcohol Dependence, 41,* 209-217.

Cottler, L.B., Schuckit, M.A., Helzer, J.E., Crowley, T., Woody, G., Nathan, P., & Hughes, J. (1995). The DSM-IV field trials for substance use disorders: major results. *Drug and Alcohol Dependence, 38,* 59-69.

Cox, D.R. (1977). *The analysis of binary data.* London: Chapman & Hall.

Cox, E. P. (1980). The optimal number of response alternatives for a scale: A review. *Journal of Marketing Research, 17,* 407-422.

Crittenden, K.S., Manfredi, C., Warnecke, R.B., Cho, Y.I., & Parsons, J. (1998). Measuring readiness and motivation to quit smoking among women in public health clinics. *Addictive Behaviors, 23,* 191-199.

Cronbach, L.J. (1946). Response sets and test validity. *Educational and Psychological Measurement, 6,* 475-494.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16,* 297-334.

Cronbach, L.J. (1984). *Essentials of psychological testing* (4th ed.). New York: Harper.

Cronbach, L.J. (1990). *Essentials of psychological testing* (5th ed.). New York: Harper & Row.

Crowe, M. (2000). Constructing normality: a discourse analysis of the DSM-IV. *Journal of Psychiatric and Mental Health Nursing, 7,* 69-77.

Crowley, T., MacDonald, M., Whitmore, E., & Mikulich, S. (1998). Cannabis dependence, withdrawal, and reinforcing effects among adolescents with conduct symptoms and substance use disorders. *Drug and Alcohol Dependence, 50,* 27-37.

Dacey, B., & Moewaka Barnes, H. (2000). *Te Ao Taru Kino: Drug use among Māori,* University of Auckland: Whariki Māori Health Research Unit, Alcohol and Public Health Research Unit.

Darke, S. (1998). Self-report among injecting drug users: a review. *Drug and Alcohol Dependence, 51,* 253-263.

Davies, J.B. (1987). Questions and answers in addiction research. *British Journal of Addiction, 82,* 1273-1276.

References

Dawe, S., Loxton, N.J., Hides, L., Kavanagh, D.J., & Mattick, R.P. (2002). *Review of diagnostic screening instruments for alcohol and other drug use and other psychiatric disorders* (2nd ed.). Canberra: Australian Government Publishing Service.

Dawkins, K. (2001). Cannabis prohibition: taking stock of the evidence. *Otago Law Review, 10,* 39-89.

Deas, D., Roberts, J., & Grindlinger, D. (2005). The utility of DSM-IV criteria in diagnosing substance abuse/dependence in adolescents. *Journal of Substance Use, 10 (1),* 10-21.

Degenhardt, L., Hall, W., & Lynskey, M.T. (2001). Alcohol, cannabis and tobacco use among Australians: a comparison of their associations with other drug use and use disorders, affective and anxiety disorders, and psychosis. *Addiction, 96,* 1603-1614.

Degenhardt, L., Lynskey, M., Coffey, C., & Patton, G. (2002). 'Diagnostic orphans' among young adult cannabis users: persons who report dependence symptoms but do not meet diagnostic criteria. *Drug and Alcohol Dependence, 67,* 205-212.

Degenhardt, L., Lynskey, M., & Hall, W. (2000). Cohort trends in the age of initiation of drug use in Australia. *New Zealand Journal of Public Health, 24,* 421-426.

Degutis, L.C. (2003). Need for brief interventions for marijuana and alcohol use related injuries. *Academic Emergency Medicine, 10,* 62-64.

De La Cuevas, C., Sanz, E.J., De La Feunte, J.A., Padilla, J., & Berenguer, J. C. (2000). The Severity of Dependence Scale as a screening test for benzodiazepine dependence: SDS validation study. *Addiction, 95,* 245-250.

Del Boca, F.K., & Noll, J.A. (2000). Truth or consequences: the validity of self-report data in health services research on addictions. *Addiction, 95 (Suppl. 3),* S347-S360.

Del Mar, C., & Glasziou, P. (2003). How many conditions can a GP screen for? *British Medical Journal, 327,* p. 1117.

Denis, C., Lavie, E., Fatseas, M., & Auriacombe, M. (2006). Psychotherapeutic interventions for cannabis abuse and/or dependence in outpatient settings. *Cochrane Database of Systematic Reviews,* Issue 3. Art No: CD00536. DOI: 10.1002/146518.CD005336.pub2.

Dennis, M.L., Babor, T.F., Roebuck, C., & Donaldson, J. (2002a). Changing the focus: the case for recognizing and treating cannabis use disorders. *Addiction, 97 (Suppl 1),* 4-15.

Dennis, M.L., & McGeary, K.A. (1999). Adolescent alcohol and marijuana treatment: kids need it now. *TIE Communique,* Fall, 10-12.

References

Dennis, M.L., Perl, H.I., Huebner, R.B., & McLellan, A.T. (2000). Methodological challenges in study design and implementation. *Addiction, 95 (Suppl 3),* S281-S308.

Dennis, M.L., Titus, J., Diamond, G., Donaldson, J., Godley, S.H., Tims, F.M., Webb, C., Kaminer, Y., Babor, T., Roebuck, M.C., Godley, M.D., Hamilton, N., Liddle, H., Scott, C.K., & The C.Y.T Steering Committee (2002b). The Cannabis Youth Treatment (CYT) experiment: rationale, study design and analysis plans. *Addiction, 97, (Suppl 1),* 16-34.

Derogatis, L.R. (1994). *Symptom Checklist 90-R (SCL-90-R): Administration, scoring, and procedures manual (3rd edition).* Minneapolis, MN: National Computing Systems Pearson, Inc.

Derogatis, L. R. (2000). *Brief Symptom Inventory 18 (BSI 18): Administration, scoring, and procedures manual.* Minneapolis, MN: National Computing Systems Pearson, Inc.

Derogatis, L. R., & Lynn, L. R. II (2000). Screening and monitoring psychiatric disorder in primary care populations. In M. E. Maruish, M. E. (Ed.), *Handbook of psychological assessment in primary care settings* (pp. 115-152). Minneapolis, NJ: Lawrence Erlbaum Associates.

Derogatis, L.R., & Savitz, K.L. (2000). The SCL-90-R and Brief Symptom Inventory (BSI) in primary care. In M. E. Maruish (Ed.), *Handbook of psychological assessment in primary care settings* (pp. 297-334). Minneapolis, NJ: Lawrence Erlbaum Associates.

Derzon, J.H., & Lipsey, M.W. (1999). What good predictors of marijuana use are good for: a synthesis of research. *School Psychology International, 20,* 69-85.

Desmond, D.P., Maddux, J.F., Johnson, T.H., & Confer, B.A. (1995). Obtaining follow-up interviews for treatment evaluation. *Journal of Substance Abuse Treatment, 12 (2),* 95-102.

De Vellis, R.F. (1991). *Scale development: Theory and applications.* Newbury Park, CA: Sage Publications.

De Wit, D.J., Hance, J., Offord, D.R., & Ogborne, A. (2000). The influence of early and frequent use of marijuana on the risk of desistance and of progression to marijuana-related harm. *Preventive Medicine, 31,* 455-464.

Drummond, D.C. (1992). Problems and dependence: chalk and cheese or bread and butter? In M. Lader, G. Edwards & D.C. Drummond (Eds), *The nature of alcohol and drug related problems* (pp. 61-82). New York: Oxford University Press.

Drummond, D.C. (1997). Alcohol interventions: Do the best things come in small packages? *Addiction, 92 (4),* 375-379.

Duff, C. (2003). Drugs and youth cultures: Is Australia experiencing the 'normalization' of adolescent drug use? *Journal of Youth Studies, 6, (4),* 433-446.

Durie, M. (2001). *Mauri Ora: The dynamics of Māori health.* Auckland, NZ: Oxford University Press.

Dyall, L. (1997). Māori. In P.M.Ellis & S.C.D.Collings (Eds.), *Mental health in New Zealand from a Public Health perspective.* Public Health Report No. 3. Wellington: Ministry of Health.

Earlywine, M. (2002). *Understanding marijuana: A new look at the scientific evidence.* New York: Oxford University Press.

Edwards, G. (1992). Problems and dependence: the history of two dimensions. In M. Lader, G. Edwards & D.C. Drummond (Eds.), *The nature of alcohol and drug related problems* (pp. 1-13). New York: Oxford University Press.

Edwards, G., Arif, A., & Hodgson, R. (1981). Nomenclature and classification of drug- and alcohol-related problems: a WHO Memorandum. *Bulletin of the World Health Organization, 59 (2),* 225-242.

Edwards, G., & Gross, M.M. (1976). Alcohol dependence: Provisional description of a clinical syndrome. *British Medical Journal, 1,* 1058-1061.

Eggington, R., & Parker, H. (2002). From one-off triers to regular users: Measuring the regularity of drug taking in a cohort of English adolescents (1996-1999). *Addiction Theory and Research, 10 (1),* 97-114.

Elley, W.B., & Irving, J.C. (1985). The Elley-Irving Socio-Economic Index 1981 Census Revision. *New Zealand Journal of Educational Studies, 20 (2),* 115-128.

Ellickson, P.L., D'Amico, E.J., Collins, R.L., & Klein, D.J. (2005). Marijuana use and later problems: When frequency of recent use explains age of initiation effects (and when it does not). *Substance Use and Misuse, 40,* 343-359.

Embretson, S.E. (1985). *Test design: Developments in psychology and psychometrics.* Orlando, FL: Academic Press.

Epstein, J.F. (2002). *Substance dependence, abuse and treatment: Findings from the 2000 National Household Survey on Drug Abuse.* NHSDA Series A-16, DHHS Publication no. (SMA) 02-3642. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Erdreich, L.S., & Lee, E.T. (1981). Use of Relative Operating Characteristic Analysis in Epidemiology. *American Journal of Epidemiology, 114 (5),* 649-662.

European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). (2002). *Annual report on the state of the drugs problem in the European Union and Norway.* Lisbon: EMCDDA.

References

Ewing, J. (1984). Detecting alcoholism: The CAGE questionnaire. *Journal of the American Medical Association, 252,* 1905-1907.

Fabrigar, L.R., Wegener, D.T., MacCallum, R.C., & Strahan, E.J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4 (3),* 272-299.

Fals-Stewart, W., O'Farrell, T.J., Freitas, T.T., McFarlin, S.K., & Rutigliano, P. (2000). The timeline followback reports of psychoactive substance use by drug-abusing patients: psychometric properties. *Journal of Consulting and Clinical Psychology, 68,* 134-144.

Farrell, M. (1999). Cannabis dependence and withdrawal. *Addiction, 94(9),* 1277-1278.

Feingold, A., & Rounsaville, B. (1995a). Construct validity of the dependence syndrome as measured by DSM-IV for different psychoactive substances. *Addiction, 90,* 1661-1669.

Feingold, A., & Rounsaville, B. (1995b). Construct validity of the abuse-dependence distinction as measured by DSM-IV criteria for different psychoactive substances. *Drug and Alcohol Dependence, 39,* 99-109.

Fergusson, D.M., Boden, J.M., & Horwood, L.J. (2006). Cannabis use and other illicit drug use. Testing the cannabis gateway hypothesis. *Addiction, 101,* 470-476.

Fergusson, D.M., & Horwood, L.J. (2001). Cannabis use and traffic accidents in a birth cohort of young adults. *Accident Analysis and Prevention, 33,* 703-711.

Fergusson, D.M., & Horwood, L.J. (2000a). Does cannabis use encourage other forms of illicit drug use? *Addiction, 95 (4),* 505-520.

Fergusson, D.M., & Horwood, L.J. (2000b). Cannabis use and dependence in a New Zealand birth cohort. *New Zealand Medical Journal, 113,* 156-158.

Fergusson, D.M., & Horwood, L.J. (1997). Early onset cannabis use and psychosocial adjustment in young adults. *Addiction, 92 (3),* 279-296.

Fergusson, D. M., Horwood, L.J., & Beautrais, A.L. (2003). Cannabis and educational achievement. *Addiction, 98,* 1681-1692.

Fergusson, D.M., Horwood, L.J., Lynskey, M.T., & Madden, M.T. (2003). Early reactions to cannabis predict later dependence. *Archives of General Psychiatry, 60,* 1033-1039.

Fergusson, D.M., Horwood, L.J., & Swain-Campbell, N.R. (2003). Cannabis dependence and psychotic symptoms in young people. *Psychological Medicine, 33,* 15-21.

Fergusson, D.M., Horwood, L.J., Northstone, K., & the ALSPAC Study Team. (2002). Maternal use of cannabis and pregnancy outcome. *BJOG: an International Journal of Obstetrics and Gynaecology, 109,* 21-27.

Fergusson, D.M., Horwood, L.J., & Swain-Campbell, N. R. (2002). Cannabis use and psychosocial adjustment in adolescence and young adulthood. *Addiction, 97,* 1123-1135.

Fergusson, D.M., Lynskey, M., & Horwood, L. (1996). The short term consequences of early onset cannabis use. *Journal of Abnormal Child Psychology, 24 (4),* 499-512.

Field, A., & Casswell, S. (1999a). *Drug use in New Zealand: Comparison surveys, 1990 & 1998.* Alcohol and Public Health Research Unit, University of Auckland.

Field, A., & Casswell, S. (1999b). *Drugs in New Zealand: National survey, 1998.* Alcohol and Public Health Research Unit, University of Auckland.

Field, A., & Casswell, S. (2000). Options for cannabis policy in New Zealand. *Social Policy Journal of New Zealand, 14,* 49-64.

Field, A., & Casswell, S. (2001). Marijuana use in New Zealand, 1990 and 1998. *New Zealand Medical Journal, 114,* 355-358.

Field, T., Diego, M., & Sanders, C. (2001). Adolescent suicidal ideation. *Adolescence, 36 (142),* 241-248.

Finch, E., & Strang, J. (1998). Reliability and validity of self-report: on the importance of considering context. *Drug and Alcohol Dependence, 51 (3),* 269.

Fleiss, J.L. (1991). Statistical methods for rates and proportions. New York: Wiley.

Fleming, M.F. (2002). Screening, assessment, and intervention for substance use disorders in general health care settings. *Substance Abuse, 23 (3 Suppl),* 47-66.

Floyd, F.J., & Widaman, K.F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7 (3),* 286-299.

Foege, W.H. (1997). Challenges to public health leadership. In R. Detels, W. Holland, J. McEwen, & G. S. Omenn (Eds), *Oxford textbook of public health, (*3rd edition). Volume 1, Section IV 'The scope of public health'. Oxford: Oxford University Press.

Fombonne, E. (1991). The use of questionnaires in child psychiatry research measuring their performance and choosing an optimal cut-off. *Journal of Child Psychology and Psychiatry, 32,* 677-694.

References

Fowler, G., & Austoker, J. (1997). Screening. In R. Detels, W.W. Holland, J. McEwen, & G.S. Omenn (Eds.), *Oxford textbook of public health* (3rd edition). Volume 3, Section III, 'public health functions' (pp. 1583-1600). Oxford: Oxford University Press.

Frances, A., First, M.B., & Pincus, H.A. (1995). *DSM-IV Guidebook.* Washington: American Psychiatric Press.

French, M.T., Roebuck, M.C., Dennis, L.L., Godley, S.H., Liddle, H.A., & Tims, F.M. (2003). Outpatient marijuana treatment for adolescents: Economic evaluation of a multisite field experiment. *Evaluation Review, 27 (4),* 421-459.

Fried, P.A. (2002). The consequences of marijuana use during pregnancy: A review of the human literature. *Journal of Cannabis Therapeutics, 2,* 85-104.

Fulkerson, J.A., Harrison, P.A., & Beebe, T.J. (1999). DSM-IV substance abuse and dependence: are there really two dimensions of substance use disorders in adolescents? *Addiction, 94 (4),* 495-506.

Galif, E., Newcomb, M., & Carmona, J. (2001). Prospective relationship between drug problems and work adjustment in a community sample. *Journal of Applied Psychology, 86 (2),* 337-350.

Gavin, F.H., Ross, H.E., & Skinner, H.A. (1989). Diagnostic validity of the drug abuse screening test in the assessment of DSM-III drug disorders. *British Journal of Addiction, 84,* 301-307.

Gerada. C. (2000). Drug misuse and primary care in the new NHS. *Drugs: Education, Prevention and Policy, 7 (3),* 213-221.

Gerada, C. (2003). Cannabis and the general practitioner – 'going to pot'. *British Journal of General Practice, 53,* 598-599.

Gignac, M., Wilens, T.E., Biederman, J., Kwon, A., Mick, E., & Swezey, A. (2005). Assessing cannabis use in adolescents and young adults: What do urine screens and parental report tell you? *Journal of Child and Adolescent Pharmacology, 15, (5),* 742-750.

Gilvarry, E. (2000). Substance abuse in young people. *Journal of Child Psychology and Psychiatry, 41,* 55-80.

Goldberg, D. (2000). Plato versus Aristotle: categorical and dimensional models for common mental disorders. *Comprehensive Psychiatry, 41 (2, Suppl 1),* 8S-13S.

Gorman, D.M., & Derzon, J.H. (2002). Behavioral traits and marijuana use and abuse: A meta-analysis of longitudinal studies. *Addictive Behaviors, 27,* 193-206.

Gorsuch, R.L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

References

Gorsuch, R.L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment, 68 (3),* 532-560.

Gossop, M., Darke, S., Griffiths, P., Hando, J., Powis, B., Hall, W., & Strang, J. (1995). The Severity of Dependence Scale (SDS): Psychometric properties of the SDS in English and Australian samples of heroin, cocaine and amphetamine users. *Addiction, 90,* 607-614.

Gossop, M., Best, D., Marsden, J., & Strang, J. (1997). Test-retest reliability of the Severity of Dependence Scale. *Addiction, 92 (3),* 353-354.

Gossop, M., Marsden, J., & Stewart, D. (2002). Dual dependence: assessment of dependence upon alcohol and illicit drugs, and the relationship of alcohol dependence among drug misusers to patterns of drinking, illicit drug use and health problems. *Addiction, 97,* 169-178.

Grant, B.F., & Dawson, D.A. (1998). Age of onset of drug use and its association with DSM-IV drug abuse and dependence: results from the National Longitudinal Epidemiologic Survey. *Journal of Substance Abuse, 10,* 163-173.

Grant, B.F., & Pickering, R. (1999). The relationship between cannabis use and DSM-IV cannabis abuse and dependence: results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse, 10 (3),* 255-264.

Greenblatt, J. C. (2002). Treatment need for adolescents age 12-17 reporting criminal behaviour in the past year by frequency of marijuana use. *Adolescent self-reported behaviors and their association with marijuana use.* USA: SAMHSA

Griffiths, P., Gossop, M., Powis, B., & Strang, J. (1993). Reaching hidden populations of drug users by privileged access interviewers: methodological and practical issues. *Addiction, 88,* 1617-1626.

Grimm L.G., & Yarnold, P.R. (Eds). (1995). *Reading and understanding multivariate statistics.* Washington, DC: American Psychological Association.

Grossberg, P.M., Brown, D.D., & Fleming, M.F. (2004). Brief physician advice for high-risk drinking among young adults. *Annals of Family Medicine, 2,* 474-480.

Gruenewald, P.J., & Klitzner, M. (1990). Results of preliminary POSIT analyses. Pacific Institute for Research and Evaluation, Inc. Unpublished report to the National Institute on Drug Abuse.

Guadagnoli, E., & Velicer, W.F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin, 103,* 265-705.

Guilford, J.P. (1954). *Psychometric methods.* New York: McGraw-Hill.

Guttman, L. (1954). Some necessary conditions for common-factor analysis. *Psychometrika, 19,* 149-161.

References

Hair, J.F., Anderson, R. E., Tatham, R.L., & Black, W.C. (1995). *Multivariate data analysis with readings* (4th ed.). Englewood Cliffs, NJ: Prentice Hall.

Hall, W. (1995a). The public health implications of cannabis use. *Australian Journal of Public Health, 19,* 235-242.

Hall, W. (1995b). What advice should family physicians give their patients about the health effects of cannabis? *Australian Family Physician, 24,* 1237-1240.

Hall, W. (1999). Assessing the health and psychological effects of cannabis use. In: H. Kalant, W. Corrigall, W. Hall & R. Smart (Eds.). *The health effects of cannabis* (pp. 3-17). Toronto, Canada: Centre for Addiction and Mental Health.

Hall, W., & Babor, T.F. (2000). Cannabis use and public health: assessing the burden. *Addiction, 95,* 485-490.

Hall, W., Degenhardt, L., & Lynskey, M. (2001). *The health and psychological effects of cannabis use.* National Drug and Alcohol Research Centre Monograph Series No. 44 (2nd ed.). Sydney: NDARC, University of New South Wales.

Hall, W., Johnston, L., & Donnelly, N. (1999). The epidemiology of cannabis use and its consequences. In: H. Kalant, W. Corrigall, W. Hall & R. Smart (Eds.). *The health effects of cannabis* (pp. 71-125). Toronto, Canada: Centre for Addiction and Mental Health.

Hall, W., & Lynskey, M. (2005). Is cannabis a gateway drug: Testing hypotheses about the relationship between cannabis use and use of other illicit drugs. *Addiction 100 (10),* 1518-1525.

Hall, W., & Solowij, N. (1998). The adverse effects of cannabis use. *The Lancet, 352,* 1611-1616.

Hall, W., & Swift, W. (2000). The THC content of cannabis in Australia: evidence and implications. *Australian and New Zealand Journal of Public Health, 24 (5),* 503-508.

Hall, W., & Swift, W. (2006). Policy implications of cannabis dependence. In: R. A. Roffman & R.S. Stephens (Eds.), *Cannabis dependence: Its nature, consequences and treatment.* International Research Monographs in the Addictions. London: Cambridge University Press.

Hall, W. & Teesson, M. (2000). Alcohol-use disorders: who should be treated and how? In G. Andrews & S. Henderson (Eds.), *Unmet need in psychiatry: problems, resources, responses* (pp. 290-301). Cambridge: Cambridge University Press.

Hammer, T., & Vaglum, P. (1990). Initiation, continuation or discontinuation of cannabis use in the general population. *British Journal of Addiction, 85,* 899-909.

References

Hanley, J., & McNeil, B.J. (1982). The meaning and use of the area under a Receiver Operating Characteristic (ROC) curve. *Diagnostic Radiology, 143,* 29-36.

Hanley, J., & McNeil, B.J. (1983). A method of comparing the areas under the Receiver Operating Characteristic curves derived from the same cases. *Radiology, 148,* 839-843.

Hannifin, J. (1990). *The cannabis abuse syndrome screening test: a brief report.* Unpublished report. Wellington: Drugs Advisory Committee.

Harrison, P.A., Fulkerson, J.A., & Beebe, T.J. (1998). DSM-IV substance use disorder criteria for adolescents: A critical examination based on a statewide school survey. *American Journal of Psychiatry, 155 (4),* 486-492.

Hasin, D., & Paykin, A. (1998). Dependence symptoms but no diagnosis: 'diagnostic orphans' in a community sample. *Drug and Alcohol Dependence, 50,* 19-26.

Hasin, D., & Paykin, A. (1999). Dependence symptoms but no diagnosis: 'diagnostic orphans' in a 1992 national sample. *Drug and Alcohol Dependence, 53,* 215-222.

Hayden, C. (1994). Primary age children excluded from school: a multi agency focus for concern. *Children and Society, 8,* 257-273.

Hayden, J.W. (1991). Passive inhalation of marijuana smoke: A critical review. *Journal of Substance Abuse, 3 (1),* 85-90.

Hays, R.D., & Ellickson, P.L. (1996). What is adolescent misuse in the United States according to the experts? *Alcohol and Alcoholism, 31 (3),* 297-303.

Health Committee. (2003). *Inquiry into the public health strategies related to cannabis use and the most appropriate legal status.* Report of the Parliamentary Health Committee to the House of Representatives. Wellington: Author.

Health Research Council. (1998a). *Guidelines for researchers on health research involving Māori.* Auckland: Author.

Health Research Council. (1998b). *Rangahau hauora Māori: Māori health research themes.* Auckland: Author.

Heather, N. (1996). The public health and brief interventions for excessive alcohol consumption: The British experience. *Addictive Behaviors, 21,* 857-868.

Heather, N. (2002). Effectiveness of brief interventions proved beyond reasonable doubt. *Addiction, 97,* 293-294.

Heishman, S.J., Singleton, E.G., & Liguori, A. (2001). Marijuana Craving Questionnaire: development and initial validation of a self-report instrument. *Addiction, 96,* 1023-1034.

References

Henry-Edwards, S., Humeniuk, R., Ali, R., Monteiro, M., & Poznyak, V. (2003). *Brief Intervention for Substance Use: A manual for use in primary care.* (Draft version 1.1 for Field Testing). Geneva: WHO, Department of Mental Health and Substance Dependence.

Heustis, M.A., & Cone, E.J. (1998). Differentiating new marijuana use from residual drug excretion in occasional marijuana users. *Journal of Analytical Toxicology, 22,* 445-454.

Holland, W.W. (1997). Public health – its critical requirements. In R. Detels, W.W. Holland, J. McEwen & G.S. Omenn (Eds.), *Oxford textbook of public health* (3rd edition). Volume 3, Section III 'public health functions' (pp. 1645-1651). Oxford: Oxford University Press.

Hollister, Leo..E. (1986). Health aspects of cannabis. *Pharmacological Reviews, 38 (1),* 1-20.

Hollister, L.E. (1998). Health aspects of cannabis: revisited. *International Journal of Neuropsychopharmacolgy, 1 (1),* 71-80.

Hollister, L.E. (2001). Marijuana (cannabis) as medicine. *Journal of Cannabis Therapy, 1 (1),* 29-42.

Home Office Research Study 261. (2003). Substance use by young offenders: the impact of normalisation of drug use in the early years of the 21st century. UK: Home Office Research Development and Statistics Directorate.

Hsiao, J.K., Bartko, J.J., & Potter, W.Z. (1989). Diagnosing diagnoses: Receiver Operating Characteristic methods and psychiatry. *Archives of General Psychiatry, 46,* 664-667.

Hunter, J.E., & Schmidt, F.L. (1990). Dichotomization of continuous variables: The implications for meta-analysis. *Journal of Applied Psychology, 75,* 334-349.

Institute of Medicine. (1990a). *Broadening the base of treatment for alcohol problems.* Washington, DC: National Academy Press.

Institute of Medicine. (1990b). *Treating drug problems,* Volume 1. Washington, DC: National Academy Press.

Institute of Medicine. (1996). *Pathways of addiction: Opportunities in drug abuse research.* Committee on Opportunities in Drug Abuse Research. Washington, DC: National Academy Press.

Institute of Medicine. (1999). *Marijuana and medicine: Assessing the science base.* Washington, DC: National Academy Press.

Jaffe, S.L., & Compton, M.T. (1997). Marijuana update for child and adolescent psychiatrists. *AACAP News, 28,* 7-9.

References

James, W.H., & Moore, D.D. (1999). Examining the relationship between gender and drug-using behaviors in adolescents: the use of diagnostic assessments and biochemical analyses of urine samples. *Journal of Drug Education, 29 (3),* 235-249.

Jensen, P. S. (1995). Scales versus categories? Never play against a stacked deck. *Journal of the American Academy of Child and Adolescent Psychiatry, 34 (4),* 485-487.

Johns, A. (2001). Psychiatric effects of cannabis. *British Journal of Psychiatry, 178,* 116-122.

Johnston, L.D., O'Malley, P., & Bachman, J. (2002). *Monitoring the Future: National survey results on adolescent drug use.* Bethesda, MD: U.S. Department of Health and Human Services.

Joy, J.E., Watson, S.J., & Benson, J.A. (Eds.). (1999). *Marijuana and medicine: assessing the science base.* Washington, DC: National Academy Press.

Kaiser, H.F. (1974). An index of factorial simplicity. *Psychometrika, 39,* 32-36.

Kalant, H., Corrigal, W., Hall, W., & Smart, R. (Eds.) (1999). *The health effects of cannabis.* Toronto, Canada: Centre for Addiction and Mental Health.

Kaminer, Y. (1994). *Adolescent substance abuse: a comprehensive guide to theory and practice.* New York: Plenum Medical Book Company.

Kamon, J., Budney, A., & Stanger, C. (2005). A contingency management intervention for adolescent marijuana abuse and conduct problems. *Journal of the American Academy of Child and Adolescent Psychiatry, 44,* 513–521.

Kandel, D.B. (Ed). (2002). *Stages and pathways of drug involvement: Examining the gateway hypothesis.* New York: Cambridge University Press.

Kandel, D.B. (2003). Does marijuana use cause the use of other drugs? *JAMA, 289,* 482-483.

Kandel, D.B., & Chen, K. (2000). Types of marijuana users by longitudinal course. *Journal of Studies on Alcohol, 61,* 637-678.

Kandel, D., Chen, K., Warner, L.A., Kessler, R.C., & Grant, B. (1997). Prevalence and demographic correlates of symptoms of last year dependence on alcohol, nicotine, marijuana and cocaine in the U.S. population. *Drug and Alcohol Dependence, 44,* 11-29.

Kandel, D.B., Yamaguchi, K., & Chen, C. (1992). Stages of progression in drug involvement from adolescence to adulthood: further evidence for the Gateway theory. *Journal of Studies on Alcohol, 53,* 447-457.

References

Kaplan, H.B., & Johnson, R. (1992). Relationships between circumstances surrounding initial drug use and escalation of drug use: moderating effects of gender and early adolescent experiences. In M. Glantz and R.W. Pickens (Eds.), *Vulnerability to drug abuse* (pp. 299-358). Washington, DC: American Psychological Association.

Kaplan, H.B., Johnson, R.J., & Bailey, C.A. (1988). Explaining adolescent drug use: An elaboration strategy for structural equations modeling. *Psychiatry, 51,* 142-163.

Kapur, B.M. (1993). Drug-testing methods and interpretation of test results. *Bulletin of Narcotics, 45,* 115-154.

Kaye, S., & Darke, S. (2002). Determining a diagnostic cut-off on the Severity of Dependence Scale (SDS) for cocaine dependence. *Addiction, 97,* 727-731.

Keen, J. (1999). Managing drug misuse in general practice. *British Medical Journal, 318,* 1503-1504.

Keleher, H. (2002). *Why primary health care offers a more comprehensive approach for tackling health inequities than primary care.* Melbourne: National Public Health Partnership.

Kendell, R.E. (1975). *The role of diagnosis in psychiatry.* Oxford, UK: Blackwell Scientific Publications.

Kendler, K.S., & Prescott, C.A. (1998). Cannabis use, abuse, and dependence in a population-based sample of female twins. *American Journal of Psychiatry, 155 (8),* 1016-1022.

Kessler, R.C., Andrews, G., Mroczek, D., Ustun, B., & Wittchen, H-U. (1998). The World Health Organization Composite International Interview Short-Form (CIDI-SF). *International Journal of Methods in Psychiatric Research, 7,* 172-185.

Kim, J-O., & Mueller, C.W. (1978). *Factor analysis: Statistical methods and practical issues.* Beverly Hills, CA: Sage.

Kingery, P.M., Alford, A.A., & Coggeshall, M.B. (1999). Marijuana use among youth. Epidemiologic evidence from the US and other nations. *School Psychology International, 20,* 9-21.

Kirisci, L., Mezzich, A., & Tarter, R. (1995). Norms and sensitivity of the adolescent version of the Drug Use Screening Inventory. *Addictive Behaviors, 20 (2),* 149-157.

Kline, P. (1986). *A handbook of test construction: Introduction to psychometric design.* New York: Methuen.

Kline, P. (1994). *An easy guide to factor analysis.* New York: Routledge.

Kline, P. (1998). *The new psychometrics: Science, psychology and measurement.* London: Routledge.

Kline, P. (2000). *The handbook of psychological testing* (2nd ed.). London: Routledge.

Klitzner, M., Schwartz, R.H., Gruenewald, P., & Blasinsky, M. (1987). Screening for risk factors for adolescent alcohol and drug use. *American Journal of Diseases of Childhood, 141,* 45-59.

Knight, J.R., Goodman, E., Puleritz, T., & DuRant, R.H. (2000). Reliabilities of short substance abuse screening tests among adolescents medical patients. *Pediatrics, 105 (4),* 948-953.

Knight, J.R., Sherritt, L., Shrier, L.A., Harris, SA.K., & Chang, G. (2002). Validity of the CRAFFT Substance Abuse Screening Test among adolescent clinic patients. *Archives of Pediatric and Adolescent Medicine, 156,* 607-614.

Knight, J.R., Shrier, L.A., & Bravender, T.D. (1999). A new brief screen for adolescent substance abuse. *Archives of Pediatric and Adolescent Medicine, 153 (6),* 591-596.

Kosterman, R., Hawkins, D., Guo, J., Catalano, R.F., & Abbott, R.D. (2000). The dynamics of alcohol and marijuana initiation: patterns and predictors of first use in adolescence. *American Journal of Public Health, 90 (3),* 360-366.

Kraemer, H.C. (1988). Assessment of 2x2 associations: Generalization of signal-detection methodology. *American Statistician, 42,* 37-49.

Kraemer, H.C. (1992). *Evaluating medical tests.* Newbury Park, CA: Sage Publications.

Kreitman, N. (1986). Alcohol consumption and the preventive paradox. *British Journal of Addiction, 81,* 353-363.

Kutchins, H., & Kirk, S.A. (1997*). DSM- the psychiatric bible and the creation of mental disorders.* New York: The Free Press.

Lader, M., Edwards, G., & Drummond, D.C. (1992). The demands which the problems perspective sets for research. In M. Lader, G. Edwards & D.C. Drummond (Eds), *The nature of alcohol and drug related problems* (pp. 189-197). New York: Oxford University Press.

Lafolie, P., Beck, O., Blennow, G., Boreus, L., Borg, S., Elwin, C.E., Karlsson, L., Odelius, G., & Hjemdahl, P. (1991). Importance of creatinine analyses of urine when screening for abused drugs. *Clinical Chemistry, 37 (11),* 1927-1931.

Last, J.M. (1987). *Public health and human ecology.* USA: Appleton and Lange.

References

Last, J.M. (1992). Ethics and public health policy. In J.M. Last & R.B. Wallace (Eds.), *Maxcy-Rosenau-Last public health and preventive medicine* (13th edition, pp. 1187-1196). Norwalk, CT: Appleton & Lange.

Law, M. (2004). Screening without evidence of efficacy. *British Medical Journal, 328,* 301-302.

Lawrinson, P., Copeland, J., Gates, P., & Gilmour, S. (in press). Determining a cut-off score for alcohol dependence using the Severity of Dependence Scale: an ROC analysis. *Addictive Behaviors.*

Leccese, M., & Waldron, H.B. (1994). Assessing adolescent substance use: A critique of current measurement instruments. *Journal of Substance Abuse Treatment, 11 (6),* 553-563.

Lemperiere, T. (1995). The importance of classifications in psychiatry. *Encephale, 5,* 3-7.

Lessler, J.T. (1995). Choosing questions that people can understand and answer. *Medical Care, 33 (4), Suppl.,* 203-208.

Lessler, J.T., & O'Reilly, J.M. (1997). Mode of interview and reporting of sensitive issues: design and implementation of audio computer-assisted self-interviewing. *NIDA Research Monograph No. 67,* pp. 366-382.

Levy, S., Sherritt, L., Harris, S.K., Gates, E.C., Holder, D.W., Kulig, J.W., & Knight, J.R. (2004). Test-retest reliability of adolescents' self-report of substance use. *Alcoholism: Clinical and Experimental Research, 28 (8),* 1236-1241.

Likert R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 140,* 44-53.

Loevinger, J. (1954). The attenuation paradox in test theory. *Psychological Bulletin, 51,* 493-504.

Loevinger, J. (1957). Objective tests as instruments of psychological theory. *Psychological Reports, 3,* 635-694.

Lucas, J.W. (2003). Theory-testing, generalization, and the problem of external validity. *Sociological Theory, 21 (3),* 236-253.

Lundqvist, T. (1995). Specific thought patterns in chronic cannabis smokers observed during in treatment. *Life Sciences, 56 (23/24),* 2141-2144.

Lux, J., King, L., Lux, D., & Makowharemahihi, J. (1993). *Maumau hinengaro: Māori cannabis use and research implications for the 1990's. A psychosociological approach.* Paper presented at the Cannabis and Health in New Zealand Conference, 4-6 October, Wellington.

Lynskey, M.T., Fergusson, D.M., & Horwood, L.J. (1998). The origins of the correlations between tobacco, alcohol, and cannabis use during adolescence. *Journal of Child Psychology and Psychiatry, 39 (7),* 995-1005.

Lynskey, M., & Hall, W. (2000). The effects of adolescent cannabis use on educational attainment: a review. *Addiction, 95 (11),* 1621-1630.

Lyons, M.J., Toomey, R., Meyer, J.M., Green, A.J., Eisen, S.A., Goldberg, J., True, W.R., & Tsuang, M.T. (1997). How do genes influence marijuana use? The role of subjective effects. *Addiction, 92,* 409-417.

MacCallum, R.C., Widaman, K.F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4,* 84-99.

MacCoun, R., & Reuter, P. (2001). Evaluating alternative cannabis regimes. *British Journal of Psychiatry, 178,* 123-128.

Mack, A., & Joy, J. (2000). *Marijuana as medicine: The science beyond the controversy.* Washington, DC: Institute of Medicine, National Academy Press.

Maddux, J.F., & Desmond, D.P. (2000). Addiction or dependence? *Addiction, 95 (5),* 661-665.

Maisto, S.A., McKay, J.R., & Connors, G.J. (1990). Self-report issues in substance abuse: State of the art and future directions. *Behavioral Assessment, 12,* 117-134.

Makkai, T. (2001). Patterns of recent drug use among a sample of Australian detainees. *Addiction, 96,* 1799-1808.

Maly, R.C. (1993). Early recognition of chemical dependence. *Primary Care, 20 (1),* 33-50.

Marteau, T.M. (1989). Psychological costs of screening. *British Medical Journal, 299,* p. 527.

Marteau, T.M. (1990). Screening in practice: Reducing the psychological costs. *British Medical Journal, 301,* 26-28.

Martin, C.S., Kaczynski, N.A., Maisto, S.A. & Buckstein, O.M., & Moss, H. (1995). Patterns of DSM-IV alcohol abuse and dependence symptoms in adolescent drinkers. *Journal of Studies on Alcohol, 56,* 672-680.

Martin, G., Copeland, J., Gates, P., & Gilmour, S. (2006). The Severity of Dependence Scale (SDS) in an adolescent population of cannabis users: reliability, validity and diagnostic cut-off. *Drug and Alcohol Dependence 83,* 90-93.

Martin, G., Copeland, J., Gilmour, S., Gates, P., & Swift, W. (2006). The Adolescent Cannabis Problems Questionnaire (CPQ-A): Psychometric properties. *Addictive Behaviors, 31,* 2238-2248.

References

Martin, G., Copeland, J., & Swift, W. (2005). The Adolescent Cannabis Check-up: Feasibility of a brief intervention for young cannabis users. *Journal of Substance Abuse Treatment, 29,* 207-213.

Martin, G.W., Wilkinson, D.A., & Kapur, B.M. (1988). Validation of self-reported cannabis use by urine analysis. *Addictive Behaviors, 13,* 147-150.

Martino, S., Grilo, C.M., & Fehon, D.CV. (2000). Development of the Drug Abuse Screening Test for adolescents (DAST-A). *Addictive Behaviors, 25,* 57-70.

Maruish, M.E. (2000). *Handbook of psychological assessment in primary care settings.* Mahwah, NJ: Lawrence Erlbaum Associates.

McArdle, P. (2004). Substance abuse by children and young people: A contemporary disease. *Archives of Disease in Childhood, 89 (8),* 701-704.

McAvoy, B., Kaner, E., Lock, C., Heather, N., & Gilvarry, E. (1999). Our Healthier Nation: are general practitioners willing and able to deliver? A survey of attitudes and involvement in health promotion and lifestyle counselling. *British Journal of General Practice, 49,* 187-190.

McCambridge, J., & Strang, J. (2004). The efficacy of single-session motivational interviewing in reducing drug consumption and perceptions of drug-related risk and harm among young people. *Addiction, 99,* 39-52.

McCambridge, J., Strang, J., Platts, S., & Witton, J. (2003). Cannabis use and the GP: brief motivational intervention increases clinical enquiry in a pilot study. *British Journal of General Practice, 53,* 637-639.

McCormick, R., Adams, P., Powell, A., Bunbury, D., Paton-Simpson, G., & McAvoy, B. (1999). Encouraging general practitioners to take up screening and early intervention for problem use of alcohol: a marketing trial. *Drug and Alcohol Review, 18,* 175-181.

McDowell, I., & Newell, C. (1987). *Measuring health: a guide to rating scales and questionnaires.* New York: Oxford University Press.

McGee, R., Williams, S., Poulton, R., & Moffitt, T. (2000). A longitudinal study of cannabis and mental health from adolescence to early adulthood. *Addiction, 95 (4),* 491-503.

McKenzie, D.P., Clarke, D.M., & Low, L.H. (1992). A method of constructing parsimonious diagnostic and screening tests. *International Journal of Methods in Psychiatric Research, 2,* 71-79.

McLellan, T., & Dembo, R. (1993). *Screening and assessment of alcohol and other drug-abusing adolescents.* Rockville: Center for Substance Abuse Treatment.

References

McPherson, T.L., & Hersch, R.K. (2000). Brief substance use screening instruments for primary care settings: A review. *Journal of Substance Abuse Treatment, 18,* 193-202.

Meehl, P. E., & Rosen, A. (1955). Antecedent probability and the efficiency of psychometric signs, patterns or cutting scores. *American Psychologist, 50,* 741-759.

Mental Health Council of Australia. (2006). *Where there's smoke…Cannabis and mental health.* Report of the Mental Health Council of Australia Working Group. Mental Health Council of Australia.

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50,* 741-749.

Metz, C.E. (1978). Basic principles of ROC analysis. *Seminars in Nuclear Medicine, 8,* 283-298.

Midanik, L.T. (1988). Validity of self-reported alcohol use: a literature review and assessment. *British Journal of Addiction, 83, 1019-1029.*

Mieczkowski, T., Newel, R., & Wraight, B. (1998). Using hair analysis, urinalysis, and self-reports to estimate drug use in a sample of detained juveniles. *Substance Use and Misuse, 33 (7),* 1547-1567.

Mikulich, S.K., Hall, S.K., Whitmore, E.A., & Crowley, T.J. (2001). Concordance between DSM-III-R and DSM-IV diagnoses of substance use disorders in adolescents. *Drug and Alcohol Dependence, 61 (3),* 237-248.

Miller, P., & Plant, M. (2002). Heavy cannabis use among UK teenagers: an exploration. *Drug and Alcohol Dependence, 65,* 235-242.

Ministry of Health. (1998). *National Drug Policy 1998-2003.* Wellington: Author.

Ministry of Health. (1999). *Taking the pulse: the* 1996/*1997 New Zealand health survey.* Wellington: Author.

Ministry of Health. (2002a). *Nurse practitioners in New Zealand.* Wellington: Author.

Ministry of Health. (2002b). *New Zealand youth health status report.* Wellington: Author.

Ministry of Health. (2002c). *Youth health: A guide to action.* Wellington: Author.

Ministry of Health. (2004). *A portrait of health: Key results of the 2002/03 New Zealand Health Survey.* Wellington: Author.

Ministry of Health. (2005a). *Te Tahuhu – Improving mental health 2005-2015: The second New Zealand mental health and addiction plan.* Wellington: Author.

References

Ministry of Health. (2005b). *Cervical screening in New Zeland: a brief statistical review of the first decade.* Wellington: National Screening Unit, MOH.

Miron, J. (2005). *The budgetary implications of marijuana prohibition.* Cambridge, MA: Harvard University.

Moberg, D.P., & Hahn, L. (1991). The adolescent drug involvement scale. *Journal of Adolescent Chemical Dependency, 21 (1),* 75-88.

Monshouwer, K., Smit, F., de Graaf, R., van Os, J., & Vollebergh, W. (2005). First cannabis use: Does onset shift to younger ages? Findings from 1988 to 2003 from the Dutch National School Survey on Substance Use. *Addiction.* 100, 963–970.

Monti, P.M., Colby, S.M., & O'Leary, T.A. (Eds.). (2001). *Adolescents, alcohol, and substance abuse: Reaching teens through brief interventions* (pp. 219-231). New York: The Guilford Press.

Moore, B., & Budney, A. (2003). Relapse in outpatient treatment for marijuana dependence. *Journal of Substance Abuse Treatment, 25,* 85-89.

Morera, O. F., Johnson, T.P., Freels, S., Parsons, J., Crittenden, K. S., Flay, B. R., & Warnecke, R. B. (1998). The measure of stage of readiness to change: some psychometric considerations. *Psychological Assessment, 10 (2),* 182-186.

Morgan, J., & Zimmer, L. (2002). Marijuana is not a gateway drug. In L. Gerdes (Ed.), *Marijuana: Contemporary issues* (pp. 30-33). San Diego, CA: Greenhaven Press Inc.

Morral, A.R., McCaffrey, D., & Iguchi, M.Y. (2000). Hardcore drug users claim to be occasional users: drug use frequency under-reporting. *Drug and Alcohol Dependence, 57,* 193-202.

Morral, A.R., McCaffrey, D., & Paddock, S. (2002). Reassessing the marijuana gateway effect. *Addiction, 97,* 1493-1504.

Morrison, A.S. (1992). *Screening in chronic disease, 2nd edition.* New York: Oxford University Press.

Mossman, D., & Somosa, E. (1989). Maximizing diagnostic information from the dexamethasone suppression test. *Archives of General Psychiatry, 46,* 653-660.

Mulaik, S.A. (1990). Blurring the distinction between component analysis and common factor analysis. *Multivariate Behavioral Research, 25,* 53-59.

Mura, P., Klintz, P., Papet, Y., Ruesch, G., & Piriou, A. (1999). Evaluation of six rapid tests for screening of cannabis in sweat, saliva and tears. *Acta Clinica Belgica, 1,* 35-38.

References

Murphy, J.M., Berwick, D.M., Weinstein, M.C., Borus, J.F., Budman, S.H., & Klerman, G.L. (1987). Performance of screening and diagnostic tests: Application of receiver operating characteristic analysis. *Archives of General Psychiatry, 44,* 550-555.

Murphy L., & Impara, J.C. (Eds.). (1996). *Assessment of substance abuse.* A Buros Desk Reference. Lincoln, Nebraska: The Buros Institute of Mental Measurements.

Nathan, P. E. (1991). Substance use disorders in the DSM-IV. *Journal of Abnormal Psychology, 100,* 356-361.

Nathan, P. E. (1996). Assessing substance abusers. In L.Murphy & J.C.Impara, (Eds.), *Assessment of substance abuse.* A Buros Desk Reference (p. xvii-xxix). Lincoln, Nebraska: The Buros Institute of Mental Measurements.

National Drug Intelligence Bureau. (2005). *New Zealand Illicit Drug Report.* Wellington: Author.

National Health Committee. (1999). *Guiidelines for recognizing, assessing, and treating alcohol and cannabis abuse in primary care.* Wellington: Ministry of Health.

National Health Committee. (2003). *Screening to improve health in New Zealand*. Wellington: Author.

Nelson, C.B., Little, R.J., Heath, A.C., & Kessler, R.C. (1996). Patterns of DSM-III-R alcohol dependence symptom progression in a general population survey. *Psychological Medicine, 26,* 449-460.

Newcomb, M.D. (1992). Understanding the multidimensional nature of drug use and abuse: the role of consumption, risk factors, and protective factors. In M.D. Glantz & R.Pickens (Eds.), *Vulnerability to drug abuse* (pp. 255-297). Washington, DC: American Psychological Association.

Newman, S.C., Shrout, P. E., & Bland, R.C. (1990). The efficiency of two-phase designs in prevalence surveys of mental disorders. *Psychological Medicine, 20,* 183-193.

New Zealand Health Information Service (NZHIS). (2001). *New Zealand drug statistics.* Wellington: Ministry of Health.

New Zealand Police. (2006). *New Zealand Police Annual Reports.* Wellington: New Zealand Police.

Nilssen, O., & Cone, H. (1994). Screening patients for alcohol problems in primary health care settings. *Alcohol Health and Research World, 18 (2),* 136-139.

Norman, R. (2001). Have you got an attitude problem? Caring for illicit drug-using patients. *Contemporary Nurse, 10,* 83-91.

References

Nunnally, J.C. (1978). *Psychometric theory.* New York: McGraw-Hill Inc.

Nunnally J.C, & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill Inc.

Obuchowski, N.A. (1998). Sample size calculations in studies of test accuracy. *Statistical Methods in Medical Research, 7,* 371-392.

Obuchowski, N.A. (2000). Sample size tables for Receiver Operating Characteristic studies. *American Journal of Radiology, 175,* 603-608.

Office of Applied Studies (OAS). (2000a). *National Household Survey on Drug Abuse: Main Findings 1998.* Rockville, MD: US Substance Abuse and Mental Health Services Administration.

Office of Applied Studies (OAS). (2000b). *Mid-Year 2000. Emergency department data from the Drug Abuse Warning Network (DAWN).* DHHS Publication no. (SMA) 01-3502, DAWN series D-17. Rockville, MD: US Substance Abuse and Mental Health Services Administration.

Oppenheim, A.N. (1992). *Questionnaire design, interviewing and attitude measurement* (new edition). London: Pinter Publishers.

Orr, J.M., Sackett, P.R., & Dubois, C.L. (1991). Outlier detection and treatment in I/O Psychology: A survey of researcher beliefs and an empirical illustration. *Personnel Psychology, 44,* 473-486.

Osborne, J.W. (2002). Notes on the use of data transformations. *Practical Assessment, Research and Evaluation, 8 (6),* 1-10.

Parker, H., Aldridge, J., & Measham, F. (1998). *Illegal leisure: The normalization of adolescent drug use.* London: Routledge.

Paton-Simpson, G., McCormick, R., Powell, A., Adams, P., & Bunbury, D. (2000). Problem drinking profiles of patients presenting to general practitioners: analysis of Alcohol Use Disorders Identification Test (AUDIT) scores for the Auckland area. *New Zealand Medical Journal, 113,* 74-77.

Paton-Simpson, G. R., & McKinnon, S. (2000). *Alcohol and drug problems in community clients at Auckland Regional Alcohol and Drug Services: Results of 1,500 screening assessments.* ALAC Occasional Publication No. 11. Clinical Information & Research Unit, Auckland Regional Alcohol & Drug Services.

Patton, G.C., Coffey, C., Carlin, J.B., Degenhardt, L., Lynskey, M., & Hall, W. (2002). Cannabis use and mental health in young people: cohort study. *British Medical Journal, 325,* 1195-1198.

Peckham, C., & Dezateux, C. (Eds.) (1998). Screening. *British Medical Bulletin, 54 (4),* 767-1025.

Pedhazur, E.J. (1997). *Multiple regression in behavioral research.* Orlando, FL: Harcourt Brace.

Pedhazur, E.J., & Schmelkin, L.P. (1991). *Measurement, design and analysis. An integrated approach.* Hillsdale, NJ: Lawrence Erlbaum.

Penrose-Wall, J., Copeland, J., & Harris, M. (2000). *Shared care of illicit drug problems by general practitioners and primary health care providers: A literature review.* Sydney: Centre for General Practice Integration Studies, University of New South Wales.

Perkonigg, A., Lieb, R., Hofler, M., Schuster, P., Sonntag, H., & Wittchen, H-U. (1999). Patterns of cannabis use, abuse and dependence over time: incidence, progression and stability in a sample of 1228 adolescents. *Addiction, 94 (11),* 1663-1678.

Peters, L., & Andrews, G. (1995). A procedural validity study of the computerized version of the Composite International Diagnostic Interview. *Psychological Medicine, 25,* 1269-1280.

Peters, L., Clark, D., & Carroll, F. (1998). Are computerized interviews equivalent to human interviews? CIDI-Auto versus CIDI in anxiety and depressive disorders. *Psychological Medicine, 28,* 893-901.

Pett, M.A., Lackey, N.R., & Sullivan, J.J. (2003). *Making sense of factor analysis. The use of factor analysis for instrument development in health care research.* Thousand Oaks, California: Sage Publications.

Pilkonis, P.A., Heape, C.L., Proietti, J.M., Clark, S.W., McDavid, J.D., & Pitts, T.E. (1995). The reliability and validity of two structured diagnostic interviews for personality disorders. *Archives of General Psychiatry, 52,* 1025-1033.

Plant, M. (1999). Editorial: Patterns and consequences matter. *Addiction Research, 7 (6),* 463-468.

Poikolainen, K. (1999). Effectiveness of brief interventions to reduce alcohol intake in primary health care patients: a meta-analysis. *Preventive Medicine, 28,* 503-509.

Pollock, N.K., & Martin, C.S. (1999). Diagnostic orphans: Adolescents with alcohol symptoms who do not qualify for DSM-IV abuse or dependence diagnoses. *American Journal of Psychiatry, 156,* 897-901.

Popham, W.J. (1978). *Criterion-referenced measurement.* Englewood Cliffs, NJ: Prentice-Hall.

Porter, T.M. (1995). *Trust in numbers: The pursuit of objectivity in science and public life.* Princeton, NJ: Princeton University Press.

Poulsen, H.A., & Sutherland, G.I. (2000). The potency of cannabis in New Zealand from 1976 to 1996. *Scientific Justice, 40,* 171-176.

References

Poulton, R.G., Brooke, M., Moffitt, T.E., Stanton, W.R., & Silva, P.A. (1997). Prevalence and correlates of cannabis use and dependence in young New Zealanders. *New Zealand Medical Journal, 110,* 68-70.

Poulton, R., Moffitt, T.E., Harrington, H., Milne, B.J., & Caspi, A. (2001). Persistence and perceived consequences of cannabis use and dependence among young adults: implications for policy. *New Zealand Medical Journal, 114,* 544-547.

Powis, B., Griffiths, P., Gossop, M., Lloyd, C., & Strang, J. (1998). Drug use and offending behaviour among people excluded from school. *Drugs: education, prevention and policy, 5 (3),* 245-256.

Prochaska, J. O., & Di Clemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51,* 390-395.

Prochaska, J.O. (2004). Population treatment for Addictions. *Current Directions in* Psychological *Science, 13,* 242-246.

Prochaska, J. O., Di Clemente, C.C., & Norcross, J.C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47 (9),* 1102-1114.

Prochaska, J.O., Velicer, W.F., Prochaska, J.M., & Johnson, J. (2004). Size, consistency, and stability of stage effects for smoking cessation. *Addictive Behaviors, 29,* 207-213.

Proudfoot, H., & Teesson, M. (2000). *Investing in drug and alcohol treatment*. Sydney: National Drug and Alcohol Research Centre.

Public Health Group (1996). *Cannabis: the public health issues 1995-1996.* Wellington: Ministry of Health.

Rahdert, E.R. (Ed.) (1991). *The Adolescent Assessment/Referral System Manual.* U.S. Department of Health and Human Services, ADAMHA, National Institute on Drug Abuse DHHS Publication No. (ADM) 91-1735.

Raistrick, D., Bradshaw, J., Tober, G., Weiner, J., Alison, J., & Healey, C. (1994). Development of the Leeds Dependence Questionnaire (LDQ): a questionnaire to measure alcohol and opiate dependence in the context of a treatment evaluation package. *Addiction, 89 (5),* 563-572.

Ramadas, D., & Moyes, C.D (1996). Passive smoking of cannabis. *New Zealand Medical Journal, 109 (1030),* 366.

Reckase, M.D. (1996). Test construction in the 1990s: Recent approaches every psychologist should know. *Psychological Assessment, 8 (4),* 354-359.

Regional Public Health. (2000). *Cannabis and youth : a report on cannabis and youth in Kapiti and the Wairarapa from Regional Public Health Report of a project undertaken by Regional Public Health, Hutt Valley, to the Health Funding Agency.* Wellington: Regional Public Health, Hutt Valley.

Rehm, J., Frick, U., & Bondy, S. (1999). Reliability and validity analysis of an alcohol-related harm scale for surveys. *Journal of Studies on Alcohol, 60,* 203-208.

Rehnstrom, A.L., Briner, R.C., & Frazier, C.L. (1989). Evaluation of EMIT as a qualitative screening test for marijuana use. *Journal of Chemical Education, 66 (4),* 346-348.

Reid, A., Lynskey, M., & Copeland, J. (2000). Cannabis use among Australian adolescents: findings of the 1998 National Drug Strategy Household Survey. *Australian and New Zealand Journal of Public Health, 24 (6),* 596-602.

Reilly, D., Didcott, R. & Swift, W., & Hall, W. (1998). Long-term cannabis use: characteristics of users in an Australian rural area. *Addiction, 93 (6),* 837-846.

Reinert, D.F., & Allen, J.P. (2002). The Alcohol Use Disorders Identification Test (AUDIT): A review of recent research. *Alcoholism: Clinical and Experimental Research, 26 (2),* 272-279.

Rey, J.M., Morris-Yates, A., & Stanislaw. H. (1992). Measuring the accuracy of diagnostic tests using receiver operating characteristics (ROC) analysis. *International Journal of Methods in Psychiatric Research, 2,* 1-11.

Rey, J.M., Plapp, J.M., & Stewart, G.W. (1989). Reliability of psychiatric diagnosis in referred adolescents. *Journal of Child Psychology and Psychiatry, 30,* 879-888.

Rey, J.M., Sawyer, M.G., Raphael, B., Patton, G., & Lynskey, M. (2002). Mental health of teenagers who use cannabis. *British Journal of Psychiatry, 180,* 216-222.

Rigter, H., & van Laar, M. (2002). Epidemiological aspects of cannabis use. In *Cannabis 2002 Report* (pp. 11-36). Technical Report of the International Scientific Conference, a joint international effort at the initiative of the Ministers of Public Health of Belgium, France, Germany, The Netherlands, Switzerland. Belgium: Ministry of Public Health.

Riley, J., Lu, N., & Thylor, B. (2000). Drug screening: a comparison of urinalysis results from two independent laboratories. *Journal of Drug Issues, 30 (1),* 171-186.

Rinaldi, R.C., Steinder, D.M., Wilford, B.B., & Goodwin, D. (1988). Classification and standardization of substance abuse terminology. *JAMA, 259 (4),* 555-557.

Robins, L.N., Cottler, L.B., & Babor, T. (1990). *CIDI Substance Abuse Module revision for DSM-IV field trial.* St Louis, MO: Washington University School of Medicine.

References

Robles, N., Flaherty, D.G., & Day, N. (1994). Retention of resistant subjects in longitudinal studies: Description and procedures. *American Journal of Drug Abuse, 20,* 87-100.

Robson, J. (1998). Screening in general practice and primary care. In C. Peckham & C. Dezateux (Eds.), *British Medical Bulletin, 54 (4),* 961-982.

Robson, P. (2001). Therapeutic aspects of cannabis and cannabinoids. *British Journal of Psychiatry, 178,* 107-115.

Roche, A.M., & Freeman, T. (2003). Brief interventions: Good in theory but weak in practice. Paper presented to the International Research Symposium, *Preventing Substance Use, Risky Use and Harm: What is evidence-based policy?* 24-27 February, Freemantle, Western Australia.

Roche, A.M., Hotham, E.D., & Richmond, R.L. (2002). The general practitioner's role in AOD issues: Overcoming individual, professional and systemic barriers. *Drug and Alcohol Review, 21,* 223-230.

Room, R. (1985). Dependence and society. *British Journal of Addiction, 80,* 133-139.

Room, R. (1995). *Issues in the cross-cultural validity of dependence definitions.* Paper presented at the 37th International Congress on Alcohol and Drug Dependence, August 20-25, San Diego.

Room, R. (1998). Alcohol and drug disorders in the International Classification of Diseases: a shifting kaleidoscope. *Drug and Alcohol Review, 17,* 305-317.

Room. R. (2000). Concepts and items in measuring social harms from drinking. *Journal of Substance Abuse, 12,* 93-111.

Room, R., Janca, A., Bennett, L.A., Schmidt, L., & Sartorius, N. (1996). WHO cross-cultural applicability research on diagnosis and assessment of substance use disorders: an overview of methods and selected results. *Addiction, 91,* 199-220.

Rosenberg, M.F., & Anthony, J.C. (2001). Early clinical manifestations of cannabis dependence in a community sample. *Drug and Alcohol Dependence, 64,* 123-131.

Rubio-Stipec, M., Peters, L., & Andrews, G. (1999). Test-retest reliability of the computerized CIDI (CIDI-Auto): Substance Abuse modules. *Substance Abuse, 20 (4),* 263-272.

Russell, M. (1994). New assessment tools for risk drinking during pregnancy: T-ACE, TWEAK, and others. *Alcohol Health and Research World, 18,* 55-61.

Sackett, D.L., & Holland, W.W. (1975). Controversy in the detection of disease. *Lancet, 2,* 357-359.

Safer, M.A. (1986). A comparison of screening for disease detection and screening for risk factors. *Health Education Research: Theory and Practice, 1*, 131-138.

Sarr, M., Bucholz, K., & Phelps, D. (2000). Using cluster analysis of alcohol use disorders to investigate 'diagnostic orphans': subjects with alcohol dependence symptoms but no diagnosis. *Drug and Alcohol Dependence, 60,* 295-302.

Saunders, J. B. (2002a). Editorial: Celebrating 20 years of the Drug and Alcohol Review. Drug *and Alcohol Review, 21,* 3-6.

Saunders, J. (2002b). The development and validation of the Australasian AUDIT. In J.D. Sellman (Ed.), *New Zealand Treatment Research Monograph, Alcohol, Drugs and Addiction* (pp. 14-15). Research proceedings from the Cutting Edge Conference, September.

Saunders, J.B., & Aasland, O.G. (1987). *The development of a screening instrument. WHO collaborative project on the identification and treatment of persons with harmful alcohol consumption. Report on phase 1.* Geneva: World Health Organization.

Saunders, J.B., Aasland, O.G., Amunsden, A., & Grant, M. (1993). Development of the Alcohol Use Disorders Indentification Test (AUDIT): WHO Collaborative Project *on Early Detection of Persons with Harmful Alcohol Consumption: II. Addiction, 88 (3),* 791-804.

Schaeffer, N.C. (1991). Hardly ever or constantly? Group comparisons using vague quantifiers. *Public Opinion Quarterly, 55,* 395-423.

Schafer, J., & Brown, S. A. (1991). Marijuana and cocaine effect expectancies and drug use patterns. *Journal of Consulting and Clinical Psychology, 59 (4),* 558-565.

Schafer, W.D. (1991). Reporting hierarchical regression results. *Measurement and Evaluation in Counseling and Development, 24 (3),* 98-100.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8 (4),* 350-353.

Schwartz, J.G., Zollars, P.R., Okorodudu, A.O., Carnahan, J.J., Wallace, J.E., & Briggs, J.E. (1991). Accuracy of common drug screen tests. *American Journal of Emergency Medicine, 9 (2),* 166-170.

Schwartz, R.H. (1988). Urine testing in the detection of drugs of abuse. *Archives of Internal Medicine, 148,* 2407-2412.

Schwartz, R.H., & Wirtz, P.W. (1990). Potential substance abuse: Detection among adolescent patients. Using the Drug and Alcohol problem Quick Screen, a 30-item questionnaire. *Clinical Pediatrics, 29,* 38-43.

References

Schwarz, N. (1999). Self report: how the questions shape the answers. *American Psychologist, 54,* 93-105.

Schwenk, C.R. (1998). Marijuana and job performance: comparing the major streams of research. *Journal of Drug Issues, 28 (4),* 941-970.

Scott, C.K. (2004). A replicable model for achieving over 90% follow-up rates in longitudinal studies of substance abusers. *Drug and Alcohol Dependence, 74,* 21-36.

Seligman, M.E.P. (1995). The effectiveness of psychotherapy: The Consumer Reports Study. *American Psychologist, 50 (12),* 965-974.

Sellman, J.D. (1994). Alcoholism: Development of the diagnostic concept. *Australian and New Zealand Journal of Psychiatry, 28,* 205-211.

Sellman, J.D., & Adamson, S. (2002). Rolling Telephone Survey: 2000-2002 Results. In J.D. Sellman (Ed), *New Zealand Treatment Research Monograph, Alcohol, Drugs and Addiction* (pp. 1-2). Research proceedings from the Cutting Edge Conference, 28-30 August, Nelson.

Selzer, M.L. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry, 127 (12),* 1653-1658.

Shadish, W., Cook, T., & Campbell, D. (2002). *Experimental and quasi-experimental designs for generalized causal inference.* Boston: Houghton Mifflin.

Sherman, R.P. (2000). Tests of certain types of ignorable nonresponse in surveys subject to item nonresponse or attrition. *American Journal of Political Science, 44,* 356-368.

Shildrick, T. (2002). Young people, illicit drug use and the question of normalization. *Journal of Youth Studies, 5 (1),* 35-48.

Shillington, A.M., & Clapp, J.D. (2001). Substance use problems reported by college students: combined marijuana and alcohol use versus alcohol-only use. *Substance Use and Misuse, 36 (5),* 663-673.

Shillington, A.M., & Clapp, J.D. (2002). Beer and bongs: Differential problems experienced by older adolescents using alcohol only compared to combined alcohol and marijuana use. *American Journal of Drug and Alcohol Abuse, 28 (2),* 379-397.

Shillington, A.M., Cottler, L.B., Mager, D.E., & Compton, W.M. 3rd. (1995). Self-report stability for substance use over 10 years: data from the St. Louis Epidemiologic Catchment Study. *Drug and Alcohol Dependence, 40,* 103-109.

Shrier, L.A., Harris, S.K., Kurland, M., & Knight, J.R. (2003). Substance use problems and associated psychiatric symptoms among adolescents in primary care. *Pediatrics, 111 (6),* 699-705.

Shrout, P.E., & Fleiss, J.L. (1981). Reliability and case detection. In J.K. Wing, P. Bebbington & L.N. Robins (Eds.), *What is a case? The problem of definition in psychiatric community surveys.* London: Grant-McIntyre.

Silber, T.J. (1987a). Adolescent marijuana use: Screening and ethics. *Adolescence, 22 (85),* 1-6.

Silber, T.J. (1987b). Adolescent marijuana use: The role of the physician. *Adolescence, 22 (86),* 363-370.

Skinner, H.A. (1982). The drug abuse screening test. *Addictive Behaviors, 7,* 363-371.

Skinner, H.A. (1987). Early detection of alcohol and drug problems – why? *Australian Alcohol and Drug Review, 6,* 293-301.

Skinner, H. (1990). Spectrum of drinkers and intervention opportunities. *Canadian Medical Association Journal, 143,* 1054-1059.

Smart, R. G. (1992). The problems perspective: implications for prevention policies. In Lader, M., Edwards, G. & Drummond, D.C. (Eds.), *The nature of alcohol and drug related problems* (pp. 167-177). New York: Oxford University Press.

Smart, R.G. (1994). Dependence and the correlates of change: a review of the literature. In G. Edwards & M. Lader (Eds.), *Addiction: Processes of change* (pp. 79-94). Oxford: Oxford University Press.

Smart, R.G., & Ogborne, R.C. (2000). Drug use and drinking among students in 36 countries. *Addictive Behaviors, 25,* 455-460.

Smiley, A. (1999). Marijuana: on road and driving simulator studies. In: H. Kalant, W. Corrigall, W. Hall & R. Smart (Eds.). *The health effects of cannabis* (pp. 172-194). Toronto, Canada: Centre for Addiction and Mental Health.

Sobell, L.C., Kwan, E., & Sobell, M. B. (1995). Reliability of a Drug History Questionnaire (DHQ). *Addictive Behaviors, 20 (2),* 233-241.

Sobell, L. C., & Sobell, M. B. (1992). Timeline Follow-Back: A technique for assessing self-reported alcohol consumption. In R. Litten and J. Allen (Eds.), *Measuring alcohol consumption; Psychosocial and biochemical methods* (pp. 41-69). Totowa, NJ: Humana Press Inc.

Sobell, L.C., Sobell, M. B., Buchan, G., Cleland, P.A., & Leo, G.I. (1996). *The reliability of the Timeline Followback method applied to drug, cigarette, and cannabis use.* Paper presented at the 30th Annual Meeting of the Association for Advancement of Behavior Therapy, New York, November.

References

Soboleva, N., Kazakova, N., & Chong, J. (2006). *Conviction and sentencing of offenders in New Zealand: 1996 to 2005.* Wellington: Ministry of Justice.

Sokol, R.J., Martier, S.S., & Ager, J.W (1989). The T-ACE questions: Practical prenatal detection of risk-drinking. *American Journal of Obstetrics and Gynecology, 160,* 863-868.

Solowij, N. (1998). *Cannabis and cognitive functioning.* Cambridge, England: Cambridge University Press.

Solowij, N. (1999). Long-term effects of cannabis on the central nervous sysytem. In: H. Kalant, W. Corrigall, W. Hall & R. Smart (Eds.). *The health effects of cannabis* (pp. 195-265). Toronto, Canada: Centre for Addiction and Mental Health.

Solowij, N., & Grenyer, B. (2002). Are the adverse consequences of cannabis use age-dependent? *Addiction, 97,* 1083-1086.

Somoza, E., & Mossman, D. (1990). Optimizing REM latency as a diagnostic test for depression using ROC analysis and information theory. *Biological Psychiatry, 27,* 990-1006.

Somoza, E., & Mossman, D. (1992). Comparing diagnostic tests using information theory: The INFO-ROC technique. *Journal of Neuropsychiatry and Clinical Neurosciences, 4,* 214-219.

Somoza, E., Steer, R.A., Beck, A.T., & Clark, D.A. (1994). Differentiating major depression and panic disorders by self-report and clinical rating scales: ROC analysis and information theory. *Behavioral Research and Therapy, 32,* 771-782.

Spitzer, R. (1983). Psychiatric diagnosis: Are clinicians really necessary? *Comprehensive Psychiatry, 24 (5),* 399-411.

Spooner, C. (1999). Causes and correlates of adolescent drug abuse and implications for treatment. *Drug and Alcohol Review, 18,* 453-475.

Spooner, C., & Flaherty, B. (1992). *Comparison of data collection methodologies for the study of young illicit drug users.* Sydney: New South Wales Drug and Alcohol Directorate.

Spooner, C., Mattick, R., & Howard, J. (1996). *The nature and treatment of adolescent substance abuse.* NDARC Monograph No. 26. Sydney: National Drug and Alcohol Research Centre, University of New South Wales.

SPSS, Inc.(2003). *SPSS Base 12.0. User's Guide.* Chicago, Ill: Author.

Statistics New Zealand. (2006). *2006 Census of population and dwellings.* Statistics New Zealand: New Zealand Government Publishing Service.

Staton, M., Leukefeld, C., Logan, T.K., Zimmerman, R., Lynam, D., Milich, R., Martin, C., McClanham, K., & Clayton, R. (1999). Risky sex behavior and substance use among young adults. *Health and Social Work, 24 (2),* 147-154.

Stephens, R. (1999). Cannabis and the hallucinogens. In B. S. McCrady & E. E. Epstein (Eds.), *Addictions: A comprehensive guidebook* (pp. 121-140). New York: Oxford Press.

Stephens, R.S., Babor, T.F., Kadden, R., Miller, M., & The Marijuana Treatment Project Research Group (2002). The Marijuana Treatment Project: rationale, design, and participant characteristics. *Addiction, 97 (Suppl 1),* 109-124.

Stephens, R. S., Curtin, L., Simpson, E., & Roffman, R. (1994). Testing the abstinence violation effect construct with marijuana cessation. *Addictive Behaviors, 19,* 23-32.

Stephens, R.S., Roffman, R., & Curtin, L. (2000). Comparisons of extended versus brief treatments for marijuana use. *Journal of Consulting and Clinical Psychology, 68 (5),* 898-908.

Stephens, R.S., Roffman, R.A., Fearer, S.A., Williams, C., Picciano, J.F., & Burke, R.S. (2004). The Marijuana Check-up: reaching users who are ambivalent about change. *Addiction, 99 (10),* 1323-1332.

Stephens, R.S., Roffman, R.A., & Simpson, E.E. (1993). Adult marijuana users seeking treatment. *Journal of Consulting and Clinical Psychology, 61,* 1100-1104.

Stevens, J.P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Matiwah, NJ: Lawrence Erlbaum.

Stoker, P. (2001). My cow or yours? Evidence for prevention. *Drug Link, 16 (3),* 16-18.

Strang, J., Witton, J., & Hall, W. (2000). Improving the quality of the cannabis debate: defining the different domains. *British Medical Journal, 320,* 108-110.

Streiner, D. (1993). A checklist for evaluating the usefulness of rating scales. *Canadian Journal of Psychiatry, 38,* 140-148.

Streiner, D.L. (1994). Figuring out factors: the use and misuse of factor analysis. *Canadian Journal of Psychiatry, 39,* 135-140.

Streiner, D.L., & Norman, G.R. (Eds.) (1995). *Health measurement scales: a practical guide to their development and use* (2nd ed.). Oxford: Oxford University Press.

Struve, F.A., Straumanis, J.J., Manno, J.E., Fitzgerald, M-J, Patrick, G., & Leavitt, J. (2000). Inadequacies of self-report data for exclusion criteria detection in marihuana research: An empirical case for multi-method direct examination screening. *Journal of Addictive Diseases, 19 (3),* 71-87.

References

Substance Abuse and Mental Health Services Administration. (2006). *The National Survey on Drug Use and Health 2005.* Rockville, MD: US Department of Health and Human Services.

Substance Abuse and Mental Health Services Administration. (2004). *The National Survey on Drug Use and Health 2003.* Rockville, MD: US Department of Health and Human Services.

Sudman, S., & Bradman, N.M. (1982). *Asking questions. A practical guide to questionnaire design.* San Francisco, CA: Jossey-Bass.

Suissa, S. (1991). Binary methods for continuous outcomes: A parametric alternative. *Journal of Clinical Epidemiology, 44,* 241-248.

Swadi, H. (1997). Substance misuse in adolescence questionnaire (SMAQ): A pilot study of a screening instrument for problematic use of drugs and volatile substances in adolescents. *Child Psychology and Psychiatry Review, 2 (2),* 63-69.

Swadi, H. (1999). Individual risk factors for adolescent substance use. *Drug and Alcohol Dependence, 55,* 209-224.

Swets, J.A. (1964). *Signal detection and recognition by human observers.* New York: John Wiley and Sons.

Swets, J.A. (1979). ROC analysis applied to the evaluation of medical imaging techniques. *Investigative Radiology, 14,* 109-121.

Swets, J.E. (1988). Measuring the accuracy of diagnostic systems. *Science, 240,* 1285-1293.

Swift, W. (1999). *Patterns and correlates of cannabis dependence.* Unpublished PhD thesis. National Drug and Alcohol Research Centre, School of Community Medicine and Public Health, University of New South Wales, Sydney.

Swift. W., Copeland, J., & Hall, W. (1998a). Choosing a diagnostic cut-off for cannabis dependence. *Addiction, 93,* 1681-1692.

Swift, W., Copeland, J., & Lenton, S. (2000). Cannabis and harm reduction. *Drug and Alcohol Review, 19,* 101-112.

Swift, W., Hall, W., & Copeland, J. (1997). *Cannabis dependence among long-term users in Sydney, Australia.* NDARC Technical Report No. 47. Sydney, NSW: National Drug and Alcohol Research Centre.

Swift, W., Hall, W., & Copeland, J. (1998b). Characteristics of long-term cannabis users in Sydney, Australia. *European Addiction Research, 4,* 190-197.

Swift, W., Hall, W. & Didcott, J., & Reilly, D. (1998c). Patterns and correlates of cannabis dependence among long-term users in an Australian rural area. *Addiction, 93 (8),* 1149-1160.

Swift, W., Hall, W., & Copeland, J. (2000). One year follow-up of cannabis dependence among long-term cannabis users in Sydney, Australia. *Drug and Alcohol Dependence, 59,* 309-318.

Swift, W., Hall, W., & Teesson, M. (2001a). Cannabis use and dependence among Australian adults: results from the National Survey of Mental Health and Well-Being. *Addiction, 96,* 737-748.

Swift, W., Hall, W., & Teesson, M. (2001b). Characteristics of DSM-IV and ICD-10 cannabis dependence among Australian adults: results from the National Survey of Mental Health and Wellbeing. *Drug and Alcohol Dependence, 63 (2),* 147-153.

Sydney, S. (2003). Editorial: Comparing cannabis with tobacco – again. *British Medical Journal, 327,* 635-636.

Sydow, K., von Lieb, R., Pfister, H., Hofler, M., Sonntag, H., & Wittchen, H-U. (2001). The natural course of cannabis use, abuse and dependence over four years: a longitudinal community study of adolescents and young adults. *Drug and Alcohol Dependence, 64,* 347-361.

Sydow, K., von Lieb, R., Pfister, H., Hofler, M., & Wittchen, H-U. (2002). What predicts incident use of cannabis and progression to abuse and dependence? A 4-year prospective examination of risk factors in a community sample of adolescents and young adults. *Drug and Alcohol Dependence, 68,* 49-64.

Tabachnick, B.G., & Fidell, L.S. (2001). *Using multivariate statistics* (4th ed.). Boston: Allyn and Bacon.

Tarter, R.E. & Hegedus, A.M. (1991). The Drug Use Screening Inventory: Its applications in the evaluation and treatment of alcohol and other drug abuse. *Alcohol Health and Research World, 15 (1),* 65-75.

Tarter, R. E., & Kirisci, L. (2001). Validity of the drug use screening inventory for predicting DSM-III-R substance use disorder. *Journal of Child and Adolescent Substance Abuse, 10 (4),* 45-53.

Tarter, R., Laird, S., Bukstein, O., & Kaminer, Y. (1992). Validation of the Drug Use Screening Inventory: Preliminary findings. *Psychology of Addictive Behaviors, 6,* 233-236.

Tarter, R.E., & Vanyukov, M.M. (2001). Introduction: Theoretical and operational framework for research into the etiology of substance use disorders. In R.E. Tarter & M.M. Vanyukov (Eds.), *Etiology of substance use disorder in children and adolescents: Emerging findings from the Center for Education and Drug Abuse Research* (pp. 1-12). New York: The Haworth Press, Inc.

References

Taylor, D.R., Fergusson, D.M., Milne, B.J., Horwood, L.J., Moffitt, T.E., Sears, M.R., & Poulton, R. (2002). A longitudinal study of the effects of tobacco and cannabis exposure on lung function in young adults. *Addiction, 97,* 1055-1061.

Tashkin, D. (1999). Cannabis effects on the respiratory system. In: H. Kalant, W. Corrigall, W. Hall & R. Smart (Eds.). *The Health Effects of Cannabis,* (pp. 313-345). Toronto, Canada: Centre for Addiction and Mental Health.

Te Rununga o Te Rarawa. (1995). *Cannabis project report.* Wellington: Te Puni Kokiri.

Thomas, Huw. (1996). A (New Zealand) community survey of adverse effects of cannabis use. *Drug and Alcohol Dependence, 42,* 201-207.

Thurstone, L.L. (1947). *Multiple factor analysis.* Chicago: University of Chicago Press.

Tims, F.M., Dennis, M.L., Hamilton, N., Buchan, B. J., Diamond, G., Funk, R., & Brantley, L.B. (2002). Characteristics and problems of 600 adolescent cannabis users in outpatient treatment. *Addiction 97 (Suppl 1),* 46-57.

Titus, J.C., & Dennis, M.L. (2005). *Global Appraisal of Individual Needs - Quick (GAIN- Q, v. 2.5.1).* Bloomington, IL: Chestnut Health Systems.

Topp, L., & Mattick, R. (1997). Choosing a cut-off on the Severity of Dependence Scale for amphetamine users. *Addiction, 92,* 839-845.

Trochim, W.K. (2001). *The research methods knowledge base* (2nd ed.). Cincinnato, OH: Atomic Dog Publishing.

True, W.R., Heath, A.C., Sherrer, J.F., Xian, H., Lin, N., Eisen, S.A., Lyons, M.J., Goldberg, J., & Tsuang, M.T. (1999). Interrelationships of genetic and environmental influences on conduct disorder and alcohol and marijuana dependence symptoms. *American Journal of Medical Genetics, 88,* 391-397.

Turner, C.F., Ku, L., Rogers, S.M., Lindberg, L.D., Pleck, J.H., & Sonenstein, F.L. (1998). Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science, 280,* 867-863.

Twitchell, G.L., Hertzog, C.A., Klein, J.L., & Schukit, M.A. (1992). The anatomy of a follow-up. *British Journal of Addiction, 87,* 1327-1333.

United Nations. (1998). *Guidelines for testing drugs under international control in hair, sweat, and saliva.* New York: Author.

United Nations Commission on Narcotic Drugs. (1999). *World situation with regard to drug abuse.* Vienna: United Nations.

United Nations Office on Drugs and Crime. (2006). *World Drug Report 2006.* Oxford: Oxford University Press.

Ustun, T.B. (2000). Unmet need for management of mental disorders in primary care. In G. Andrews & S. Henderson (Eds.), *Unmet need in psychiatry: problems, resources, responses* (pp. 157-171). Cambridge: Cambridge University Press.

Ustun, B., Compton, W., Mager, D., Babor, T., Baiyewu, O., Chatterji, S., Cottler, L., et al. (1997). WHO study on the reliability and validity of the alcohol and drug use disorder instruments: overview of methods and results. *Drug and Alcohol Dependence, 47,* 161-169.

van den Bree, M.B.M., and Pickworth, W.B. (2005). Risk factors predicting changes in marijuana involvement in teenagers. *Archives of General Psychiatry; 62*: 311-319.

Vandrey, R., Budney, A.J., Kamon, J.L., & Stanger, C. (2005). Cannabis withdrawal in adolescent treatment seekers. *Drug and Alcohol Dependence, 78,* 205-210.

Van Etten, M.L., Newmark, Y.D., & Anthony, J.C. (1997). Initial opportunity to use marijuana and the transition to first use: United States, 1979-1994. *Drug and Alcohol Dependence, 49,* 1-7.

Velicer, W.F., & Fava, J.L. (1998). Effects of variable and subject sampling on factor analysis. *Psychological Methods, 3*, 231-251.

Velicer, W.F., & Jackson, D.N. (1990). Component analysis versus common factor analysis - some further observations. *Multivariate Behavioral Research, 25 (1),* 97-114.

Vereby, K.G., & Buchan, B.J. (1997). Diagnostic laboratory: Screening for drug abuse. In J.H. Lowinson, P. Ruiz, R.B. Millman, & J.G. Langrod (Eds.), *Substance abuse: A comprehensive textbook* (pp. 369-376). Baltimore: Williams & Wilkins.

Volk, R.J., Steinbauer, J.R., Cantor, S.B., & Holzer, C.E. (1997). The Alcohol Use Disorders Identification Test (AUDIT) as a screen for at-risk drinking in primary care patients of different racial/ethnic backgrounds. *Addiction, 92 (2),* 197-206.

Wagner, F.A., & Anthony, J.C. (2002). From first drug use to drug dependence: developmental periods of risk for dependence upon marijuana, cocaine and alcohol. *Neuropsychopharmacology, 26 (4),* 479-488.

Wald, N.J. (1994). Guidance on terminology. *Journal of Medical Screening, s76.*

Waldron, H.B. (1997). Adolescent substance abuse and family therapy outcome: a review of randomized trials. *Advanced Clinical Child Psychology, 19,* 199-234.

Waldron, H.B., Slesnick, N., Brody, J.L., Turner, C.W., & Peterson, T.R. (2001). Treatment outcomes for adolescent substance abuse at 4- and 7-month assessments. *Journal of Clinical and Consulting Psychology, 69,* 802-813.

References

Walton, M.A., Chathapuram, S.R., & Reischl, T.M. (1998). Tracking substance abusers in longitudinal research: Understanding follow-up contact difficulties. *American Journal of Community Psychology, 26 (2),* 233-253.

Warner, L.A., Kessler, R.C., Hughes, M., Anthony, J.C., & Nelson, C.B. (1995). Prevalence and correlates of drug use and dependence in the United States. *Archives of General Psychiatry, 52,* 219-229.

Watters, J., & Biernacki, P. (1989). Targeted sampling: options for the study of hidden populations. *Social Problems, 36,* 416-430.

Weinberg N.Z., Rahdert, E., Colliver, J.D., & Glantz, M.D. (1998). Adolescent substance abuse: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 37 (3),* 252-261.

Weller, R.A., & Halikas, J.A. (1980). Objective criteria for the diagnosis of marijuana abuse. *Journal of Nervous and Mental Disease, 168,* 98-103.

West, R. (2005). Editorial. Time for a change: putting the Transtheoretical (Stages of Change) Model to rest. *Addiction, 100,* 1036-1039.

Widiger, T.A., & Clark, L.A. (2000). Toward DSM-V and the classification of psychopathology. *Psychological Bulletin, 126,* 946-963.

Widiger, T., & Trull, T.J. (1991). Diagnosis and clinical assessment. *Annual Review of Psychology, 42,* 109-133.

Wiesbeck, G.A., Shuckit, M.A., Kalmijn, J.A., Tipp, J.E., Bucholz, K.K., & Smith, T.L. (1996). An evaluation of the history of a marijuana withdrawal syndrome in a large population. *Addiction, 91 (10),* 1469-1478.

Wilkins, C., Casswell, S., Bhatta, K., & Pledger, M. (2002). *Drug Use in New Zealand: National surveys comparison, 1998 and 2001.* University of Auckland: Alcohol and Public Health Research Unit.

Wilkins, C., Casswell, S., Pledger, M., Ford, M., Debasish, R., & Barnes, H. (2003). *Health Behaviours Survey (HBS): Illicit Drugs 2003.* Auckland: Centre for Social and Health Outcomes Research and Evaluation (SHORE) & Te Ropu Whariki.

Wilkins, C., Girling, M., Sweetsur, P., & Butler, R. (2005). *Cannabis and other illicit drug trends in New Zealand, 2005. Findings from the Cannabis Module of the 2005 Illicit Drug Monitoring System (IDMS).* Auckland: SHORE, Massey University.

Wilkins, C., Girling, M., Sweetsur, P., Huckle, T., & Huakau, J. (2006). *Legal party pill use in New Zealand. Prevalence of use, availability, health harms and 'gateway effects' of benzylpiperazine (BZP) and trifluorophenylmethylpiperazine (TFMPP*). Auckland: SHORE, Massey University.

Wilkins, C., & Sweetsur, P. (2005). *The illicit market for cannabis in New Zealand: dollar value and structure of the black market.* Auckland: SHORE & Te Ropu Whariki.

Williams, S., Brown, A., Patton, R. & Crawford, M.J., & Touquet, R. (2005). The half-life of the 'teachable moment' for alcohol misusing patients in the emergency department. *Drug and Alcohol Dependence, 77,* 205-208.

Williams, L., & Parker, H. (2001). Alcohol, cannabis, ecstacy and cocaine: drugs of reasoned choice amongst young adult recreational drug users in England. *International Journal of Drug Policy, 12,* 397-413.

Willner, P. (2000). Further validation and development of a screening instrument for the assessment of substance misuse in adolescents. *Addiction, 95 (11),* 1691-1698.

Wilson, J.M.G., & Jungner, G. (1968). *Principles and practice of screening for disease.* WHO Public Health Papers 34. Geneva: World Health Organization.

Windle, M. (2000). Parental, sibling, and peer influences on adolescent substance use and alcohol problems. *Applied Developmental Science, 4 (2),* 98-110.

Winokur, G., Zimmerman, M., & Cadoret, R. (1988). 'Cause the bible tells me so. *Archives of General Psychiatry, 45,* 683-684.

Winters, K. (1992). Development of an adolescent substance abuse screening questionnaire. *Addictive Behaviors, 17,* 479-490.

Winters, K. (2003). Assessment of alcohol and other drug use among adolescents. In Allen, J. P. & Wilson, V. B. (Eds.), *Assessing alcohol problems* (2nd ed), pp. 101-NIH Publication No. 03-3745. Bethseda, MD: National Institute on Alcohol Abuse and Alcoholism.

Winters, K.C., Latimer, W., & Stinchfield, R.D. (1999). The DSM-IV criteria for adolescent alcohol and cannabis use disorders. *Journal of Studies on Alcohol, 60,* 337-344.

Winters, K., Stinchfield, R., Henly, G., & Schwartz, R. (1991). Validity of adolescent self-report of alcohol and other drug involvement. *International Journal of the Addictions, 25,* 1379-1395.

Winters, K.C., & Zenilman, J.M. (1994). *Simple screening instruments for outreach for alcohol and other drug abuse and infectious diseases.* Treatment Improvement Protocol (TIP) Series. Rockville, MD: United States Department of Health and Human Services.

Wisniewski, N.M., Glenwick, D.S., & Graham, J.R. (1985). Adolescent Drug Involvement Scale. *Addictive Behaviors, 10,* 55-67.

References

Wittchen, H.U. (1994). Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): a critical review. *Journal of Psychiatric Research, 28,* 57-84.

Wolff, K., Farrell, M., Marsden, J., Monteiro, M.G., Ali, R., Welch, S., & Strang, J. (1999). A review of biological indicators of illicit drug use, practical considerations and clinical usefulness. *Addiction, 94 (9),* 1279-1298.

Woolard, R., Nirenberg, T.D., Becker, B., Longabaugh, R., Minugh, P.A., Gogeneni, A., Carty, K., & Clifford, P.R. (2003). Marijuana use and prior injury among injured problem drinkers. *Academic Emergency Medicine, 10 (1),* 43-51.

World Health Organization. (1992). *International Classification of Diseases –Tenth Revision (ICD-10).* Geneva, Switzerland: Author.

World Health Organization. (1997a). *Cannabis: A health perspective and research agenda.* Geneva, Switzerland: Author.

World Health Organization. (1997b). *Composite International Diagnostic Interview, version 2.1.* Geneva, Switzerland: Author.

World Health Organization. (1998). *Alcohol, drugs and tobacco programme.* World Health Organization Phase III Collaborative Study on implementing and supporting early intervention strategies in primary health care, Report on Strand I: General practitioner current practices and perceptions of preventive medicine and early intervention for hazardous alcohol use. A 16-country study. Copenhagen, Denmark: WHO.

World Health Organization. (2002). *The World Health Report 2002: Reducing risks, promoting healthy life.* Geneva, Switzerland: Author.

World Health Organization. (2004). *The neuroscience of psychoactive substance use and dependence.* Geneva, Switzerland: Author.

WHO ASSIST Working Group. (2002). The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): development, reliability and feasibility. *Addiction, 97 (9),* 1183-1194.

Wu, T.C., Tashkin, D.P., Djahed, B., & Rose, J.E. (1998). Pulmonary hazards of smoking marijuana as compared with tobacco. *New England Journal of Medicine, 318,* 347-351.

Wutzke, S.E., Conigrave, K.M., Kogler, B.E., Saunders, J.B., & Hall, W.D. (2000). Longitudinal research: methods for maximizing subject follow-up. *Drug and Alcohol Review, 19,* 159-163.

Yacoubian, G.S. (2000). Reassessing the need for urinalysis as a validation technique. *Journal of Drug Issues, 30 (2),* 323-334.

References

Yska, R. (1990). *New Zealand Green – the story of marijuana in New Zealand.* Auckland: David Bateman.

Zimmer, L., & Morgan, J.P. (1997a). The war over marijuana. *Psychology Today, 10 (7),* 102-106.

Zimmer, L., & Morgan, J.P. (1997b). *Marijuana myths, marijuana facts: A review of the scientific evidence.* New York: Lindesmith Center.

Zimmerman, M. (1988). Why are we rushing to publish DSM-IV? *Archives of General Psychiatry, 45,* 1135-1138.

Zou, K.H., Hall, W.J., & Shapiro, D.E. (1997). Smooth non-parametric Receiver Operating Characteristic curves for continuous diagnostic tests. *Statistics in Medicine, 16,* 2143-2156.

APPENDICES

APPENDIX 1

DSM-IV criteria for Substance Dependence

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

1. tolerance, as defined by either of the following:
   a. a need for markedly increased amounts of the substance to achieve intoxication or desired effect
   b. markedly diminished effect with continued use of the same amount of the substance

2. withdrawal, as manifested by either of the following:
   a. the characteristic withdrawal syndrome for the substance
   b. the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms.

3. the substance is often taken in larger amounts or over a longer period than was intended.

4. there is a persistent desire or unsuccessful efforts to cut down or control substance use.

5. a great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects.

6. important social, occupational, or recreational activities are given up or reduced because of substance use.

7. the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.

Specify if:

With Physiological Dependence: evidence of tolerance or withdrawal
(i.e., either item 1 or 2 is present)

Without Physiological Dependence: no evidence of tolerance or withdrawal
(i.e., neither item 1 nor 2 is present).

Appendix 1
DSM/ICD Criteria for Substance Dependence,
Some Assumptions, and Terminology

DSM-IV criteria for Substance Abuse

A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:

1. recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences; suspensions; or expulsions from school; neglect of children or household).
2. recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use)
3. recurrent substance-related legal problems (e.g. arrests for substance-related disorderly conduct)
4. continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights).

B. The symptoms have never met the criteria for Substance Dependence for this class of substance.

Source: DSMIV (APA, 1994, pp.181-183).

ICD-10 criteria for Substance Dependence

Three or more of the following symptoms occurring together for at least one month, or if persisting for a period of less than one month, should have occurred together repeatedly within a 12-month period:

1. a strong desire or sense of compulsion to take the substance
2. impaired capacity to control the use of the substance, in terms of onset, termination, or levels of use
3. a physiological withdrawal state as evidenced in the characteristic withdrawal syndrome, or by use of the same (or closely related) substance to relieve or avoid the withdrawal symptoms
4. tolerance, evidenced by increased dosages required to achieve effects originally produced by lower doses
5. preoccupation with substance use, manifested by neglect of alternative pleasures, or by a great deal of time spent in activities necessary to obtain, take or recover from the effects of the substance
6. persisting substance use despite clear evidence of harmful consequences

Appendix 1
DSM/ICD Criteria for Substance Dependence,
Some Assumptions, and Terminology

ICD-10 criteria for Harmful Use

1. Use of the substance has caused actual damage to the mental or physical health of the user.

Source: ICD-10 (WHO, 1992).

Drug Dependence Syndrome (DDS): some assumptions

Several important assumptions are associated with the DDS:

1. The DDS was primarily a *description* of a clinically meaningful cluster of cognitive, behavioural, and physiological symptoms, i.e., a socio-psycho-biological phenomenon, requiring multiple assessment criteria.

2. the essential nature of this syndrome was *conjunction of elements*, and a clear expectation of concurrence of phenomena. Not all the components need always be present, or not always present in the same intensity. Dependence is a "plastic" condition, with potentially multiple manifestations, depending on cultural, environmental, personal influences and consequences (Edwards et al., 1981).

3. The elements were inter-related (*coherent*) and co-occurred in varying degree. The syndrome was thus *dimensional*, and the degree of dependence experienced can vary along a continuum from low to high severity. Increasing coherence of elements was likely among more dependent users exhibiting more symptoms (Institute of Medicine, 1990).

4. The 'dependence syndrome' was *unidimensional*. Although multidimensional forces such as biology and aberrant learning may act to produce dependence within an individual, the essential nature of the coherent syndrome was that it represented a single underlying factor: i.e., loss of control of (compulsive) drug use, despite adverse sequelae.

5. A 'dependence syndrome' is nosologically differentiated from an 'abuse syndrome' (problematic use in the absence of compulsive use, tolerance and withdrawal) which is based on a set of distinct, specifiable behaviours and seen as reflecting the harmful consequences of repeated use (APA, 1994). Dependence implies use patterns that are more problematic, compulsive, and difficult to stop despite adverse consequences. Thus, a dependence diagnosis represents a greater level of problem severity than the abuse diagnosis, which forms a second - but related - axis (Drummond, 1992).

6. Substance abuse is a lesser degree of impairment more likely in individuals who have begun using substances only recently (APA, 1994).

7. Abuse of a particular drug often evolves into dependence (APA, 1994). Dependence is best seen as an evolving process (Drummond, 1992). The dimensional approach implies that along the continuum of severity, abuse is a mild prodromal condition to dependence (Bukstein & Kaminer, 1994; Feingold & Rounsaville, 1995a, 1995b).

Appendix 1
DSM/ICD Criteria for Substance Dependence,
Some Assumptions, and Terminology

8. Just as dependence is conceptualised as a continuous variable, current scientific understanding of drug problems is that they exist on a continuous basis throughout the entire population of individuals using drugs (Edwards, 1992). In the dimensional view, no single cut-point was deemed suitable for distinguishing dependent from non-dependent individuals. An individual with high dependence may not have problems in other realms, while another individual with low dependence may have severe problems in these other areas (Edwards et al., 1981). The effect of this re-conceptualisation has been a progressive move globally towards a 'problem-oriented' treatment approach in which dependence, (a special kind of problem involving an altered psychobiological state), may be only one of the problems to be treated (Drummond, 1992).

9. Diagnosis does not always disable. The drug may cause little tissue damage, little impairment of function, and be relatively inexpensive (Edwards et al., 1981). Thus, being a 'case' according to ICD-10 or DSM-IV criteria in a general population survey does not mean that a person is disabled. Need for treatment is a function of both diagnosis and disability (Ustun, 2000). Symptoms and disablement may be nonlinearly related. Hence, there is not a simple 'line' that can be drawn around dependence, abuse/harmful use (or both) syndromes, which equates precisely with 'need for treatment' (defined in terms of impairment) by either the user or by others. For example, some individuals may have several dependence symptoms, but these may be manageable in their daily lives. The abuse syndrome, in particular, is broadly defined, relatively 'easy' to receive (one symptom requirement), and may include individuals who have encountered self-limiting, transient or relatively mild problems related to their substance use (Drummond, 1992).

10. The drug dependence concepts constitute a "culture-bound syndrome" (Room, 1998) with a specific history and location in particular cultural circumstances. Dependence may cause little damage or social impairment, a factor partly influenced by cross-cultural differences in population ethnicity, substance availability, attitudes to and norms of, drug use and social approval (Abel & Casswell, 1998; Room, 1998). Research on the cross-cultural applicability of the main ICD-10 diagnoses and criteria has clearly found that cultures differ in the thresholds at which the criteria and diagnoses would be applied (Room, Janca, Bennett, Schmidt & Sartorius, 1996). Behaviour which would be thought normal and not medically significant in one place would be regarded as diagnostic and pathognomic in another (Room, 1998; Room et al., 1996). Albeit, a drug use problem (or drug abuse) can be defined as use at a level or in a way that 'produces behaviour changes (that) would be viewed as extremely undesirable in almost all cultures' (APA, 1994).

11. An individual's pattern of substance use may meet criteria for multiple diagnoses at any particular time, e.g. Cannabis Dependence and Alcohol Abuse (or vice-versa); polysubstance Dependence, etc (APA, 1994). The majority of illicit drug users will show consumption patterns involving several different substances, e.g., cannabis, cocaine, opioids and alcohol; cannabis, alcohol and tobacco (WHO, 1992). The co-occurrence of cannabis, alcohol and tobacco use is well-documented (Hall, 1995; Field & Casswell, 1999b; Wilkins et al., 2002).

Appendix 1
DSM/ICD Criteria for Substance Dependence,
Some Assumptions, and Terminology

Clarification of terminology and a caveat

Substance 'use', 'misuse', 'abuse' and 'dependence'

Definitional variations of substance 'use', 'misuse' and 'abuse' confound the literature and confuse the reader. A complex matrix of individual, social and cultural factors shape and determine general patterns of substance use in a society in any particular historical period. Diverse societies worldwide represent different drug cultures with substantial variation between dominant drug classes in use, patterns and levels of consumption, and profiles of substance-related problems and pathology (Room, 1998; Room et al., 1996; WHO, 1992). Drug control policies influence the way people view the use of particular drugs (Casswell, 1997; Field & Casswell, 2000; Room, 1985). Hence, ascribing concepts of 'misuse' and 'abuse' to (perceived) excessive use of any psychoactive substance inevitably involve temporal, value-laden, culture-specific judgements about different drugs in different contexts (Edwards et al., 1981; Room, 1995, 1998). Since cannabis, heroin and other drugs are often referred to as 'drugs of abuse' many consider each use of these drugs to be "abuse". Thus, in many societies 'use' often implies a pejorative judgement, and *any* use of marijuana/cannabis (cocaine, heroin, methamphetamine, etc.) has become synonymous with 'misuse' and 'abuse', simply because use of these substances is socially undesirable or unsanctioned (illegal or 'illicit'). Similarly, the term substance 'use' by adolescents has been largely abandoned in favour of substance 'abuse' to reflect the ideology that *any* use among minors constitutes abuse, since it violates the law. While serving the purpose of reflecting social opprobrium, however, this terminology obscures the distinction necessary to classify substance abuse and dependence as health problems. Widespread use of cannabis is *not* an indication of its abuse potential (Institute of Medicine, 1999). The medical and scientific communities use contemporary professional standards to differentiate between use, and forms of problematic use. The most frequent terms for problematic or pathological use are abuse, misuse, harmful use and dependency (Gorman & Derzon, 2002; Swift et al., 2001a). The World Health Organization Expert Committee on Drug Dependence has suggested alternative terms which describe problematic use of drugs with some clarity: unsanctioned, hazardous, dysfunctional and harmful use (see Edwards et al., 1981).

The distinction between any substance use, misuse i.e., 'any use of a drug that varies from a socially or medically accepted use' (Rinaldi, Steinder, Wilford & Goodwin, 1988, p. 557), and Psychoactive Substance Use Disorder (PSUD), i.e., 'maladaptive patterns' of substance use which are defined consensually as either abuse or dependence according to the criteria set forth by the DSM-IV (APA, 1994), is critical. With clearly-defined characteristics and symptoms, PSUD is not merely a severe variant of substance use (see APA, 1994, 2000; WHO, 1992). Substance use is *behaviour* whereas PSUD is a *clinical condition.* Upon surpassing a consensually accepted threshold as a consequence of consumption behaviour, the individual is deemed affected: criteria are satisfied for a PSUD diagnosis of abuse or dependence. PSUD is a mental disorder, a dichotomous (present/absent) taxonomic category. The diagnostic criteria, also dichotomous, denote the severity of the consequences of consumption. Qualifying for at least one of four psychosocial disturbances meets criteria for a DSM-IV diagnosis of abuse, while at least three symptoms reflecting biological disruption are required to qualify for a dependence diagnosis (Tarter & Vanyukov, 2001).

Thus, whereas substance use is necessarily prodromal to PSUD, it is by itself not sufficient to induce this outcome. It is a well-documented observation that for most users of most drugs non-problematic (harm-free) controlled use is the norm. Simple and unproblematic use is the rule

and not the exception with most drugs, even among adolescents. Placing the dependence syndrome into perspective avoids making a falsely alarmist (and biased) impression that *all* substance users run a high risk of becoming abusers or dependent. Most users of psychoactive substances manage their drug use and/or maintain a functional or productive lifestyle. Most users do *not* become abusers or drug-dependent.

It is recognised, however, that all of the commonly used recreational mood-altering drugs are harmful in one way or another to *some* of those who use them. *Any* use of *any* drug increases the **risk** of harmful use later. Albeit, substance-related harm varies in degree and kind on a dimension that differs between individuals, and even within the same individuals over time (APA, 1994). The important point is that the only certain negative of recreational drug use is an increase in the **risk**, and not the certainty, of harm. This position is, however, qualified by a caveat. The one drug form that is universally harmful to *all* users (active and 'passive' users, alike) is tobacco - hence *all* tobacco consumption is now seen as 'abuse'. 'Safe' levels of tobacco and cannabis smoking may be suggested but will not have wide acceptability among health specialists (Smart, 1992).

The drug 'user', 'abuser', 'addict', 'drug-dependent'

Numerous terms have been adopted or proposed in the field of drug research to identify individuals who do experience problems related to their drug use. Historically, labels such as 'drug addict', 'drug abuser' or 'junky', or use of vague terms such as 'a drug problem', have been used by the public and the media in a manner that has been derogatory towards people who use drugs, and those who have problems related to drug use. Widespread and deep-seated, stigmatisation is invalid, punitive, and disempowering, reinforcing denial of the problem (WHO, 2004). Kaplan and colleagues (1992, 1988) found that such negative social sanctions (labels) strongly predict escalating drug use via three paths: (1) a positive self-perception of being called a 'drug ab/user' (2) loss of the drug user's motivation to conform to a society that has alienated him/her, and (3) the resulting lack of opportunities to socialize with non-drug users, and greater involvement with drug-using groups. Being labelled an 'addict' or 'junky' is thus a powerful phenomenon. By serving the purpose of supplying a ready-made identity and social group for adolescents in this developmental task, such labels can be a real barrier to change (Spooner, 1999; WHO, 2004). For these unacceptable (and numerous other) reasons, insofar as is possible the terminology used throughout this paper will be that commonly used and accepted in academic and medical publications. It is strongly emphasized that use of terms such as 'user', 'cannabis abuse/r', cannabis dependence, or 'drug/substance abuse/r' *neither denotes blame nor suggests moral condemnation of the cannabis or substance user*, but are used in a very specific (diagnostic) sense.

Sub-clinical drug use problems: 'at risk', 'problematic', 'hazardous' use

'Risk' has been variously defined, for example … "a probability of an adverse outcome, or a factor that raises this possibility" (WHO, 2002, p. 7). Various terms such as "problem", "problematic", "at risk" or "potentially problematic/harmful", "risky", "unsafe", "excessive", "hazardous", "sub-syndromal", "pre-clinical", "sub-clinical", "sub-threshold", and more recently, "diagnostic orphans" (Degenhardt et al., 2001; Hasin et al., 1998) have been proposed by drug researchers or treatment professionals to identify individuals who do not meet the psychiatric criteria for a drug disorder, but who nevertheless appear to experience some substance-related problems. Such terms are often used interchangeably to describe the continuum of problems from less to more severe levels. In this

thesis, the terminology below has been adopted to correspond with the use pattern and problem levels:

substance use denotes any consumption/use of substances, per se. Substance use may refer to anything from experimental use through dependent use (as defined by the ICD-10 (WHO, 1992) and DSM-IV/DSM-IV-TR (APA, 1994, 2000). Individual drug use patterns are dynamic and complex. Intra-individual changes can occur between patterns, and over time.

non-problematic, 'experimental' use that might or might not continue. Experimental use is motivated by the desire to experience new feelings or moods, and is generally single or short-term use (or)

'*recreational*' or '*social use*' that refers to non-medical use which serves some function or purpose, but does not cause problems for the user. Recreational use occurs on specific social occasions (e.g., people attending dance parties may take ecstasy or 'party pills').

'potentially problematic, risky, hazardous, unsafe, excessive use' refers to a non-medical level of consumption that exceeds the agreed threshold for 'safe' use and, while not currently sufficient for a formal diagnosis as either dependence or abuse under the DSM-IV or ICD-10 diagnostic system, renders the user vulnerable to, or at risk of, developing a substance-related disorder or problems at some future point in time.

'problem use', 'harmful use' (ICD) or ***'abuse'.*** (DSM) refers to substance use that is actually causing damage to the user's physical or mental health (ICD, DSM) and social functioning (DSM). Problem/harmful users have one or more drug-related problems or adverse events (accident, injury, health, employment, school, family, legal problems). Harmful use often leads to psychological and physiological dependence.

'dependent use' refers to impaired control over drug use (psychological addiction) that may involve tolerance and withdrawal (physical addiction) if use is ceased abruptly, and continued use despite serious consequences

Generally, as this brief typology indicates, a standard three-stage conceptualization of drug-taking behaviour is employed (or implicit), in which each stage - use, abuse, dependence - is marked by higher levels of use and increasingly serious consequences. Other terms such as 'substance misuse' and 'problem/problematic substance use' are used in an inclusive sense to refer to substance use that is either risky/unsafe **or** harmful to the wellbeing of the user or others, but which currently might or might not be sufficient for a diagnosis of substance dependence or (DSM-IV) abuse/(ICD-10) harmful use.

The Harm Minimization/Reduction approach to cannabis and other drug use

Originating as an international response to the growing AIDS epidemic crisis in the 1980s, *harm minimization* is a public health alternative to the moral/criminal and disease models of drug use and addiction. Offering a realistic, compassionate alternative to the prevailing 'abstinence-only' or 'zero-tolerance' policies derived from the traditional disease model, *harm reduction* accepts the practical facts that many people use drugs and engage in high-risk behaviours, and that idealistic visions of a drug-free society are unlikely to (ever) become reality. Ironically (yet not surprizing),

Appendix 1
DSM/ICD Criteria for Substance Dependence,
Some Assumptions, and Terminology

longitudinal research has shown that laws prohibiting cannabis possession appear to have little impact on deterring cannabis use, despite the high costs of control/law enforcement and other costs of prohibition. Social costs include encroachment on individual rights and freedoms, the impact of the penalties (fines, imprisonment) on convicted offenders (otherwise law-abiding citizens), and other adverse social consequences on users such as negative impacts on employment, and family discord caused by an arrest for cannabis possession (Swift, Copeland & Lenton, 2000).

The broadest way *harm reduction* can be conceptualised is in relation to illness prevention in populations who are not yet afflicted by the problem. However, harmful behaviour happens. The primary goal is the reduction of drug-related harm rather than drug use, *per se.* Under the rubric of 'harm reduction' a diverse spectrum of programmes and policies aimed at ameliorating the consequences of both licit and illicit drug use now proliferate e.g. needle exchange, methadone maintenance; tobacco cessation counseling and technology; introduction of low alcohol beers and wines and their pricing differential (tax advantage), random breath tests and blood-alcohol level tests, Server/trainer programmes, Drink-Less education campaigns, Sobering-up centres (from police care to health care), controls on alcohol and tobacco advertising; Screening and brief intervention (SEI/SBI); tertiary specialist treatment for advanced alcohol/other drug problems.

For cannabis, three general classes of intervention are employable in an effort to reduce the harm associated with addictive behaviour:

1. changing the risks of administration, such as smoking techniques (use filtered joints, avoiding waterpipes/bongs, avoid deep inhalation, use vaporizers to reduce particulate matter/tars and carbon monoxide, use stronger products for less smoking to get THC) or the route of administration (from inhaling to oral ingestion of cannabis products);
2. providing a safer alternative substance or drug to replace the more harmful substance (e.g. using cannabis as a 'harm reduction' alternative to, for example, cocaine, heroin, LSD, alcohol or methamphetamine); and
3. reducing the frequency and/or intensity (quantity, dose level) of target behaviour (e.g. early intervention, such as screening/brief advice or therapy for excessive cannabis use).

The *harm reduction* perspective has become popularized in the New Zealand alcohol and drug treatment field in recent years, and it is upon this perspective that the contemporary public health approach to substance use disorders and their treatment is based in New Zealand (MOH, 1998). Articulated in a comprehensive, intersectorial, nationally-coordinated policy on tobacco, alcohol and other drugs, this strategic framework incorporates the use of both high-risk and population approaches while addressing the special needs of target groups (Maori, youth, mental health/dual diagnosis clients, polydrug users, pregnant women) in a holistic approach combining a spectrum of interventions at the level of primary, secondary and tertiary prevention across a variety of environments or settings (MOH, 1998).

However, the tension between prohibition and harm reduction is exemplified in New Zealand's approach to cannabis use. While prohibition of cannabis remains in place in New Zealand (as in Australia) the official policy is one of *harm reduction*. Various schemes are in place which soften the prohibition stance in an attempt to find a policy path in which the adverse consequences and costs of criminalization are reduced without moving to legal status for cannabis, on the grounds that legalization would imply support for cannabis use (Casswell, 1997). These issues are explored within the parameters of the 'decriminalization/legalization' debate, an ongoing contentious (and often vexatious) public discourse in contemporary New Zealand.

APPENDIX 2

From: "jbashford"
Subject: EXPERT PANEL -- Cannabis Screen Development
Date: Monday, March 26, 2007 11:58 AM

MEMORANDUM TO EXPERT PANEL FOR CANNABIS SCREEN DEVELOPMENT

Dear Panelists,

Firstly, a very sincere "thank you" for accepting my invitation to be included on my Expert Panel (EP) of New Zealand Clinicians and Researchers. As you well know by now, the central aim of the planned research is to develop a simple, brief, self-report cannabis screen to assist in the rapid identification of individuals whose current cannabis consumption already shows symptoms of ('harmful' use), or makes them vulnerable to developing ("at risk"/"risky" use), cannabis-related problems or disorder.

Secondly, thank you - again - for your patience. Considerable time has lapsed since my first approach. Inevitably, research planning and negotiation does take time! Very soon, however, we will be able to begin the first study in the series, i.e. the iterative selection and refinement of items for the 'provisional' cannabis screen, the process in which the contribution your role and the particular expert perspective you bring to this research, is so vital. The provisional cannabis screen thus generated will then be tested in an index clinical sample, and the items that perform/discriminate well retained, while those performing less well will be discarded.

As you also well know by now, the theoretical underpinnings of a brief cannabis screen are, of course, the now ascendant Screening/Early Intervention (S/EI) approach, articulated (and a directive) in the National Drug Policy and exemplified in the development of the well-known alcohol screener, the AUDIT. It has, in fact, been suggested that we model the development of the cannabis screen on the AUDIT, a pioneer in this approach. Cannabis is, however, a different drug to alcohol, has unique characteristics and properties that manifest in different ways. Some of the AUDIT questions don't seem "right" for cannabis. Nonetheless, it is desirable that the problem domains encompassed by the cannabis screen mirror the DSM-IV and ICD-10 diagnostic criteria for substance use disorders, for a variety of reasons. Not least among these is that this will enhance the potential for concordance of the cannabis screen with DSM-IV and ICD-10 diagnoses, which are to be generated by the (WHO) CIDI-Auto (computerized) interview in this research, and will be used as the criterion standard for screen validation.

With these perspectives in mind, I have gathered a range of items with potential (at least face validity) for the cannabis screen from existing (generic) screens and the literature. To varying degrees, these approximate the DSM-IV criteria. Your task will be to rate these according to your views about their suitability/appropriateness in a brief cannabis-specific screen, based on your clinical or research experience and the cannabis literature.

Firstly, however, to ensure we haven't missed any potential cannabis-affected life domains, we need to reach consensus on the domains/problem areas to include in a brief cannabis screen. This is the time to ensure everything is "in" at the beginning. Clearly, since we aim to identify the whole spectrum of cannabis-related morbidity along the consumption/problem severity continuum, and since this is a screen only (and not a specialized measure/assessment) we need a selection of good "early" indicators from a wide breadth of representative problem areas. In addition, whether it is used as a self-completed questionnaire or a practitioner-administered screener, attention to the psychometric and technical characteristics (simple wording/level of abstraction; readability; comprehensibility; minimum length possible; multidimensional/discriminatory power; response format, instructions, presentation, scoring, interpretation) will be necessary to make it maximally practical, acceptable, rapidly scored/interpreted. These qualities are necessary to ensure ready uptake and utility of the screen.

Appendix 2
Letters to Expert Panels (EP)

This will inevitably involve some trade-offs, especially with screen length. For example, on a practical level, given the aim to construct as parsimonious a screen as possible, items will need to be selected for their maximum relevance. To maximize item efficiency the ideal would be that each item in the screen would itself be an important multiple-valued (by using Likert-type 5 or 7-point response format) problem indicator scale. Thus, scores would be summed to produce a mathematical estimate of respondents' current status on each of the screen's constituent problem scales, as well as an overall index of cannabis-related problems or disorder (similar to the AUDIT).

To get this going the immediate plan is:

(1) EP will first consider the domains/variables that a brief cannabis screen should appropriately cover.

(We are undecided about the most time-efficient procedure that is convenient for all, here):
(a) a telephone conference has been suggested as an 'ideal' time-efficient technology
(OR)
(b) panellists could each individually consider the domains and email their thoughts to me) ---- (see below)

(2) Once agreement is reached on screen domains/variables necessary, Expert Panel will consider the item pool I have compiled, and rate the items according to their judgements, and,

(3) At the same time EP will be invited (encouraged!) to make their suggestions for additional items and/or suggest amendments in wording of existing items.

To get an idea of your preferences about how we "go" from here, please advise the following as soon as possible:

1. Is correspondence by email acceptable to, or preferred by, you?

2. If we take the Teleconference option:
   (a) what days/times are most suitable for you? and
   (b) what days/times are definitely "out" ?

3. Will you be attending the Cutting Edge Conference? (a potential opportunity for EP to meet briefly).

4. If so, would attending a meeting (scheduled at a convenient time) be acceptable to you?

***** RSVP to my email address *****

Just to reiterate -- your particular expertise and perspectives are critical to the success of the project and the utility of the final product. Your contribution is indeed appreciated and highly valued, and will be acknowleged in documentation about this study. I anticipate a collectively satisfying asscociation for all in this worthy endeavour.

I now look forward to your early reply,
Kind regards, JAN
[Home address of Jan Bashford]
[Email address]
[Home telephone number]

Appendix 2
Letters to Expert Panels (EP)

20 May 2003.

Dear Professor …….

International Expert Panel: Development of a brief cannabis screen

I write as a PhD candidate in the School of Psychology at Massey University, New Zealand, under the supervision of Dr Ross Flett (Massey University) and Drs. Jan Copeland and Wendy Swift (National Drug and Alcohol Research Centre, University of New South Wales) seeking your assistance with my research. I aim to develop a brief screening tool to reliably identify cannabis users whose **current** consumption is either (a) harmful (a diagnosis of cannabis use dependence or abuse) or (2) potentially harmful, and putting the user at risk of developing cannabis use disorder at a future time. Within the rubric of the Screening/Early Intervention approach, the screen is intended for use in a range of primary health care and other community settings.

Using the Expert Panel (EP) methodology of iterative consultation, an item pool has already been constructed and reduced to a selection of questions considered to have potential as predictors of cannabis use-related problems. These items have been approved as culturally appropriate/sensitive to Maori and Pacific Island peoples. Before testing the items among cannabis users, I plan to submit the items to an international panel of experts (IEP) in the addictions/cannabis field for their scrutiny and comment. As an international authority in this area of inquiry, I would be very grateful if you would agree to provide such scrutiny and comment. If you were agreeable I would like you to take a look at the 'provisional cannabis screen' and identify any omissions, or make recommendations for changes or modifications to any questions or response options. Rolling back the point of detection to an earlier stage in the natural history of the disorder (cannabis users "at risk") means that we need good precursors or early-stage (sub-threshold syndrome) indicators of specific cannabis-related problems, as well as symptoms (diagnostic criteria) of cannabis use disorder. Reviewing this list and making comments or suggested amendments would be the extent of your commitment.

As you are aware there is no internationally agreed cannabis screening tool so I would greatly appreciate your involvement in this worthy project. Please contact me by email, telephone, or by post at the address above and I will forward you the items.

I look forward to hearing from you.

Yours sincerely,
JAN BASHFORD

APPENDIX 3

CANNABIS SCREEN DEVELOPMENT

Specifications

Purpose of Screen

To provide a brief, simple, rapidly-scored/interpreted screen to assist in the reliable identification of *currently* problematic or risky (hazardous/unsafe) cannabis use among the cannabis-using population. Thus, the screen will target cannabis users whose *current* consumption (a) already shows symptoms of/meets criteria for a Cannabis Use Disorder (CUD; i.e., harmful use/abuse, dependence), or (b) while not *currently* meeting criteria for a formal diagnosis, renders them vulnerable to/ 'at risk' of developing, a cannabis use disorder or problems at a future time. Targeting *current* (c/f 'lifetime') consumption/symptoms accords with a Screening/Early Intervention approach. We will use a (maximum) 12-months window to be consistent with DSM-IV and ICD-10 diagnostic criteria.

Intended Application

Cannabis users are a heterogeneous population. The screen is expected to be suitable for routine use among predominant ethnic groups across a variety of health care and community-based settings, e.g:

(a) primary health care (GPs, hospital outpatient, mental health services, psychologists, counsellors, other medical and nursing practices), community-based organizations (probation, social services, education), etc.
(b) useful as a cost- and time-efficient screen in psychiatric epidemiological research, and
(c) as a preliminary screener at admission to (tertiary) substance abuse treatment to identify appropriate targets for in-depth cannabis assessment.

Characteristics

In screen development/item consideration we must keep in mind several attributes which are critical for ready uptake and utility of the screen across these diverse settings in New Zealand. These include:

Psychometric:

Reliability; diagnostic accuracy/validity (sensitivity, specificity); predictive (longitudinal) validity; discriminatory power (to distinguish 'harmful' and 'at risk' diagnostic subgroups) is vital.

Operational:

Parsimony (brief/short as possible), acceptability; simplicity (for self-report/readability, i.e., instructions/wording/format/response options); simple scoring/interpretability (for lay administration; no training necessary).

Content:

The creation/refinement of the initial item pool is a crucial stage in scale construction. Any constraints or limitations to breadth of screen content introduced at the stage of item pool generation could mean that the screen may reflect the best *perceived* selection from a finite group of candidate items – rather than the best

questions *possible.* As with all drugs, harmful and unsafe/risky cannabis consumption exist as continua. Harmful cannabis use can range along the continuum of severity from relatively mild symptoms to seriously/severely symptomatic (usually dependent use). Given the focus on 'risky' or prodromal/pre-clinical cannabis use (i.e. indicative of a developing/incipient CUD) *inclusiveness* is the guiding principle in item generation. In contrast to alcohol, the risk levels of cannabis consumption for physical and psychological harm, including the threshold level for development of cannabis dependence, are unknown. This is further complicated by the wide individual variation in vulnerability to the harmful sequelae of cannabis use. As argued in the development of the AUDIT, therefore, simply using cannabis consumption as 'the' reference variable is not really a viable option as (a) the relationship between levels of consumption/consumption variables may not be strictly linear, and (b) cannabis intake/consumption patterns are not the sole determinants of cannabis-related harm. (One research question will be: **is** there a threshold level of cannabis use after which point harm reported progressively increases in a linear manner as a function of consumption?).

A caveat is warranted: The objective of this research, i.e., to devise a screening instrument for harmful/potentially harmful cannabis use **demands** (by definition) that individual items in the final screen are positively correlated with the cannabis consumption variables. Thus, at this juncture we should aim for cannabis-specific items as research experience, such as development of the AUDIT (Saunders & Aasland, 1987) has revealed these perform best/correlate with the consumption variables. Thus, working from a 'problems' perspective, and making **no** assumptions about the existence of a use disorder (dependence/abuse), care must be exerted to encompass a broad spectrum of problem indicators in potential cannabis-affected life domains—rather than detailed, specific assessment. We need to focus on precursors or good (reliable) early-stage indicators of specific cannabis-related problems. We also need optimally representative items of the particular conceptual domains to capture the whole spectrum of cannabis-related morbidity along the problem severity continuum. Ultimately, however, in order to reconcile brevity with maximum content representativeness, it is hoped (idealized!) that *each item* on the final screen will be a problem indicator scale. This may necessitate some trade-off between length of screen (longer = increased reliability) and "best" items, as ideally the number of items in each content domain should reflect its importance to the target construct. There is a limit to the testing time that participants will endure, however, and we are ultimately aiming for the *minimum* number of items possible. We thus need to reduce our item pool to a manageable group of our "best" items (15-30?) before testing. In addition, as previously noted in Memo 1, a close-as-possible approximation of DSM-IV and ICD-10 diagnostic criteria (the criterion standard) is also desirable for screen validation purposes (but see caveat, below*).

Scoring / Interpretation:

Scoring procedure/format is another important EP consideration. Many existing screens feature a 'yes/no' or 'agree/disagree' response option. Potential cultural issues inhere, however. Note that a binary response format is inimical to Maori experience (see Durie, 2001). Many prominent statisticians criticize the binary approach. A compelling argument can be made for a multidimensional, quantitative, linear (additive) model. The numeric model used can be based on numbers, extent, intensity, degree, or level**.** If each item is itself a multiple-valued (e.g., Likert-type) problem indicator variable scale, every respondent will receive scores on a set of predefined and pre-anchored dimensions. Summation of responses to individual items will yield a mathematical estimate of respondents' status in each of the screen's constituent problem areas, as well as an overall index of cannabis-related disorder or problems (scores can range from 0 - ? with higher scores indicating more severe cannabis-related problems). This maximizes (1) information yielded by the screen (e.g., indicates area to target intervention) and (2) power to discriminate diagnostic subgroups, and (3) identifying the individual's assigned point along the cannabis problem severity continuum based on his/her score.

Validation Issues*

In many respects we are starting from 'scratch'. As with many psychological constructs, there is no universally-accepted 'gold standard' for validation of the cannabis screen; i.e., no established criteria as to what constitutes a 'case' by which the screen's validity (sensitivity/specificity) can be gauged. There is no

existing screen *specific* to cannabis pathology, and there is no **incontrovertible** 'gold standard' for diagnosing CUD. Logically, therefore, there is no 'gold standard' for prodromal/pre-clinical cannabis use problems. At best, we currently have the CIDI (DSM-IV and ICD-10 diagnostic criteria) as the most reliable widely accepted criterion standard for CUD (established cannabis-related pathology). Cannabis is of particular historical significance in New Zealand culture (and 'availability' an important concept in its status). Importantly, however, the conceptual and validation work on substance use disorders concepts and constructs was done almost exclusively in the US and Britain. Although culturally close (and despite the limited cultural range), they may be culturally-specific. Therefore, DSM-IV criteria for diagnosis of a CUD may be too conservative/may underestimate the prevalence of cannabis use disorders in the New Zealand context.

A corollary of this is the potentially poor sensitivity of DSM-IV to pre-clinical cannabis problems; the DSM criteria may be poor indicators of early stage cannabis use problems. Other than lesser (DSM-IV and ICD-10) criteria, no standard exists for a pre-pathological point or threshold on the continuum of cannabis use problem severity. This necessitates a longitudinal component to the research design to identify the optimal point (screen score) for an appropriate *early* intervention. To accommodate validation limitations, the research design incorporates two validation paradigms: (1) Clinician assessments/ratings of participant status on the DSM-IV diagnostic criteria and along cannabis use problem severity continuum, and (2) the CIDI-Auto (Drug Module), a WHO-approved computerized diagnostic interview for generating DSM-IV and ICD-10 diagnoses of CUD (and other drug disorders).

Content Domains

Given the paucity of existing cannabis screens**,** review of the research literature provides little theoretical/empirical basis for a priori specification of a multidimensional model of cannabis use problem severity. This gives rise to the need to assemble a pool of items from the literature, existing instruments and drug assessment interviews, DSM and ICD criteria, etc, that represent a **broad** range of cannabis use problem indicators. Firstly however, we must address the antecedent task – problem domain specification. As Memo 1 advised, the best approach to domain specification for this research appears to be the 'rational approach', an iterative process in which screen domains/items are selected/reduced/refined via EP negotiation and (final) consensus.

Listed below are content domains I have accumulated in my literature reviewing and in consultation. In conjunction with the existing literature, please consider these domain categories in light of your clinical or research experience to identify what you consider the most important domains/variables for predicting and measuring cannabis-related problems. It is not suggested that this list is complete in any way. Your identification of the 'gaps' in this inventory, and your suggestions for additional domains/variables are critical to the representativeness of our sample of items from the whole universe of possible content domains. Please also consider all possible/reasonable levels within each variable you identify (e.g., the number of behaviourally-anchored points/intervals on a Likert scale that are reasonable for the variable---- 5 or 7, e.g. never, yearly, monthly, weekly, daily; never, rarely, sometimes, often, always; unlikely, don't know, likely).

- **NB * ***
  - **(1)** All consequences are negative; 'positive' feelings or outcomes have low face validity for both a 'problems' screen and/or a primary health care setting. The screen must have good face validity so it can be employed as a starting point for intervention/discussion of the individual's cannabis-using behaviour.
  - **(2)** Window is past 12 months.
  - **(3)** **No** assumption about hierarchical importance of domains is made.

Appendix 3
Cannabis Screen Specifications
and Problem Domain Survey


	Domain / Variable	Level	Comments
A.	**Cannabis Consumption** Quantity	Unit – joint? (e.g., cone = ?:" joints)	
	Frequency	Times / "sessions" (at least 1 hour apart ?)	
	"Binge" using?	Time stoned x frequency?	
B.	**Using Behaviour / Dependence** Start day with joint	Likert (times per week)	
	Neglect responsibilities / commitments (avoid when stoned)	Likert (frequency)	
	Loss of control/Failed attempts to cut down	yes/no? or frequency?	
	Longest period of abstinence (past 12 months)	Likert (weeks? days?)	
C.	**Psychological Reactions** Guilt/remorse/regret/shame/worry over use	Likert/frequency	
	Paranoia/hallucinations	Likert/frequency	
	other ?	?	
D.	**Health Effects**		
	Motivation/fatigue/energy loss	Likert	
	Cardio/respiratory	Likert	
	Gastrointestinal/nausea	Likert	
	Blank-out/memory loss	Likert	
	Memory/Cognitive/Concentration Distractibility	Likert	
	Accidents/risk of/hazardous behaviour	Likert	

Appendix 3
Cannabis Screen Specifications
and Problem Domain Survey

	Domain / Variable	Level	Comments
E.	**Social Consequences**		
	Concern from others/advice to cut down	Likert	
	Interpersonal conflict	Likert	
	Role performance interruption (e.g., parental, marital, work)	Likert	
	Friends/peer group ?	Likert	
	Employment/Education	Likert	
	Financial	Likert	
	Legal/Criminal	Likert	
F.	**Adjuncts**		
	Acknowledgement of a cannabis use problem		
	Perception of Risk		
	Readiness to Change / Help-seeking		

Further Comments:

Name: _____ Date: _____

Thank you very much for your comment and input into this study.

Appendix 4
EP Memo 3:
Domain Survey Feedback

APPENDIX 4

CANNABIS SCREEN DEVELOPMENT

EXPERT PANEL

Memorandum 3: Feedback from Domains Survey

Greetings to all,

My sincere thanks to all for the time and energy you devoted to completing the Domains survey recently. As emphasized in Memo 2, since no existing data-analytic technique can remedy serious deficiencies in an item pool, the creation/refinement of the initial item pool is the pivotal stage in screen construction. This cannot be overstated. The responses returned by most of the Panel reflect both an appreciation of the complexity of the issues that characterize this stage of screen development, and a commendable approach to the demands of the task. The breadth/diversity of your responses was considerable - if not daunting. Ergo, it has been a challenge to collate and summarize these contributions in a manageable, concise form without losing the essence of any one promising suggestion! With this caveat, a summary of your collective responses to the life domains/variables provided in the first round follows. This is prefaced by several critical points that must be kept foremost in mind during the entire process of cannabis screen construction:

- the cannabis screen will target both harmful cannabis use (CUD; Dependence/Abuse) *and* potentially harmful ('at risk', unsafe) cannabis use, thus
- we need to focus on precursors or good (reliable) *early-stage* indicators of specific cannabis- related problems, as well as symptoms of established CUD
- while on the one hand it is vital to include a broad range of cannabis problem indicators in the emerging screen, on the other (1) this strategy could lead to content irrelevancy/loss of specificity (2) there are (finite) limits on the testing time we can expect respondents to endure
- Accordingly, in each successive round of the iterative EP process careful attention to selection of the most apposite questions possible (at the very least intuitively) for measuring/predicting cannabis use problems is critical to adequate - and hopefully good! – screen performance.

DOMAINS/VARIABLES: Expert Panel Perspectives

A Foreword:

At the Panel meeting during Cutting Edge it was pointed out that language has a temporal (and even spatial/geographic) dimension. As in any life activity, meanings change over time and quickly become dated in the area of drug use. Thus, use of trendy, vernacular, or colloquial terms is inadvisable in a drug screen as this can damage credibility, and even invite ridicule. Another related language aspect is the ongoing emergence of new cannabis variants. The prudent way to proceed, therefore, is to use widely used, conceptually simple (concrete), jargon-free terms and phraseology.

Most of the EP appeared to find the presented domains/variables comprehensive. Several additional variables were suggested. These are listed for your consideration after the feedback that follows.

Appendix 4
EP Memo 3:
Domain Survey Feedback

A. CANNABIS CONSUMPTION (Quantity, Frequency, 'Binge' using)

This is both a key area and a difficult section to report on. Arguably, these are the most important variables, and well worth the time/energy invested to face the challenge they present. Certainly your responses reflect the complexity of the issues involved in any attempt at quantification of cannabis intake:

- *'Quantity'*: Unlike 'standard' units of alcohol (and even this is problematic) no robust measure exits to accurately capture an absolute amount (or 'unit') of THC. Several responses suggested the "joint" as the basic unit (and joints by days/times used as the Q/F index). However, others suggest that even a "joint" would be at best a blunt measure. To further complicate, potency is not well captured by terms in current use. Thus, rather than 'quantity' per se, a more appropriate term is *'Quality'* (operationalised as cannabis variants) which provides a (somewhat rough) guide to potency. In particular, panellists suggest that asking users' *preference* for a particular variant in addition to which product they *typically use* provides indices of (1) user's knowledge of the drug market (2) potency preferred, and thus (3) intuitively – tolerance.

- There are, nevertheless, serious limitations with the notion of directly comparing the quality of different forms of cannabis. This would arise, for example, in following the measurement approach suggested by several panellists, i.e. creating a graduated scale (intended to represent increasing potency) of cannabis products, as it is extremely difficult to compare quality of the different forms of cannabis. Rather than a horizontal scale-type format, therefore, it is advisable that the variants commonly used be presented on separate lines (vertical format) and only roughly in order of increasing potency.

- *'Frequency'* of use was endorsed by all panellists, and clearly appears to be a useful indicator of potential problems. However, attempts to measure this variable (either numerical - 'times used', 'sessions' - or temporal, such as 'time/hours stoned') are also fraught with difficulties associated with the subjectivity/self-estimation of the 'stone' experience (when 'stoned'/when not 'stoned'; when does one 'session' end and another start) and the number of joints actually used when 'stoned' (some shared, some not, etc). At best, therefore, responses would be impressionistic only, and at worst could ultimately prove to be meaningless/useless.

- Panel comments further suggest that, in fact, separating Quantity/Frequency of cannabis use is somewhat artificial, as - logically - "the more often you smoke the more you smoke". However, the level of *perceived* intoxication is less the more often you smoke, because of either physical tolerance and/or compensatory behaviour. Thus, when asked "how many hours were you stoned on a day when you were using cannabis?" only early users will typically report spending long periods of time 'stoned'. Hours 'stoned' on a typical day of cannabis use, therefore, has potential as it facilitates an estimation of chronicity of use? This perspective, however, is not shared by all Panel members.

- In direct contrast to alcohol, 'Binge' use appears to be quite problematic for cannabis. Several of the panel left this category blank, while others questioned the appropriateness of this variable to cannabis use. Given the existing measurement challenges in quantifying cannabis consumption/involvement, attempting to capture 'binge' use of cannabis (as a discrete behavioural pattern) seems misguided?

Summary:
Quantification of cannabis use is complex and problematic. In particular, 'quantity' questions are too technical, and any responses likely to be at best impressionistic, and at worst – meaningless/useless. 'Quality' is a more appropriate concept, providing information about

cannabis users' preferences for a particular potency. 'Frequency' of cannabis use is strongly endorsed as a useful indicator of potential problems, but demands careful consideration of response options. 'Binge' use appears to have little support as a candidate item in a brief cannabis screen.

B. USING BEHAVIOUR/DEPENDENCE (DSM-IV Criteria - 12 months)

Start day with joint:
Most panellists endorsed inclusion of this question with a Likert-type response option. One panellist (correctly) observed that "this was not early screening". However, since we are targeting the whole spectrum of cannabis use problem severity, from non-problematic to severely/seriously dependent use, inclusion of this question would seem advisable – at least in the initial testing of the screen.

Neglect responsibilities/commitments and expectations (default when stoned):
These criteria also gained support. However, several panelists cautioned that the meaning of "what was normally expected of you" and "commitments/responsibilities" be clarified/spelled out to respondents. Since this item requires some insight on the part of the respondent, specifying potential examples of these phenomena may facilitate more reliable and accurate/valid reporting.

Loss of control/Failed attempts to cut down:
Again, these (cardinal DSM-IV) criteria met with panel support. One comment was, however, that these are two separate variables (the former event-by-event based, and the latter a longer-term perspective) and therefore should be represented by two separate items.

Longest period of abstinence (past 12 months):
While conceptually part of the previous criteria (Loss of control/Failed attempts to cut down) panel endorsement of this variable suggests that in itself this would be an additional useful indicator of degree of control the user has over his/her cannabis use. Well-planned (Likert-type) response options could yield valuable information.

C. PSYCHOLOGICAL REACTIONS

Several important points preface this section:

(1) the key emphasis here is on psychological *reactions* to cannabis use (and not, for example, an organic aetiology, a result of a mental health disorder, or injury). Thus,

(2) there needs to be a clear cause-effect link to cannabis use

(3) categories such as hallucinations (and depression) must be separated out –or removed –as it would be extremely difficult (if not impossible) to separate cannabis-induced hallucinations or depression from a pre-existing (dual diagnosis) or latent pathology in a brief screen?

(4) the concepts/wording need careful consideration for cultural appropriateness.

Guilt/remorse/regret/shame/worry over use:
As expected, there was strong support for this (DSM-IV-type) variable. As noted above, the wording requires careful thought. For example, one respondent suggested that 'shame' (a social concept experienced personally) is well understood by Pacific Nations people while 'guilt' (an internal, psychological concept) is not. These cultural considerations are very important (see Memo 2).

Paranoia/hallucinations:
Perhaps a good summary of responses to this variable was the comment "very important domain variable". It was suggested that the hallucinations variable should be removed, however, as this experience is "normally a bonus (for the user) and not a negative". In Memo 2 it was proposed

Appendix 4
EP Memo 3:
Domain Survey Feedback

that all consequences are negative, as 'positive' feelings/outcomes have low face validity for both a 'problems' screen and/or a primary health care setting.

Maintaining the focus on negative *reactions* to cannabis use, it was suggested that 'anxiety' would be a "goer" (e.g., how often have you become paranoid or anxious after using cannabis?). This could be presented in two separate questions. Given their status in the drug (and particularly cannabis) literature, paranoia/anxiety appear to be worthwhile candidate variables for the screen.

D. HEALTH EFFECTS

Motivation/fatigue/energy loss
Although endorsed as a screen candidate, this variable was perceived as "a challenge to capture in a question". Suggestions focused on loss of interest in, and/or difficulty experienced in finishing or completing projects/activities once started, and which had been previously enjoyed or seen as important. Other suggestions included failing marks/grades, loss of employment, etc. Given the historical status of this variable in the cannabis literature ('amotivational syndrome') perhaps these elements could be combined and the latter outcomes specified (along with others) as examples?

Cardio/Respiratory
While viewed as a potential item, panelists raised the difficulties involved (1) separating out the (confound) effect of tobacco use and (2) any question on this variable is quite nonspecific to cannabis. It may be advisable, therefore to omit this variable in a *brief* screen?

Gastrointestinal/nausea
This variable received a very lukewarm response. Thus, because subject to the same ('nonspecific') difficulties as the previous variable, perhaps also best to leave out?

Blank-out/memory loss
Lack of comment on this variable is ambiguous. It was suggested, however, that this phenomenon is both "very rare and not that diagnostically useful". Given this, it may be more appropriate to capture the intent of the construct in the following item.

Memory/cognitive/concentration/distractibility
This variable received strong support. As a cardinal cannabis concept, concentration/distractibility appears an essential item – at least in the emerging screen. The necessity for concrete language was emphasized. Again this outcome must be cannabis-linked and not a function of, for example, head injury.

Accidents/risk of/hazardous or risky behaviours
Again, perceived to be a good (DSM-IV) variable by all. However, the need to attend to language ("be specific") to avoid confusion among this population was stressed. Specifically, suggestions include separation of accidents from 'risky' behaviours by calling them 'injuries' with an injury threshold (e.g., an injury requiring some form of treatment). Various 'risky' behaviours were suggested, ranging from - driving a vehicle, operating machinery, boating, swimming, hunting, going to work/school 'stoned' - to risky sexual behaviour when 'stoned'.

E. SOCIAL CONSEQUENCES

Concern from others/advice to cut down
Endorsed by all, and described as "very important" this (DSM-IV) variable is clearly a screen contender.

Interpersonal conflict
Perspectives on this (DSM-IV) variable were diverse. It was pointed out that some of the heaviest cannabis use might occur in supportive social environments (e.g., family/whanau, friends who are users) and conflict may only arise when a user attempts to reduce consumption/abstain. Another perspective supporting this notion was that some groups (e.g., Rastafarians) regard cannabis as an important aspect of culture/spirituality. Clearly (as one panelist cautioned) this construct "would

need spelling out". A second caution was that conflict must be clearly linked to cannabis use. A further perspective conceptualized this variable in terms of a loss of ability to communicate freely, i.e. having to deceive/lie to cover up for use to family or friends who would not approve of cannabis use (indirect conflict). It is clear that a question on this variable would need careful specification.

Role performance interruption (marital, parental, work/education)
The minimal interest this (DSM-IV) variable appeared to evoke suggests that the intended content of this variable might be better incorporated in the variable 'neglect of commitments and responsibilities/failure to do what was expected of you' where specific examples of these behaviours might be specified.

Friends/peer group
Drawn from the cannabis literature (the 'drug/cannabis subculture' peer group and/or alienation/isolation from non-using peers) this variable gained support as an indicator of cannabis involvement. A possibility is spending *more* or *less* time with non-using friends with a Likert-type response format along a continuum.

Employment/Education
While not giving rise to many Panel comments, this outcome variable is prominent in the cannabis literature, thus would seem a likely candidate item for the provisional screen, at least? Questions might ask, e.g., if user has missed any days/been absent from school/work because of cannabis use (although this could also be addressed in the 'failure to meet commitments/do what was expected of you' variable). Other suggestions were frequent changes of employment/difficulty maintaining a job, or deciding what job to do, because of cannabis use. Failing marks at school was another suggestion (see motivation/fatigue/energy loss variable, above).

Financial
While seen by all Panel as important, this (DSM-IV-type) variable is problematic. Some users spend money on cannabis, others make money on cannabis. A scale to capture this continuum (maximum 'negative' cost through to considerable gain/benefit) was suggested. An alternative suggestion was two separate questions ("How much do you make/spend on cannabis per week"). While the desirability of 'negative' consequences in a 'problems' screen is an issue here (and we would essentially be looking for 'amount spent' as a problem indicator) the reality of cannabis distribution in New Zealand may require that we include the 'make/gain' category in the interim screen?

Legal/Criminal
Convicted of a crime committed to make money to obtain cannabis (burglary/fraud), committed while 'stoned'/intoxicated, or convicted while just 'hanging out' (possession) – i.e. DSM-IV criteria--were suggestions for this variable. Number of offences (Likert responses) and/or type of offences were also suggested. Stealing from family/friends (to buy cannabis) was a further suggestion.

F. ADJUNCT ITEMS

(*Acknowledgement of a cannabis use problem, Perception of Risk, Readiness to Change/Help-seeking).*
Consensus indicated the perceived importance of this domain and all constituent variables. In general population or primary health care settings, these questions have clear potential as facilitators of discussion about the user's cannabis consumption and need for brief intervention/referral.

PANEL SUGGESTIONS

Consumption Variables:
Preferred method of administration (smoking, spotting, bongs, eating), Tolerance (sessions increased and/or using more to get stoned now than 12 months ago; or spending more on cannabis now than 12 months ago).

Appendix 4
EP Memo 3:
Domain Survey Feedback

Other:
Heavy use of alcohol and other drugs by family members; Communication in relationships (e.g. ability to express oneself); Spirituality/well-being; Cultural/religious status reason for using (e.g., Rastafarian); Sub-culture disapproval (friends' disapproval of cannabis use); User's concern for own health; Strategies used to obtain cannabis (What have you had to do to get cannabis? Does this concern you?); Reduction in social activities (sports, hobbies, etc) because of cannabis use.

General:
A further suggestion was the inclusion of a standard, 'Does this concern you? (with a 'Yes/No' response option) following each question asking about the negative consequences experienced after cannabis use (as a measure of motivation/readiness-to-change).

CONCLUDING COMMENTS:
Providing feedback that takes account of every single suggestion in a conscientious attempt to collate/evaluate the combined weight of support for each Domain/variable has been a challenge! I trust I have not overlooked/underestimated any single contribution. It would be unwise, indeed, to bring premature foreclosure on potential screen content at this early stage. This serves to underscore the necessity to keep the EP process iterative, recursive, and open-ended throughout screen construction/refinement. Accordingly, I welcome comment on this summary, and I look forward to your further suggestions and perspectives.

Your next task will be selecting from an item pool the particular items that you consider most appropriate/most representative of the above domains/variables for cannabis use/users.

MY SINCERE THANKS TO ALL ---- YOUR INPUT IS APPRECIATED!

Appendix 5
Revision 1 and 2 of the
Question Pool

APPENDIX 5

QUESTION POOL FOR CANNABIS SCREEN (1)

Filter/stem questions: Have you ***ever*** used cannabis? YES NO

***If* YES**: Have you used cannabis during the past 12 months? YES NO

***If* YES**: **Please answer the following questions about your cannabis use.**
All questions apply to your CANNABIS USE DURING THE PAST 12 MONTHS.

DOMAIN/Variable **(DSM-IV and ICD-10 Criteria)**		***Question***
A. Cannabis Consumption		
Quality:		
Preference (potency)	(a)	What cannabis products do you prefer to use? 1= Cabbage/Leaf; 2=Bush/Heads; 3= Commercial Oil, 4= Hash; 5= Skunk/Hydro, 6= Gold Oil; 7= Head Oil; 8= Other
Most often/usually use	(a)	What cannabis products do you use most often? 1= Cabbage/Leaf; 2=Bush/Heads; 3= Commercial Oil, 4= Hash; 5= Skunk/Hydro, 6= Gold Oil; 7= Head Oil; 8= Other
Frequency:	(a)	How often have you used cannabis during the past 12 months ? 0= Never; 1= not in the last 6 months, 2=monthly or less; 3= 2-3 x month; 4= weekly; 5= twice/wk; 6=3-4 x wk; 7= daily/almost daily
	(b)	During the past 12 months how many times/sessions would you use cannabis on a typical day when you were using? 0= no use; 1= once; 2= twice; 3= 3-4 times; 4= 5-6 times; 5= 7-9 times; 6= 10 or more times.
Temporal/Hours stoned:	(a)	During the past 12 months how many hours were you 'stoned' on a typical day when you had been using cannabis? 0= none/less than 1; 1= 1 or 2; 2= 3 to 4; 3= 5 to 6; 4 = 7 to 9; 5= 10 to 12; 6= all day/all the time)
	(b)	Are you spending more and more time stoned now than you were 12 months ago? 0= much less time; 1= a bit less time; 2 = about the same time; 3= a bit more time; 4= a lot more time; 5= much more time

Appendix 5
Revision 1 and 2 of the
Question Pool

B. Using Behaviour/Dependence

Experimental/vs Dependence
(Reason/Motivation for Use):

(a) Over the past 12 months have the ***effects*** of cannabis been more important to you than the ***adventure*** or ***excitement*** of use?
0= No, definitely not = 0; Probably not = 1; Not sure/don't know = 2
Possibly/ maybe = 3 ; Yes, definitely = 4

(b) Why did you use cannabis over the past 12 months?
I use/used cannabis because……..(***tick every category that applies to you):***

Its cool
its exciting
my friends use it
everyone uses it
its easy to get/obtain
it makes me feel better about myself
it helps me fit in, socialize, and relate to others better
it makes me happy, find things funny, laugh a lot
it helps me get more out of life
it makes me hallucinate
it makes me dream
it increases sexual experience/ makes sex more enjoyable
it stops/reduces pain
it helps me relax/sleep
it calms/controls my anger
it reduces boredom
it fills in time/its something to do; there's nothing else to do
it helps me forget and escape bad feelings (loneliness, anxiety, depression)
I can't stop using it

Genetic/Environment:
(Familial Drug Use)

(c) Are, or were, any members of your family (mother, father, brother, sister) heavy users of alcohol, cannabis, or any other drugs?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

Categories OK? or make them more specific (Yes/No) ?

Start day with joint:

(DSM-IV criteria no 2-
ICD-10 criteria 3-
withdrawal avoidance)

(a) During the past 12 months how often did you need to use cannabis first thing in the morning to get yourself going?

0=never; 1= once or twice; 2= less than monthly; 3=monthly;
4= weekly; 5= several times a week; 6= daily/always

(b) Over the past 12 months would you usually use cannabis in the morning to get yourself going?
0= never; 1 = rarely; 2= sometimes; 3= quite often;
4= often; 5= very often; 6= always

Appendix 5
Revision 1 and 2 of the
Question Pool

(c) Do you like to get stoned in the morning?
0= never; 1 = rarely; 2= sometimes; 3= quite often;
4= often; 5= very often; 6= always

Tolerance

(a) Are you using/do you need to use more cannabis to get stoned/high now than you were 12 months age?
0= No, definitely not = 0; Probably not = 1; Not sure/don't know =2
Possibly/ maybe = 3 ; Yes, definitely = 4

Withdrawal:

(a) Over the past 12 months have you had/experienced headaches, cravings, or felt irritable when you tried to cut down or stop using cannabis ?
0= never; 1 = rarely; 2= sometimes; 3= quite often;
4 = often; 5= very often; 6= always

(b) Over the past 12 months did you feel restless, irritated, grouchy, anxious or depressed when you could not use cannabis?
0= never; 1 = rarely; 2= sometimes; 3= quite often;
4 = often; 5= very often; 6= always

(c) Over the past 12 months did you crave for or "miss" cannabis when you could not use it for a while?
0= never; 1 = rarely; 2= now and then/sometimes; 3= quite often;
4 = often; 5= very often; 6= always

Loss of control:
(DSM-IV criteria 3)
(ICD-10 criteria 2)

(a) During the past 12 months how often did you find that once you had started using cannabis you could not stop?
0= never; 1= once or twice; 2= less than monthly; 3=monthly;
4= weekly; 5=several times a week; 6=daily/always

(b) During the past 12 months have you ever been unable to stop using cannabis when you wanted to?
0= Never; 1= rarely; 2= now and then/sometimes; 3= quite often ;
4= often; 5= very often; 6= always

(c) Over the past 12 months did you find it difficult to cope with life without cannabis?
0= Never; 1= rarely; 2= now and then/sometimes; 3= quite often ;
4= often; 5= very often; 6= always

(d) Over the past 12 months have you felt that you were "hooked' on cannabis?
0= Never; 1= rarely; 2= sometimes; 3= quite often;
4= often; 5= very often; 6= always.

(e) During the past 12 months did you ever think your cannabis use was out of control?
0= Never; 1= rarely; 2=sometimes; 3= quite often;
4= often; 5= very often; 6= always.

Appendix 5
Revision 1 and 2 of the
Question Pool

	(f)	Over the past 12 months have you ever felt unable to control your cannabis use? 0= Never; 1= rarely; 2= sometimes; 3= quite often; 4= often; 5= very often; 6= always.
	(g)	How often over the past 12 months did you wish you could stop using cannabis? 0= Never; 1= rarely; 2= sometimes; 3= quite often; 4= often; 5= very often; 6= always.
	(h)	How difficult do you think you would find it to stop using or go without cannabis? Not difficult =0; unsure/don't know =1; a bit difficult =2; quite difficult = 3; very difficult = 4; impossible = 5
Longest period of abstinence: (DSM-IV criteria 3) (ICD-10 criteria)	(a)	Over the past 12 months what was the longest period/ time that you abstained from/went without using cannabis (or during which you did not use any cannabis?) 0= 3 months or longer; 1= one or two months; 2= 2-3 weeks; 3 = one week; 4= 2-3 days; 5 = one day; 6= less than one day/no abstinence
Failed attempts to cut down (DSM-IV criteria 4) (ICD-10 criteria 1 and 2)	(a)	Over the past 12 months how often would you try to cut down/reduce your cannabis use, or (quit) stop using altogether, but found you couldn't/were unsuccessful ? 0= Never; 1 = once or twice; 2= less than monthly; 3= monthly; 4= weekly; 5= several times a week; 6=daily/all the time
	(b)	During the past 12 months did you find it difficult to get through a day using cannabis? 0= Never; 1= rarely; 2= sometimes; 3= quite often ; 4= often; 5= very often; 6= always
	(c)	Over the past 12 months how often did your longing for cannabis become so strong that you could not help/resist/stop using it? 0= Never; 1= rarely; 2= now and then; 3= sometimes; 4= quite often; 5= very often; 6= always
	(d)	How often over the past 12 months did you start using cannabis and then found it difficult to stop before you became completely intoxicated or 'stoned'? 0= Never; 1= rarely; 2= sometimes; 3= quite often 4= often; 5= very often; 6= always
	(e)	Over the past 12 months did you ever start using cannabis when you had decided not to? 0= Never; 1= rarely; 2= sometimes; 3= quite often; 4= often; 5= very often; 6= always.
Preoccupation Salience (DSM-IV Criteria 5)	(a)	During the past 12 months have you spent a lot of time thinking about cannabis or trying to get cannabis? 0= Never; 1= rarely; 2= sometimes; 3= quite often; 4 = often; 5= very often; 6= always

Appendix 5
Revision 1 and 2 of the
Question Pool

(b) Over the past 12 months did you find yourself thinking about when you would next be able to use cannabis/get stoned?
0= Never; 1= rarely; 2= sometimes; 3= quite often;
4 = often; 5= very often; 6= always

(c) Over the past 12 months have you given up or neglected activities which you used to enjoy (hobbies, interests, pastimes, sports, social clubs or outings) or thought were important, because of your cannabis use?
0= Never; 1= rarely; 2= sometimes; 3= quite often;
4= often; 5= very often; 6= always.

(d) Over the past 12 months have you given up any recreational activities or hobbies you once enjoyed for cannabis use?
0= Never; 1= rarely; 2= sometimes; 3= quite often;
4= often; 5= very often; 6= always.

(e) Over the past 12 months would you say that you have neglected or given up other pleasures or interests in favour of using cannabis?
0= Never; 1= rarely; 2= sometimes; 3= quite often;
4= often; 5= very often; 6= always.

C. Psychological Reactions

Guilt, remorse, shame, regret
(DSM-IV criteria 7)

(a) During the past 12 months how often have you felt guilty or ashamed after using cannabis?
0=Never; 1= rarely; 2= now and then; 3=sometimes; 4=quite often;
5=very often; 6=always/all the time

(b) Over the past 12 months after using cannabis how often did you regret it?
0=Never; 1= rarely; 2= sometimes; 3=quite often;
4= often; 5=very often; 6=always/all the time

Worry about use

(a) How often over the past 12 months have you felt worried about the effects of your cannabis use?
0=Never; 1= rarely; 2= =sometimes; 3=quite often;
4 = often ; 5=very often; 6=always/all the time

Paranoia Anxiety

(a) During the past 12 months have you experienced paranoid episodes after using cannabis?
0=Never; 1= rarely; 2= sometimes; 3=quite often; 4= often;
5=very often; 6=always/all the time

(b) How often during the past 12 months did you get/feel paranoid or anxious after using cannabis?
0=Never; 1= rarely; 2==sometimes; 3=quite often; 4 = often;
5=very often; 6=always/all the time

Appendix 5
Revision 1 and 2 of the
Question Pool

(c) How often over the past 12 months did you become frightened or panicky after using cannabis when there was no good reason to be afraid?
0=Never; 1= rarely; 2= sometimes; 3=quite often; 4 =often;
5=very often; 6=always/all the time

(d) Over the past 12 months how often did you find that using cannabis makes you anxious, paranoid (suspicious) or distrustful?
0=Never; 1= rarely; 2= sometimes; 3=quite often; 4 = often;
5=very often; 6=always/all the time

D. Health Effects
(DSM-IV Criteria 7) (ICD-10 Criteria 6)
Physical or Psychological Harm
(Composites)

(a) At any time during the past 12 months do you think that using cannabis harmed your health or made you unwell?
No, definitely not =0 ; Probably not = 1 ; Not sure/don't know =2 ;
Possibly/ maybe = 3 ; Yes, definitely =4

(b) Do you think that using cannabis over the past 12 months has made your general health poorer than usual?
No, definitely not =0 ; Probably not =1 ; Not sure/don't know = 2 ;
Possibly/ maybe = 3 ; Yes, definitely =4

Nausea/Pain

(c) After smoking cannabis have you had trouble with pains (e.g., chest, lungs, or stomach) or nausea (felt or been sick) over the past 12 months?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

Fatigue/Motivation or Energy Loss
(DSM-IV Criteria 6)

(a) Over the past 12 months have feelings of tiredness, fatigue, or lack of energy after using cannabis made it harder for you to finish things or get things done?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

(b) Because of cannabis use over the past 12 months have you lacked the energy to get things done in the way you used to ?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

Memory/Cognitive Concentration Distractibility

(a) Over the past 12 months have you had problems concentrating and remembering things after using cannabis?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

(b) Over the past 12 months have often have you had problems with your short-term memory after cannabis use?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

Appendix 5
Revision 1 and 2 of the
Question Pool

(c) Over the past 12 months, did you find you often forgot things after using cannabis? (e.g., meetings, appointments, promises made, past events, study/learning, , things you had to do)
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

(d) After using cannabis how often over the past 12 months would you start to do something then get distracted and forget what you were going to do?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

(e) During the past 12 months have you soon lost interest in, or found it hard to finish things that you previously enjoyed or were important to you? (e.g., hobbies, interests, assignments, playing sport, etc)
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

(f) Over the past 12 months when trying to do something how often did you find that you were easily distracted because of cannabis use?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

(g) Over the past 12 months have you found it more difficult to understand new information or to study because of cannabis use?
0=Never; 1= rarely; 2=sometimes; 3=quite often; 4 = often
5=very often; 6=always/all the time

Risky/Hazardous Behaviour
(DSM-IV A2 Criteria)
(ICD-10 Harmful Use)

(a) Over the past 12 months have you engaged in/done any of the following activities/things after using cannabis?
Check every activity that applies to you:
Driving a vehicle
operating machinery
drink alcohol
use other drugs
boating
climbing
swimming/diving
hunting/forestry work
gone to work stoned
gone to school stoned
family outings/social events
Hung out in town stoned
risky sex (unprotected)

Injuries/ Accidents

(a) During the past 12 months has your cannabis use resulted in you or someone else receiving an injury that required medical treatment?
No = 0
Yes = 1

(b) After using cannabis have you accidentally injured yourself or someone else during the past 12 months?
No = 0
Yes = 1

Appendix 5
Revision 1 and 2 of the
Question Pool

E. Social Consequences
(DSM-IV Abuse Criteria) (IDC-10 Harmful Use)

(**Composite** item) (a) During the past 12 months how often has your cannabis use led to health, social, legal or financial problems?
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Neglect responsibilities/ commitments when stoned: (DSM-IV criteria A1) (ICD-10 criteria 5)

(a) During the past 12 months how often have you neglected your responsibilities, or failed to do what you were expected or supposed to do because of cannabis use?
(e.g., been late for, or absent from, work or class, failed to pay rent on time, look after children responsibly, neglect household duties, let down a partner, friend, or family member; failed to visit family; failed to complete a task, assignment, or job adequately; missed an appointment, practice, or training, etc; suspension/expulsion from school, got into trouble at work or fired from job, etc)
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

(b) Over the past 12 months have you planned to do something, or been expected to do something, and then not been able to because of being stoned/cannabis use?
0= Never; 1= rarely; 2=sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

(c) Over the past 12 months have you ever been unable to carry out your usual responsibilities or what you were supposed to do because of your cannabis use?
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Concern from others, advice to cut down

(a) Has a partner, relative, friend, or a doctor or other health worker been concerned about your cannabis use or suggested you cut down over the past 12 months?
No = 0
Yes = 1

(b) Has anyone (partner, relative or a friend, a doctor or a nurse, or anyone else) expressed concern over your cannabis use or told you to stop using cannabis over the past 12 months?
No = 0
Yes = 1

(c) Have people close to you complained about your cannabis use during the past 12 months?
No = 0
Yes = 1

(d) During the past 12 months has anyone said that you use too much cannabis?
No = 0
Yes = 1

Appendix 5
Revision 1 and 2 of the
Question Pool

(e) Over the past 12 months has anyone (partner, family, friends) said that you use more cannabis than is good for you?
No = 0
Yes = 1

(f) Over the past 12 months has your cannabis use ever created problems between you and your partner, parents, or other close relative?
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Friends/Peer group association
(DSM-IV Criteria 6)
ICD-10 Criteria 5

(a) Over the past 12 months have you spent *more* or *less* time with family and friends who do not use cannabis?
0= much less time; 1= a bit less time; 2 = about the same time/no change; 3= a bit more time; 4= a lot more time; 5= much more time
[* Note scoring reversal – so may need to change item wording to keep scoring consistent/simple, ie. 'friends who use cannabis?').

(b) Do you have any close friends who are *not* cannabis users?
Yes = 0
No = 1

(OR)

(c) Have you any friends or peers who do *not* use cannabis?
Yes = 0
No = 1

(d) Over the past 12 months did you spend more time with friends who use cannabis than other kinds of friends?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know = 2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

(e) Over the past 12 months, have you spent more and more time alone when using cannabis/so that you could use cannabis?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know = 2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

(f) Over the past 12 months have you tended to smoke more on your own than you used to?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know = 2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

(g) Over the past 12 months did your friends criticize you for using too much cannabis?
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

(h) Have you lost any friends because of your use of cannabis over the past 12 months?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know =2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

Appendix 5
Revision 1 and 2 of the
Question Pool

Financial

(a) On average how much would you spend on cannabis per week over the past 12 months?
(In dollars ($)
0 = 0; 0-25 = 1; 26-50 = 2; 51-75 = 3; 76-100 = 4; 101-150 = 5; over $150 = 6

(b) On average how much did you make off cannabis per week over the past 12 months?
$0 = 0; up to $25 = 1; up to $50 = 2; up to $75 = 3; up to $100 = 4; up to $150 = 5; over $150 = 6
[* NB. Scoring in the *same* direction denotes level of cannabis involvement]

(c) Over the past 12 months did you ever spend more than you could afford or get into serious money problems because of your cannabis use?
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Legal/Criminal

(a) Have you been arrested or convicted of a crime because of your cannabis use during the past 12 months? (e.g., a crime committed while stoned, or to make money to buy cannabis; cannabis possession; cannabis supply, etc).
No = 0
Yes = 1
[Are we interested in further elaboration of offences/number?]

E. Adjunct Items

Insight/Acknowledgement of a Cannabis Use Problem

(a) Do you think you have a cannabis use problem at present?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =
(** Scoring?)

(b) Do you think that using cannabis is causing you problems?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(c) Do you think that you use too much cannabis?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(d) Do you ever think that your cannabis use is a problem?
0= Never; 1= rarely; 2= sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

(e) Is cannabis use affecting you in ways you do not like?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely = .

Appendix 5
Revision 1 and 2 of the
Question Pool

(f) Are you concerned or worried about your cannabis use ?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely = .

(g) Do you wish you could stop using cannabis? (** see Loss of Control (g))
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =
(* Scoring? since respondent view not necessarily
"correct"/insightful about own problem/in own best interests!!)

Risk Perception; Attitude

(a) Do you think you are at risk of developing/could develop cannabis use problems if you continue using as you are now?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(b) Do you think that cannabis is addictive or harmful?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

Readiness To Change; Help-seeking

(a) Do you want to reduce or quit your cannabis use?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(b) Would you like some assistance to help you reduce or quit your cannabis use?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =
(This response format might uncover any ambivalence ?)

Appendix 5
Revision 1 and 2 of the
Question Pool

QUESTION POOL FOR CANNABIS SCREEN (2)

Filter/stem questions:

Have you ***ever*** used cannabis? **Yes** **No**

If "**Yes**": Have you used cannabis during the past 12 months? **Yes** **No**

If "**Yes**": **Please answer the following questions about your cannabis use.**
Please tick the box that is most correct for you over the PAST 12 MONTHS

DOMAIN/Variable **(DSM-IV and ICD-10 Criteria)**		***Question***
A. Cannabis Consumption		
Quality/Potency:		
Preference	(a)	What cannabis products do you prefer to use? **(OR) What type of cannabis do you prefer to use?** 0= No preference; 1= Cabbage/Leaf; 2=Bush/Heads; 3=Commercial Oil; 4= Hash; 5= Skunk/Hydro, 6= Gold Oil; 7= Head Oil;
Most often/usually use	(b)	What cannabis products do you use most often? **(OR) What type of cannabis do you use most often?** 0= No preference; 1= Cabbage/Leaf; 2=Bush/Heads; 3=Commercial Oil; 4= Hash; 5= Skunk/Hydro, 6= Gold Oil; 7= Head Oil;
Frequency	(a)	How often have you used cannabis during the past 12 months? 0= not in the last 6 months, 1= once a month or less; 2= 2-3 days a month; 3= once a week; 4 = 2 days a week; 5 = 3-4 days a week; 6= 5-6 days a week; 7 = daily/every day.
	(c)	During the past 12 months how many times have you used cannabis on a typical day when you were using? 1= once; 2= twice; 3= 3-4 times; 4= 5 - 6 times; 5= 7-9 times; 6= 10 or more times.
Increased use	(c)	Are you using ***more*** or ***less*** cannabis now than you were 12 months ago? 0= Much less; 1 = a bit less; 2 = No change/same or similar; 3= a bit more; 4 = much more

Appendix 5
Revision 1 and 2 of the
Question Pool

B. Using Behaviour/Dependence
Experimental/social vs Problem Use

Stated reason(s) for use (a) I use cannabis because**…..…(tick what applies to you):**
(or: tick EVERY thing/reason that applies to you)

It's cool/fun
my friends use it
it's easy to get/obtain
it's safer than alcohol
it makes me feel good/better about myself
it helps me fit in, feel part of the group, and relate to others better
it makes me happy, find things funny, and laugh a lot
everyone uses it
it helps me get more out of life
it helps me cope with problems and stress
I like it/like the 'buzz'
I can't stop using it
it makes me hallucinate
it improves my creativity/enjoyment (films, music, crafts, etc)
it is important to me for spiritual reasons
it makes sex better/more enjoyable
it stops/reduces pain
it helps me relax/sleep
it calms/controls my anger
it reduces boredom
it fills in time/its something to do; there's nothing else to do
it helps me forget and escape bad feelings (loneliness, anxiety, depression)
it helps my appetite
it's exciting

Genetic/Environment

(a) Have **any** members of your family/whanau/aiga (including grandparents and other relatives) ever been heavy users of, or had problems with, alcohol, cannabis, or any other drugs?

No, not one =
Yes, at least one =
Yes, several =
Don't know =

<u>Withdrawal Relief/ Avoidance</u>

Start day with joint (a) Do you like to get stoned in the morning?
0=never; 1= rarely; 2= occasionally; 3=quite often;
4= often; 5= very often; 6 = always/all the time

(b) Over the past 12 months how often have you used cannabis first thing in the morning?
0=never; 1= once or twice; 2= less than monthly; 3=monthly;
4= weekly; 5= several times a week; 6= daily/always

Appendix 5
Revision 1 and 2 of the
Question Pool

Tolerance (a) Do you need to use more cannabis now to get stoned than you did 12 months ago?
0= No, definitely not; Probably not = 1; Not sure/don't know =2
Possibly/ maybe = 3 ; Yes, definitely = 4

Withdrawal: (a) Over the past 12 months have you had cravings or felt agitated if you tried to cut down or stop using cannabis?
0= never; 1 = rarely; 2= sometimes; 3= quite often;
4 = often; 5= very often; 6= always/all the time

(f) Over the past 12 months have you felt restless, irritable, grumpy, anxious or depressed when you could not use cannabis?
0= never; 1 = rarely; 2= sometimes; 3= quite often;
4 = often; 5= very often; 6= always/all the time

Loss of control:

Inability to abstain (a) During the past 12 months have you **always** been able to stop using cannabis when you wanted to?
0= always/all the time; 1= usually/most of the time;
2= sometimes/half of the time; usually not/not many times = 3;
4= never/ at no time

(b) Over the past 12 months have you felt that you needed cannabis?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often;
4= often; 5= very often; 6= always/all the time.

(c) How often over the past 12 months did you wish you could stop using cannabis?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often;
4= often; 5= very often; 6= always/all the time.

Longest period of abstinence (a) Over the past 12 months what was the longest period/time that you went without using cannabis ?
0= 3 months or longer; 1= 1-2 months; 2= 2-3 weeks; 3 = one week;
4= 4-6 days ; 5 = 2-3 days; 6 = one day; 7= less than one day/no time

Unsuccessful efforts to control use/ failed attempts to cut down

(a) Over the past 12 months how often did you try to cut down on (**or reduce)** your cannabis use, but found you couldn't?

(OR)

Over the past 12 months how often did you try to use less cannabis, but found you couldn't?
0= Never; 1 = once or twice; 2= less than monthly; 3= monthly;
4= weekly; 5= several times a week; 6=daily/all the time

(f) During the past 12 months have you found it difficult to get through a day without using cannabis?
0= Never; 1= rarely; 2= sometimes; 3= quite often ;
4= often; 5= very often; 6= always/all the time

Appendix 5
Revision 1 and 2 of the
Question Pool

(c) How difficult do you think you would find it to stop using or go without cannabis?
Not at all difficult =0; probably not difficult =1;
unsure/don't know =2; a bit difficult = 3; quite difficult = 4;
very difficult = 5; impossible=6 .

(d) Over the past 12 months have you ever used cannabis when you had decided not to?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often;
4= often; 5= very often; 6= always/all the time.

Preoccupation/ Salience

(a) During the past 12 months have you spent a lot of time thinking about cannabis or trying to get cannabis?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often;
4 = often; 5= very often; 6= always/all the time

(b) Over the past 12 months did you find yourself thinking about when you would next get stoned?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often;
4 = often; 5= very often; 6= always/all the time

Important activities given up or reduced

(c) Over the past 12 months have you given up things you used to enjoy or were important?
0= None at all/nothing; 1= one or two things; 2= some things;
3= quite a few things; 4 = lots of things; 5= everything

B. Psychological Reactions/Problems

Guilt, remorse, shame

(a) During the past 12 months how often have you felt ashamed or guilty about using cannabis?
0=Never; 1= rarely; 2= now and then; 3=occasionally/sometimes;
4=quite often; 5=very often; 6=always/all the time

(b) How often have you regretted using cannabis over the past 12 months?
0=Never; 1= rarely; 2= occasionally/sometimes; 3=quite often;
4= often; 5=very often; 6=always/all the time

Worry about use

(a) How often over the past 12 months have you felt worried about your cannabis use?
0=Never; 1= rarely; 2= =occasionally/sometimes; 3=quite often;
4 = often ; 5=very often; 6=always/all the time

Paranoia/Anxiety

(a) How often during the past 12 months did you feel paranoid or anxious after using cannabis?
0=Never; 1= rarely; 2==occasionally/sometimes; 3=quite often;
4 = often; 5=very often; 6=always/all the time

C. Health Effects

Physical or Psychological Harm

Composite item

(a) Over the past 12 months cannabis has made my health:
Much better = A bit better = No effect/no change =
A bit worse = Much worse =

Appendix 5
Revision 1 and 2 of the
Question Pool

Nausea/Passed out	(b)	Over the past 12 months have you felt sick or passed out (had a "whitey") after using cannabis? 0=Never; 1= rarely; 2=occasionally/sometimes; 3=quite often; 4 = often; 5=very often; 6=always/all the time
Fatigue/Motivation or Energy Loss	(c)	Over the past 12 months have you lacked the energy to get things done in the way you used to? 0=Never; 1= rarely; 2=occasionally/sometimes; 3=quite often; 4 = often; 5=very often; 6=always/all the time
Memory/Cognitive, Concentration, and Distractibility	(d)	Have you had problems concentrating and remembering things over the past 12 months? 0=Never; 1= rarely; 2=occasionnally/sometimes; 3=quite often; 4 = often; 5=very often; 6=always/all the time
	(e)	How often over the past 12 months have you started to do something, and then forgotten what you were going to do? 0=Never; 1= rarely; 2=occasionally/sometimes; 3=quite often; 4 = often; 5=very often; 6=always/all the time
	(f)	Over the past 12 months have you ever found it difficult to understand new information or to study? 0=Never; 1= rarely; 2=oaccasionally/sometimes; 3=quite often; 4 = often; 5=very often; 6=always/all the time
Cannabis use in risky/hazardous situations;	**(a)**	**Over the past 12 months have you done/engaged in any of the** following things/**activities *when you were stoned*?** Tick **every** activity **(thing)** that applies to you: Driven a vehicle operated machinery (e.g., power tools, drills, saws, etc) drinking alcohol used other drugs boating climbing swimming/diving hunting forestry work gone to work gone to school family outings/social events hung out in town had unprotected sex used a weapon (knife, firearm, etc) became aggressive or violent
Injuries/ Accidents	**(b)**	**During the past 12 months have you or anybody else been injured** because you were stoned? 0 = No 1 = Yes, once 2 = Yes, several times

Appendix 5
Revision 1 and 2 of the
Question Pool

E. Social Consequences

Neglect responsibilities/social role obligations/commitments when stoned:

(a) Over the past 12 months has anything you had planned, or were expected to do, not happened because you got stoned instead? (*examples*: a family outing, chores, take care of children, an assignment, appointment, training, attend school or work, etc)
0= Never; 1= rarely; 2=occasionally/sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

(b) In the past 12 months, did your use of cannabis ever interfere with/get in the way of your work at school, your job, or home life?
0= Never; 1= rarely; 2=occasionally/sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Social/interpersonal problems caused/exacerbated by cannabis use .. (a) . Has a partner, relative, friend, a doctor, or other health worker been concerned about your cannabis use or suggested you cut down over the past 12 months?

***Concern from others/* advice to cut down** .
No = 0
Yes = 1

(b) Over the past 12 months has your cannabis use ever created/**caused** problems between you and your partner, parents, or other close relative?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Friends/Peer group (a) Over the past 12 months have you spent more time with friends who use cannabis than other kinds of friends?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know = 2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

(b) Have you tended to smoke more on your own over the past 12 months than you used to?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know = 2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

(c) Have you lost any friends over the past 12 months because you use/d cannabis?
No, definitely not = 0 ; Probably not = 1 ; Not sure/don't know =2 ;
Possibly/ maybe = 3 ; Yes, definitely = 4

Financial /cost of drug (a) On average, how much did you spend on cannabis per week over the past 12 months?
$0 (no cost) = 0; $1- $25 = 1; $26- $50 = 2; $51- $75 = 3;
$76- $100 = 4; over $100 = 5; Grow own = 6

(b) On average, how much did you make off cannabis per week over the past 12 months?
$0 = 0; up to $25 = 1; up to $50 = 2; up to $75 = 3;
up to $100 = 4; over $100 = 5

Appendix 5
Revision 1 and 2 of the
Question Pool

Financial Problems (c) Over the past 12 months did you ever spend more than you could afford or get into serious money problems because of cannabis?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

Legal/Criminal Problems (a) Have you been arrested within the past 12 months because of your cannabis use?
(*examples:* for something you did when stoned, or to get money to buy cannabis; for cannabis possession, cannabis supply, etc).
0 = No
1= Yes, once
2 = Yes, more than once

D. Adjunct Items
Insight/Acknowledgement
of a Cannabis Use Problem (a) Do you think that you use too much cannabis?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(b) Do you ever think that your cannabis use is a problem?
0= Never; 1= rarely; 2= occasionally/sometimes; 3= quite often
4= often; 5= very often; 6= always/all the time

(c) Is cannabis use affecting you in ways you do not like?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely = .

Risk Perception; **Attitude** (a) Do you think that cannabis is addictive or harmful?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(b) Do you think you are at risk of developing problems if you continue using cannabis as you are now?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

Readiness To Change;
Help-seeking (a) Do you wish you could stop using cannabis?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely

(b) Do you want to **cut down**/reduce or quit your cannabis use?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

(c) Would you like some assistance to help you **cut down**/reduce or quit your cannabis use?
No, definitely not = ; Probably not = ; Not sure/don't know = ;
Possibly/ maybe = ; Yes, definitely =

Appendix 6
EP Item Pool Survey: Memo 4

APPENDIX 6


CANNABIS SCREEN DEVELOPMENT

EXPERT PANEL

Memorandum 4: Item Pool

Greetings to all in 2003,

I trust you all had a welcome break over the Christmas/New Year period, and that (at least some of) your New Year resolutions are still viable! Inevitably, the holidays slowed the momentum in this study somewhat, as everyone enjoyed much-needed respite from work demands and other pressures. However, the flip side is that you have all had ample time to digest and reflect on the feedback summary from the Domains Survey, and should therefore be well prepared for our next important task – item selection and refinement.

Item Generation and Preliminary Reduction

Guided by the procedure outlined in earlier memos, i.e., closely informed by (1) your views, opinions, and suggestions from your specialist perspectives summarized in Memo 3 (2) prerequisite DSM-IV and ICD-10 criteria for validation purposes (3) the 'domains/variables' approach that characterizes the AUDIT and other brief screens, I have compiled an item pool of questions from various relevant sources, such as: standardised diagnostic interview schedules; drug assessment schedules and questionnaires; (generic) drug screens, and the few cannabis screens that do exist, as well as miscellaneous literature resources. However, to eliminate potential introduction of bias in the task ahead, the source of each item in the pool will be kept anonymous in the meantime. Given your familiarity with the literature you will (inevitably) recognize the origins of some items. Please try and minimize this influence/bias in your considerations.

The initial draft item pool numbered 98 candidate questions. As in any screen development, this reflected considerable overlap of item content. To keep the present EP task manageable, I consulted with Ashley and Phil over considerable time (my grateful thanks to you both for your efforts and patience! ☺) for preliminary culling of items that were either: clearly inappropriate to cannabis, over-represented, poorly-worded, ambiguous, or not culturally-appropriate, (etc). In short, 33 items with limited face validity in New Zealand settings were discarded in the initial reduction procedure. There are serious pitfalls in prematurely vetoing questions with any promise, however, so we retained several items that 'came close' to being eliminated. The viability of these –and other –items was duly enhanced by modifications to phraseology, terms, response categories, etc. Thus, while some of the 55 residual items appear in their original (source) form, others have been adapted to reflect (hopefully!) the phenomenon of cannabis use more 'authentically' or characteristically in New Zealand culture. In their present form, therefore, all items appear to be face-valid, at least.

The principal considerations underlying item selection for the screen item pool require reiteration. It is crucial that we keep them foremost in mind:

- the cannabis screen will target both harmful use (CUD; cannabis dependence/abuse) and potentially harmful (at risk/unsafe) use, thus
- we need precursors or good (reliable and valid) early-stage (sub threshold syndrome) indicators of specific cannabis-related problems, as well as symptoms (diagnostic criteria) of CUD
- respondent cooperation, time, resources, attrition, and various other factors impose tight constraints on the number of screen items that can be provisionally tested. Our present task is careful selection of the most apposite questions possible to capture the phenomenon of early/advanced cannabis use problems in New Zealand

In addition to adequate representative content, other important considerations include those of appropriate language; terms; acceptability; cultural sensitivity and appropriateness; measurement issues (especially cannabis consumption); scoring (particularly discriminatory power); ease of administration/interpretation; predictive and other validation issues, etc.. These will not be elaborated further here, and I refer you back to Memo 1, 2, and 3 for specifications and detailed discussion.

Appendix 6
EP Item Pool Survey: Memo 4

> At this juncture an adequate baseline number of items for planned data reduction/factor analytic techniques is vital. Opinions vary among psychometricians. For example Nunnally (1978) recommends there should be at least one to two times as many items as will appear on the final screen to allow ample room to discard items that work poorly. Guilford (1954) opines that when items are carefully selected, no more than 50 per cent more items should be needed in the preliminary form than are desired in the final version.

Given the constraints of research in field settings we should aim for a consensus on a balance between:
(a) an adequate - yet manageable - number of the most important variables/predictors,
(b) the most inclusive/discriminative range of levels for each of these variables.

Clearly, the 55 residual items more than satisfy these guidelines. As you will observe, Likert-type scales have been utilized where appropriate to maximize possible score distributions/variance necessary to achieve both statistical and discriminatory power.

The Present Task
Ultimately, to reconcile (desired) brevity with maximum content representativeness, it is hoped that *each item* on the final screen will be a multiple-valued problem indicator scale. Ideally, the number of items in each content domain should reflect its importance to the target construct. We are aiming for the *minimum* number of items possible. We thus require a manageable group of our "best" items in the pool before testing. In addition (as re/iterated in Memo 1, 2, 3) a close-as-possible approximation of DSM-IV and ICD-10 diagnostic criteria (the criterion standard) is also desirable for screen validation purposes. Current opinion among clinicians (Ashley and Phil) is that testing the current 55-item pool is viable among an (index) sample of Alcohol and Drug Treatment clients. No further item reduction is necessary. It is highly desirable to trial as many items as is realistically manageable, especially given that this is a relatively "new" area, and opinion can vary as to just what *are* the "best" items.

Accordingly, keeping in mind all the foregoing specifications, technical and operational issues, your present task is to examine the item pool from the specialist perspective you bring to the Panel, and complete all the various components in the survey in the spaces provided. The format of the item pool is identical to that presented in the Domains Survey, i.e. following the (logical?) progression through domains/variables grouped into sections (A B C D E F) as exemplified in the AUDIT and other brief screens. You may consider that this ordering is inappropriate. Accordingly, space is provided for your comments and indications of your preferred ordering of sections, or even items within a section. Space is also provided alongside every item for your comments about that item, and any suggested modifications to words/terms, language, response options, response categories, etc. You may even consider that potentially important variables have been omitted in the item pool at this point (it's not impossible! we must keep vigilant!). Conversely, you may consider a particular item to inadequately represent a variable. In either event, please say so, and ensure you add "your" item to the pool in the space provided either adjacent to the item in question, or at the end of the survey. You will see that I have left some scales without scores – I seek your expert opinions on these. Please complete (or modify) these as you think most appropriate.

A final caution seems prudent, and I quote- yet again - a principle that has guided the generation of the candidate items for the pool from the very outset:

> **Since no existing data-analytic technique can remedy serious deficiencies in an item pool, the creation of the initial item pool is a crucial stage in scale construction. Subsequent psychometric analysis can identify weak, unrelated items that should be dropped from the emerging scale but are powerless to detect content that should have been included.**
> (Guilford, 1954; Streiner & Norman, 1995).

Your prompt response to this survey will be much appreciated.

☺ ☺ ☺ **THANK YOU!!** ☺ ☺ ☺

Question Pool for Cannabis Screen

FILTER/STEM QUESTIONS:

	Have you *ever* used cannabis?	**Yes**	**No**
***If* "Yes":**	Have you used cannabis during the past 12 months?	**Yes**	**No**
***If* "Yes":**	**Please answer the following questions about your cannabis use over the past 12 months.**		

	Domain / Variable	Question	Response Categories	Comments
A	**Cannabis Consumption**			
	Quality/Potency: Preference	a). What cannabis products do you prefer to use?	0 No preference 1 Cabbage/Leaf 2 Bush/Heads 3 Commercial Oil 4 Hash 5 Skunk/Hydro 6 Gold Oil 7 Head Oil	
	Most often/usually use	b). What cannabis products do you use most often?	0 No preference 1 Cabbage/Leaf 2 Bush/Heads 3 Commercial Oil 4 Hash 5 Skunk/Hydro 6 Gold Oil 7 Head Oil	
	Frequency:	a). How often have you used cannabis during the past 12 months?	0 not in the last 6 months 1 monthly or less 2 2 – 3 times per month 3 weekly 4 twice /week 5 3 – 4 times per week 6 daily / almost daily	
		b). During the past 12 months how many times would you use cannabis on a typical day when you were using?	1 once 2 twice 3 3 – 4 times 4 5 – 6 times 5 7 – 9 times 6 10 or more times	
	Increased use:	a). Are you using more cannabis now than you were 12 months ago?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
B	Using Behaviour / Dependence **Experimental/vs Dependence:** Stated reason(s) for use		a). I use cannabis because ..... (TICK **EVERY** CATEGORY THAT APPLIES TO YOU)	☐ its cool ☐ its exciting ☐ my friends use it ☐ everyone uses it ☐ its easy to get/obtain ☐ its safer than alcohol ☐ it makes me feel good/better about myself ☐ it helps me fit in, feel part of the group, and relate to others better ☐ it makes me happy, find things funny, and laugh a lot ☐ it helps me get more out of life ☐ it helps me cope with problems and stress ☐ it makes me hallucinate ☐ it is important to me for spiritual reasons ☐ it increases sexual experience/ makes sex more enjoyable ☐ it stops/reduces pain ☐ it helps me relax/sleep ☐ it calms/controls my anger ☐ it reduces boredom ☐ it fills in time/its something to do; there's nothing else to do ☐ it helps me forget and escape bad feelings (loneliness, anxiety, depression) ☐ I can't stop using it	

Appendix 6
EP Item Pool Survey: Memo 4

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
	Genetic / Environment:		a). Have any members of your family / whanau (including grandparents and other relative) been heavy users of, or dependent on alcohol, cannabis, or any other drugs?	☐ Yes ☐ No ☐ Don't know	
	Start day with joint:	withdrawal avoidance	a) During the past 12 months how often did you use cannabis first thing in the morning?	0 never 1 once or twice 2 less than monthly 3 monthly 4 weekly 5 several times a week 6 daily / always	
		withdrawal avoidance	b). Do you like to get stoned in the morning?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always	
	Tolerance:	tolerance	a). Do you need to use more cannabis now to get stoned than you did 12 months ago?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	Withdrawal:	withdrawal	a). Over the past 12 months have you had cravings or felt irritable if you tried to cut down or stop using cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		withdrawal	b). Over the past 12 months did you feel restless, irritated, grumpy, anxious or depressed when you could not use cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
	Loss of Control:	loss of control	a). During the past 12 months have you ever been unable to stop using cannabis when you wanted to?	0 never 1 rarely 2 now & then / sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		compulsive use / loss of control	b). Over the past 12 months have you felt that you needed cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		loss of control	c). How often over the past 12 months did you wish you could stop using cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	Longest Period of Abstinence:	loss of control	a). Over the past 12 months what was the longest time that you went without using cannabis?	0 3 months or longer 1 one or two months 2 2 – 3 weeks 3 one week 4 2 – 3 days 5 one day 6 less than one day / no time	
	Failed Attempts to Cut Down	failed attempts to cut down	a). Over the past 12 months how often did you try to reduce your cannabis use or stop using altogether, but found you couldn't?	0 never 1 once or twice 2 less than monthly 3 monthly 4 weekly 5 several times a week 6 daily / all the time	
		failed attempts to cut down	b). During the past 12 months have you found it difficult to get through a day without using cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 6
EP Item Pool Survey: Memo 4

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
		Desire to cut down/failed attempts	c). How difficult do you think you would find it to stop using or go without cannabis?	0 not at all difficult 1 probably not difficult 2 unsure/don't know 3 a bit difficult 4 quite difficult 5 very difficult 6 impossible	
		Desire to cut down/failed attempts	d). Over the past 12 months did you ever use cannabis when you had decided not to?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	Preoccupation / Salience	preoccupation / salience	a). During the past 12 months have you spent a lot of time thinking about cannabis or trying to get cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		preoccupation / salience	b). Over the past 12 months did you find yourself thinking about when you would next be able to get stoned?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	Important Activities Given Up or Reduced	preoccupation / salience	c). Over the past 12 months have you given up or neglected/lost interest in hobbies or other activities that you used to enjoy or that were important to you?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
C	Psychological Reactions / Problems **Guilt, Remorse, Shame**	psychological problems	a). During the past 12 months how often have you felt ashamed or guilty about using cannabis?	0 never 1 rarely 1 now & then 3 sometimes 4 quite often 5 very often 6 always / all the time	

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
		psychological problems	b). How often have you regretted using cannabis over the past 12 months?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	Worry About Use	psychological problems	a). How often over the past 12 months have you felt worried about your cannabis use?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	Paranoia / Anxiety	psychological problems	a). How often during the past 12 months did you feel paranoid or anxious after using cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		psychological problems	b). Over the past 12 months how often have you found that using cannabis makes you anxious, paranoid (suspicious) or distrustful?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
D	Health Effects **Composite Item**	physical or psychological harm	a). Over the past 12 months cannabis has made my health	☐ Much better ☐ A bit better ☐ No effect / no change ☐ A bit worse ☐ Much worse	
	Nausea / Pain	physical or psychological harm	b). Over the past 12 months have you felt sick or had chest pains after smoking / using cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 6
EP Item Pool Survey: Memo 4

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Fatigue / Motivation or Energy Loss	physical or psychological harm	c). Over the past 12 months have you lacked the energy to get things done in the way you used to?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
Memory / Cognitive, Concentration, and Distractibility	physical or psychological harm	d). Have you had problems concentrating and remembering things over the past 12 months?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	physical or psychological harm	e). How often over the past 12 months have you started to do something, and forgotten what you were going to do?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	physical or psychological harm	f). Over the past 12 months have you found it more difficult to understand new information or to study?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
	Cannabis Use In Risky / Hazardous Situations	Risky behaviour / cannabis use in hazardous situations	a). Over the past 12 months have you engaged in or done any of the following activities / things when you were stoned? [Tick **EVERY** activity that applies to you]	☐ driving a vehicle ☐ operating machinery ☐ drink alcohol ☐ use other drugs ☐ boating ☐ climbing ☐ swimming/diving ☐ hunting ☐ forestry work ☐ gone to work ☐ gone to school ☐ family outings/social events ☐ hung out in town ☐ risky sex (unprotected) ☐ used a weapon (knife, firearm, etc) ☐ became aggressive or violent	
	Injuries / Accidents	Risky behaviour / cannabis use in hazardous situations	b). During the past 12 months has your cannabis use resulted in you or someone else receiving an injury that required medical treatment?	0 No 1 Yes	
E	Social Consequences **Neglect commitments, responsibilities when stoned:**	neglect social role obligations	a). Over the past 12 months have you planned to do something (e.g. a family outing, a task or assignment) or been expected to do something (chores, go to work, school, an appointment), and then not been able to because of being stoned?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		neglect social role obligations	b). In the past 12 months, did your use of cannabis ever interfere with/get in the way of your work at school, or a job, or at home?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 6
EP Item Pool Survey: Memo 4

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Concern From Others / Advice To Cut Down	social & interpersonal problems caused / exacerbated by cannabis use	a). Has a partner, relative, friend, or a doctor or other health worker been concerned about your cannabis use or suggested you cut down over the past 12 months?	0 No 1 Yes	
	social & interpersonal problems caused / exacerbated by cannabis use	b). Over the past 12 months has your cannabis use ever created problems between you and your partner, parents, or other close relative?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
Friends / Peer Group	social & interpersonal problems caused / exacerbated by cannabis use	a). Over the past 12 months have you spent more time with friends who use cannabis than other kinds of friends?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / Maybe 4 Yes, definitely	
	social & interpersonal problems caused / exacerbated by cannabis use	b). Have you tended to smoke more on your own over the past 12 months than you used to?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / Maybe 4 Yes, definitely	
	social & interpersonal problems caused / exacerbated by cannabis use	c). Have you lost any friends over the past 12 months because of your use of cannabis?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / Maybe 4 Yes, definitely	
Financial / *Cost of Drug*		a). How much did you spend on average on cannabis per week over the past 12 months?	0 $0 - No cost / grow own 1 $1 - $25 2 $26 - $50 3 $51 - $75 4 $76 - $100 5 over $100	
		b). On average how much did you make off cannabis per week over the past 12 months?	0 $0 1 up to $25 2 up to $50 3 up to $75 4 up to $100 5 over $100	

* NB. Scoring in the *same* direction denotes level of cannabis involvement.. We need to consider the relevance of this question in a brief screen vis-à-vis keeping the scoring simple for primary care/generalist settings.

	Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
	Financial Problems:	social & interpersonal problems caused / exacerbated by cannabis use	c). Over the past 12 months did you ever spend more than you could afford or get into serious money problems because of cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
	Legal / Criminal	legal problems caused by cannabis	a). Have you been arrested or convicted of a crime within the past 12 months because of your cannabis use? (e.g., a crime committed while stoned, or to make money to buy cannabis; cannabis possession; cannabis supply, etc).	0 No 1 Yes	

	Domain / Variable	Question	Response Categories	Comments
F	Adjunct Items **Insight / Acknowledgement of a Cannabis Use Problem:**	a). Do you think that you use too much cannabis?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
		b). Do you ever think that your cannabis use is a problem?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		c). Is cannabis use affecting you in ways you do not like?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	Risk Perception; Attitude:	a). Do you think that cannabis is addictive or harmful?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	

Appendix 6
EP Item Pool Survey: Memo 4

Domain / Variable	Question	Response Categories	Comments
	b). Do you think you are at risk of developing problems if you continue using cannabis as you are now?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
Readiness to Change; Help-Seeking:	a). Do you wish you could stop using cannabis?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	b). Do you want to reduce or quit your cannabis use?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	c). Would you like some assistance to help you reduce or quit your cannabis use?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	

(* Scoring? and order of response options ? since respondent view not necessarily correct"/insightful about own problem/in own best interests)

[This response format could uncover any ambivalence ?]
How to score these last 3 items? e.g. a person with an (otherwise) high score indicating relatively serious cannabis use problems might respond "No, definitely not" to all three items while another (apparently low-scoring/pre-symptomatic) respondent might respond "Yes, definitely"……?

Order of Sections/Questions:

In your opinion, is the ordering of questions as they appear above (i.e., A, B, C, D, E, F) appropriate for testing in the first instance among the index sample? If not, please indicate the order you consider appropriate for administration of questions to respondents.

Recommended Order of Questions:

A	Cannabis Consumption	_____
B	Using Behaviour / Dependence	_____
C	Psychological Reactions / Problems	_____
D	Health Effects	_____
E	Social Consequences	_____
F	Adjunct Items	_____

Further Comments:

Name: _____ Date: _____

Thank you very much for your contribution.

Your input in this study is very much appreciated.

APPENDIX 7

Question Pool for Cannabis Screen

FILTER/STEM QUESTIONS:

Have you ***ever*** used cannabis? Yes / No

If "Yes": Have you used cannabis during the past 12 months? Yes / No

If "Yes": **Please answer the following questions about your cannabis use.**
Tick the box that is most correct for you over the PAST 12 MONTHS

Domain / Variable	Question	Response Categories	Comments
A Cannabis Consumption ***Quality/Potency:*** Preference	a). What cannabis products do you prefer to use? **(OR)** b). What type of cannabis do you prefer to use?	0 No preference 1 Cabbage/Leaf 2 Bush/Heads 3 Commercial Oil 4 Hash 5 Skunk/Hydro 6 Gold Oil 7 Head Oil	
Most often/usually use	a). What cannabis products do you use most often? **(OR)** b) What type of cannabis do you use most often?	0 No preference 1 Cabbage/Leaf 2 Bush/Heads 3 Commercial Oil 4 Hash 5 Skunk/Hydro 6 Gold Oil 7 Head Oil	
Frequency:	a). How often have you used cannabis during the past 12 months?	0 not in the last 6 months 1 once a month or less 2 2 - 3 days per month 3 once a week 4 two days per week 5 3 - 4 days per week 6 5 - 6 days per week 7 daily / every day	
	b). During the past 12 months how many times would you use cannabis on a typical day when you were using?	1 once 2 twice 3 3 – 4 times 4 5 – 6 times 5 7 – 9 times 6 10 or more times	
Increased use:	a). Are you using ***more*** or ***less*** cannabis now than you were 12 months ago?	0 Much less 1 A bit less 2 No change/same or similar 3 A bit more 4 Much more	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
B Using Behaviour / Dependence **(Experimental/vs Problem Use)** Stated reason(s) for use		a). I use cannabis because..... (TICK **EVERYTHING** THAT APPLIES TO YOU)	☐ it's cool/fun ☐ my friends use it ☐ it's easy to get/obtain ☐ it's safer than alcohol ☐ it makes me feel good/better about myself ☐ it helps me fit in, feel part of the group, and relate to others better ☐ it makes me happy, find things funny, and laugh a lot ☐ everyone uses it ☐ it helps me get more out of life ☐ it helps me cope with problems and stress ☐ I like it/like the 'buzz' ☐ I can't stop using it ☐ it makes me hallucinate ☐ it improves my creativity/enjoyment (films, music, crafts etc) ☐ it is important to me for spiritual reasons ☐ it makes sex better/more enjoyable ☐ it stops/reduces pain ☐ it helps me relax/sleep ☐ it calms/controls my anger ☐ it reduces boredom ☐ it fills in time/its something to do; there's nothing else to do ☐ it helps me forget and escape bad feelings (loneliness, anxiety, depression) ☐ it helps my appetite ☐ it's exciting	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Genetic / Environment:		a). Have **any** members of your family / whanau / aiga (including grandparents and other relatives) ever been heavy users of, or had problems with, alcohol, cannabis, or any other drugs?	☐ No, not one ☐ Yes, at least one ☐ Yes, several ☐ Don't know	
Start day with joint:	withdrawal avoidance	a) Do you like to get stoned in the morning?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always/all the time	
		b). Over the past 12 months how often have you used cannabis first thing in the morning?	0 never 1 once or twice 2 less than monthly 3 once a month 4 once a week 5 several times a week 6 daily/always	
Tolerance:	tolerance	a). Do you need to use more cannabis now to get stoned than you did 12 months ago?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
Withdrawal:	withdrawal	a). Over the past 12 months have you had cravings or felt agitated if you tried to cut down or stop using cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
		b). Over the past 12 months did you feel restless, irritable, grumpy, anxious or depressed when you could not use cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Loss of *Control*:	Inability to abstain	a). During the past 12 months have you **always** been able to stop using cannabis when you wanted to?	0 Always/all the time 1 usually/most of the time 2 sometimes/half of the time 3 not usually/not many times 4 Never/ at no time	
		b). Over the past 12 months have you felt that you needed cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
	Desire to cut down/stop	c). How often over the past 12 months did you wish you could stop using cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
Longest Period of Abstinence:		a). Over the past 12 months what was the longest time that you went without using cannabis?	0 3 months or longer 1 one or two months 2 2 – 3 weeks 3 one week 4 4 – 6 days 5 2 –3 days 6 one day 7 less than one day/ no time at all	
Failed Attempts to Cut Down/Unsuccessful Efforts to *Control* Use	failed attempts to cut down	a). Over the past 12 months how often did you try to (**cut down on your cannabis**) use less cannabis, but found you couldn't?	0 never 1 once or twice 2 less than monthly 3 monthly 4 weekly 5 several times a week 6 daily / all the time	
	failed attempts to cut down	b). During the past 12 months have you found it difficult to get through a day without using cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
	Desire to cut down/failed attempts	c). How difficult do you think you would find it to stop using or go without cannabis?	0 not at all difficult 1 probably not difficult 2 unsure/don't know 3 a bit difficult 4 quite difficult 5 very difficult 6 impossible	
	Desire to cut down/failed attempts	d). Over the past 12 months did you ever use cannabis when you had decided not to?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
Preoccupation / Salience	preoccupation / salience	a). During the past 12 months have you spent a lot of time thinking about cannabis or trying to get cannabis?	0 never 1 rarely 2 sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		b). Over the past 12 months did you ever find yourself thinking about when you would next be able to get stoned?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
Important Activities Given Up or Reduced		c). Over the past 12 months have you given up things you used to enjoy or were important? (e.g., work, school, sports, hobbies, being with family or friends, etc)	0 None at all/nothing 1 one or two things 2 some things 3 quite a few things 4 lots of things 5 everything	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
C Psychological Reactions / Problems *Guilt, Remorse, Shame*	psychological problems	a). During the past 12 months how often have you felt ashamed or guilty about using cannabis?	0 never 1 rarely 2 occasionally/sometimes 3 quite often 4 often 5 very often 6 always / all the time	
		b). How often have you regretted using cannabis over the past 12 months?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always /all the time	
Worry About Use		a). How often over the past 12 months have you felt worried about your cannabis use?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
Paranoia / Anxiety		a). How often during the past 12 months did you feel paranoid (suspicious) or anxious after using cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
D Health Effects *Composite Item*	physical or psychological harm	a). Over the past 12 months cannabis has made my health	☐ Much better ☐ A bit better ☐ No effect / no change ☐ A bit worse ☐ Much worse	
Nausea / Passed out		b). Over the past 12 months have you felt sick or passed out (had a "whitey") after using cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Fatigue / Motivation or Energy Loss		c). Over the past 12 months have you lacked the energy to get things done in the way you used to?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
Memory / Cognitive, Concentration, and Distractibility		d). Have you had problems concentrating and remembering things over the past 12 months?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
		e). How often over the past 12 months have you started to do something, and then forgotten what you were going to do?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
		f). Over the past 12 months have you ever found it difficult to understand new information or to study?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	

N.B. *** In this section items are not *specifically* linked to cannabis ("because of /after cannabis use", etc) as respondent may/is likely to lack the insight to make the connection; such direct linkage may also be (mis)understood as a result of intoxication (a proximal effect) rather than the long-term cumulative effect. One purpose of the screen is to sift out/through these phenomena?**

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Cannabis Use In Risky / Hazardous Situations	Cannabis use in risky/hazardous situations	a). Over the past 12 months have you done/**engaged in** any of the following things/**activities** ***when you were stoned?*** [Tick **EVERYTHING**/ activity that applies to you]	☐ driven a vehicle ☐ operated machinery (e.g., power tools, drills saws, etc) ☐ drinking alcohol ☐ used other drugs ☐ boating ☐ climbing ☐ swimming/diving ☐ hunting ☐ forestry work ☐ gone to work ☐ gone to school ☐ family outings/social events ☐ hung out in town ☐ had unprotected sex ☐ used a weapon (knife, firearm, etc) ☐ became aggressive or violent	
Injuries / Accidents		b). During the past 12 months have you or anybody else been injured because you were stoned?	0 Never 1 Once 2 Twice 3 Three or more times	
E Social Consequences **Neglect commitments, responsibilities when stoned:**	neglect social role obligations	a). Over the past 12 months has anything you had planned, or were expected to do, not happened because you got stoned instead? (*examples:* a family outing, chores, take care of children, an assignment, appointment, training, school or work, etc)	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
	neglect social role obligations	b). In the past 12 months, did your use of cannabis ever interfere with/get in the way of your work at school, your job, or home life?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Concern From Others / Advice To Cut Down	social & interpersonal problems caused / exacerbated by cannabis use	a). Has a partner, relative, friend, a doctor, or any other health worker been concerned about your cannabis use or suggested you cut down over the past 12 months?	0 No 1 Yes	
		b). Over the past 12 months has your cannabis use ever created problems between you and your partner, parents, or other close relative?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
Friends / Peer Group		a). Over the past 12 months have you spent more time with friends who use cannabis than other kinds of friends?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / Maybe 4 Yes, definitely	
		b). Have you tended to smoke more on your own over the past 12 months than you used to?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / Maybe 4 Yes, definitely	
		c). Have you lost any friends over the past 12 months because you use/d cannabis?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / Maybe 4 Yes, definitely	
Financial / Cost of Drug		a). How much did you spend on average on cannabis per week over the past 12 months?	0 $0 - No cost / grow own 1 $1 - $25 2 $26 - $50 3 $51 - $75 4 $76 - $100 5 over $100	
		b). On average how much did you make off (**how much money have you earned from selling**) cannabis per week over the past 12 months?	0 $0 1 up to $25 2 up to $50 3 up to $75 4 up to $100 5 over $100	

*** NB. Scoring in the *same* direction denotes 'level of cannabis involvement'. We need to consider the relevance of these $ questions in a brief screen? i.e., vis-à-vis keeping the scoring simple for primary care/generalist settings? But you want to trial them in the first instance?**

Appendix 7
International EP Item Pool Survey

Domain / Variable	DSM-IV & ICD-10 Diagnostic Criteria: Cannabis Dependence / Abuse	Question	Response Categories	Comments
Financial Problems:		c). Over the past 12 months did you ever spend more than you could afford or get into serious money problems because of cannabis?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
Legal / Criminal	legal problems caused by cannabis	a). Have you been arrested within the past 12 months because of your cannabis use? (*examples:* something you did when stoned, or to get money to buy cannabis; cannabis possession; cannabis supply, etc).	0 Never 1 Once 2 Twice 3 Three or more times	

Domain / Variable	Question	Response Categories	Comments
F Adjunct Items Insight / Acknowledgement of a Cannabis Use Problem:	a). Do you think that you use too much cannabis?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	b). Do you ever think that your cannabis use is a problem?	0 never 1 rarely 2 sometimes/occasionally 3 quite often 4 often 5 very often 6 always / all the time	
	c). Is cannabis use affecting you in ways you do not like?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	

Appendix 7
International EP Item Pool Survey

Domain / Variable	Question	Response Categories	Comments
Risk Perception; Attitude:	a). Do you think that cannabis is addictive or harmful?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	b). Do you think you are at risk of developing problems if you continue using cannabis as you are now?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
Readiness to Change; Help-Seeking:	a). Do you wish you could stop using cannabis?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	b). Do you want to reduce/**cut down** or quit your cannabis use?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	
	c). Would you like some assistance to help you reduce or quit your cannabis use?	0 No, definitely not 1 Probably not 2 Not sure / don't know 3 Possibly / maybe 4 Yes, definitely	

Scoring plan for these last 3 items? e.g. a person with an (otherwise) high score indicating relatively serious cannabis use problems might respond "No, definitely not" to all three items while another (apparently low-scoring/pre-symptomatic) respondent might respond "Yes, definitely".....

Appendix 7
International EP Item Pool Survey

Further Comments:

Name: _____ Date: _____

Thank you very much for your contribution.
Your input in this study is very much appreciated. ☺

APPENDIX 8

CANNABIS SCREEN DEVELOPMENT

International Expert Panel

Memorandum 3: Summary from Question Pool Review

19 September 2003

Greetings to my International Expert Panel,

In view of the multiple demands on the time and energies of all panel members in this study, I consider it a remarkable achievement - and an honour - to report a 100 percent return rate for this survey! My very sincere thanks to all, indeed, for your valued input into this worthy project. Your responses reflect both the complexity of the issues inherent in measuring cannabis use/problems and diverse opinions about how to approach this task. Accordingly, each individual contribution was considered at length to ensure each perspective was represented in deliberations. This strategy enabled me to evaluate the overall level of support for the items collectively, together with level of endorsement for specific, individual items and associated response options.

The issues currently under consideration include: possibly redundant or inappropriate items, recommendations for additional items, alternative wording of items, improvements to response categories, criteria/timeframe and various other issues. These have instigated another critical review and revision of the item pool to ensure a briefer and simpler measure.

General

Overall level of endorsement of the approach taken to generating the item pool content was high. Almost all panel members found the domains/variables comprehensive, with the "very methodological approach taken to this research" casting a broad net that "pretty well covers the waterfront". One or two comments suggested that the item pool might include too much detail for a screening test. However, given the efforts explicitly devoted to ensuring coverage of a wide breadth of problem areas before initial testing (as recommended for screen construction) such feedback was, indeed, gratifying. There was, perhaps, some misunderstanding of the intention to empirically reduce the item pool to as few "best" predictors as possible (hopefully 10 or fewer items) over the research period. That very few suggestions were made for additional items suggests further affirmation of the "thorough systematic" approach.

Several panel members considered that ideally, all or most of the items should be retained, and that the item pool was "ready to go now". Others offered some constructive criticism and made suggestions for further item improvements. Many of these are being incorporated into the current item pool revision. A brief outline follows.

Redundant/Inappropriate Items

Given the general goal of 'over inclusiveness' specifically recommended in item pool generation, it was expected that most panellists would consider at least one or two items to be redundant. However, this must be balanced by the need to keep the item pool to a manageable length in order to reduce the respondent burden/ensure cooperation at screen administration. Some panel members deemed one or two further items inappropriate for inclusion in a screen. Guided by the weight of aggregate IEP opinion, items perceived either redundant or inappropriate were carefully re-examined in context and the following (14) items removed from the provisional item pool:

Appendix 8
IEP Summary Feedback of Survey


Page 1:	Preference for cannabis products; Increased Use (baseline problems).
Page 3:	(a) Do you like to get stoned in the morning? In favour of (b) how often have you used first thing
	Withdrawal of (a) in favour of (b)
Page 4:	How often did you wish you could stop using… (a duplication)
Page 5:	Preoccupation/Salience (b) in favour of (a)
Page 6:	Psychological Reactions/Problems: (a) times felt ashamed or guilty in favour of (b) regretted using
	Worry about cannabis use (repetitious with items in section F)
Page 7:	Memory/Cognitive (e) and (f) in favour of (d) had problems concentrating and remembering…
Page 9:	Financial/Cost of Drug (a) and (b) removed as inappropriate items (c) remains
Page 10:	Adjunct Items (c)
Page 11:	Adjunct Items (c)

A further item (Genetic/Environment, p. 3) was somewhat contentious with several panel members considering it “conceptually inappropriate” (a risk factor, not a problems indicator). Others suggested the item either “had potential” or was “OK” or “fine”. Further evaluation may yet see this item removed.

Additional Items
As anticipated, suggestions in this category were almost exclusively related to ‘quantity’ of cannabis consumption. As one Panellist put it: “I think you need to face up to this dimension”. Given the notorious measurement difficulties inherent in the total absence of a robust/standard measure of cannabis consumption, this is a formidable ‘ask’, indeed! Another popular suggestion in the consumption domain was ‘number of hours stoned per day’, an item previously considered by the local EP (see Memo 3), and generally rejected on account of the highly subjective nature of responses to such an item (reliability/validity) which could ultimately render responses meaningless. Nevertheless, given these IEP opinions, appropriate reconsideration will be given to including both items in the pool. Other suggestions included ‘life area harm items’ (scales used for alcohol) and respiratory problems (see Memo 3 for issues involved). In sum, other than ‘quantity’ measures, very few additional areas for measurement consideration were suggested.

Response Categories
Most respondents made constructive comments at some point in the survey about this area. In the interests of attempting to generate maximum dimensionality/variability in the measures, this was, perhaps, naively overdone! Almost all Panellists recommended that the Likert-type scales be compressed or truncated consistently, and some suggested an attempt to standardize response options, where appropriate. Acknowledging the wisdom of these suggestions, the researcher is incorporating both modifications into the current revision. This will result in a simpler response format.

In addition, where the response is appropriate to the question, and the resulting loss in variability not too troublesome (notably Section F), some items are to be converted from the Likert-type to the binary ‘Yes/No’ answer format. Some suggested changes are also to be made to actual (numeric) measures, to reflect IEP opinion about the nature of the underlying variable.

The two large multiple response items (Reasons for Use, Use in Risky/Hazardous Situations) clearly needed some work. Most Panellists endorsed the potential utility of both questions, while noting the need to reduce their ‘burden’ to a manageable format for a brief screen. These changes are being made. Finally, one criticism was targeted directly at the typical Likert-type response, *per se,* as being uanchored

Appendix 8
IEP Summary Feedback of Survey


/abstract response scales with 'notoriously low reliability" (c/f continuous scales and Yes/No categories). While acknowledging the desirability of concrete anchor points for this population group, reconsideration of this issue with respect to items in the pool suggests that the Likert-type response format is 'the way to go' at least initially, as it 'fits' the questions more appropriately. Over a 12-month window, for example, respondents would find it difficult to reliably recall how often they worried about their cannabis use, how often they felt sick after using cannabis, how often they lacked their usual energy, just how many things/outings they gave up, how often they regretted using cannabis, and so on? A numeric answer to such questions would, surely, be a guess-timate?. People engage in mental averaging and recall experiences (behaviours and events) in more generic terms of "never, sometimes, quite often, very often/frequently, and always"?. Sometimes referred to as "fuzzy" verbal expressions of frequency or magnitude, these are standard practice in health questionnaires - despite their various limitations. However, where concrete terms and/or anchor points would clearly enhance the psychometric qualities of items, these will be incorporated.

Wording of Items

Additions to, and removal of, words/phrases in items was suggested by several of the Panel.. All these have been carefully evaluated and modifications made where clarity, and thus the quality, of the item was appreciably enhanced.

Criteria/Timeframe

While acknowledging the need to have the 12-month window so that it maps onto the DSM-IV and ICD-10 diagnostic timeframe for a 12-month diagnosis, one panel member considers this window to be problematic for detection of *current* problems. It was argued that people who have reduced use will still look impaired on both systems, yielding convergent but not predictive validity. While this timeframe is inevitable regardless of chosen timeframe, this problem is diminished with shorter recent time frames applied to both. Further review of this validation issue is needed.

CONCLUDING COMMENTS

Nunnally (1978) observes that a test can be no better than the items of which it is composed. Content validity depends on a 'rational appeal' to an adequate coverage and the propriety of important content. It is thus built into test construction, and not a standard applied later by statistical techniques. This principle has guided the generation of items for the brief cannabis screen. The procedure for *ensuring* content validity is outlined thus:

> In practice, content validity can only be assured by getting experts in the field to state what they regard as the vital material, converting this into test items and then sending it out to consultant experts again to see if they can see any glaring omissions or items that are concerned with the same problems (Kline, 1986, p. 154).

Following the local Expert Panel process of discursive reiterative item generation and refinement, the 'second-level' International Expert Panel Review has ensured this recommended procedure has, indeed, been systematically followed. Many IEP offered their continued support and best wishes, and asked to be kept informed of developments.

MY SINCERE THANKS FOR YOUR SUPPORT AND BEST WISHES YOUR INPUT IS VERY MUCH APPRECIATED

Kind regards, JAN.

APPENDIX 9

From: Philip Siataga
To: jbashford
Date: Wednesday, 14 May 2003 09:26
Subject: Re: comments on the cannabis screen draft

Thanks Jan,
I wish you well with the rest of the process. I welcomed the opportunity to comment (credit to your inclusive process). Ive read through your response to Havila's questions -thank you. It did clarify a number of important considerations. Wouldnt mind seeing the PIDAS Screen myself actually so Ill follow that up.

Kind Regards

Philip Siataga

---- Original Message ----
From: jbash[illegible]
To: psiataga
Cc: Ross Flett
Sent: Monday, May 12, 2003 12:16 PM
Subject: Fw: comments on the cannabis screen draft

Dear Phil,

Thank you very much for your comments on the draft cannabis screen.
Receiving feedback from several Pacific Island clinicians has been great -- a positive experience for me.
It is indeed affirming that all reviewers endorse the overall aim of the cannabis screen; the target groups (those with currently problematic cannabis use /dependence/abuse, and those at risk of developing such problems in the future); the domains/concepts incorporated in the draft screen; and in fact, expressed very little criticism of the item wording.
In short - the draft screen has been well-received by Pacific Island clinicians.
This has been very encouraging.

An aspect that did raise questions from all reviewers was the actual application of the screen to Pacific Island people:process/the background context, administration, format, and intervention (where indicated) issues.
As your concerns were in these areas, I forward (below) a copy of my response to Havila, whose comprehensive feedback incorporated your questions as well as various others.
As you will see, this reply addresses your specific issues.

It is important to keep in mind that this cannabis screen is at the very early stages of the development process - and if it performs well in the index population, will likely go through multiple stages of testing/adaptation to various groups in the population - the process generally undertaken in development of any instrument (e.g., to make translations, and to develop 'norms' in diverse demographic groups).

I trust your main concerns are addressed below.
Please feel free to come back to me if any remain outstanding.
Again - thank you for your feedback - much appreciated.

Kind regards,
Jan

16/06/03

Appendix 9
Cultural Consultants: Dialogue

From: Havila
To: 'jbashford'
Date: Monday, 12 May 2003 07:40
Subject: RE: comments on the cannabis screen draft

Hi Jan

Thanks for the hard work Jan....you poor thing. Anyway, you've certainly clarified things. It's great that you're also trying to pick up risk & not just dependency issues etc. I agree with your comments & you've answered a lot of my questions.

Well, keep up the good work...gotta go & catch a flight but if you need other stuff from me feel free to email. Otherwise, you can get PIDAS, TUPU, LOTOFALE & all PI A&D & mental health services' numbers from the ALAC PI Directory (Tina should have one)..it's just to get ideas of some of the cultural questions that they ask.

All the best with your work
Havila

-----Original Message-----
From: jbashford [mailto:
Sent: Saturday, May 10, 2003 5:00 PM
To: havila
Cc: Ross Hett
Subject: comments on the cannabis screen draft

Dear Havila,

Thank you so much for taking the time/effort to review the cannabis screen draft.
Thank you also for your supportive comments - they are appreciated, indeed.
Yes - instrument construction is certainly a challenge! and fraught with infinite difficulties.

I want to respond fully to your comments and suggestions, but in order to reduce this to a manageable task I'll write in 'shorthand' format - brief form, confident that you will comprehend the points made. In responding, I am assuming you read my letter accompanying the screen.

To reply to your numbered points:

1. Yes, simplicity is a key characteristic of a brief screen. Each item in the draft screen has gone through numerous revisions (through an iterative, consultative process) to achieve this standard - the 'bare bones', but adequate to convey the core gist of the information needed. Reading level required (if self-administered) would be approx. 11-12 (Standard 5-6). However, for someone without this reading level, or language, the GP (or counsellor, other, etc) can administer.

2. Process: this screen is primarily targeted at the population level/primary care settings, so the context would be GP/Nurse/Other health professional and patient, School/Employment Counsellor (etc)/Psychologist/Probation Officer/Mental Health/Drug Counsellor and client (etc, etc.).In short - yes, indeed, the background process would already be established.
These brief "lifestyle:" screens are also seen as ideal for embedding within a general lifestyle heath interview or a population survey.
So - for example, in the course of the conversation, the doctor will ask "Have you ever used cannabis?" (and after a positive response) "have you used it in the past 12 months?" and if a positive response, may ask the patient the screen questions in the most appropriate way for that client (if defensive - may scatter the items in a general health interview; if not, may ask the patient to fill in the screen, or administer it him/herself to the patient). The important point here is that the process is in

Appendix 9
Cultural Consultants: Dialogue

place - the doctor suspects cannabis may lie behind the patient's presenting problems (though the patient may be unaware/or not reporting use).- -maximizing the "opportunistic" moment.

3. Likert scales: At this very early stage of screen construction it is critical to achieve maximum discriminatory power for psychometric analysis to differentiate groups along the continuum of risk. Scales with 5 at least - and 7 are even better- points are desirable at this stage. After testing/data analysis, categories can be collapsed as analysis indicates to simplify. Note that I aim to identify not only those with a probable Cannabis Use Disorder (Dependence, Abuse/Harmful Use) but also those "at risk" of developing problems in the future (so several 'discrete' groups). In fact this latter group is really the "true" target of an Early Intervention.

4. Lack of cultural references: It is extremely difficult to achieve specific cultural references for every group in the population in any brief instrument - usually, a cross-cultural (international) screen (like the AUDIT) is developed, then adapted/tested in specific ethnic groups.
This is very likely to be the direction taken here- if necessary (depends how the screen performs in its initial trial and follow-up).
This is a task for future research.

5. That refinement would be part of this process? (in 4, above)
Yes - incorporating the family into the intervention is so important !
e.g., if a GP -family doctor- or PI health worker--administered this to a patient, he/she would deal with these issues?

6. As (1) above - administration of the screen is flexible/open.
It could be self or other-administered - and likely to be other-administered if in primary care setting.

7. As a BRIEF screen (which aims only to identify if the potential presence of a problem - its not an assessment or a diagnostic tool) this screen is intended for use across all demographics (at this stage).
We will see how it performs in our sample, firstly- we have ethical approval to trial in cannabis users aged 13 and over.

8. Screen format:
As my brief letter cautioned (and your comments in red on the screen suggest you did not see this) when respondents actually respond to the screen questions, that is all they will see (and we intend to make it respondent-friendly with appropriate graphics, etc.).
I left the sections/Domain headings in at this stage so (as clinicians) you could see just what domains/concepts the questions represented.(I note you are happy with the concepts)
Respondents will see a set of questions (nicely-formatted) only.
For example, in the response options the numbers ("1 = 0, 2 = 1" etc) won't be there - just the words along the continuum, and the accompanying boxes (or similar graphics) for them to mark.

Similarly, I left the Filter questions in (at very top) so you could see that the process would be underway.
You certainly don't just throw a screen under someone's nose "cold turkey" . Even if someone goes to a website, and responds to an on-line drug screen there is a process going on there - and that someone has very good reason to seek out/fill in an on-line drug use screen? (the process is some sort of insight that he/she just could have a problem?). By contrast, the screen could be well applied to seek out/benefit those without this insight.

General: Again, thank you for your kind, encouraging comments.
You clearly appreciate the many pitfalls.
I would be very keen to see the TUPU and the PIDAS questionnaires - is there any way you could send them to me/suggest a way I can access them?
I would be very grateful.

16/06/03

Appendix 9
Cultural Consultants: Dialogue

6. Reading level inadequate: or Pacific Island respondents who are not Palangi-literate:
As (1) above - administration of the screen is flexible/open.
It could be self or other-administered - and likely to be other-administered if in primary care setting or Pacific Island health setting.

7. As a BRIEF screen (which aims only to identify if the potential presence of a problem - its not an assessment or a diagnostic tool) this screen is intended for use across all demographics (at this stage). We will see how it performs in our sample, firstly- we have ethical approval to trial in cannabis users aged 13 and over.

8. Screen format:
As my brief letter cautioned (and your comments in red on the screen suggest you did not see this) when respondents actually respond to the screen questions, that is all they will see (and we intend to make it respondent-friendly with appropriate graphics, etc.).
I left the sections/Domain headings in at this stage so (as clinicians) you could see just what domains/concepts the questions represented.(I note you are happy with the concepts)
Respondents will see a set of questions (nicely-formatted) only.
For example, in the response options the numbers ("1 = 0, 2 = 1" etc) won't be there - just the words along the continuum, and the accompanying boxes (or similar graphics) for them to mark.

Similarly, I left the Filter questions in (at very top) so you could see that the process would be underway. You certainly don't just throw a screen under someone's nose "cold turkey" . Even if someone goes to a website, and responds to an on-line drug screen there is a process going on there - and that someone has very good reason to seek out/fill in an on-line drug use screen? (the process is some sort of insight that he/she just could have a problem?). By contrast, the screen could be well applied to seek out/benefit those without this insight.

General: Again, thank you for your kind, encouraging comments.
You clearly apreciate the many pitfalls.
I would be very keen to see the TUPU and the PIDAS questionnaires - is there any way you could send them to me/suggest a way I can access them?
I would be very grateful.

Kind regards,
Jan

14/05/03

Appendix 9
Cultural Consultants: Dialogue

From: Tina McNicholas
To: jbashford
Cc: havila
Date: Friday, 9 May 2003 16:15
Subject: FW: the cannabis screen draft

Thanks Havila

Jan, one last piece of feedback received on the screening tool for you.

Regards
Tina

Manager Pacific Programmes
Alcohol Advisory Council of NZ

www.alcohol.org.nz

---Original Message---
From: Havila
Sent: Friday, May 09, 2003 4:04 PM
To: Tina McNicholas
Subject: FW: the cannabis screen draft

Hi Tina

Had a browse through the screen. I've made comments in red.

Overall, some key points:

1. The screen needs to be very simple (language and questionnaire format) especially if this is to be handed to Pacific clients (we know how they feel about Palagi questionnaires, they tell them what they want to hear)
2. Is there a process where the clinician & client develop some rapport ('connection building') before the questionnaire is filled?
3. The likert scales used are too complicated (some up to 7) & needs to be simple & directly related to the question asked
4. There is a lack of cultural reference in the screen (refer Tupu & PIDAS assessment questionnaires for guide)
5. A couple of cultural questions needed eg. in the end of questionnaire if they want to see a Pacific counselor or try & gain info on how family & culture perceives their THC use or if significant others (eg.

Appendix 9
Cultural Consultants: Dialogue

father) also supporting their use, need to gather info on how significant others & families can be involved in the intervention

6. What happens to those who do not understand English well or are Palangi illiterate?
7. Can't remember what age group is the screen developed for, is it generic or will it capture all cultural, youth & adult and gender issues?

Overall, the concepts in the screen are fine. My concern is the process of giving them to PI clients to fill & the need to simplify the language and the format of the questionnaire. Otherwise, well done to whoever is developing it, I know how hard it is to find the right words for questionnaires

Cheers
HMK

-----Original Message-----
From: Tina McNicholas [mailto:
Sent: Tuesday, May 06, 2003 3:15 PM
To: havila
Subject: FW: the cannabis screen draft

Bula Havila
Here you go, the screen as discussed. Appreciate your feedback on this asap.
Malo aupito!
Tina

Tina Nadakuitavuki McNicholas
Manager Pacific Programmes
Alcohol Advisory Council of NZ

www.alcohol.org.nz

-----Original Message-----
From: Tina McNicholas
Sent: Friday, May 02, 2003 3:41 PM
To: Francis Agnew (E-mail); Halo Asekona (E-mail 2); Havila Matangi (E-mail); Kirk Mariner (E-mail); Ned Cook (E-mail); Phil Siataga (E-mail); Nina Tafau-Brown (E-mail); Rodney Lefeisiuao (E-mail 2); Rodney Lefeisiuao (E-mail); Yasmin Iese (E-mail); Jo Jackson (E-mail)
Cc: 'jbashford'
Subject: FW: the cannabis screen draft

Bula vinaka people

The attached cannibis screen has been forwarded to us for pre-testing. In your capacity as Pacific clinicians, I would be grateful if you could cast your eyes on it and forward any specific comments that you may have about the appropriateness of its contents on pacific people. Some background/contextual information is provided below.

Please forward your comments by **Friday 9 May 2003**.

16/06/03

Appendix 9
Cultural Consultants: Dialogue

Pacific Island perspective

From: Tina McNicholas
To: jbashford
Cc:
Date: Friday, 9 May 2003 09:57
Subject: FW: the cannabis screen draft

Hi Jan
Some comments on the screen below.
regards, Tina

Tina Nadakuitavuki McNicholas
Manager Pacific Programmes
Alcohol Advisory Council of NZ

www.alcohol.org.nz

-----Original Message-----
From:
Sent: Friday, May 02, 2003 6:53 PM
To: Tina McNicholas
Subject: Re: the cannabis screen draft

Bula Tina
Thanks for that. I had a very brief look at the draft cannabis screen test and it looked a bit lengthy in my opinion, but very comprehensive in raising the client's awareness about the effects of cannabis. It would be useful if the client and the clinician have the time. Most people I dealt with in the past came with a very good knowledge of the severity of their drug use, they just do not know how to stop and to stay stopped. I will find time to have a good look at it again may be next week when I am down for the NZCCA conference in Wellington. Kind regards Ned.

----- Original Message -----

From: Tina McNicholas
To: Francis Agnew (E-mail) ; Halo Asekona (E-mail 2) ; Havila Matangi (E-mail) ; Kirk Mariner (E-mail) ; Ned Cook (E-mail) ; Phil Siataga (E-mail) ; Nina Talau-Brown (E-mail) ; Rodney Leleisiuao (E-mail 2) ; Rodney Leleisiuao (E-mail) ; Yasmin Iese (E-mail) ; Jo Jackson (E-mail)
Cc: jbashford
Sent: Friday, May 02, 2003 3:40 PM
Subject: FW: the cannabis screen draft

Bula vinaka people

The attached cannibis screen has been forwarded to us for pre-testing. In your capacity as Pacific

10/05/03

Appendix 9
Cultural Consultants: Dialogue

From: Tina McNicholas
To: jbashford
Cc: ptsiatag
Date: Friday, 9 May 2003 10:05
Subject: FW: the cannabis screen draft

Jan, more comments on the screen.
Regards

Tina Nadakuitavuki McNicholas
Manager Pacific Programmes
Alcohol Advisory Council of NZ

www.alcohol.org.nz

-----Original Message-----
From: Philip Siatagа
Sent: Wednesday, May 07, 2003 2:49 AM
To: Tina McNicholas
Subject: Re: the cannabis screen draft

Hi Tina,

Hows it all going?Heaps to catch up on.

I've written other comments on the screening doc in red.

Overall , the Cannabis Screen is asking relevant questions for a generic audience.I think it is a worthwhile and a much needed 'tool' . And I've responded with this mind. However, the issues we face with this screeing tool are same as with with Alcohol - i.e. factoring in the engagement process-and the cross-cultural sensitivities in utilising the screening. It is unclear how actually using this tool when working cross-culturally will be addressed. To be frank, Ethics Approvals in general I'm still quite reserved about when it comes to Pacific (knowing from experience that ethics approval processes in my opinion across the country have often not considered this dimension/dynamic well in the recent past on a range of research and development issues).

MY concern is not the substance of the tool (I have suggested possible minor additions or changes) but its use with Samoan Clients and Pacific peoples more generally). The tool essentially has potential for adaption for our Pacific population groups but it would need to go through the whole process of trialling with specific targeted groups.(I dont know robust the trialling is for inclusion of this and Im certain that this nformation what be avialble form Nelson). Ive presumed that there has been limited involvement to date of Pacific peoples but correct me if Im wrong. Not sure what process Jan has employed to date becuase this determines what "consderation of culturally appropriateness" actually means and so I've erred on the side of caution with respect to this. I simply can't see where specific consideration of Pacific Peoples has been applied here.To be

Appendix 9
Cultural Consultants: Dialogue

blunt. I like the tool, agree with its need, but I would need more information about intentions for adaption for other population groups etc. It is mainstream tool and useful. Its a bit like waht we did with workforce competencies. The gennic and the specific Pacific .

Hope my comments are helpful. And to reiterate I do think this screening tool will add value as intervention. Would like hower to know more about the Cultural Appropriteness of it myself as I dont have anybackground on the process (apart from the purpose etc supplied) which has brought the tool to its current phase.

Kind Regards
Phil Siataga

----- Original Message -----

From: Tina McNicholas
To: Francis Agnew (E-mail) ; Halo Asekona (E-mail 2) ; Havila Matangi (E-mail) ; Kirk Mariner (E-mail) ; Ned Cook (E-mail) ; Phil Siataga (E-mail) ; Nina Talau-Brown (E-mail) ; Rodney Leleisiuao (E-mail 2) ; Rodney Leleisiuao (E-mail) ; Yasmin Iese (E-mail) ; Jo Jackson (E-mail)
Cc: jbashford
Sent: Friday, May 02, 2003 3:40 PM
Subject: FW: the cannabis screen draft

Bula vinaka people

The attached cannibis screen has been forwarded to us for pre-testing. In your capacity as Pacific clinicians, I would be grateful if you could cast your eyes on it and forward any specific comments that you may have about the appropriateness of its contents on pacific people. Some background/contextual information is provided below.

Please forward your comments by Friday 9 May 2003.

Many thanks
Tina

DEVELOPMENT AND VALIDATION OF A BRIEF CANNABIS SCREEN
In consultation with treatment providers, advisors from the addictions field, an Expert Panel of cannabis researchers and clinicians for provisional screen development, and supervised by my Chief Supervisor (Dr. Ross Flett, Massey University) and international cannabis researchers co-supervisors (Drs.Jan Copeland and Wendy Swift, National Drug and Alcohol Research Centre, Sydney University) I aim to develop a brief, self-report cannabis screening instrument to enable rapid and reliable

Appendix 9
Cultural Consultants: Dialogue

identification of cannabis users whose *current* consumption either (1) manifests symptoms of cannabis use problems/disorder, or (2) puts the user at risk of developing cannabis use problems/or disorder at a future time.

Cannabis use problems pervade New Zealand society. Of particular concern for future societal morbidity, cannabis use is now an integral part of local youth culture. Recent statistics and trends indicate a significant upturn in both cannabis use and its attendant health, psychological and social (interpersonal, educational, employment, legal) problems. This reflects in treatment admissions for primary/secondary cannabis use problems, which now represent an ever-increasing proportion of our community-based Alcohol and Drug Treatment Services admissions (currently as high as 43% of all admissions. Alcohol, or comorbid alcohol and cannabis form as many as 76% of total clientele (NCTD, 2002). Unlike well-researched alcohol problems, however, up until now little research attention has been devoted to cannabis. A priority in National Drug Policy (Ministry of Health, 1998) is a reduction in cannabis use and its adverse consequences. Development of the Screening/Early Intervention approach to cannabis use is a national policy directive. Paradoxically, however, as yet no longitudinally-validated cannabis screen exists, similar to the well-known alcohol screen, the AUDIT. In particular, there has been no attempt to develop a screen for early-stage (pre-clinical, unsafe, risky) cannabis use to facilitate timely identification and *early* intervention among "at risk" cannabis users. A brief, reliable, simple, self-report, rapidly-adminstered and rapidly-scored cannabis screen used across various primary care contexts (General Practitioners, hospital outpatient clinics, hospital wards, mental health services, Youth Services, Counselling Services, Nursing Practices, Youth Services, Social Services, Justice/Probation, occupational, educational, etc) would facilitate a timely, humane, and appropriate therapeutic intervention to attempt to arrest progression to a more serious and destructive stage of CUDisorder/problems.

The individual, social and economic benefits that would accrue to the health and wellbeing of all New Zealanders from Screening/Early Intervention into cannabis use are potentially infinite, and outlined in the National Drug Policy (1998) and elsewhere (see Durie, 2001, 2002). Cannabis is a significant problem for New Zealanders, including Maori and Pacific Island population groups (Durie, 2001, 2002). Although modest, development of a cannabis screen would certainly be a contribution to the health and wellbeing of all New Zealanders - and most importantly, to those whose lives are potentially compromised - and many severely disabled - by misuse of this harmful substance. Screening/Early Intervention can be justified on an ethical, humane, economic, rational - commonsense- imperative.

This research has received ethical approval from the Massey University Human Ethics Committee and the I Ethics Committee. The provisional cannabis screen will be tested among an index sample (aged 13 and over) voluntarily recruited from among clients at the Nelson Alcohol and Drug Services. A 12-month follow-up will determine the predictive capacity of the screen.

The items forwarded for your inspection have been developed over a protracted period and represent the end product of a systematic process of item generation and refinement. Of note, cultural appropriateness/sensitivity has been a prominent consideration during this process.The current version of 54 (provisional) items will be trialled among the clinical sample and the items that perform poorly will be deleted. The ultimate aim is to identify the 10 items (or less) that perform best in predicting CUD and 'risky' cannabis use. Simplicity, acceptability, brevity, reliability/validity, speedy administration and scoring/interpretation are the desired characteristics, as these will help promote ready uptake of the cannabis screen among the target health care (and other) settings.

-----Original Message-----

16/06/03

Appendix 9
Cultural Consultants: Dialogue

From: jbashford [mailto
Sent: Tuesday, April 15, 2003 3:33 PM
To: Tina McNicholas
Subject: the cannabis screen draft

Dear Tina,

I attach the current draft of provisional items for the brief cannabis screen for your inspection.
Please note that this is still in the 'edit' process, so changes may still be made (e.g., items discarded before testing).
We intend to trial these items among a clinical sample - and cull out any poor performers after statistical analyses (and follow-up). It is hoped to reduce to a much shorter version - say 10 items, at most.
Note that the screen is yet to be formatted for administration - respondents are presented with the items only, and not the diagnostic criteria/sections, headings etc.

The item pool draft has been constructed with close attention to cultural sensitivity/appropriateness. Given the importance I place on these aspects, however, I welcome any criticisms, comments, suggestions, etc you may care to offer from a Pacific Island perspective.

Again, - my sincere thanks for your assistance in this project.
It will allow me to feel more confident in/allow peace of mind about this very important element.
I look forward to your comments.
Kind regards,
JAN

This e-mail message has been scanned for viruses and content.

Appendix 9
Cultural Consultants: Dialogue

From: Hirini, Paul
To: jbashford
Date: Wednesday, 23 April 2003 19:04
Subject: RE: provisional cannabis screen items:cultural relevance

Hi Jan

Thanks for the opportunity to look over the draft questionnaire/interview.

I had a read through the screening tool which looks very comprehensive and impressive, well done. From my perspective with regard to cultural aspects I see no obvious problems with the suggested items.

I wondered only if people who respond are to see the headings (like the genetic/environment heading)? If so I then wondered potentially (and only potentially as a hunch) some Maori people might 'possibly' react to the genetic word in a negative way due to the public debate about genetic engineering and the ideas around protection of whakapapa or geneology of many whanau and tribes. I'm guessing that the headings (not sure if a written questionnaire format or verbal administration or potentially both) are for the interviewer's reference only as with many measures, so probably not a potential problem in this case.

I'm assuming there is a demographic section of the measure to attach that will give you the details re: ethnic/cultural identity etc. If you need any advice there also no worries.

Well done Jan! The items seem very relevant and reflects a great amount of background work. Hope all else going well so far. Happy to be of any further help.

All the best Jan, kia ora.

Paul

-----Original Message-----
From: jbashford
Sent: Wednesday, 23 April 2003 2:58 p.m.
To: Hirini, Paul
Cc: Flett, Ross
Subject: provisional cannabis screen items:cultural relevance

Hello Paul,

As agreed, I forward the provisional items for the brief cannabis screen for your scrutiny with regard to cultural sensitivity/appropriateness for Maori. The questions represent the (provisional) 'end' product of a systematic process of item generation and refinement using the Expert Panel methodology. Careful attention was devoted to cultural aspects throughout this multi-stage process.

We plan to trial the (54) items among our index sample of drug treatment (high risk) clients, and select the items that perform best in identifying those currently with, and those at risk of developing, cannabis-related disorder/problems.
As brevity is (one of) the cardinal desired characteristics of a screen intended for use in primary care/general population settings, it is desirable that data reduction results in say, 10 (or even fewer), final items.

I look forward to your perspective and any comments and suggestions you might care to make.
Thank you very much, once again, for your contribution to the EP study.

16/06/03

APPENDIX 10

☐☐☐

PLEASE READ THIS BEFORE STARTING

Some people can use cannabis without developing any serious problems. Others can experience health problems, or other kinds of problems. If you answer the questions below, it can help you to work out if you are having any problems with cannabis. If you have any difficulties ask your counsellor for help.

There are no right or wrong answers.
Nobody but the researcher will see your answers.

For each question TICK ☑ the answer that is closest to your cannabis use OVER THE PAST 12 MONTHS.

Office Use Only

1. I use cannabis because .....
(Tick EVERY thing/reason that applies to you.)

- ☐ it's cool/fun; I like the 'buzz'
- ☐ my friends/everyone uses it
- ☐ it's easy to get/obtain
- ☐ it's safer than alcohol
- ☐ it makes me feel good/better about myself
- ☐ it helps me fit in, feel part of the group, and relate to others better
- ☐ it makes me happy, find things funny, and laugh a lot
- ☐ it helps me cope with problems and stress
- ☐ I can't stop using it
- ☐ it makes me hallucinate
- ☐ it improves my creativity/enjoyment (films, music, crafts, etc)
- ☐ it makes sex better/more enjoyable
- ☐ it stops/reduces pain
- ☐ it helps me relax/sleep
- ☐ it calms/controls my anger
- ☐ it reduces boredom, fills in time; it's something to do
- ☐ it helps me forget/escape bad feelings (loneliness, anxiety, depression)
- ☐ it helps my appetite

☐

Appendix 10
The CUPIT: Research Version

2. On how many days have you used cannabis during the past 12 months?
(If there was no pattern to your cannabis use, please make your **best estimate**.)

Office Use Only:

- ☐ 1 – 6 days (less than one day a month)
- ☐ 7 – 12 days (an average pattern of one day a month)
- ☐ 13 - 36 days (an average pattern of 2 – 3 days a month)
- ☐ 37 - 52 days (an average pattern of one day a week)
- ☐ 53 -104 days (an average pattern of 2 days a week)
- ☐ up to 208 days (an average pattern of 3-4 days a week)
- ☐ up to 312 days (an average pattern of 5-6 days a week)
- ☐ up to 365 days (daily/most days)

☐

3. Now please think about your **recent** cannabis use.
On how many days have you used cannabis over the past 3 months (90 days)?

- ☐ no days
- ☐ 1 – 2 days (less than one day a month)
- ☐ 3 – 4 days (an average pattern of one day a month)
- ☐ 5 - 9 days (an average pattern of 2 – 3 days a month)
- ☐ 10 - 15 days (an average pattern of one day a week)
- ☐ 16 - 26 days (an average pattern of 2 days a week)
- ☐ 27 - 52 days (an average pattern of 3-4 days a week)
- ☐ 53 - 78 days (an average pattern of 5-6 days a week)
- ☐ 79 - 90 days (daily/most days)

☐

4. How many times would you use cannabis on a typical day when you were using?
(***Note:*** at least one hour between each new 'use'.)

- ☐ once
- ☐ twice
- ☐ 3 – 4 times
- ☐ 5 – 6 times
- ☐ 7 – 9 times
- ☐ 10 or more times

☐

5. How much of the average day do you spend/or feel stoned?

- ☐ 0 hours
- ☐ 1 – 2 hours
- ☐ 3 – 4 hours
- ☐ 5 – 6 hours
- ☐ 7 – 8 hours
- ☐ 9 or more hours

☐

Appendix 10
The CUPIT: Research Version

Office Use Only

6. What type of cannabis do you use most often?

- ☐ cabbage/leaf
- ☐ bush/heads
- ☐ commercial oil
- ☐ hash
- ☐ skunk/hydro
- ☐ gold oil
- ☐ head oil

7. On average, how much cannabis would you smoke when you use?

Joints	☐	0 – 1	☐	2 – 3	☐	4 – 5	☐	6 – 7	☐ 8 or more
Cones	☐	0 – 1	☐	2 – 3	☐	4 – 5	☐	6 – 7	☐ 8 or more
Spots	☐	0 – 1	☐	2 – 3	☐	4 – 5	☐	6 – 7	☐ 8 or more

8. Do you need to use more cannabis now to get stoned/high than you did 12 months ago?

- ☐ no, definitely not
- ☐ probably not
- ☐ not sure/don't know
- ☐ possibly/maybe
- ☐ yes, definitely

9. Have **any** members of your family/whanau/aiga (including grandparents and other relatives) **ever** been heavy users of, or had problems with, alcohol, cannabis, or any other drugs?

- ☐ no, not one
- ☐ yes, at least one
- ☐ yes, several
- ☐ don't know

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only:

10. How often have you used cannabis first thing in the morning?

- ☐ never
- ☐ once or twice
- ☐ less than monthly
- ☐ monthly
- ☐ one day a week
- ☐ several days a week
- ☐ daily/always

☐

11. Did you feel restless, irritable, grumpy, anxious or depressed when you could not use cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

12. Have you been able to stop using cannabis when you wanted to?

- ☐ never/at no time
- ☐ sometimes (not often)
- ☐ quite often (half the time)
- ☐ very often (usually)
- ☐ always/all the time

☐

13. Have you felt that you needed cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only:

14. What was the longest time that you went without using cannabis?

- ☐ 6 months or longer
- ☐ 3 – 5 months
- ☐ 1 – 2 months
- ☐ 2 – 3 weeks
- ☐ one week
- ☐ 4 – 6 days
- ☐ 2 – 3 days
- ☐ one day
- ☐ no days at all

☐

15. How often did you try to cut down on your cannabis use, but found you couldn't?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

16. Have you found it difficult to get through a day without using cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

17. How difficult do you think you would find it to stop using or go without cannabis altogether?

- ☐ not at all difficult
- ☐ a bit difficult
- ☐ quite difficult
- ☐ very difficult
- ☐ impossible

☐

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only:

18. Did you ever use cannabis after you had decided not to?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

19. Have you spent time thinking about cannabis or trying to get cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

20. Have you given up things you used to enjoy or were important because of cannabis? (e.g., work, school, sports, hobbies, being with family or friends, etc.)

- ☐ none at all/nothing
- ☐ one or two things
- ☐ quite a few things
- ☐ lots of things
- ☐ everything

21. How often have you felt bad about or regretted using cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

22. How often did you feel paranoid (suspicious) or anxious after using cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only:

23. Cannabis has made my health ……..

- ☐ much better
- ☐ a bit better
- ☐ no effect/no change
- ☐ a bit worse
- ☐ much worse

24. Have you felt sick or passed out (had a "whitey") after using cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

25. Have you had a cough, sore chest, or breathing problems for any length of time?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

26. Have you lacked the energy to get things done in the way you used to?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

27. Have you had problems concentrating and remembering things?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only

28. Have you done any of the following things/activities after using cannabis? (Tick **every thing** that applies to you):

- ☐ driven a vehicle
- ☐ operated machinery (e.g., power tools, drills, saws, etc)
- ☐ used alcohol or other drugs
- ☐ sports/recreation (boating, climbing, swimming/diving, cycling, etc)
- ☐ gone to work, school
- ☐ hung out in town
- ☐ had unprotected sex
- ☐ used a weapon (knife, firearm, etc)
- ☐ none of these things

☐

29. Have you or anybody else been injured after you used cannabis?

- ☐ no
- ☐ yes, once
- ☐ yes, several times

☐

30. Has anything you had planned, or were expected to do, not happened after using cannabis?
(*e.g.,* a family outing, chores, taking care of children, an assignment/homework, appointment, job interview, training, attending school or work, etc)

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

31. Did your use of cannabis ever interfere with (get in the way of) your work at school, your job, or your home life?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only

32. Has a partner, relative, friend, a doctor or other health worker been concerned about your cannabis use or suggested you cut down?

- ☐ no
- ☐ yes

☐

33. Has your cannabis use ever created/caused problems between you and your partner, parents, other close relative, or friend?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

34. Have you spent more time with friends who use cannabis than non-using friends?

- ☐ no, definitely not
- ☐ probably not
- ☐ not sure/don't know
- ☐ possibly/maybe
- ☐ yes, definitely

☐

☺ Only two more pages to go! ☺

Appendix 10
The CUPIT: Research Version

OVER THE PAST 12 MONTHS ……..

Office Use Only:

35. Have you tended to smoke cannabis on your own more than you used to?

- ☐ no, definitely not
- ☐ probably not
- ☐ not sure/don't know
- ☐ possibly/maybe
- ☐ yes, definitely

☐

36. Have you lost any friends or partners (boyfriend/girlfriend) because you use/d cannabis?

- ☐ no, definitely not
- ☐ probably not
- ☐ not sure/don't know
- ☐ possibly/maybe
- ☐ yes, definitely

☐

37. Did you ever spend more than you could afford or get into serious money problems because of cannabis?

- ☐ never
- ☐ sometimes
- ☐ quite often
- ☐ very often
- ☐ always/all the time

☐

38. Have you been arrested, even for a few hours, because of your cannabis use?
(e.g., for something you did when stoned, or to get money to buy cannabis; for cannabis possession, cannabis supply, etc).

- ☐ no
- ☐ yes, once
- ☐ yes, twice or more

☐

Appendix 10
The CUPIT: Research Version

39. Do you think that cannabis is addictive?

- ☐ no
- ☐ yes

40. Do you think that cannabis can be harmful?

- ☐ no
- ☐ yes

41. Do you think that you use too much cannabis?

- ☐ no
- ☐ yes

42. Do you think that your cannabis use is ever a problem?

- ☐ no
- ☐ yes

43. Do you think you are at risk of getting into problems if you keep on using cannabis as you are now?

- ☐ no, definitely not
- ☐ probably not
- ☐ not sure/don't know
- ☐ possibly/maybe
- ☐ yes, definitely

Office Use Only:

☺ Thank you for taking part. ☺

Your answers will help us to understand more about cannabis use problems. We will then be better able to help those with cannabis use problems.

Please put your answers in the envelope, seal it and hand it to your counsellor.

APPENDIX 11

Cannabis Use Problem Severity

Clinician Diagnosis/Rating Form

Code No: ☐☐☐

Clinician Diagnosis

Primary drug problem **-12 months** .....

- Lifetime .....

Probable secondary/comorbid drug problem(s) .....

Presenting problem/Client view .....

Clinician Rating

This person has a cannabis use problem on a severity scale of (circle one)

1 = non-problematic use
2 = 'risky' use/some problems
3 = harmful use/abuse
4 = dependence; mild to moderate symptom level
5 = severely dependent/serious problem level

DSM-IV Criteria Score = ☐☐

Clinician: .....

Date: .....

Appendix 11
Clinician Diagnosis / Rating Form
and DSM-IV Criteria Checklist

DSM-IV Criteria Checklist

	Tick each/all criteria the client meets
Cannabis Abuse:	
(A) A maladaptive pattern of cannabis use leading to clinically significant impairment or distress, as manifested by one (or more) of the following symptoms during past 12-months.	
1. Recurrent use resulting in failure to fulfill obligations at work, school or home.	☐
2. Recurrent use/intoxication in situations in which use is physically hazardous (driving, operating machinery, etc).	☐
3. Recurrent cannabis-related legal problems.	☐
4. Continued cannabis use despite recurrent social/interpersonal problems.	☐
(B) The symptoms have never met the criteria for Cannabis Dependence.	☐
Subtotal	☐☐
Cannabis Dependence:	
A maladaptive pattern of cannabis use leading to clinically significant impairment or distress, as manifested by 3 (or more) of the following symptoms during the past 12 months.	
5. Cannabis used in larger amounts or over a longer period than intended.	☐
6. Persistent desire/unsuccessful efforts to cut down or control use.	☐
7. Great deal of time spent in obtaining, using, recovering from effects of, cannabis.	☐
8. Important social, occupational, recreational activities given up/reduced because of cannabis use.	☐
9. Continued cannabis use despite persistent cannabis-related physical or psychological problems (respiratory, nausea, gastrointestinal, memory, depression, anxiety, confusion, hallucinations, etc).	☐
10. Marked tolerance (need more cannabis to get same effect).	☐
11. Withdrawal (presence of withdrawal symptoms, or relieve or avoid withdrawal).	☐
Total	☐☐

APPENDIX 12

Date:	☐☐ ☐☐ ☐☐	**ID/Code**	☐☐☐
Time began:	☐☐ ☐☐		
Time completed:	☐☐ ☐☐		

Interview Schedule

Sociodemographic Information

1. Age (in years) ☐☐

2. Gender

Female	1
Male	2

3. Ethnic Identity

(a) Do you have Māori ancestry?

No	1
Yes	2

(b) What ethnic group do you identify most closely with?

NZ European/Pakeha	1
Māori	2
Samoan	3
Cook Island Māori	4
Tongan	5
Nuiean	6
Chinese	7
Indian	8
Other ethnic identity (specify).....	9

Appendix 12
The Interview Schedule

4. Source of Referral To Treatment

Self	1
Partner/family	2
Friend(s)	3
GP	4
Community Health/Mental Health Service	5
School/Educational Institution	6
Workplace	7
Justice Dept: Probation or court-mandated	8
Other (specify)……	9

5. What is the highest level of school education you have obtained?

Primary School	1	(go to 6)
Secondary School	2	(go to 5a)

5a. How many years secondary education did/have you complete(d)? ……

6. Are you still in school?

Yes	1	(go to 8)
No	2	

7. Have you obtained any qualifications since leaving school?

No qualification	1
Trade qualification	2
Polytechnic/Undergraduate University degree	3
Postgraduate degree	4
Started, but didn't complete	5
Other (specify)……	6

8. Are you currently employed?

Employed full-time	1
Employed part-time/casual	2
Self-employed	3
Unemployed	4
Sickness benefit/pension	5
Student	6
Other (specify)……	7

9. What is your current occupation? ……..……

Appendix 12
The Interview Schedule

10. What is your main source of income? (only one)

Full-time employment	1
Part-time employment	2
Government benefit/pension	3
Student Allowance/ Study Scholarship	4
Partner/family	5
Criminal/illegal	6
No income	7
Other (specify).....	8

11. Who do you usually live with?

Live alone	1
Live with partner	2
Live alone with child(ren)	3
Live with partner and child(ren)	4
Live with parents	5
Other relatives	6
Friends/flatmates	7
Landlord	8
Other (specify)	9

12. Are you currently in a relationship?

Married/de facto	1
Yes, but not living together	2
Separated/divorced	3
Widowed	4
Never married	5
Other (specify)	6

13. Do you have any children under 16 years of age that live with you?

Yes	1
No	2

Appendix 12
The Interview Schedule

14. **Drug Use History** (Sobell, Kwan & Sobell, 1995)

DRUG CATEGORY	Ever Used (If NO, leave remainder of the line blank.)	Age First Used	Ever Regular Use (at least weekly)	Year Last Used	Frequency Of Use In Past 90 days 0 = no use 1 = 1-3 x/month 2 = 1 x/week 3 = 2-3 x/week 4 = 4-6 x/week 5 = daily 1x/day 6 = several x/day
Alcohol	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Tobacco	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Ecstasy	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Opiates: Heroin, MST/Morphine, opium, homebake, Methadone, Poppy Seed Tea	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Cocaine/Crack	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Stimulants: Amphetamines (Speed, Ritalin) Methamphetamines (P, Ice)	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Benzodiazepines / Minor Tranquillizers: Valium, Rivitrol, Temazepam (Footballs)	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Hallucinogens: LSD, Mescaline/Cactus, Psilocybin/Mushrooms	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Inhalants/Solvents: Glue, Petrol, Aerosols/Spray Cans, Paint Thinner, Butane	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Other Category: (specify)	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)
Other Category: (specify)	☐ No ☐ Yes (tick appropriate box)	☐☐	☐ No ☐ Yes (tick appropriate box)	☐☐☐☐	0—1—2—3—4—5—6 (circle appropriate number)

Appendix 12
The Interview Schedule

15. Apart from cannabis, have you ever felt dependent on, or experienced problems because of the use of any of these other drugs?

No	1	(skip to 16)
Yes	2	
(Specify drug(s)).....		

15a. When was the last time you felt dependent on this/these drug(s)? .....

15b. Did you have treatment for these problems?

No	1
Yes	2

15c. Most recent occasion? (not current treatment) ..... years ..... months ago

15d. For which drug(s) have you had treatment?

No problem/treatment	0
Alcohol	1
Tobacco	2
Cannabis	3
Ecstasy	4
Opiates (heroin, methadone, homebake, morphine)	5
Cocaine/Crack	6
Stimulants (amphetamines, methamphetamines)	7
Benzodiazepines	8
Hallucinogens (LSD, Mushrooms)	9
Inhalants/solvents	10
Other (specify)	11

16. Did/does anyone in your family have a problem with alcohol, cannabis, or other drugs?

No, not one	0
Yes, at least one member	1
Yes, several members	2
Don't know/unsure	99

[IF YES.....specify]

16a. Mother (which drug) .....

16b. Father (which drug) .....

16c. Sibling (which drug) .....

16d. Other relative (specify)..... (which drug) .....

Appendix 12
The Interview Schedule

Cannabis Use/Historical and Current

First Use

17. How old were you when you first tried cannabis? ..... years

18. Have you *ever* used cannabis on a regular basis (at least once a week)?

No	1	(go to 19)
Yes	2	(go to 18a)

18a. How old were you when you first started using regularly? .....

18b. For how long did you use cannabis regularly? ..... (years)

Current Use / Patterns of Use

19. Current Use - Timeline Followback (Sobell & Sobell, 1992) - cannabis use past 90 days

20. Would you say that your recent use (in 19) is your typical pattern of use?

Yes	1	(go to 20a)
No, more frequent	2	(go to 20b)
No, less frequent	3	(go to 20b)
don't know	99	

20a. **[IF YES]** How long would this have been your typical pattern of cannabis use?

one to less than six months	1
six months to less than a year	2
1 to 5 years	3
more than 5 years	4
don't know/remember	99

20b. **[IF NO]** What was your use pattern before that?

Please describe: .....
(e.g., daily, less than daily, more than weekly, etc, and timeframe) .....
.....

21. How do you usually use cannabis?

spot	1
smoke joint, cannabis only	2
smoke joint, cannabis and tobacco	3
bong/waterpipe/pipe	4
eaten	5
other (specify)	6
don't remember/know	99

Appendix 12
The Interview Schedule

22. What kind of cannabis do you usually use?

Cabbage/Leaf	1
Heads/Buds	2
Skunk/Hydro	3
Oil: Commercial	4
Oil: Gold	5
Oil: Head	6
Hash	7
other (specify) ……..	8
don't know	99

Availability/Source/Cost

23. Where do you usually get your cannabis from?

grow my own	1
buy from dealer	2
buy from friends/relatives	3
gift from friends/relatives	4
payment for services	5
other (specify) ……..	6

24. How much would you usually spend on cannabis per week? $……..

25. Are you spending more on cannabis now than you were 12 months ago?

spend nothing/no cost	0
spending less now	1
spending about the same	2
spending more now	3
don't know/unsure	99

Cannabis Use Disorder

26. CIDI-Auto version 2.1 (Drug Use Module) diagnostic interview for DSM-IV and ICD-10 Cannabis Use Disorder 12 months version (Interviewer –administered).

27. Severity of Dependence Scale (SDS, Gossop et al., 1992). (Self- administered).

Health

Medical/Psychiatric History

28. During the past three (3) months, would you say your health in general was:

Excellent	0
Very good	1
Good	2
Fair	3
Poor	4

Appendix 12
The Interview Schedule

29. Have you consulted a doctor or a specialist about your own health in the past three (3) months?

No	1
Yes (if YES, specify problem).....	2

30. Do you suffer from any long-term medical conditions – that is, conditions that have lasted, or are likely to last, for six months or more?

No	1
Yes (if YES, specify)	2
Don't know	99

31. Do you currently have any problems with, or concerns about, your respiratory health? (asthma, bronchial/respiratory congestion, a wheezy or whistly chest)

No	1
Yes (if YES, specify)	2

32. Have you ever seen a psychologist, counsellor, or other mental health professional because of concerns over your mental/psychological health?

No	1
Yes	2
Don't know	99

33. Have you ever been admitted to a psychiatric hospital or been prescribed medication for a mental, emotional, behavioural or psychological condition?

No	1	(go to 35)
Yes (If YES, specify condition).....	2	
Don't know	99	

34. Are you currently being treated/taking medication for mental, emotional, behavioural, or psychological problems?

No	1
Yes (If YES, specify)	2

35. Do you believe your cannabis use has ever created any medical, psychological, or cognitive/thinking problems?

No	1
Yes (If YES, specify)	2
Not sure/don't know	99

Appendix 12
The Interview Schedule

Psychiatric Symptomatology

36. BSI (Derogatis, 1993), 18-item, self-administered.

Scores:

Somatisation (SOM)	.....
Depression (DEP)	.....
Anxiety (ANX)	.....
Global Severity Index (GSI)	.....

Problems Created by Cannabis

37. Do you think you have ever had any problems related to your cannabis use?

No	1
Yes	2 (go to 37a)
Don't know/unsure	99

37a. **[IF YES]**, Why ? .....

.....

When did this occur? .....

Future Cannabis Use/Readiness to Change

38. Have you **ever** attempted to cut down on your use of cannabis or quit using altogether?

No	1	(go to 39)
Yes	2	(go to 38a)

38a. **[IF YES]** Have you **ever** sought help/treatment for your cannabis use?

No	1	(go to 39)
Yes	2	

38b. What sort of help did you seek/to whom did you go for help?

(Specify) .....

39. Have you **ever** been questioned about your cannabis use by a health professional, such as a doctor or practice nurse, or discussed it with them?

No	1
Yes	2

Appendix 12
The Interview Schedule

40. Do you think you have a problem with your cannabis use at present?

No, definitely not	1	(go to 41)
Probably not	2	(go to 41)
Possibly/may be	3	(go to 41)
Yes, definitely	4	(go to 42)
Don't know/unsure	99	(go to 41)

41. Do you think that you are at risk of developing a cannabis use problem in the future if you keep on using at the level you are now?

No, definitely not	1
Probably not	2
Possibly/ may be	3
Yes, definitely	4
Don't know/unsure	99

42. What is your personal goal/intention for your cannabis use over the next 12 months?

No change/continue as before	1
I want to quit or cut down, but I'm not sure if I'm ready	2
I am preparing to cut down/quit	3
I am cutting down now	4
Not sure/don't know	99

43. Cannabis Problems Questionnaire (Copeland et al, 2001), 53-item. .....
Adolescent Version: CPQ-A, 58-item

44. Would you like some assistance to help you cut down or quit your cannabis consumption?

No	1
Yes	2
Unsure/don't know	99

☺ Thank you for your help ☺

APPENDIX 13

Quantification of Cannabis Use

The quantification of *any* drug use is difficult and open to error. Even with the legal substances, such as tobacco and alcohol, errors can occur in estimates of the number of cigarettes or drinks consumed on a typical day or "session". Several factors impact on the accuracy of drug users' reports of their consumption. Variations in alcohol content between different beverage types (beer, wine, spirits, 'mixes', 'alcopops'), and the application of different definitions of what constitutes a 'standard' drink' in different countries, for example, render 'standardisation' of alcohol consumption problematic. Further, these 'standard' size definitions are constantly in flux as consumption levels hazardous to health are revised. Similar problems may occur with tobacco consumption, with differing nicotine content and packet size of different brands.

Quantifying drug use other than alcohol and tobacco is even more challenging (Carroll, 1995; Sobell et al., 1995). Cannabis exemplifies the difficulties involved. Being illicit, no reliable information on the level or consistency of THC exists. There is no robust 'standard' measure/unit of cannabis or 'standard' method of consumption (APA, 2000; Clark et al., 2001; Hall & Swift, 2000). The commonly reported units such as the joint or cone (used in bongs/waterpipe) may vary in size, and may also include varying mixes of tobacco. These measurement problems are compounded by frequent sharing of cannabis (Hall & Swift, 2000). Various other factors (purity, plant strain, cultivation, product used, amount, potency, administration route, titration, degree of intoxication sought and attained) determine THC bioavailability (Adams & Martin, 1996; Hall & Swift, 2000; Stephens et al., 2002).

Accordingly, after synthesizing the existing research literature with extensive clinical (Ashley Koning, project advisory committee) and expert (Jan Copeland, Wendy Swift) consultation, the writer selected the 'cone' used in earlier research (Copeland et al., 2001a;

Appendix 13
Quantification of Cannabis Use

Didcott et al., 1997; Martin et al., 2005; Swift, 1999; Swift et al., 1997, 1998a, 1998b, 1998c, 2000) as the basic unit of measurement of *quantity* consumed in this research. As in Australia (Didcott et al., 1997), the 'cone' (bong) is a highly prevalent method of cannabis consumption in New Zealand, readily understood by adolescent and adult users. Consistent with previous studies, other routes of use reported (joint or 'blunt', spot) were converted into cones to 'standardize' the quantity of intake across respondents for the Timeline Follow-Back component. Interestingly, following the researcher's clinical consultation/education (AK) on local products, the agreed formula to use for this conversion (one joint = 3 cones) was identical to that used in the Australian studies. This affords some confidence in both the conversion rationale and the comparability of data. Similarly, clinical consultation (AK) clarified that approximately 2-3 spots were roughly equivalent to one cone. In view of the measurement crudity, the researcher took a cautious approach and adopted the conversion formula: 2 spots=1 cone.

As in any research, this cannabis quantification procedure is open to question. However, the writer's decision is defensible on several grounds. First, all baseline interviews were conducted face-to-face, and the researcher visually demonstrated the size of a 'standard' cone to ensure participants clearly understood the measure. Respondents neither expressed nor appeared to have any difficulties whatsoever with this, and care was taken when converting other variants (e.g., "blunts") into 'standard' cones. Furthermore, at follow-up respondents' recall of the demonstrated 'standard' cone was remarkably good (impressive). This in turn affords confidence in the reports of the proportion telephone-interviewed at follow-up. Second, results of urinalysis (n=40) showed good correspondence between the biochemical test and self-reported number of cones consumed, suggesting a general absence of under-reporting or other bias. Moreover, "quasi-triangulation" of other measures across the whole sample revealed self-reports to be reliable. Third, even if the actual quantity of THC was under- or over-estimated, the rank order of respondents' cannabis consumption was probably preserved (see Didcott et al., 1997; Swift, 1999). Finally - and perhaps most importantly - with a longitudinal follow-up component in this research, respondents served as their own control measure.

APPENDIX 14

ID: _____ DATE: _____

TLFB Summary Form – Baseline

Week	# of days in week	# of days of Cannabis use	# of cones consumed in week
1			
2	7		
3	7		
4	7		
5	7		
6	7		
7	7		
8	7		
9	7		
10	7		
11	7		
12	7		
13	7		
14			
Total	X		
Last 30 days only			

APPENDIX 15

Severity of Dependence Scale (SDS)

Please answer all the questions below based on your average experience when using **Cannabis DURING THE LAST SIX MONTHS.** Circle one number for each question.

1. Did you ever think your use of cannabis was out of control?

Never or almost never	0
Sometimes	1
Often	2
Always or nearly always	3

2. Did the prospect of missing a smoke make you very anxious or worried ?

Never or almost never	0
Sometimes	1
Often	2
Always or nearly always	3

3. How much did you worry about your cannabis use?

Not at all	0
A little	1
Quite a lot	2
A great deal	3

4. Did you wish you could stop?

Never or almost never	0
Sometimes	1
Often	2
Always or nearly always	3

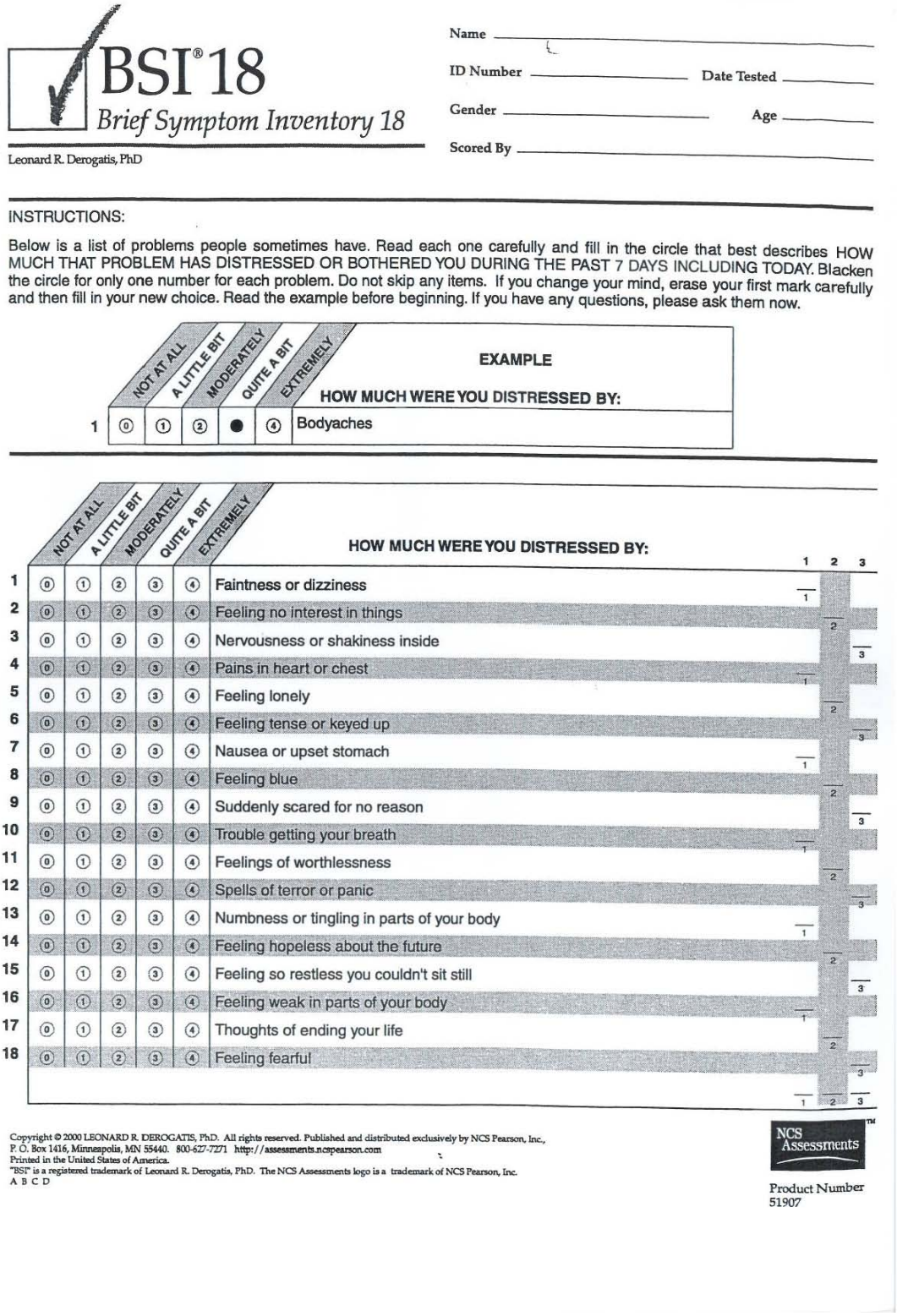
5. How difficult would you find it to stop or go without cannabis?

Not difficult	0
Quite difficult	1
Very difficult	2
Impossible	3

TOTAL SCORE

Appendix 16
BSI 18

APPENDIX 16



BSI®18
Brief Symptom Inventory 18

Leonard R. Derogatis, PhD

Name _____

ID Number _____ Date Tested _____

Gender _____ Age _____

Scored By _____

INSTRUCTIONS:

Below is a list of problems people sometimes have. Read each one carefully and fill in the circle that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. Blacken the circle for only one number for each problem. Do not skip any items. If you change your mind, erase your first mark carefully and then fill in your new choice. Read the example before beginning. If you have any questions, please ask them now.

EXAMPLE

	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY	HOW MUCH WERE YOU DISTRESSED BY:
1	0	1	2	●	4	Bodyaches

	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY	HOW MUCH WERE YOU DISTRESSED BY:	1	2	3
1	0	1	2	3	4	Faintness or dizziness	1		
2	0	1	2	3	4	Feeling no interest in things		2	
3	0	1	2	3	4	Nervousness or shakiness inside			3
4	0	1	2	3	4	Pains in heart or chest	1		
5	0	1	2	3	4	Feeling lonely		2	
6	0	1	2	3	4	Feeling tense or keyed up			3
7	0	1	2	3	4	Nausea or upset stomach	1		
8	0	1	2	3	4	Feeling blue		2	
9	0	1	2	3	4	Suddenly scared for no reason			3
10	0	1	2	3	4	Trouble getting your breath	1		
11	0	1	2	3	4	Feelings of worthlessness		2	
12	0	1	2	3	4	Spells of terror or panic			3
13	0	1	2	3	4	Numbness or tingling in parts of your body	1		
14	0	1	2	3	4	Feeling hopeless about the future		2	
15	0	1	2	3	4	Feeling so restless you couldn't sit still			3
16	0	1	2	3	4	Feeling weak in parts of your body	1		
17	0	1	2	3	4	Thoughts of ending your life		2	
18	0	1	2	3	4	Feeling fearful			3
							1	2	3

NCS Assessments™

Product Number
51907

APPENDIX 17

CANNABIS PROBLEMS QUESTIONNAIRE

Instructions:
These questions are about experiences that you may have had in connection with your use of cannabis (marijuana, pot, dope, etc), in the LAST 6 MONTHS.

PLEASE ANSWER ALL THE QUESTIONS BY TICKING YES OR NO

	IN THE LAST SIX MONTHS:	YES	NO
1.	Have you tended to smoke more on your own than you used to?	☐	☐
2.	Have you worried about meeting people you don't know when you are stoned?	☐	☐
3.	Have you spent more time with smoking friends than other kinds of friends?	☐	☐
4.	Have your friends criticised you for smoking too much?	☐	☐
5.	Have you had any debts?	☐	☐
6.	Have you sold any of your belongings to buy cannabis?	☐	☐
7.	Do you find yourself making excuses about money?	☐	☐
8.	Have you been caught out lying about money?	☐	☐
9.	Have you been in trouble with the police due to your smoking?	☐	☐
10.	Have you been in prison?	☐	☐
11.	Have you been physically sick after smoking?	☐	☐
12.	Have you passed out after a smoking session?	☐	☐
13.	Have you had pains in your chest or lungs after a smoking session?	☐	☐
14.	Have you felt paranoid after a smoking session?	☐	☐
15.	Have you had any accidents requiring hospital admission after smoking?	☐	☐
16.	Have you lost any weight without trying to?	☐	☐

Appendix 17
Cannabis Problems Questionnaire

	IN THE LAST SIX MONTHS:	YES	NO
17.	Have you been neglecting yourself physically?	☐	☐
18.	Have you failed to wash for several days at a time?	☐	☐
19.	Have you felt depressed for more than a week?	☐	☐
20.	Have you felt so depressed that you felt like doing away with yourself?	☐	☐
21.	Have you given up any recreational activities you once enjoyed for smoking?	☐	☐
22.	Do you find it hard to get the same enjoyment from your usual interests?	☐	☐
23.	Has your general health been poorer than usual?	☐	☐
24.	Have you driven while stoned?	☐	☐
25.	Have you felt more antisocial after smoking?	☐	☐
26.	Have you worried about getting out of touch with friends or family?	☐	☐
27.	Have you been concerned about a lack of motivation?	☐	☐
28.	Have you worried about feelings of personal isolation or detachment?	☐	☐
29.	Do you usually have a smoke in the morning, to get yourself going?	☐	☐

If you are <u>not</u> living with your spouse or partner, omit Questions 30 – 39. GO TO QUESTION 40.

These questions apply to you if you have lived with your spouse or partner during the past six months.

	IN THE LAST SIX MONTHS:	YES	NO
30.	Has your spouse used cannabis on a regular basis?	☐	☐
31.	Has your spouse complained about your smoking?	☐	☐
32.	Has your spouse tried to stop you from having a smoke?	☐	☐
33.	Has he/she talked to you less than usual because you have been smoking?	☐	☐
34.	Has he/she threatened to leave you because of your smoking?	☐	☐
35.	Has he/she had to put you to bed after you have been smoking?	☐	☐

Appendix 17
Cannabis Problems Questionnaire

	IN THE LAST SIX MONTHS:	YES	NO
36.	Have you argued with him/her about smoking?	☐	☐
37.	Have you avoided him/her after you have been smoking?	☐	☐
38.	Have you been legally separated from your spouse?	☐	☐
39.	Has he/she refused to have sex with you because of smoking?	☐	☐

If you have no children, omit Questions 40 – 44.
GO TO QUESTION 45.

These questions apply to you if you have children.

	IN THE LAST SIX MONTHS:	YES	NO
40.	Have your children criticised your smoking?	☐	☐
41.	Have you had rows with your children about smoking?	☐	☐
42.	Do your children tend to avoid you when you have been smoking?	☐	☐
43.	Have your children tried to stop you from having a smoke?	☐	☐
44.	Do you tend to light up a bong/joint in front of your children?	☐	☐

If you have been unemployed for the last six months, omit Questions 45 – 53.

These questions apply to you if you have been employed in the last six months.

	IN THE LAST SIX MONTHS:	YES	NO
45.	Have you found your work less interesting than you used to?	☐	☐
46	Have you been unable to arrive on time for work due to your smoking?	☐	☐
47.	Have you missed a whole day at work after a smoking session?	☐	☐
48.	Have you been less able to do your job because of smoking?	☐	☐
49.	Have you gone to work stoned?	☐	☐
50.	Has anyone at work complained about you being late or absent?	☐	☐
51	Have you had any formal warnings from your employers?	☐	☐
52.	Have you been suspended or dismissed from work?	☐	☐
53.	Have you had any accidents at work after smoking?	☐	☐

Thank you for your participation in this study. ☺

Appendix 18
Cannabis Problems Questionnaire - Adolescents

APPENDIX 18

CANNABIS PROBLEMS QUESTIONNAIRE-A

We would like to find out if you have experienced any of the difficulties that other people who use cannabis sometimes complain of. Some questions specifically ask about problems associated with using cannabis, while others ask about general problems that may have occurred.

Instructions:
Read each question carefully and answer either YES or NO by putting a tick in the appropriate box.

Please answer the questions that apply to you. All the questions apply to your experiences in the LAST 6 MONTHS

In the last 6 months:		YES	NO
1.	Have you tended to smoke more on your own than you used to?	☐	☐
2.	Have you worried about meeting people you don't know when you are stoned?	☐	☐
3.	Have you spent more time with smoking friends than other kinds of friends?	☐	☐
4.	Have your friends criticised you for smoking too much?	☐	☐
5.	Have you had any debts?	☐	☐

Appendix 18
Cannabis Problems Questionnaire -
Adolescents

In the last 6 months:		YES	NO
6.	Have you pawned any of your belongings to buy cannabis?	☐	☐
7.	Have you found yourself making excuses about money?	☐	☐
8.	Have you found yourself worried about the amount of money you have been spending on cannabis?	☐	☐
9.	Have you been caught out lying about money?	☐	☐
10.	Have you been in trouble with the police due to your smoking?	☐	☐
11.	Have you been in juvenile detention or prison?	☐	☐
12.	Have you been physically sick after smoking?	☐	☐
13.	Have you passed out after a smoking session?	☐	☐
14.	Have you had pains your chest or lungs after a smoking session?	☐	☐
15.	Have you had a persistent chest infection or cough?	☐	☐
16.	Have you felt paranoid or antisocial after a smoking session?	☐	☐
17.	Have you had any accidents requiring hospital admission after smoking?	☐	☐
18.	Have you lost any weight without trying to?	☐	☐
19.	Have you been neglecting yourself physically?	☐	☐
20.	Have you felt depressed for more than a week?	☐	☐
21.	Have you felt so depressed you felt like doing away with yourself?	☐	☐
22.	Have you given up any activities you once enjoyed because of smoking?	☐	☐
23.	Have you had less energy than usual?	☐	☐
24.	Have you found it hard to get the same enjoyment from your usual interests?	☐	☐
25.	Has your general health been poorer than usual?	☐	☐

Appendix 18
Cannabis Problems Questionnaire - Adolescents

In the last 6 months:		YES	NO
26.	Have you driven while stoned?	☐	☐
27.	Have you worried about getting out of touch with friends or family?	☐	☐
28.	Have you been concerned about a lack of motivation?	☐	☐
29.	Have you felt less able to concentrate than usual?	☐	☐
30.	Have you worried about feelings of personal isolation or detachment?	☐	☐

If you have lived with a parent (or guardian) in the past 6 months, answer these questions. OTHERWISE, GO TO QUESTION 36.

If you have lived with a parent/guardian in the past 6 months:		YES	NO
31.	Do your parent(s) use cannabis on a regular basis?	☐	☐
32.	Have your parent(s) complained about your smoking?	☐	☐
33.	Have your parent(s) tried to stop you from having a smoke?	☐	☐
34.	Have you argued with them about your smoking?	☐	☐
35.	Have you tried to avoid your parent(s) after you have been smoking?	☐	☐

If you have had any regular boyfriend(s) / girlfriend(s) / partner(s) in the past 6 months, answer these questions. OTHERWISE, GO TO QUESTION 41.

Thinking about the partner that you spent the most time with over the past 6 months:		YES	NO
36.	Does he / she use cannabis on a regular basis?	☐	☐
37.	Has he / she complained about your smoking?	☐	☐
38.	Have you argued with him / her about smoking?	☐	☐
39.	Has he / she threatened to leave you because of your smoking?	☐	☐
40.	Have you avoided him / her after you have been smoking?	☐	☐

Appendix 18
Cannabis Problems Questionnaire -
Adolescents

If you have been enrolled in school, training for employment, or any courses of study in the last 6 months, answer these questions. OTHERWISE, GO TO QUESTION 50

In the last 6 months:		YES	NO
41.	Have you been less interested or motivated in schoolwork / study?	☐	☐
42.	Have you been unable to attend classes because of smoking?	☐	☐
43.	Have your school / course marks dropped?	☐	☐
44.	Have you gone to classes stoned?	☐	☐
45.	Have you been less able to concentrate on your schoolwork / study?	☐	☐
46.	Have you smoked on school premises?	☐	☐
47.	Have you been unable to complete homework because of your smoking?	☐	☐
48.	Have you had complaints from teachers about your work?	☐	☐
49.	Have you been disciplined or suspended from school because of marijuana?	☐	☐

If you have been employed, either part-time or full-time, in the past 6 months, ANSWER THESE QUESTIONS.

		YES	NO
50.	Have you found your work less interesting than you used to?	☐	☐
51.	Have you been unable to arrive on time for work due to your smoking?	☐	☐
52.	Have you missed a whole day at work after a smoking session?	☐	☐
53.	Have you been less able to do your job because of smoking?	☐	☐
54.	Have you gone to work stoned?	☐	☐
55.	Has anyone at work complained about you being late or absent?	☐	☐
56.	Have you had any formal warnings from your employers?	☐	☐
57.	Have you been suspended or dismissed from work?	☐	☐
58.	Have you had any accidents at work after smoking?	☐	☐

Thank you for your participation in this study. ☺

Appendix 19
Participant Feedback
Questionnaire

APPENDIX 19

☐☐☐

Participant Feedback

Your answers and comments to the questions below will help us improve the questionnaire and the interview process. I am interested in your honest opinion, whether it is positive or negative. Please answer all items as honestly as possible.

Please TICK ☑ the appropriate answer.

Office Use Only

1. Did you enjoy taking part in this research?

   ☐ No (why?) ……..
   ☐ Yes

☐

2. Did you find it helpful (benefit from) having to think about, and answer questions on, your cannabis use and any problems you might be experiencing from using?

   ☐ No
   ☐ Yes

☐

3. Did you have any difficulty in understanding and answering the questions?

   ☐ No
   ☐ Yes (specify) ……

☐

4. Did you find any of the questions offensive, or not acceptable, to you?

   ☐ No
   ☐ Yes (specify) ……

☐

Appendix 19
Participant Feedback
Questionnaire

5. Would most people be comfortable answering questions like these from their doctor, nurse, counsellor/therapist, or other health worker?

Office Use Only

- ☐ Very uncomfortable
- ☐ Quite uncomfortable
- ☐ Neutral/unsure
- ☐ Quite comfortable
- ☐ Very comfortable

☐

6. How honest are most people likely to be when answering questions from their health care provider about their cannabis use?

- ☐ Very dishonest
- ☐ Quite dishonest
- ☐ Neutral/unsure
- ☐ Quite honest
- ☐ Very honest

☐

7. How important is it that your health care provider or counsellor knows about your cannabis use when interviewing you about your health habits or problems?

- ☐ Not at all important
- ☐ Not very important
- ☐ Unsure / neutral
- ☐ Quite important
- ☐ Very important

☐

8. Have you any suggestions that could help us make a better questionnaire or improve the interview process?

- ☐ No
- ☐ Yes

☐

Comments/suggestions:

.....

Thank you for your help.

Appendix 20
Examples of Poster Displays

APPENDIX 20

Invitation

Have you used cannabis during the past 12 months?

If "YES" - I NEED YOUR HELP!

Whether you have used cannabis only occasionally, or used regularly, over the past year you are invited to take part in health research I am conducting for my PhD thesis. I need input from people who have used any cannabis at all over the past year. I aim to develop a brief questionnaire to help identify people currently with, and those at risk of developing, cannabis-related problems. This will enable health professionals to provide the appropriate help for these problems.

CAN YOU HELP?

IF YES, please collect forms from [Name] or your Peer Supporters.

THANK YOU !

ALL INFORMATION IS STRICTLY CONFIDENTIAL.

Jan Bashford, School of Psychology, Massey University.




ODY OT AN MY S ACC THE
DA

Appendix 20
Examples of Poster Displays

Invitation

Have you used cannabis during the past 12 months?

If "YES" - I NEED YOUR HELP!

Whether you have used cannabis only occasionally, or used regularly, over the past year you are invited to take part in a health research project I am conducting for my PhD thesis. I need input from people who have used any cannabis at all over the past year.

I aim to develop a brief questionnaire to help identify people currently with, and those at risk of developing, cannabis-related problems. This will enable health professionals to provide the appropriate help for these problems.

CAN YOU HELP?

IF YES, please collect an Information Sheet for further details, and forms from: [Name] **(**School Nurse**)** [Name] **(**Counsellor**)** or the **Student Office**

This does NOT imply any commitment/obligation to take part.

ALL INFORMATION IS STRICTLY CONFIDENTIAL.

NOBODY OTHER THAN MYSELF HAS ACCESS TO THE DATA.

If you decide to participate: THANK YOU !!

Jan Bashford, School of Psychology, Massey University

APPENDIX 21
CANNABIS SCREEN STUDY

Counsellor Guide/Checklist

Eligibility criteria: All clients aged 13 upwards who have used cannabis during the past 12 months - both existing clients and new admissions - regardless of primary or secondary (etc) drug problem. Exclude those who are clearly impaired (neurological or psychiatric). For those under age 16 years, assess/certify competency (Consent Form).

Recruitment: Invite all clients to participate. Provide Information Sheet to take away..
Please promote research. Iinvite and answer questions. Emphasize benefits, and outline responsibilities (urine testing, interview with researcher, contact information required).
Assure *confidentiality/anonymity of identity.* **Emphasize** *researcher* ***(only)*** *has access to information provided. Get participant signature (Consent Form) and contact details (Annex).*

CHECKLIST: ***Consent Form signed? (participant and counsellor)***
Locator information recorded?
Where applicable – competency certified?
Urine sample provided?
(Note: Code numbers to be allocated by the researcher).

Procedures:
(1) **Participant** to complete the questionnaire **in privacy (**space provided in your room). Completed questionnaire to go in the envelope provided.

(2) **Counsellor**:
(a) Please ascertain participant has answered **all** questions. If any difficulties arose with the questions, please note the nature of these on the envelope face.
Check participant understands researcher will be in contact for the interview.
Please thank respondents for participating.

(b) Complete the Clinician Diagnosis/Rating Form
The DSM-IV diagnostic criteria are provided for your assistance – and will enable some data comparisons.
Assemble forms together (questionnaire in envelope, Annex, Clinician forms) and give to [NAME] for my collection.

MY SINCERE THANKS FOR YOUR SUPPORT IN THIS WORTHY PROJECT. YOUR ROLE IS CRITICAL TO ITS SUCCESS, AND YOUR CONTRIBUTION MUCH VALUED.

Appendix 21
Recruitment Guidelines / Checklist

CANNABIS SCREEN STUDY

Youth Aid Guidelines/Checklist

Eligibility: All those aged 13 upwards who have used cannabis over the past 12 months

Recruitment: Please p*romote* research (a positive activity).
Invite all eligible to participate.
Provide Information Sheet, and answer any questions.
Emphasize benefits (a worthwhile contribution).
Assure confidentiality/anonymity of identity
Emphasize researcher (only) has access to answers
Get participant signature, and parental signature for those under 16 years (Consent Form)
Ensure contact details are provided (Annex).

CHECKLIST

* Consent Form signed ? (Participant, Parent, YA Officer)
* Locator information provided?

Procedures: Participant to complete the questionnaire in privacy
Completed questionnaire to go in the envelope

Check that participant understands researcher will be in contact for the interview.
Please thank respondents for participating.

Assemble forms together (questionnaire, Annex, Consent Form), seal in envelope for my collection.

MY SINCERE THANKS FOR YOUR SUPPORT IN THIS WORTHY PROJECT. YOUR ROLE IS CRITICAL TO ITS SUCCESS, AND MUCH VALUED

Appendix 21
Recruitment Guidelines / Checklist

CANNABIS SCREEN STUDY

Probation Officer Guidelines/Checklist

Eligibility: All those who have used cannabis over the past 12 months

Recruitment: Please p*romote* research (a positive activity).
Invite all who are eligible to participate.
Provide Information Sheet, and answer any questions.
Emphasize benefits (a worthwhile contribution).
Assure confidentiality/anonymity of identity
Emphasize researcher (only) has access to answers
Get participant signature (Consent Form)
Check that contact details have been provided (Annex).

CHECKLIST

* Consent Form signed ? (Participant)
* Locator information provided?

Procedures: Participant to complete the questionnaire in privacy
Completed questionnaire, Consent Form, and Annex to go in the envelope provided, and sealed.

Check that participant understands researcher will be in contact for the interview.
Please thank respondents for participating.

Please notify (email/telephone) the researcher to uplift the envelope.

MY SINCERE THANKS FOR YOUR SUPPORT IN THIS WORTHY PROJECT. YOUR ROLE IS CRITICAL TO ITS SUCCESS, AND MUCH VALUED 

Appendix 22
Examples of Participant Information Sheets

APPENDIX 22

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2048
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Participant Information Sheet

Researcher Information:

Jan Bashford, School of Psychology, Massey University, for the degree Doctor of Philosophy. **The project is being supervised.** The researcher's Supervisor, Dr. Ross Flett, can be contacted at the above address, telephone, or fax number.

Participation:

Along with all clients of the Alcohol and Drug Services who report using cannabis in the past 12 months, **you are invited to take part** in this research which aims to develop a brief screen to assist health professionals to rapidly identify those with, and those at risk of developing, cannabis use problems. **If you are otherwise eligible but under 16 years of age,** and have been assessed by your Counsellor as having the necessary competence to understand the nature, risks and consequences of the research, then you are considered able to give your informed consent to participate.

Your participation is entirely voluntary, and you have the right:

- to decline to participate without giving a reason, or
- if you decide to participate, to refuse to answer any particular questions, and
- to withdraw at any time without giving a reason
- to ask any questions about the study at any time during participation
- to have access to a summary of the research findings when available.

If you choose not to take part, or if you do then withdraw, **your care will not be affected** in any way.

Procedures:

Participants will be assessed by their counsellors in the usual way, and given a brief questionnaire to fill in (approximately 5-10 minutes). **At no stage will Counsellors see responses** participants make to these questions. Urine samples will then voluntarily be provided. This will be followed by a **confidential interview** with the researcher, which will take approximately 45 minutes. Questions will ask about use and experiences of cannabis and other drugs, social circumstances, and general medical and psychological health. Further information may be needed from participant's records to complete data requirements. Twelve (12) months

Appendix 22
Examples of Participant Information Sheets

after this interview, participants will be contacted and **re-interviewed on the same questions**. Participants will be required to provide their contact address and telephone number, and that of at least one other contact person, to assist the researcher to follow them up.

Confidentiality/Anonymity:

All information that is collected will be kept **strictly confidential** and **private**, and will be used only for research purposes. A coding system will be used for all research forms. **No names or any form of identification will be used in any publications** about the research. Participants **will not be able to be identified** in this study. During the research period, records will be kept in **locked, secure storage** to which only the researcher has access. Data is then securely stored at Massey University for 5 years before being destroyed.

Benefits:

Several benefits are possible for participants in this study:

- The opportunity to **gain insight** into their own (potentially harmful or risky) cannabis use
- **Helping and contributing** to the development of a screen for harmful or risky cannabis use with the potential for intervention/**prevention of serious harm occurring** in other cannabis users' lives, thus
- **Contributing to the reduction of cannabis-related harm** in the community.

Approval from Ethics Committee:

This study has received ethical approval by:

- The Massey University Human Ethics Committee
  This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Protocol 02/141. If you have any concerns about the conduct of this project, please contact Professor Sylvia V. Rumball, Chair, Massey University Campus Human Ethics Committee: Palmerston North, telephone 06 350 5249, email S.V.Rumball@massey.ac.nz.
- The Ethics Committee

Consent to Participate:

Your written consent is required for participation in this study. Your signature on the Consent Form for this study indicates that you have read and understood the Information Sheet, that you have had the details explained to you by your Counsellor, and had any questions answered to your satisfaction; and that you agree to participate in the study according to the conditions covered in this Information Sheet.

* **If you have any further questions about this study, you may ask your Counsellor or the Researcher and Supervisor at the telephone number given above. If you have any queries or concerns about your rights as a participant in this study you may wish to contact the Health and Disability Advocate at free phone 0800 XXXXXXX.**

Appendix 22
Examples of Participant Information Sheets

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Participant Information Sheet

Hi,

My name is Jan, and I am a research student at Massey University. I'd like you to consider taking part in my study. I'm asking as many people as I can find who have used cannabis in the past 12 months, so that I can try and use their experiences to help develop a short screen (another name for questionnaire) for problems that can happen after cannabis use. This screen will help doctors and other health care workers work out who might be having problems from their cannabis use now, or in the future. If you could take part, but are under 16 years of age, we'll need to ask your parent, caregiver or guardian if this is okay.

You don't have to be in the study, and you have the right:

- to say you don't want to take part, without giving a reason, or
- if you do decide to be in the study, you can refuse to answer any of the questions you don't want to answer, and you can change your mind about being in the study at any time, and get out of it without giving a reason
- to ask any questions about the study at any time
- to get a summary of the study findings when they are ready

Procedures:

If you decide to be in the study, here is what will happen:

1. Firstly, your Youth Aid Officer will give you a questionnaire to fill in. This will ask about your cannabis use and any health or other problems you might be having from using cannabis. This will take between 5-15 minutes to do. You then put this in the envelope I will provide, seal it down, and give it to your Youth Aid Officer for me to collect.

AT NO TIME WILL YOUR YOUTH AID OFFICERS SEE YOUR ANSWERS TO THESE QUESTIONS

2. A few days later, this will be followed by a confidential (private) interview with me. We will arrange this to be at a time and place that suits you, and it will take about 45 minutes.

Appendix 22
Examples of Participant Information Sheets

You will be asked about your use and experiences of cannabis and other drugs, social circumstances, and your health in general.

3. Twelve (12) months after this interview, I will contact you so I can re-interview you on the same questions. This is to see if things have stayed the same or changed over that 12 months. For this I will need your contact address and telephone number, and that of at least one other contact person to help me catch up with you in case you have moved since the first interview. If it is easier, I can email or text you.

Confidentiality/Anonymity:
Everything you say and write will be kept STRICTLY PRIVATE AND CONFIDENTIAL to me, and used only for my study. Code numbers will be used on all research forms. NO NAMES OR ANY FORM of IDENTIFICATION WILL BE USED in any written reports. You will NOT BE ABLE TO BE IDENTIFIED in this study. During the study period, my records will be kept in locked, secure storage to which only I have access. Data is then securely stored at Massey University for 5 years before being destroyed.

Approval from Ethics Committee:
This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Application 04/41. If you have any concerns about the conduct of this project, please contact Professor Sylvia V. Rumball, Chair, Massey University Campus Human Ethics Committee: Palmerston North, telephone 06 350 5249, email humanethicspn@massey.ac.nz.

Consent to Participate:
I need your written consent, and if you are under 16 years that of your parent/caregiver or guardian, before you take part in this study. Your signature(s) on the Consent Form for this study shows that you have read and understood this Information Sheet, that you have had the details explained to you by your Youth Aid Officer, and had any questions answered to your satisfaction; and that you agree to take part in the study according to the conditions covered in this Information Sheet.

Researcher: **Jan Bashford, School of Psychology, Massey University, for the degree Doctor of Philosophy**

Supervisor: **Dr. Ross Flett, can be contacted at the above address, telephone, or fax number.**

If you have any further questions about this study, you may ask your Youth Aid Officer, the Researcher, or her Supervisor at the telephone/fax number given above.

Appendix 22
Examples of Participant Information Sheets

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Participant Information Sheet

Hi,

My name is Jan. As a research student at Massey University, I invite you to consider taking part in my study. I'm asking as many as I can find who have used cannabis in the past 12 months from among secondary school students and people in other locations, so that I can try and use their experiences to help develop a short screen (questionnaire) for problems that can happen after using cannabis. This screen will help health care and social services workers work out who could be having problems from their cannabis use now, or sometime in the future. The most appropriate help for these problems can then be offered.

Your participation is entirely voluntary, and you have the right:

- **to decline to take part without giving a reason, or**
- **if you decide to participate, to refuse to answer any particular questions, to withdraw at any time without giving a reason**
- **to ask any questions about the study at any time during participation**
- **to get a summary of the research findings when available.**

Procedures:

1. Firstly, if you choose to take part, you complete a brief questionnaire about your cannabis use, and any problems you might be having from this use, in privacy. This will take between 5-15 minutes. You then put this in the envelope provided with the (signed) Consent Form and the Contact Form, seal it, and either give it to your Counsellor or put it in the collection box at the Student Office for my collection.

   AT NO TIME WILL ANYONE OTHER THAN MYSELF SEE YOUR ANSWERS TO THESE QUESTIONS.

2. A few days later, this will be followed by a private/confidential interview with me (the researcher). This will take approximately 45 minutes. I will ask for information

Appendix 22
Examples of Participant Information Sheets

about your use and experiences of canrabis and other drugs, social circumstances, and general medical and psychological health.

3. Twelve (12) months after this interview, I will contact you to re-interview you on the same questions. To enable me to get in touch, I will need your contact address and telephone number, and that of at least one other contact person in case you have moved meanwhile. An email or txt address would also be helpful. Please write these details on the Contact Form (provided) and seal in the envelope with the questionnaire.

Confidentiality/Anonymity:
EVERYTHING YOU SAY AND WRITE WILL BE KEPT STRICTLY PRIVATE AND CONFIDENTIAL to me, and used only for my study. Code numbers will be used on all research forms. **NO NAMES OR ANY FORM of IDENTIFICATION WILL BE USED** in any written reports. You will **NOT BE ABLE TO BE IDENTIFIED** in this study. During the study period, my records will be kept in locked, secure storage to which only I have access. Anonymous data is then securely stored at Massey University for 5 years before being destroyed. Consent forms are stored separately.

Approval from Ethics Committee:
This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Application 05/07. If you have any concerns about the conduct of this project, please contact Dr. John G. O'Neill, Chair, Massey University Campus Human Ethics Committee: PN telephone 06 350 5799 x 8635, email humanethicspn@massey.ac.nz.

Consent to Participate:
I need your written consent before you take part in this study. Your signature on the Consent Form for this study shows that you have read and understood this Information Sheet, had any questions answered to your satisfaction, and that you agree to take part in the study according to the conditions covered in this Information Sheet.

Researcher: **Jan Bashford, School of Psychology, Massey University, for the degree Doctor of Philosophy**

Supervisor: **Dr. Ross Flett, can be contacted at the above address, telephone, or fax number.**

If you have any further questions about this study, you may ask your School Counsellor, Nurse, the Researcher, or her Supervisor at the telephone/fax number given above.

Appendix 22
Examples of Participant Information Sheets

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Participant Information Sheet

Hi,

My name is Jan. As a research student at Massey University, I invite you to consider taking part in my study. I'm asking as many people as I can find who have used cannabis in the past 12 months, so that I can try and use their experiences to help develop a short screen (questionnaire) for problems that can happen after using cannabis. This screen will help health care and social services workers work out who could be having problems from their cannabis use now, or sometime in the future. The most appropriate help for these problems can then be offered.

Your participation is entirely voluntary, and you have the right:

- to decline to take part without giving a reason, or
- if you decide to participate, to refuse to answer any particular questions, and
- to withdraw at any time without giving a reason
- to ask any questions about the study at any time during participation
- to get a summary of the research findings when available.

Neither participation nor non-participation will affect your justice outcomes.

Procedures:

1. Firstly, if you choose to take part, your Probation Officer will give you a brief questionnaire to fill in about your cannabis use, and any problems you might be having from this use. This will take between 5-15 minutes. You then put this in the envelope provided, seal it, and give to your Probation Officer for my collection.

AT NO TIME WILL YOUR PROBATION OFFICER SEE YOUR ANSWERS TO THESE QUESTIONS.

2. A few days later, this will be followed by a private/confidential interview with me (the researcher) at Community Corrections. This will take approximately 45 minutes. I

Appendix 22
Examples of Participant Information Sheets

will ask for information about your use and experiences of cannabis and other drugs, social circumstances, and general medical and psychological health.

3. Twelve (12) months after this interview, I will contact you to re-interview you on the same questions. To help me get in touch, I will need your contact address and telephone number, and that of at least one other contact person in case you have moved meanwhile. An email or txt address would also be helpful.

Confidentiality/Anonymity:
EVERYTHING YOU SAY AND WRITE WILL BE KEPT STRICTLY PRIVATE AND CONFIDENTIAL to me, and used only for my study. Code numbers will be used on all research forms. NO NAMES OR ANY FORM of IDENTIFICATION WILL BE USED in any written reports. You will NOT BE ABLE TO BE IDENTIFIED in this study. During the study period, my records will be kept in locked, secure storage to which only I have access. Data is then securely stored at Massey University for 5 years before being destroyed.

Approval from Ethics Committee:
This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Application 04/42. If you have any concerns about the conduct of this project, please contact Professor Sylvia V. Rumball, Chair, Massey University Campus Human Ethics Committee: Palmerston North, telephone 06 350 5249, email humanethicspn@massey.ac.nz.

Consent to Participate:
I need your written consent before you take part in this study. Your signature on the Consent Form for this study shows that you have read and understood this Information Sheet, that you have had the details explained to you by your Probation Officer and had any questions answered to your satisfaction; and that you agree to take part in the study according to the conditions covered in this Information Sheet.

Researcher: Jan Bashford, School of Psychology, Massey University, for the degree Doctor of Philosophy

Supervisor: Dr. Ross Flett, can be contacted at the above address, telephone, or fax number.

If you have any further questions about this study, you may ask your Probation Officer, the Researcher, or her Supervisor at the telephone/fax number given above.

Appendix 22
Examples of Participant Information Sheets

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Participant Information Sheet

Hi,

My name is Jan. As a research student at Massey University, I invite you to consider taking part in my study. I'm asking as many people as I can find in and other locations who have used cannabis in the past 12 months, so that I can try and use their experiences to help develop a short screen (questionnaire) for problems that can happen after using cannabis. This screen will help health care and social services workers work out who could be having problems from their cannabis use now, or sometime in the future. The most appropriate help for these problems can then be offered.

Your participation is entirely voluntary, and you have the right:

- **to decline to take part without giving a reason, or**
- **if you decide to participate, to refuse to answer any particular questions, and**
- **to withdraw at any time without giving a reason**
- **to ask any questions about the study at any time during participation**
- **to get a summary of the research findings when available.**

Procedures:

1. Firstly, if you choose to take part, you complete a brief questionnaire about your cannabis use, and any problems you might be having from this use, in privacy. This will take between 5-15 minutes. You then put this in the envelope provided with the (signed) Consent Form and the Contact Form, seal it, and put it in the collection box for my collection.

AT NO TIME WILL ANYONE OTHER THAN MYSELF SEE YOUR ANSWERS TO THESE QUESTIONS.

Appendix 22
Examples of Participant Information Sheets

2. A few days later, this will be followed by a private/confidential interview with me (the researcher). This will take approximately 45 minutes. I will ask for information about your use and experiences of cannabis and other drugs, social circumstances, and general medical and psychological health.

3. Twelve (12) months after this interview, I will contact you to re-interview you on the same questions. To enable me to get in touch, I will need your contact address and telephone number, and that of at least one other contact person in case you have moved meanwhile. An email or txt address would also be helpful. Please write these details on the Contact Form (provided) and seal in the envelope with the questionnaire.

Confidentiality/Anonymity:
EVERYTHING YOU SAY AND WRITE WILL BE KEPT STRICTLY PRIVATE AND CONFIDENTIAL to me, and used only for my study. Code numbers will be used on all research forms. **NO NAMES OR ANY FORM of IDENTIFICATION WILL BE USED** in any written reports. You will **NOT BE ABLE TO BE IDENTIFIED** in this study. During the study period, my records will be kept in locked, secure storage to which only I have access. Anonymous data is then securely stored at Massey University for 5 years before being destroyed. Consent forms are stored separately.

Approval from Ethics Committee:
This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Application 04/136. If you have any concerns about the conduct of this project, please contact Professor Sylvia V. Rumball, Chair, Massey University Campus Human Ethics Committee: Palmerston North, telephone 06 350 5249, email humanethicspn@massey.ac.nz.

Consent to Participate:
I need your written consent before you take part in this study. Your signature on the Consent Form for this study shows that you have read and understood this Information Sheet, had any questions answered to your satisfaction, and that you agree to take part in the study according to the conditions covered in this Information Sheet.

Researcher: **Jan Bashford, School of Psychology, Massey University, for the degree Doctor of Philosophy**

Supervisor: **Dr. Ross Flett, can be contacted at the above address, telephone, or fax number.**

If you have any further questions about this study, you may ask your Nurse, , the Researcher, or her Supervisor at the telephone/fax number given above.

Appendix 23
Examples of Consent Forms

APPENDIX 23

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Consent Form

I have been invited to participate in research designed to develop a brief screen for cannabis use problems, which is being conducted by the School of Psychology at Massey University. This study hopes to learn more about cannabis use and the problems caused by cannabis use, and the way in which these cannabis use problems develop over time. A brief screen will enable health professionals to rapidly identify those with, or those at risk of developing, cannabis use problems. The appropriate intervention/help for these problems can then be offered.

I have read and I understand the Information Sheet for volunteers taking part in the study. I have had the details explained to me by my Counsellor, and my questions have been answered to my satisfaction. I understand that:

(a) I have the right to withdraw from the study at any time and to decline to answer any particular questions

(b) all information collected will be kept strictly **confidential** and will be used only for research purposes

(c) the researcher may need further information from my records to help with the study

(d) my name will **not** be used in any publications about the study, **and I will not be able to be identified** in any publications

(e) this research project is not part of any alcohol or other drug treatment, and my decision whether to participate or not will in **no way** affect my treatment

(f) I will be given a copy of this consent form to keep

(g) If I have any questions about the study at any time, I can ask my Counsellor, the Researcher, or her Supervisor (Tel. 06 356 9099) who will be happy to answer them.

(h) My signature indicates that I have decided to participate having read the information provided above.

Applicable to Participants Under 16 Years of Age:

(i) I know what to expect if I decide to be in this research, what kind of questions I might get asked, and how the researcher is going to use that information.

Appendix 23
Examples of Consent Forms

Applicable to all Participants:

Name	Signature of Participant
Signature of Counsellor/Witness	Signature of Researcher

Competence of Participants Under 16 Years of Age:

I ....., Counsellor, confirm that I have discussed with ..... his/her understanding of the **Information Sheet**, and in my opinion he/she has the competence to understand the nature, risks, and consequences of participation in this research.

Signed: _____

Date: _____

Appendix 23
Examples of Consent Forms

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Consent Form

I have been invited to take part in research to develop a questionnaire for cannabis use problems.

This is being run by Jan, who is a student at the School of Psychology at Massey University.

They want to learn more about cannabis use and the problems caused by cannabis use, and the way that these cannabis use problems develop.

I have read and I understand the Information Sheet about the research. They explained the details to me, and I was happy with the way they answered my questions about the study.

I understand that:

(a) I can stop being in the study at any time, and do not have to answer any particular questions if I don't want to

(b) everything I say or write is **strictly confidential** and will be used only for this research

(c) **my name will not be used** anywhere in this study

(d) **no one who knows me will see my answers, or be able to link my name to my answers**

(e) I will be given a copy of this consent form to keep

(f) If I have any questions about the study at any time, I can ask my Youth Aid Officer, the Researcher, or her Supervisor (Ross, on Tel. 06 356 9099, ext. 2051), who will be happy to answer them.

(g) My signature shows that I have decided to be in the study after having read the information above, and that

(h) I know what's going to happen in this research, what kind of questions I might get asked, and how the researcher is going to use that information.

Appendix 23
Examples of Consent Forms

All Participants:

Name	Signature of Participant
Signature of Police Youth Aid Officer	Signature of Researcher

For Participants under 16 years:

Signature of Parent/Caregiver or Guardian

Appendix 23
Examples of Consent Forms

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Consent Form

I have been invited to take part in research to develop a questionnaire for cannabis use problems.

This is being conducted by Jan, a student at the School of Psychology at Massey University.

They want to learn more about cannabis use and the problems caused by cannabis use, and the way these cannabis use problems develop.

I have read and I understand the Information Sheet about the study. I have had the details explained to me, and I was happy with the way they answered my questions about the study.

I understand that:

(a) I can stop being in the study at any time, and not answer any particular questions if I don't want to

(b) everything I say or write is **strictly confidential** and will be used only for this research

(c) **my name will not be used anywhere in this study**

(d) **no one who knows me will see my answers or be able to link them with my name**

(e) I will be given a copy of this consent form to keep

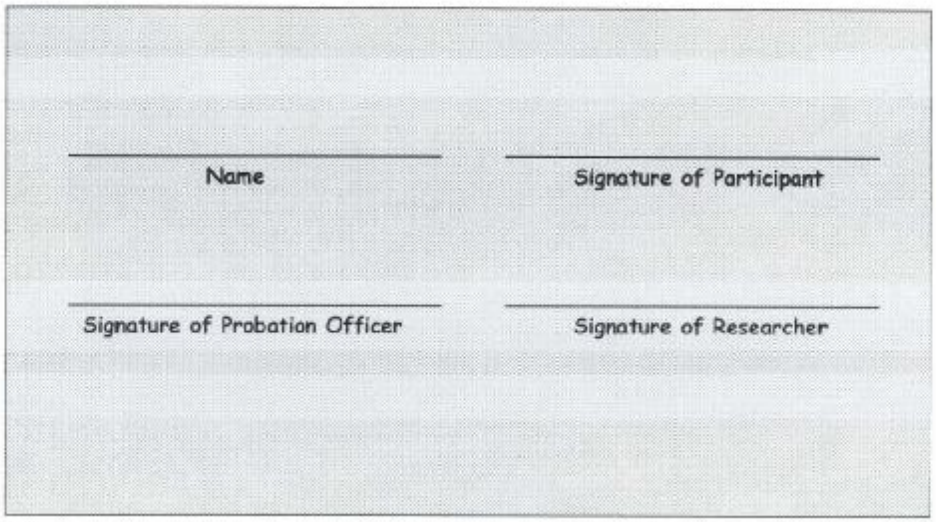
(f) If I have any questions about the study at any time, I can ask my Probation Officer, the Researcher, or her Supervisor (Ross, Tel. 06 356 9099, ext. 2051), who will be happy to answer them.

(g) My signature shows that I have decided to be in the study after having read the information above, and

(h) I know what is going to happen in this research, what kind of questions I might get asked, and how the researcher is going to use that information, and that

(i) whether I decide to take part or not will have no effect whatsoever on my outcomes in the justice process.

Appendix 23
Examples of Consent Forms



Appendix 23
Examples of Consent Forms

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Consent Form

I have been invited to take part in research to develop a questionnaire for cannabis use problems.

This is being conducted by Jan, a student at the School of Psychology at Massey University. They want to learn more about cannabis use and the problems caused by cannabis use, and the way these cannabis use problems develop.

I have read and I understand the Information Sheet about the study. I have asked any questions I had about the study, and was happy with the answers given.

I understand that:

(a) I can stop being in the study at any time, and not answer any particular questions if I don't want to

(b) everything I say or write is **strictly confidential** and will be used only for this research

(c) **my name will not be used anywhere in this study**

(d) **no one who knows me will see my answers or be able to link them with my name**

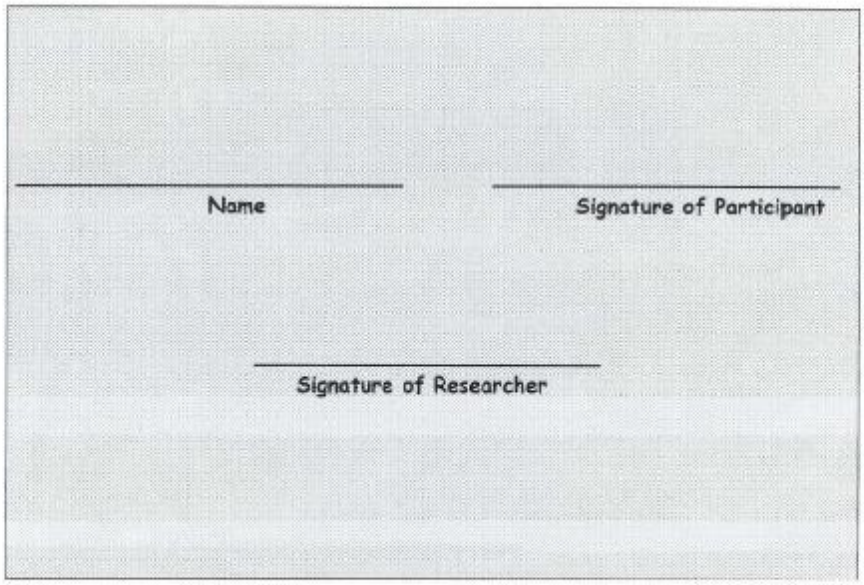
(e) I will be given a copy of this consent form to keep

(f) If I have any questions about the study at any time, I can ask the researcher, or her Supervisor (Ross, Tel. 06 356 9099, ext. 2051), who will be happy to answer them.

(g) My signature shows that I have decided to be in the study after having read the information above, and

(h) I know what is going to happen in this research, what kind of questions I might get asked, and how the researcher is going to use that information.

Appendix 23
Examples of Consent Forms



Appendix 23
Examples of Consent Forms

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
http://psychology.massey.ac.nz

Development of a Brief Screen for Cannabis Use Problems

Consent Form

I have been invited to take part in research to develop a questionnaire for cannabis use problems.

This is being conducted by Jan, a student at the School of Psychology at Massey University. They want to learn more about cannabis use and the problems caused by cannabis use, and the way these cannabis use problems develop.

I have read and I understand the Information Sheet about the study. I have asked any questions I had about the study, and was happy with the answers given.

I understand that:

(a) I can stop being in the study at any time, and not answer any particular questions if I don't want to

(b) everything I say or write is **strictly confidential** and will be used only for this research

(c) **my name will not be used anywhere in this study**

(d) **no one who knows me will see my answers or be able to link them with my name**

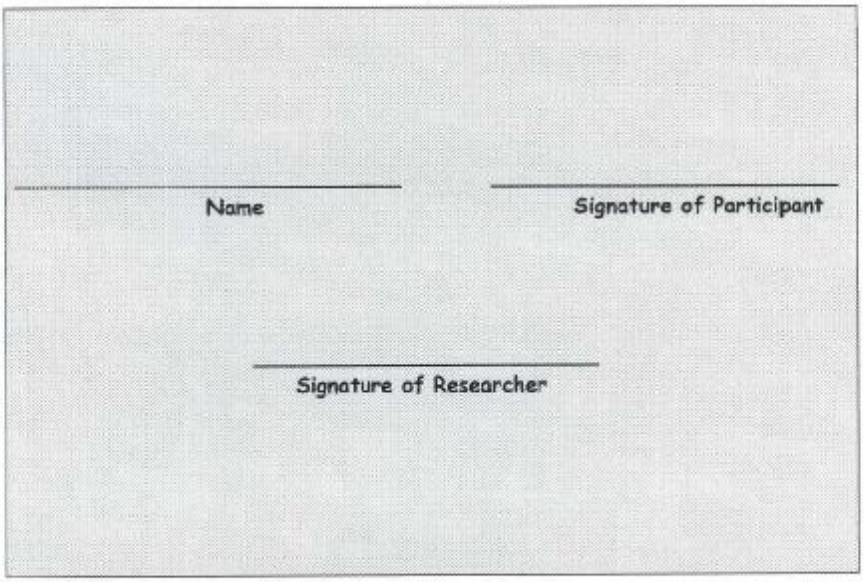
(e) I will be given a copy of this consent form to keep

(f) If I have any questions about the study at any time, I can ask the researcher, or her Supervisor (Ross, Tel. 06 356 9099, ext. 2051), who will be happy to answer them.

(g) My signature shows that I have decided to be in the study after having read the information above, and

(h) I know what is going to happen in this research, what kind of questions I might get asked, and how the researcher is going to use that information.

Appendix 23
Examples of Consent Forms



APPENDIX 24

Development of a Brief Screen for Cannabis Use Problems Study

ANNEX TO CONSENT: FOLLOW-UP CONTACT INFORMATION

1. ID CODE .....

2. Date of Baseline Interview .....

3. Participant's Name .....

4. Participant's Address .....

Phone No/email address .....

5. Name of Contact/Locator Person (1) .....

Address .....
Phone No/email address
.....

6. Name of Contact/Locator Person (2) .....

Address .....
Phone No/email address
.....

7. Name of Contact/Locator Person (3) .....

Address .....
Phone No/email address
.....

8. Follow-Up Interview due: .....

9. Date of Follow-Up Interview .....

APPENDIX 25

Question	Number of days used past 12 months	Number of days used past 3 months	Times used on typical day of use	Hours a day stoned	Average number of joints smoked when using	Average number of cones smoked when using	Average number of spots used when smoking	Need more to get stoned than 12 months ago	Times used first thing in the morning	Felt restless, irritable, anxious when could not use	Able to stop using when wanted to
Number of days used past 12 months	1.000	0.800	0.555	0.514	0.275	0.277	0.331	0.302	0.549	0.411	0.492
Number of days used past 3 months	0.800	1.000	0.474	0.443	0.209	0.302	0.255	0.303	0.537	0.366	0.474
Times used on typical day of use	0.555	0.474	1.000	0.675	0.420	0.207	0.356	0.370	0.531	0.383	0.524
Hours a day stoned	0.514	0.443	0.675	1.000	0.287	0.505	0.387	0.303	0.564	0.445	0.439
Average number of joints smoked when using	0.275	0.209	0.423	0.287	1.000	0.025	0.407	0.217	0.272	0.209	0.361
Average number of cones smoked when using	0.277	0.302	0.207	0.305	0.025	1.000	0.356	0.221	0.300	0.201	0.277
Average number of spots used when smoking	0.331	0.255	0.362	0.307	0.407	0.359	1.000	0.439	0.411	0.321	0.397
Need more to get stoned than 12 months ago	0.302	0.303	0.370	0.303	0.217	0.221	0.439	1.000	0.460	0.365	0.390
Times used first thing in the morning	0.549	0.537	0.531	0.564	0.272	0.300	0.411	0.460	1.000	0.563	0.505
Felt restless, irritable, anxious when could not use	0.411	0.366	0.383	0.445	0.209	0.201	0.321	0.365	0.563	1.000	0.530
Able to stop using when wanted to	0.492	0.474	0.524	0.439	0.361	0.277	0.397	0.390	0.505	0.530	1.000
Felt the need for cannabis	0.458	0.397	0.467	0.493	0.278	0.276	0.341	0.331	0.564	0.503	0.550
Longest time without cannabis	0.615	0.547	0.366	0.393	0.173	0.176	0.291	0.342	0.392	0.427	0.439
Times tried to cut down without success	0.133	0.086	0.111	0.273	0.128	0.128	0.178	0.226	0.218	0.423	0.254
Found it difficult to get through a day without cannabis	0.503	0.452	0.452	0.463	0.235	0.260	0.375	0.366	0.579	0.383	0.555
Would find it difficult to stop using altogether	0.553	0.551	0.450	0.443	0.237	0.236	0.340	0.424	0.506	0.545	0.539
Used after deciding not to	0.234	0.212	0.320	0.423	0.140	0.210	0.256	0.375	0.320	0.463	0.495
Spent time thinking about/trying to get cannabis	0.346	0.250	0.414	0.421	0.179	0.290	0.339	0.365	0.439	0.505	0.426
Given up enjoyable/important things for cannabis	0.263	0.281	0.264	0.278	0.157	0.242	0.258	0.307	0.356	0.508	0.457
Regret/felt bad about using cannabis	-0.023	-0.044	0.036	-0.021	-0.016	0.002	0.059	0.080	0.028	0.242	0.157
Felt paranoid or anxious after using cannabis	-0.105	-0.097	-0.005	-0.076	-0.070	0.100	0.057	0.073	-0.077	0.068	-0.016
Cannabis has made my health.	-0.017	-0.059	-0.101	-0.053	-0.141	-0.024	-0.074	0.049	0.020	0.203	0.030
Cough, sore chest/breathing problems for any length of	0.161	0.130	0.173	0.193	0.169	-0.003	0.109	0.152	0.127	0.269	0.136
Lacked energy to get things done	0.141	0.143	0.134	0.104	0.027	0.181	0.145	0.259	0.147	0.374	0.325
Concentration and memory problems	0.107	0.118	0.130	0.064	0.092	0.116	0.115	0.257	0.175	0.297	0.340
Things planned/expected not happened after using	0.263	0.258	0.212	0.221	0.026	0.196	0.191	0.258	0.316	0.433	0.347

Key:

Significant to $p<.05$, or better

Non-significant

Appendix 25
Correlation Matrix for the Pool Questions

Appendix 25
Correlation Matrix for the
Pool Questions

Question	Felt the need for cannabis	Longest time without cannabis	Times tried to cut down without success	Found it difficult to get through a day without cannabis	Would find it difficult to stop using altogether	Used after deciding not to	Spent time thinking about trying to get cannabis	Given up on cyclic/important things for cannabis	Regret/felt bad about using cannabis	Felt paranoid or anxious using cannabis
Number of days used past 12 months	0.459	0.516	0.139	0.500	0.553	0.231	0.346	0.223	-0.033	-0.105
Number of days used past 3 months	0.[illegible]	0.584	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.353	0.[illegible]	-0.044	-0.[illegible]
Times used on typical day of use	0.457	0.368	0.111	0.452	0.450	0.325	0.414	0.264	0.036	-0.085
Hours a day stoned	0.493	0.390	0.273	0.483	0.413	0.429	0.421	0.278	-0.021	-0.076
Average number of joints smoked when using	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	-0.[illegible]	-0.[illegible]
Average number of cones smoked when using	0.278	0.176	0.125	0.260	0.236	0.[illegible]	0.290	0.242	0.002	0.188
Average number of spots used when smoking	0.341	0.281	0.175	0.375	0.340	0.258	0.338	0.288	0.668	0.057
Need more to get stoned than 12 months ago	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
Times used first thing in the morning	0.384	0.392	0.275	0.573	0.536	0.325	0.439	0.326	0.028	-0.077
Felt restless, irritable, anxious when could not use	0.602	0.427	0.429	0.680	0.515	0.460	0.505	0.528	0.242	0.006
Able to stop using when wanted to	0.565	0.439	0.254	0.563	0.559	0.465	0.428	0.407	0.157	0.016
Felt the need for cannabis	1.000	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	-0.[illegible]
Longest time without cannabis	0.527	1.000	0.134	0.467	0.552	0.214	0.385	0.267	-0.135	-0.150
Times tried to cut down without success	0.243	0.134	1.000	0.326	0.250	0.397	0.230	0.313	0.387	0.205
Found it difficult to get through a day without cannabis	0.[illegible]	0.467	0.[illegible]	1.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
Would find it difficult to stop using altogether	0.548	0.552	0.253	0.693	1.000	0.431	0.623	0.337	0.056	-0.060
Used after deciding not to	0.470	0.214	0.397	0.485	0.431	1.000	0.602	0.447	0.238	0.187
Spent time thinking about/trying to get cannabis	0.605	0.305	0.230	0.592	0.623	0.602	1.000	0.461	0.107	0.000
Given up on cyclic/important things for cannabis	0.467	0.267	0.313	0.550	0.367	0.447	0.461	1.000	0.308	0.128
Regret/felt bad about using cannabis	0.105	-0.135	0.387	0.244	0.056	0.235	0.107	0.308	1.000	0.368
Felt paranoid or anxious after using cannabis	-0.003	-0.150	0.205	0.094	-0.060	0.107	0.000	0.120	0.000	1.000
Cannabis has made my life[illegible]	0.142	-0.017	0.133	0.153	0.[illegible]	0.224	0.090	0.317	0.258	0.040
Cough, sore chest/breathing problems for any length of	0.292	0.148	0.292	0.322	0.253	0.299	0.243	0.256	0.211	0.115
Lacked energy to get things done	0.300	0.123	0.343	0.366	0.258	0.381	0.343	0.283	0.271	0.319
Concentration and memory problems	0.[illegible]	0.114	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
Things planned/expected not happened after using	0.378	0.169	0.227	0.424	0.308	0.375	0.411	0.575	0.281	0.228

Key:

Significant to $p<.05$, or better

Non-significant

Appendix 25
Correlation Matrix for the
Pool Questions

Question	Cannabis has made my health....	Cough, sore chest/ breathing problems for any length of time	Lacked energy to get things done	Concentration and memory problems	Things perceived/ expected not happened after using cannabis	Cannabis interfered with work at school, job or home	Cannabis caused problems with significant others	Spent more time with cannabis users than non-using friends	Tendency to smoke more or own than before
Number of days used past 12 months	-0.017	0.101	0.141	0.107	0.235	0.107	0.260	0.174	0.305
Number of days used past 3 months	-0.059	0.135	0.148	0.118	0.288	0.164	0.245	0.221	0.397
Times used on typical day of use	-0.101	0.179	0.131	0.120	0.213	0.113	0.272	0.197	0.237
Hours/day stoned	0.053	0.156	0.104	0.064	0.124	0.211	0.277	0.223	0.247
Average number of joints smoked when using	-0.141	0.150	0.027	0.083	0.035	0.001	0.134	-0.032	0.119
Average number of bones smoked when using	-0.024	-0.003	0.101	0.116	0.155	0.109	0.283	0.217	0.079
Average number of spots used when smoking	-0.074	0.108	0.142	0.112	0.197	0.162	0.221	0.264	0.234
Need more to get stoned than 12 months ago	0.048	0.152	0.258	0.257	0.259	0.289	0.307	0.306	0.290
Times used first thing in the morning	0.028	0.177	0.147	0.175	0.313	0.273	0.358	0.280	0.364
Felt restless, irritable, anxious when could not use	0.203	0.269	0.374	0.267	0.432	0.477	0.461	0.294	0.200
Able to stop using when wanted to	0.330	0.135	0.325	0.340	0.347	0.305	0.360	0.264	0.394
Felt the need for cannabis	0.142	0.282	0.360	0.240	0.379	0.367	0.412	0.290	0.366
Longest time w/out cannabis	0.017	0.148	0.123	0.164	0.183	0.135	0.187	0.242	0.253
Times tried to cut down without success	0.130	0.297	0.243	0.255	0.227	0.291	0.288	0.088	0.149
Found it difficult to get through a day without cannabis	0.150	0.322	0.266	0.326	0.424	0.409	0.463	0.327	0.374
Would find it difficult to stop using altogether	0.015	0.263	0.258	0.275	0.308	0.315	0.344	0.250	0.413
Used after deciding not to	0.024	0.296	0.261	0.326	0.379	0.450	0.396	0.266	0.343
Spent time thinking about/trying to get cannabis	0.060	0.240	0.343	0.310	0.421	0.449	0.410	0.425	0.320
Given up enjoyable/important things for cannabis	0.317	0.286	0.482	0.418	0.375	0.501	0.563	0.405	0.208
Regret/felt bad about using cannabis	0.286	0.211	0.371	0.240	0.291	0.286	0.230	0.107	0.097
Felt paranoid or anxious after using cannabis	0.040	0.115	0.315	0.171	0.228	0.185	0.079	0.133	0.101
Cannabis has made my health	1.000	0.192	0.326	0.355	0.293	0.316	0.244	0.116	0.216
Cough, sore chest/breathing problems for any length of time	0.192	1.000	0.361	0.257	0.307	0.333	0.200	0.174	0.233
Lacked energy to get things done	0.326	0.361	1.000	0.522	0.430	0.514	0.356	0.290	0.126
Concentration and memory problems	0.355	0.257	0.522	1.000	0.477	0.506	0.364	0.227	0.173
Things perceived/expected not happened after using	0.293	0.307	0.430	0.477	1.000	0.580	0.373	0.338	0.297

Key:

Significant to $p<.05$, or better

Non-significant

Appendix 25
Correlation Matrix for the
Pool Questions

Question	Serious money problems because of cannabis use	Skunk/ hydro good all head all	Cabbage/ leaf bush/ heads commercial oil hash	Drive operated machinery sports/ recreation unprotected sex used weapon score	Cool/fun Tiers drugs use easy to get makes me happy score	Safer than alcohol reduces pain relaxes me sleep relax helps appetite score	Makes me hallucinate Improves creativity sex more enjoyable score	Helps me fit in feel good self myself reduces boredom	Helps me cope with stress control anger forget/ escape bad feelings can't stop using score
Number of days used past 12 months	0.244	0.282	0.12	0.529	-0.033	0.403	0.174	0.078	0.350
Number of days used past 3 months	0.256	0.239	0.100	0.610	-0.002	0.428	0.143	0.073	0.339
Times used on typical day of use	0.140	0.369	0.158	0.373	0.070	0.356	0.260	0.262	0.394
Hours a day stoned	0.157	0.215	0.117	0.314	0.063	0.332	0.230	0.213	0.332
Average number of joints smoked when using	0.114	0.317	0.172	0.147	0.122	0.159	0.116	0.085	0.247
Average number of bongs smoked when using	0.190	0.245	0.063	0.213	0.169	0.220	0.231	0.107	0.141
Average number of spots used when smoking	0.292	0.405	0.105	0.330	0.163	0.312	0.110	0.132	0.256
Need more to get stoned than 12 months ago	0.291	0.228	0.065	0.255	0.255	0.191	0.149	0.345	0.335
Times used first thing in the morning	0.571	0.357	0.124	0.515	0.044	0.280	0.206	0.147	0.256
Felt healthier, more vibrant when could not use	0.475	0.154	0.058	0.541	0.147	0.155	0.115	0.203	0.438
Able to stop using when wanted to	0.255	0.250	0.065	0.295	0.187	0.192	0.087	0.219	0.411
Felt the need for cannabis	0.394	0.221	0.153	0.290	0.148	0.211	0.136	0.213	0.414
Longest time without cannabis	0.147	0.165	0.135	0.256	0.049	0.235	0.082	0.013	0.253
Times tried to cut down without success	0.330	0.142	-0.007	0.224	0.003	0.221	0.094	0.124	0.321
Found it difficult to get through a day without cannabis	0.397	0.262	0.129	0.391	0.207	0.303	0.069	0.264	0.449
Would find it difficult to stop using altogether	0.276	0.251	0.142	0.575	0.212	0.307	0.117	0.155	0.445
Used after deciding not to	0.293	0.163	0.117	0.110	0.033	0.232	0.143	0.377	0.342
Spent time thinking about/trying to get cannabis	0.255	0.175	0.167	0.213	0.307	0.296	0.261	0.341	0.257
Given up enjoyable/important things for cannabis	0.446	0.182	0.085	0.244	0.209	0.142	0.087	0.284	0.351
Rhyme/felt bad about using cannabis	0.292	0.107	0.024	0.104	0.018	0.107	0.057	0.104	0.188
Felt paranoid or anxious after using cannabis	0.174	-0.013	-0.035	0.041	0.020	-0.023	-0.033	0.074	0.056
Cannabis has made my health...	0.199	-0.143	0.032	0.094	0.100	-0.171	-0.041	0.006	0.123
Cough, sore chest/breathing problems for any length of	0.401	0.102	0.093	0.237	-0.071	0.172	-0.043	0.032	0.242
Lacked energy/a get up and go time	0.344	0.075	0.051	0.149	0.113	0.075	-0.020	0.118	0.231
Concentration and memory problems	0.341	0.063	0.069	0.112	0.161	0.125	-0.041	0.121	0.200
Things planned/expected not happened after using	0.421	0.159	0.069	0.272	0.204	0.151	0.047	0.223	0.279

Key:

Significant to $p<.05$, or better

Non-significant

Appendix 25
Correlation Matrix for the
Pool Questions

Question	Number of days used past 12 months	Number of days used past 3 months	Time period on typical day of use	How soon day stoned	Average number of joints smoked when using	Average number of cones smoked when using	Average number of spots used when smoking	Need more to get stoned than 12 months ago	Time used first thing in the morning	Feel restless, irritable, anxious when could not use	Make to stop using when wanted to
Cannabis interfered with work, school, job or home	0.187	0.184	0.113	0.211	0.301	0.165	0.182	0.285	0.273	0.277	0.303
Cannabis caused problems with significant others	0.266	0.245	0.272	0.272	0.234	0.263	0.225	0.307	0.359	0.461	0.369
Spent more time with cannabis users than non-using	0.172	0.221	0.197	0.222	0.322	0.217	0.284	0.308	0.260	0.294	0.264
Tendency to smoke more on own than before	0.303	0.307	0.237	0.247	0.219	0.078	0.234	0.290	0.304	0.305	0.304
Serious money problems because of cannabis use	0.244	0.238	0.140	0.167	0.214	0.165	0.252	0.281	0.371	0.473	0.283
Stuck/dyslexic/dull headed	0.232	0.233	0.508	0.278	0.312	0.248	0.485	0.226	0.357	0.134	0.257
Cabbage/leaf bush/heads commercial vs hash	0.121	0.190	0.150	0.111	0.270	0.000	0.195	0.005	0.124	0.096	0.069
Drive operated machinery sports/accident on unprotected sex used weapon score	0.529	0.519	0.373	0.344	0.247	0.215	0.339	0.256	0.312	0.341	0.293
Cool/fun friends use easy to get makes me happy score	-0.033	-0.002	0.070	0.083	0.122	0.169	0.153	0.266	0.044	0.140	0.137
Safer than alcohol reduces pain helps me sleep/relax helps appetite score	0.403	0.420	0.300	0.332	0.295	0.220	0.212	0.291	0.206	0.193	0.192
Makes me hallucinate improves creativity sex more enjoyable score	0.174	0.143	0.269	0.230	0.216	0.231	0.119	0.149	0.208	0.113	0.087
Helps me to feel good about myself reduces boredom	0.078	0.070	0.262	0.240	0.309	0.167	0.153	0.245	0.127	0.202	0.219
Helps me cope with stress control anger forget/escape/ feelings can't stop using score	0.350	0.303	0.530	0.503	0.247	0.141	0.252	0.395	0.298	0.468	0.444

Key:

Significant to $p<.05$, or better

Non-significant

Appendix 25
Correlation Matrix for the
Pool Questions

Question	Felt the need for cannabis	Longest time without cannabis	Times I tried to cut down without success	Found it difficult to get through a day without cannabis	Would find it difficult to stop using altogether	Used after deciding not to	Spent time thinking about trying to get cannabis	Given up enjoyable/important things for cannabis	Neglected/behaved using cannabis	Felt paranoid or anxious after using cannabis
Cannabis interfered with work at school, job or home	0.387	0.135	0.251	0.484	0.319	0.430	0.449	0.331	0.292	0.162
Cannabis caused problems with significant others	0.412	0.167	0.322	0.463	0.344	0.352	0.410	0.553	0.220	0.072
Spent more time with cannabis users than non-users	0.200	0.242	0.005	0.227	0.250	0.350	0.425	0.435	0.157	0.130
Tendency to smoke more on day than before	0.366	0.258	0.145	0.374	0.418	0.342	0.328	0.338	0.057	0.101
Serious money problems because of cannabis use	0.304	0.147	0.000	0.397	0.270	0.200	0.255	0.440	0.252	0.114
Skunk/hydro/gold oil/hash oil	0.224	0.165	0.142	0.332	0.231	0.133	0.175	0.180	0.021	-0.012
Call bag of bush/heads commercial/ oil/ hash	0.132	0.135	-0.007	0.126	0.170	0.111	0.107	0.295	-0.021	-0.035
Drive operated machinery/ social recreation unprotected sex/ used weapon/ score	0.235	0.256	0.224	0.391	0.375	0.116	0.213	0.244	0.164	0.041
Cool/fun friends use easy to get makes me happy score	0.192	0.049	0.003	0.207	0.212	0.332	0.307	0.290	0.012	0.020
Safer than alcohol reduces pain helps me sleep/relax helps appetite score	0.271	0.265	0.211	0.303	0.307	0.222	0.286	0.412	-0.017	-0.023
Makes me hallucinate improves creativity/ sex/ love/ enjoyable score	0.133	0.082	0.031	0.068	0.117	0.142	0.251	0.287	-0.037	-0.038
Helps me ill/ill feel good about myself/ reduces boredom	0.215	0.019	0.124	0.264	0.150	0.377	0.341	0.254	0.104	0.074
Helps me cope with stress control anger/ forgets/ escape sad feelings can't stop using score	0.413	0.282	0.321	0.446	0.440	0.342	0.267	0.331	0.124	0.066

Key:

Significant to $p<.05$, or better

Non-significant

Appendix 25
Correlation Matrix for the Pool Questions

Question	Cannabis has made my health.....	Cough, sore chest/ breathing problems for any length of time	Lacked energy to get things done	Concentration and memory problems	Things planned/ expected not happened after using cannabis	Cannabis interfered with work at school, job or home	Cannabis caused problems with significant others	Spent more time with cannabis users than non-using friends	Tendency to smoke more on own than before
Cannabis interfered with work at school, job or home	0.315	0.233	0.511	0.305	0.550	1.000	0.466	0.318	0.257
Cannabis caused problems with significant others	0.244	0.209	0.309	0.354	0.373	0.400	1.000	0.237	0.271
Spent more time with cannabis users than non-using	0.118	0.174	0.250	0.277	0.336	0.518	0.257	1.000	0.189
Tendency to smoke more on own than before	0.219	0.235	0.129	0.143	0.297	0.257	0.271	0.169	1.000
Serious money problems because of cannabis use	0.169	0.401	0.344	0.341	0.471	0.409	0.427	0.291	0.237
Skunk/hydro gold oil head oil	-0.143	0.103	0.075	0.052	0.159	0.020	0.062	0.163	0.141
Cabbage/leaf bush/heads commercial oil hash	0.032	0.099	0.051	0.069	0.009	0.051	0.122	0.006	0.107
Drive operated machinery sports/recreation unprotected sex used weapon score	0.061	0.207	0.119	0.112	0.272	0.086	0.312	0.068	0.288
Cool/fun friends use easy to get makes me happy score	0.106	0.071	0.113	0.181	0.204	0.201	0.200	0.252	0.135
Safer than alcohol reduces pain helps me sleep/relax helps appetite score	0.171	0.172	0.075	0.125	0.151	0.164	0.142	0.149	0.237
Makes me hallucinate improves creativity sex more enjoyable score	-0.041	-0.043	-0.020	-0.041	0.047	-0.012	0.118	0.054	0.168
Helps me fit in feel good about myself reduces boredom	0.003	0.032	0.119	0.131	0.223	0.240	0.249	0.271	0.220
Helps me cope with stress control anger forget/escape bad feelings can't stop using score	0.123	0.243	0.281	0.300	0.278	0.246	0.339	0.160	0.319

Key:

[white box] Significant to *p*<.05, or better

[grey box] Non-significant

Appendix 25
Correlation Matrix for the Pool Questions

Question	Serious money problems because of cannabis use	Skunk/ hydro gold oil head oil	Cabbage/ leaf bush/ heads commercial oil hash	Drive operated machinery sports/ recreation ..nprotected sex used weapon score	Cool/fun friends use easy to get makes me happy score	Safer than alcohol reduces pain helps me sleep/ relax helps appetite score	Makes me halluc nate mproves creativity sex more enjoyable score	Helps me fit in feel good about myself reduces boredom	Helps me cope with stress contro anger forget/ escape bad fee ings can't stop usi g score
Cannabis interferred with work at school, job or home	0.409	0.020	0.051	0.088	0.231	0.161	-0.012	0.218	0.246
Cannabis caused problems with s gnificant others	0.427	0.062	0.122	0.212	0.230	0.142	0.118	0.240	0.339
Spent more time with cannabis users than non-using	0.291	0.163	0.086	0.088	0.252	0.149	0.034	0.271	0.160
Tendency to smoke more on own than before	0.237	0.141	0.107	0.286	0.155	0.237	0.168	0.220	0.315
Ser ous money problems because of cannabis use	1.000	0.148	0.204	0.333	0.028	0.280	0.050	0.174	0.401
Skunk/hydro gold o l head oil	0.148	1.000	0.040	0.285	0.117	0.310	0.173	0.158	0.212
Cabbage/leaf bush/heads commercial oil hash	0.204	0.040	1.000	0.209	-0.021	0.157	0.038	-0.009	0.139
Drive operated machinery sports/ rec reation ..nprotected sex ..sed weapon score	0.333	0.295	0.209	1.000	-0.161	0.284	0.129	-0.010	0.211
Cool/fun friends use easy to get makes me happy score	0.028	0.117	-0.021	-0.161	1.000	0.053	0.235	0.485	0.246
Safer than alcohol reduces pain helps me sleep/ra ax helps appetite score	0.280	0.310	0.157	0.284	0.053	1.000	0.364	0.366	0.395
Makes me ha luci nate mproves creativity sex more enjoyable score	0.050	0.173	0.038	0.129	0.235	0.364	1.000	0.372	0.146
Helps me fit in feel good about myself reduces boredom	0.174	0.158	-0.009	-0.010	0.485	0.366	0.372	1.000	0.442
Helps me cope with stress contro anger forget/escape bad feelings can't stop using score	0.401	0.212	0.139	0.211	0.246	0.395	0.146	0.442	1.000

Key:

Significant to $p<.05$, or better

Non-significant

APPENDIX 26

Date: ☐☐ ☐☐ ☐☐ ID/Code: ☐☐☐

Time to complete: ☐☐ ☐☐

Follow-Up Interview Schedule

Sociodemographic Information

1. Are you still in school/polytechnic?

Yes	1
No	2

2. Are you currently employed?

Employed full-time	1
Employed part-time/casual	2
Self-employed	3
Unemployed	4
Sickness benefit/pension	5
Student	6
Other (specify).....	7

3. What is your main source of income? (only one)

Full-time employment	1
Part-time employment	2
Government benefit/pension	3
Student Allowance/ Study Scholarship	4
Partner/family	5
Criminal/illegal	6
No income	7
Other (specify).....	8

4. What is your current living situation?

Live alone	1
Live with partner	2
Live alone with child(ren)	3
Live with partner and child(ren)	4
Live with parents	5
Other relatives	6
Friends/flatmates	7
Landlord	8
Other (specify)	9

5. How many times have you moved/changed your accommodation during the past 12 months (since baseline interview)?

Specify .....

Appendix 26
Follow-up Interview Schedule

6. Are you currently in a relationship?

Married/de facto	1
Yes, but not living together	2
Separated/divorced	3
Widowed	4
Never married	5
Other (specify)	6

Drug Use in Past 12 Months

7.

Drug Category	Used during past 12 months	Frequency Of Use In Past 90 days 0 = no use 1 = 1-3 /month 2 = 1 /week 3 = 2-3 /week 4 = 4-6 /week 5 = daily / today 6 = several /day
Alcohol	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Tobacco	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Ecstasy	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Opiates: Heroin, MST/Morphine, Opium, Homebake, Methadone, Poppy Seed Tea	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Cocaine/Crack	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Stimulants: Amphetamines (Speed, Ritalin), Methamphetamines (P, ice)	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Benzodiazepines / Minor Tranquillizers: Valium, Rivotril, Temazepam (Normison)	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Hallucinogens: LSD, Yesterday/Datura, Psilocybin/Mushrooms	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Inhalants/Solvents: Glue, Petrol, Aerosols/Spray Cans, Paint Thinner, Butane	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Other Category: (specify)	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)
Other Category: (specify)	☐ No ☐ Yes (tick appropriate box)	0—1—2—3—4—5—6 (circle appropriate number)

Appendix 26
Follow-up Interview Schedule

8. During the past 12 months, apart from cannabis did you experience problems or seek treatment for problems from use of any of these drugs?

No	1	
Yes	2	**(go to question 8a.)**
(Specify drug(s)).....……		

8a. Where/what type/length of treatment did you seek?

……

8b. If unable to get help, why?
(e.g. in prison, residential rehabilitation, hospital etc)

……

Cannabis Use

9. Current Use - Timeline Followback (Sobell & Sobell, 1992) - cannabis use past 90 days

10. Has your cannabis use changed over the past 12 months (since last interview)?

No, still the same	1	
Yes, using more now	2	**(go to question 10a.)**
Yes, using less now	3	**(go to question 10b.)**
Yes, no use at all now	4	**(go to question 10b.)**
don't know	99	

10a. If 'Yes', more frequent now, give details of use levels/period/reasons using more now

……

……

……

10b. If 'Yes', less frequent now/have quit, give details of use levels/period/reasons using less now

……

……

……

11. How much do you currently spend on cannabis per week? $……..

Appendix 26
Follow-up Interview Schedule

12. Are you spending more on cannabis now than you were 12 months ago?

spend nothing/no cost	0
spending less now	1
spending about the same	2
spending more now	3
don't know/unsure	99

Cannabis Use Disorder

13. CIDI-Auto version 2.1 (Drug Use Module) diagnostic interview for DSM-IV and ICD-10 Cannabis Use Disorder 12 months version (Interviewer –administered).

14. Severity of Dependence Scale (SDS. Gossop et al., 1992). (Self- administered).

Health: Medical/Psychiatric

15. During the past three (3) months, would you say your health in general was:

Excellent	0
Very good	1
Good	2
Fair	3
Poor	4

16. Have you consulted a doctor or a specialist about your own health in the past three (3) months?

No	1
Yes (if YES, specify problem).....	2

17. Do you currently have any problems with, or concerns about, your respiratory health? (asthma, bronchial/respiratory congestion, a wheezy or whistly chest)

No	1
Yes (if YES. specify)	2

18. Have you had any concerns about, or had treatment (counselling/medication) for, any mental health problems over the past 12 months?

No	1
Yes (If YES, specify)	2

19. Do you believe your cannabis use has created any medical, psychological, or cognitive/thinking problems over the past 12 months ?

No	1
Yes (If YES, specify)	2
Not sure/don't know	99

Appendix 26
Follow-up Interview Schedule

Health: Psychiatric Symptomatology

20. BSI (Derogatis, 1993), 18-item, self-administered.

Scores:

Somatisation (SOM) .....

Depression (DEP) .....

Anxiety (ANX) .....

Global Severity Index (GSI) .....

Future Cannabis Use/Readiness to Change

21. Have you attempted to cut down on cannabis or quit using altogether over the past 12 months?

No	1	**(go to question 22)**
Yes	2	**(go to question 21a.)**

21a. [IF YES] Did you seek help/treatment (for your cannabis use)?

No	1	**(go to question 22)**
Yes	2	

21b. What sort of help did you seek/to whom did you go for help?

(Specify) .....

21c. Did you find/do you believe this was useful/helpful?

No
Yes (specify how).....

Appendix 26
Follow-up Interview Schedule

22. Do you think you have a problem with your cannabis use at present?

No, definitely not	1	**(go to question 23)**
Probably not	2	**(go to question 23)**
Possibly/may be	3	**(go to question 23)**
Yes, definitely	**4**	**(go to question 24)**
Don't know/unsure	99	**(go to question 23)**

23. Do you think that you are at risk of developing a cannabis use problem in the future if you keep on using at the level you are now?

No, definitely not	1
Probably not	2
Possibly/ may be	3
Yes, definitely	**4**
Don't know/unsure	99

24. What is your personal goal/intention for your cannabis use in the next 12 months?

No change/continue as before	1
I want to quit or cut down, but I'm not sure if I'm ready	2
I am preparing to cut down/quit	3
I am cutting down now	**4**
Not sure/don't know	99

25. Cannabis Problems Questionnaire (Copeland et al, 2001), 53-item. ……..
(or 58-item CPQ-A for adolescents)

26. Would you like some assistance to help you cut down or quit your cannabis consumption now?

No	1
Yes	2
Unsure/don't know	99

☺ Thank you for your help ☺

Appendix 27
ROC Curves for the CUPIT
Subscales at Baseline and Follow-up
with Performance Indicators

APPENDIX 27

ROC curves for the CUPIT subscales and corresponding sensitivity/specificity at baseline and follow-up.

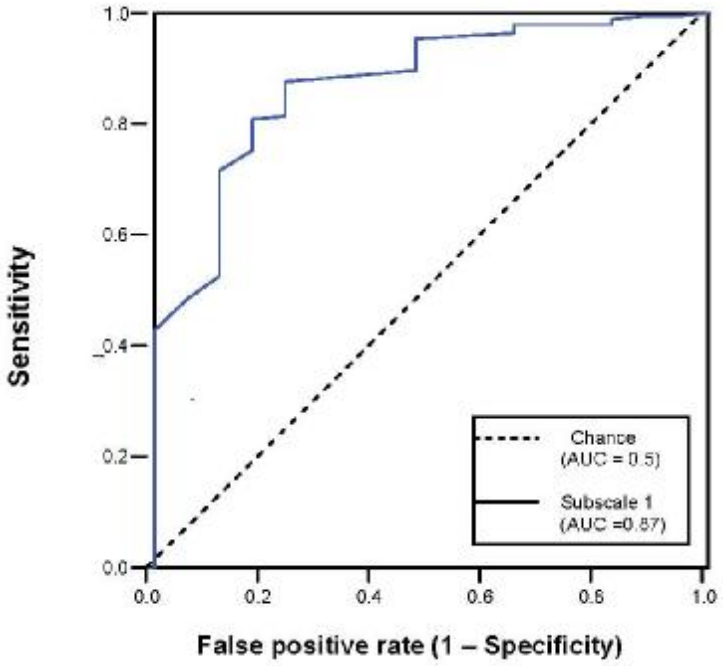


Figure 1: *ROC curve for Impaired Control scale at baseline.*

Table 1: Sensitivity, specificity, and χ^2 values of Impaired Control scale at potential cut-off scores when discriminating between cannabis users with and without a DSM-IV/ICD-10 diagnosis of cannabis dependence or abuse/harmful use at baseline (N=211).

Scale score	Sensitivity	Specificity	χ^2
5	.99	.06	4.80
6	.99	.12	14.11
7	.99	.18	18.65
8	.98	.18	11.84
9	.98	.35	38.24
10	.96	.35	27.14
11	.95	.53	46.73
12	.95	.53	43.56
13	.94	.53	38.13
14	.92	.53	29.89
15	.90	.53	23.96
16	.88	.76	44.41
17	.81	.76	29.40

Appendix 27
ROC Curves for the CUPIT
Subscales at Baseline and Follow-up
with Performance Indicators

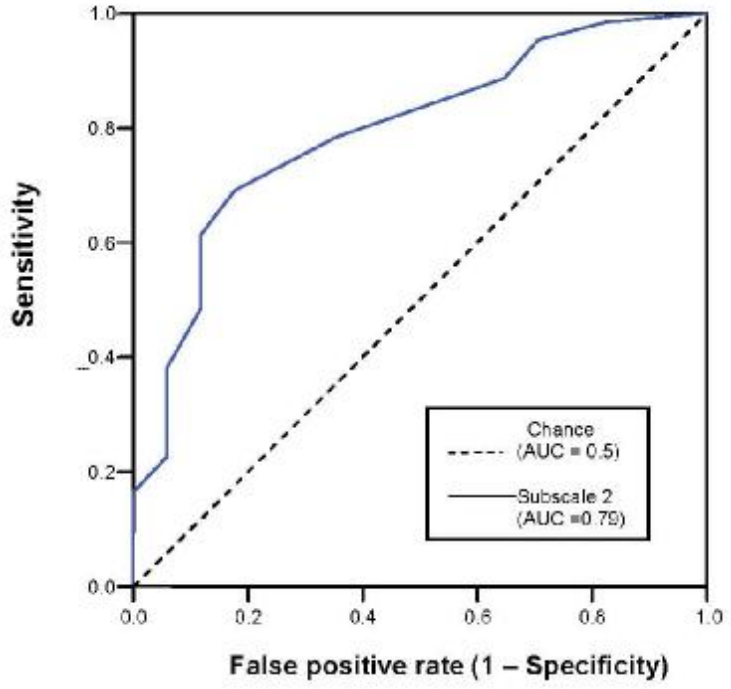


Figure 2: *ROC curve for Problems scale at baseline.*

Table 2: Sensitivity, specificity, and χ^2 values of Problems scale at potential cut-off scores when discriminating between cannabis users with and without a DSM-IV/ICD-10 diagnosis of cannabis dependence or abuse/harmful use at baseline (N=211).

Scale score	Sensitivity	Specificity	χ^2
1	.95	.29	15.48
2	.89	.35	7.79
3	.78	.65	15.41
4	.69	.82	18.15
5	.61	.88	15.71
6	.48	.88	8.49
7	.38	.94	7.10

Appendix 27
ROC Curves for the CUPIT
Subscales at Baseline and Follow-up
with Performance Indicators

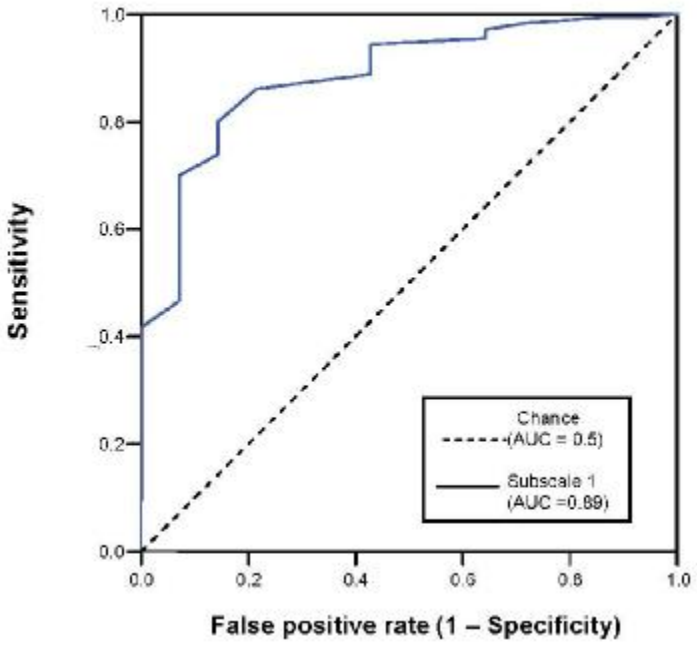


Figure 3: *ROC curve for Impaired Control scale at Follow-up.*

Table 3: Sensitivity, specificity, and χ^2 values of Impaired Control scale at potential cut-off scores when discriminating between cannabis users with and without a DSM-IV/ICD-10 diagnosis of cannabis dependence or abuse/harmful use at 12-month follow-up (N=194).

Scale score	Sensitivity	Specificity	χ^2
5	.99	.07	5.52
6	.99	.14	16.08
7	.99	.21	21.36
8	.98	.29	27.04
9	.97	.36	28.82
10	.96	.36	20.32
11	.94	.57	41.07
12	.94	.57	38.29
13	.93	.57	35.79
14	.91	.57	27.90
15	.89	.57	22.29
16	.86	.79	35.96
17	.80	.86	30.13

Appendix 27
ROC Curves for the CUPIT
Subscales at Baseline and Follow-up
with Performance Indicators

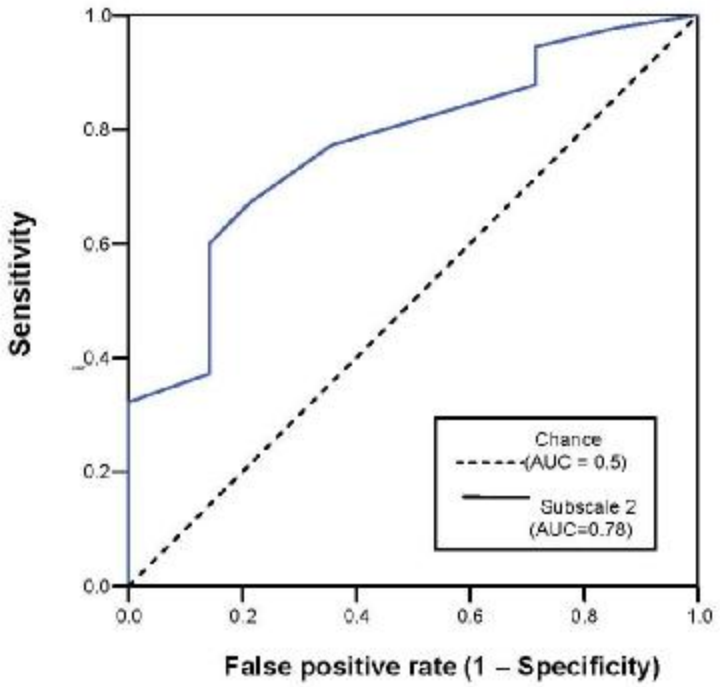


Figure 4: *ROC curve for Problems scale at Follow-up.*

Table 4: Sensitivity, specificity, and χ^2 values of Problems scale at potential cut-off scores when discriminating between cannabis users with and without a DSM-IV/ICD-10 diagnosis of cannabis dependence or abuse/harmful use at 12-month follow-up (N=194).

Subscale 2 score	Sensitivity	Specificity	χ^2
1	.94	.29	10.28
2	.88	.29	2.99
3	.77	.64	11.70
4	.67	.79	11.81
5	.60	.86	11.06
6	.47	.86	5.70
7	.37	.86	2.98