CONFIRMATORY BIAS IN THE DIAGNOSIS OF ADHD.

An Exploratory Study and Survey of New Zealand Clinicians' Protocols & Practices in the Diagnosis of Attention-Deficit Hyperactivity Disorder.

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i

Abstract

Attention-deficit hyperactivity disorder (ADHD) is a heterogeneous syndrome of childhood, with primary symptoms of inattention, hyperactivity, and impulsivity. In recent years, numbers of children diagnosed with ADHD have increased. While many factors may be associated with this increase, one possibility is increased false positive diagnoses due to confirmatory bias (CB) in the diagnostician. CB occurs when a clinician pays attention to positive symptoms with disregard of disconfirmatory symptoms. The present study used a quasi-experimental approach to investigate whether CB was present in the diagnosis of ADHD. Diagnostic decision making was examined in three hypothetical case studies where the ratio of positive to negative ADHD symptoms varied. Results demonstrated CB in the diagnosis of ADHD for many participants. Forty-three percent of clinicians gave no indication of considering disconfirmatory symptoms. Additionally, for all symptoms but one, more attention was paid when they were positive rather than negative. Gaining knowledge from psychological literature and completing an internship increased the likelihood of considering disconfirmatory data. CB was related to clinicians' real-world belief of ADHD prevalence, although this was limited to a statistical trend. The majority of clinicians gave a tentative ADHD diagnosis for all case studies. For clear (i.e. not tentative) diagnoses, clinicians who demonstrated CB were significantly more likely to give a positive diagnosis than a negative diagnosis, whether or not this diagnosis was correct. Results suggest possible misdiagnosis of ADHD in some cases, with concerns of this study being support for the potential of overdiagnosis as a function of CB. Some additional hints of underdiagnosis by a few clinicians merit further research, with the phenomenon of a possible *dis*confirmatory bias raised and discussed. In addition, clinicians were surveyed regarding ADHD assessment and treatment in actual practice. Clinicians indicated using an average of 7 assessment steps, with school information, parent or family interview, and rating scales being the most popular tools. Clinicians who took disconfirmatory data into account used more assessment steps in actual practice than the CB group. There was a mean of 4 treatment options listed, with the most utilised being medication and

behavioural treatment. Findings are limited by the survey-based, correlational nature of the study. The ability to generalise findings to actual practice is considered and discussed.

Acknowledgements

Table of Contents

List of Tables

List of Figures

Chapter 1: The Background of the Study

1.0 Introduction

The diagnosed rate and prescribed treatment of the childhood mental disorder Attention-Deficit Hyperactivity Disorder (ADHD) has increased dramatically over recent years. It is questionable what factors may account for the burgeoning incidence of ADHD (e.g. increased occurrence, improved detection, increased rate of false positive diagnoses). Whatever the case, New Zealand has followed international trends of increasing numbers of children being treated for this disorder. The estimate of New Zealand children receiving Ritalin, a stimulant treatment prescribed predominantly for ADHD, has increased ten-fold over the past six years - from approximately 300 in 1993 to around 3500 in 1999 (Aldridge, 1999). Although the ages of those treated is not specified in Aldridge's (1999) article, 3500 children would represent approximately 4% of those under 15 in New Zealand according to census figures (Statistics New Zealand, 1999).

A related issue is highlighted by a report from the Ministry of Health (now Medsafe) indicating that medical practitioners in some areas of the country prescribe Ritalin at higher rates than do clinicians in other areas (Evening Standard, July 16, 1997). This mirrors findings in the U.S. of different prescription practices in different regions (Zametkin & Ernst, 1999a). Possibilities for such discrepancies include the accuracy of diagnosis (Cotugno, 1993; Sabatino & Vance, 1994; Wolraich et al., 1990).

Another related potential explanation for varying diagnostic rates, suggested by research in other areas of childhood mental health (de Mesquita & Gilliam, 1994) and by anecdotal evidence in this area, is 'confirmatory bias' in the diagnosing clinician. Confirmatory bias occurs when attention is paid only to evidence confirming a hypothesis. Disconfirmatory evidence, which may indicate an alternative formulation, is ignored. In short, the clinician diagnoses ADHD because they are looking for it. Clinicians themselves have expressed concern regarding possible overdiagnosis of the hyperactive behaviour common to ADHD (Bennett & Sherman, 1983). More recently,

1

Jaffe (1995) has expressed concern that public recognition and the potential trivialisation of ADHD might result in it becoming a *"diagnosis du jour"* (p.11) and blamed as a cause for a range of dysfunctions.

Accurate diagnosis and practice is of central importance here: the implications of possible misdiagnosis are far-reaching. False positive diagnoses are in themselves of concern, with the 'labelling' effect having obvious negative sequelae (e.g. Rosenhan, 1973). Additionally, there is the consequence that diagnosis is generally followed by treatment. If a false positive diagnosis does occur, the misdiagnosed child may well be receiving unnecessary treatment. Part of the standard treatment regimen for ADHD includes methylphenidate (trade name Ritalin®), a stimulant drug. Current treatment protocol recommends incremental prescription of Ritalin, allowing for continued treatment over several years where necessary (Medsafe, 1999). As with most medications, use of Ritalin is not entirely without risk. Common side effects include a range of mild cardiovascular, central nervous system (CNS), and skin conditions. More rare, but more serious, are side effects that include convulsions, tics, toxic psychosis, angina, hepatic abnormalities, blood disorders, and growth retardation (Medsafe, 1999). There is also reportedly a growing Ritalin abuse problem amongst youth, both overseas and in New Zealand (Aldridge, 1999; Gibbs, 1999). Consequently, unnecessary prescribing is of concern. Conversely, if false negative diagnoses occur, children with ADHD may not receive potentially beneficial assistance. While the treatment situation is of concern, the current study focuses more specifically on the initial issue of false positive diagnoses and confirmatory bias.

1.1 The Present Study

With the increase in both diagnoses and treatment of ADHD, it is worthwhile to investigate the possibility of confirmatory bias in practitioners. The current study was designed to use fictitious case studies to investigate this phenomenon. The purpose was to determine whether clinicians diagnosed ADHD in hypothetical cases where the symptomatology did not meet required *Diagnostic and Statistical Manual*

of Mental Disorders (*4th edition*; DSM-IV) criteria for diagnosis of the disorder (American Psychiatric Association [APA], 1994). A second part of this research included a survey of these clinicians to ascertain their ADHD diagnostic protocols and assessment/treatment practice.

1.2 Overview

The following two chapters review the literature on the two major topics investigated by this research - ADHD and confirmatory bias in diagnosis.

The review of ADHD covers the history of the disorder, aetiological theories, diagnostic criteria, recommended and actual assessment protocols, epidemiology, comorbidity, treatment options, and recommended and actual treatment practices. As the available literature on ADHD is vast, attempt has been made to give a broad overview of the area. The focus is directed primarily on research published in the past decade and particularly that focused on diagnosis of the disorder.

Confirmatory bias is first reviewed generally and then more particularly as it applies to diagnosis and the decision making process of clinicians. The biasing influence of real-world beliefs is examined. Additionally, there is comment on research investigating clinicians' confidence in the accuracy of their diagnosis and its relationship to accuracy of diagnosis. Again, given that the literature on both confirmatory bias and clinical decision making is voluminous, only the issues most salient to the present study are covered.

Following the review of the literature, an overview of the current study is presented.

Chapter 2: Attention-Deficit/Hyperactivity Disorder

2.0 Introduction to ADHD

ADHD is a heterogeneous syndrome characterised primarily by symptoms of inattention, impulsivity, and hyperactivity (APA, 1994; Barkley, 1998b). For the purposes of the present review, ADHD will be looked at in its childhood form, as it is usually first diagnosed in childhood or adolescence. However, the disorder may persist into adulthood (Biederman et al., 1993; Goldman, Genel, Bezman, & Slanetz, 1998). Between 30 and 80% of those diagnosed in childhood experience continuing problems through their life span (Biederman et al., 1993; Murphy & Gordon, 1998). While not the focus here, the possibility of an initial diagnosis in adulthood is not precluded as long as there is indication that symptoms have been present since childhood (Murphy & Gordon, 1998).

2.1 History of ADHD

Both the name of the disorder and the associated diagnostic criteria have changed over time. This reflects the uncertainty of researchers regarding cardinal symptoms and aetiological factors (Barkley, 1998a; Lynam, 1996). As terms may be generally synonymous but not precisely congruent, it can be problematic to compare studies, particularly across time (Richters et al., 1995).

Early references to ADHD include the character of 'Fidgety Phil', described in the mid-19th century poetry of Heinrich Hoffman, a German physician (Barabasz & Barabasz, 1996; Barkley, 1998b; Zametkin, 1995). The first clinical description of hyperactive behaviour in children is considered to be that of Still in 1902 (Anastopoulos & Barkley, 1992; Barkley, 1990, 1998b; DuPaul, Guevremont, & Barkley, 1991). Still described children seen in clinical practice who exhibited a *"defect in moral control"* (Still, 1902, cited in Barkley, 1998b; p.4). Symptoms

4

included inattention, aggression, defiance, resistance to discipline, excessive emotion and disinhibition, with the main quality of behaviour being immediate self-gratification. Still's proposed aetiology was biological, with factors of genetic predisposition, possible brain injury of either pre- or post-natal origin, or an underlying neurological dysfunction (Barkley, 1998b).

An encephalitis epidemic in North America during 1917-1918 left survivors with behavioural and cognitive symptoms of what is now known as ADHD. This led to the creation of a disorder known as Postencephalitic Behaviour Disorder (Barkley, 1998b). Brain damage as causal continued to be a popular theme over the years (e.g. minimal brain damage [1920s-1930s], brain-injured child syndrome [1940s-1950s], and minimal brain dysfunction [1950s-1960s]; Ross & Ross, 1982).

However, over time diagnosis became focussed more on the presenting symptomatology. Hence the diagnoses of hyperkinetic impulse disorder, hyperactive child syndrome, hyperactivity, hyperkinetic reaction of childhood disorder, hyperkinesis, hyperkinetic syndrome, and Strauss syndrome (named after Alfred Strauss, an influential early researcher) became more common during the 1950s-1960s (Ross & Ross, 1982; Schwartz & Johnson, 1981). Aetiological theories at the time again suggested CNS dysfunction, cortical overstimulation, and cortical/subcortical imbalance as underlying the hyperactive syndrome (Barkley, 1998b).

During the 1970s and 1980s, research into the disorder increased. Descriptions of the syndrome expanded to include attentional deficits as well as hyperactivity and impulsivity (Maag & Reid, 1994). Subtypes reflecting these dimensions created controversy as little empirical validation for subtype formulation existed at the time (Barkley, 1998b). The DSM-II (APA, 1968) disorder of Hyperkinetic Reaction of Childhood became Attention-Deficit Disorder (with or without hyperactivity) in DSM-III (APA, 1980). The revised edition (DSM-III-R; APA, 1987) moved back towards more emphasis on hyperactivity. ADD without hyperactivity was

5

reclassified into the minor category of Undifferentiated ADD. Currently, DSM-IV (APA, 1994) uses the term 'Attention-Deficit Hyperactivity Disorder', with subtypes of predominantly inattentive (sometimes still referred to as ADD), predominantly hyperactive-impulsive, and combined type.

2.2 Aetiology

The varied nomenclature relating to ADHD reflects, at least to some extent, the history regarding the proposed aetiology of the disorder. To date, despite considerable research and theorising, the cause is unknown (Holowenko, 1999; Zametkin & Ernst, 1999b).

Historically, the aetiology of ADHD has been much debated in the literature, with theories suggesting many causes in addition to the neurological and biological dysfunctions discussed earlier. A wide range of research has covered factors such as environmental toxins (particularly lead), diet, genetic factors, disease sequelae, allergies, foetal alcohol syndrome, environmental stressors, and parenting style or practices (see Ross & Ross, 1982; Winchell, 1981). Due to the voluminous literature available and the need for the present review to balance a broad overview against space constraints, only the major aetiological theories are discussed here.

Research has supported some theories more than others, with the greatest evidence pointing to the contribution of neurological and genetic factors (Barabasz & Barabasz, 1996; Barkley, 1998b; Biederman, 1998; Holowenko, 1999; Goldman et al., 1998; Riccio, Hynd, Cohen, & Gonzalea, 1993). However, despite ongoing research and debate, there is not an identified definitive cause for ADHD. Most studies are, by necessity, correlational in nature and do not allow for more definitive causal statements (Barkley, 1998b). There remains the possibility of multifactorial, multidimensional aetiology (Holowenko, 1999).

6

Brain damage was proposed first as the cause for ADHD. Attention focussed on the frontal lobe region of the brain, particularly the pre-frontal cortex. This is not surprising given that the symptoms produced by frontal lobe lesions can mimic those of ADHD. Impairments can include attentional shifting, problems in mental organisation, impulsivity, and disinhibition (Lezak, 1995). While there is evidence that pre- or post-natal brain injury may, in some cases, be linked to later development of ADHD (Dawson, 1997), there is no consistent pattern (Levy, Barr, & Sunohara, 1998). Given the absence of brain injury in most children diagnosed with ADHD, it is unlikely to be the primary cause (Anastopolous & Barkley, 1992; Barkley, 1998b).

Diet, particularly adverse reaction to artificial food additives and sugar, became a major aetiological theory in the 1970's and was well publicised in the media (Barabasz & Barabasz, 1996). Stemming from this was treatment that consisted of a diet free of the identified substances, known as the Feingold Diet (Feingold, 1975). Much research was directed towards this topic (see Ross & Ross, 1982; Winchell, 1981). However, empirical studies failed to find any substantive evidence to support efficacy claims for the Feingold diet in the majority of cases (Barkley, 1998b; Zametkin, 1995). For a small subgroup of children with ADHD, food sensitivity may play some part in the disorder (whether causal or exacerbatory). In these cases, dietary management may be a helpful part of treatment (Nussbaum & Bigler, 1990; Ross & Ross, 1982). Findings suggest that sugar is also not a major contributor to ADHD behaviour, except for a possible small effect in a minority of cases (Wolraich, Wilson, & White, 1995).

There is more research support for the implication of environmental toxins in the aetiology of ADHD, although such factors probably only account for a minority of cases (Barkley, 1998a). Lead, even at sub-toxic levels, has been shown to be associated with hyperactivity (Levy et al., 1998) but is probably not a factor in the majority of cases (Nussbaum & Bigler, 1990). Maternal alcohol intake and smoking during the foetal period can have negative sequelae, one of which is hyperactivity (Barkley, 1990; Levy et al., 1998; Streissguth et al., 1984).

7

There is little empirical evidence to support the view that ADHD is due to poor parenting practices (Anastopolous & Barkley, 1992; Barkley, 1998b; Nussbaum & Bigler, 1990). However, parenting practices are important in managing this disorder. Problems with inconsistent boundary setting or overcontrol may exacerbate behaviour difficulties (Barkley, 1998b).

While ADHD is not thought to be due to parenting practices, parentage itself may be an important factor in the aetiology of ADHD. Genetic links in ADHD are well-documented (Thapar, Holmes, Poulton, & Harrington, 1999). There is a higher rate of ADHD in biological relatives of children with ADHD in comparison to the general population (Biederman et al., 1987). Relative to unaffected families, siblings of children with ADHD are 5-7 times more likely to also develop the disorder and the risk for inheritance of ADHD from a parent with the disorder is up to 50% (Barkley, 1998a). Twin studies on those with ADHD have found higher concordance for the disorder in monozygotic twins than in dizygotic twins, and indicate heritability of up to 91% (Levy et al., 1998). While not definitive, these results argue for a genetic susceptibility towards the disorder. However, environmental factors may still be important in both maintaining symptoms and eventual outcome of the disorder (Levy et al., 1998).

The prevailing current view is based on neurophysiological evidence, and argues for CNS abnormality in the developing brain (Zametkin & Liotta, 1998). In particular, there is suggested right hemispheric dysfunction in the prefrontal, caudate, and parietal areas of the brain, with a possible genetic relationship to dopaminergic systems (Barkley 1998a; Birchard, 1999; Levy, et al., 1998). One recent study found an association between prefrontal neural processing deficits and ADHD (Silberstein et al., 1999). There is also recent suggestion that serotonin may play a role in ADHD, as psychostimulant effects appear to depend on serotonergic neurotransmission (Gainetdinov et al., 1999).

8

In recent years, Barkley (1997) has proposed an updated aetiological model for ADHD. Barkley suggests impaired behavioural inhibition as the primary deficit in ADHD. This is proposed to link with deficits in executive functioning, particularly response inhibition, working memory, self-regulation of motivation, and motor control and sequencing. Such deficits are suggested to make it difficult for children to pursue behaviour directed towards future goals. Thus, the problem is not so much one of attention but of behavioural inhibition and self-control (Barkley, 1998a). Barkley rests his theory on initial findings implicating prefrontal lobe dysfunction as an underlying mechanism of ADHD (Castellanos et al., 1996). However, more research is required to assess the ultimate merits of this theory (Barkley, 1997). Furthermore, the question of what causes the proposed neurophysiological deficits remains unanswered by research. Yet, if empirically supported, such a theory could well result in increased understanding of the disorder and a shift in focus on the primary deficits involved.

2.3 Diagnostic Criteria & Related Issues

To qualify for a diagnosis of ADHD using DSM-IV criteria (APA, 1994), six of nine symptoms of either inattention or of hyperactivity/impulsivity must be present for more than 6 months. They must be present to an extent that is maladaptive and at variance with developmental level. Onset of at least some symptoms must occur prior to the age of 7 years, with clinically significant impairment currently evident in social, academic, or occupational functioning. Symptoms must be present in at least two settings, such as school and home. Additionally, symptoms must not occur only during a pervasive developmental disorder or psychotic disorder, nor be better accounted for by another mental disorder such as anxiety or mood disorders.

In terms of DSM subtyping, symptoms of inattention include failure in detailed attention to work or activities; difficulty with sustaining attention; seeming not to listen when spoken to; not following instructions and failing to finish tasks; problems with task/activity organisation; avoidance or dislike of tasks requiring sustained

mental application; frequently losing necessary items such as pencils or books; being easily distracted; and forgetfulness in daily tasks. Manifestations of hyperactivity include fidgeting; not remaining in a seat when expected; excessive and inappropriate running or climbing; difficulty playing quietly; being 'on-the-go'; and excessive talking. Impulsivity symptoms include blurting out answers before questions are completed; difficulties in waiting one's turn; and frequent interruption or intrusion.

Diagnosis is based upon the combination of presenting symptoms. The predominantly inattentive subtype requires at least six of the nine inattentive symptoms and fewer than five hyperactive/impulsive symptoms. The predominantly hyperactive/impulsive subtype requires six or more hyperactive/impulsive symptoms and less than five of the inattentive. The combined subtype requires at least six symptoms on both dimensions and has been found to produce more severe clinical impairment with greater risk of comorbidity (Faraone, Biederman, Weber, & Russell, 1998).

Diagnosis prior to age 6 or after age 14 requires additional specialist evaluation. Caution is recommended in any diagnosis of ADHD in children under 5, as inattentive and hyperactive behaviour is common in pre-schoolers and not necessarily indicative of ADHD (Nussbaum & Bigler, 1990; Searight, Nahlik, & Campbell, 1995; Swanson et al., 1998). Barkley (1990, 1998b) argues that symptom duration of 12 months would be more diagnostically appropriate for this age group. A prominent sub-group of children with ADHD are diagnosed before 5, with notable hyperactivity symptoms having begun at birth or very early infancy and continuing throughout the lifespan (Nussbaum & Bigler, 1990). In adolescents, symptoms of ADHD may present more subtly (Searight et al., 1995), and the symptoms tend to manifest as restlessness rather than outright hyperactivity (American Academy of Child and Adolescent Psychiatry [AACAP], 1997). Diagnosis of ADHD in adults is a separate specialist area and requires a thorough evaluation (AACAP, 1997).

Hyperkinetic Disorder (HKD), rather than ADHD, is the nomenclature used by the 10th edition of *International Statistical Classification of Diseases and Related Health Problems* (ICD-10; World Health Organisation [WHO], 1992). Hyperkinesis refers to severe and persistent hyperactivity (Kewley, 1998). While the two diagnoses both recognise the same problematic behaviours, there are three main differences between them (Swanson et al., 1998).

1) HKD (ICD-10; WHO, 1992) requires symptoms to be present in all three domains (inattention, hyperactivity and impulsivity) whereas ADHD may have sub-types in cases where symptoms are from only one or two domains. Thus, according to ICD criteria, a disorder with attentional, perceptual, and motor control symptomatology, but without hyperactivity, cannot be classified as a hyperkinetic disorder (Bertelsen, 1999). In contrast, DSM allows for a predominantly inattentive subtype of ADHD.

2) If there is comorbid conduct disorder, ICD allows for a diagnostic category entitled Hyperkinetic Conduct Disorder; DSM allows for comorbidity – a diagnosis of Conduct Disorder and ADHD.

3) ICD proposes a single differential diagnosis be made and does not recommend diagnosis of HKD if internalising disorders such as anxiety and depression are present. Implicit in this stance by ICD is the view that co-occurrence of two disorders produces a unique syndrome, better served by a separate diagnosis (Cantwell, 1996b). On the other hand, DSM generally allows for as many comorbid diagnoses as there are simultaneous separate disorders (with certain exceptions).

Overall, diagnosis of HKD is more stringent than ADHD, thereby identifying a *"refined phenotype"* (Swanson et al., 1998; p.429). A primary reason for this appears to be differences in diagnostic symptoms, with ICD reflecting more hierarchical decision making and DSM allowing for more co-occurrence.

11

Thus, ADHD is a broader diagnosis than HKD. One consequence of this is that it may produce false positive diagnoses. Research has identified overdiagnosis of ADHD (Cotugno, 1993; Sabatino & Vance, 1994; Wolraich et al., 1990). Rates of incorrect diagnosis for ADHD varied from 28% in one study (Wolraich et al., 1990) to 78% in another (Cotugno, 1993). Calls have been made for research addressing the validity of the DSM-IV diagnosis (Bertelsen, 1999; Leung et al., 1996). A more extreme view, circulated in the United States and other media, has questioned whether ADHD is actually a disorder at all (see Barkley, 1998b). Public campaigns have been mounted against ADHD, and especially against the use of Ritalin (Barkley, 1998b; Goldman et al., 1998). In reaction, support groups for parents of children with ADHD have formed and publicised pro-ADHD arguments. Such support groups have also proliferated throughout New Zealand.

In addition to public discussion, debate has also occurred in the literature but is generally less polarised than in the public arena (Goldman et al., 1998). Barkley (1998b) claims that *"no major or widespread controversy ever existed within the professional or scientific fields over the nature of the disorder"* (p.33). However, there is clearly still ongoing debate, although less on the validity of ADHD as a diagnostic entity than on issues related to diagnostic criteria (e.g. Baughman, 1999; Breggin, 1999; Goldman & Genel, 1999).

Several criticisms of the current criteria may be made. For example, 'symptoms' of inattention, behavioural disinhibition, excessive activity, and variability in task performance may easily be identified in quite normal, but highly active, children. While stating that differentiation needs to be made between a true ADHD syndrome and normal, age-appropriate, highly active behaviour (APA, 1994), DSM-IV criteria remain vague and imprecise with unclear differentiation of abnormality (Carey, 1999). The diagnostic criteria require children to *"often"* display each of the hyperactive/impulsive or inattentive symptoms (APA, 1994; pp. 83-84). However, no precise definition of *"often"* is given. No empirical data supports the current assessment of six inattentive or hyperactive symptoms as a true delineation between

12

normality and abnormality (Levy, Hay, McStephen, Wood, & Waldman, 1997). Other criticisms include how well criteria apply to those under 6 or over 14, whether criteria should be adjusted for gender, the requirement of symptom onset prior to age 7, and failure to stipulate a lower boundary of age for diagnosis (Barkley, 1998b).

Another criticism occurs in regard to exclusionary criteria, which might benefit from further refinement. For example, the case of a gifted but unstimulated child is not precluded from an ADHD diagnosis by the formal exclusionary criteria in DSM-IV (APA, 1994). While ADHD may certainly apply to a gifted child, it must be questioned whether a diagnosis of ADHD is warranted or useful in those cases where provision of more challenge and stimulation for the child results in removal of problematic hyperactive/inattentive symptomatology. While DSM-IV (APA, 1994) discusses this situation in regard to differential diagnosis, it does not extend such differentiation to the formal diagnostic criteria - which the DSM format puts into discrete boxed segments. An extensive literature search could find no available research data on techniques of clinicians regarding their reading and usage of DSM. However, a common-sense perspective would suggest it is possible that, given time and practice constraints, at least some clinicians may only read the boxed criteria sections of DSM-IV and not read the accompanying prose. Thus, it would seem worthwhile to extend formal criteria in these sections to consideration of other issues including environmental situations (i.e. lack of stimulation and giftedness).

In line with the impact of environmental factors, some have proposed systemic reasons for the diagnosis. For example, it may be a simplistic label for conflict between children and adults or adult-controlled institutions, such as schools (Breggin & Breggin, 1995). It is suggested that children who are bored, angry or anxious may earn a label of psychopathology by acting out with behaviour that is unacceptable to the adults who control aspects of the child's life (such as parents or teachers). Medication is then given to control the child's unwanted behaviour. Breggin & Breggin (1995) suggest that the identified child does indeed have a deficit, but that this deficit is systemic and includes the amount of attention *received* from adults,

13

particularly fathers. The proposed answer for this problem is not medication and self-control programmes but simply more attention and love for the child.

However, despite some controversy, the DSM diagnosis of ADHD has become accepted by the vast majority of mental health professionals (Barkley, 1998b; McBurnett, Lahey, & Pfiffner, 1993; Nussbaum & Bigler, 1990) with the weight of research evidence supporting its construct validity (Goldman et al., 1998). Even some of those calling for further validation studies note that the diagnosis is *"not invalid"* (Leung et al., 1996; p.492). Recent research findings have also provided preliminary support for the validity of DSM-IV ADHD subtypes (Faraone, et al., 1998; Gaub & Carlson, 1997; Gomez, Harvey, Quick, Scharer, & Harris, 1999; Lahey et al., 1994).

A moderate view reflected here is that ADHD does have some established construct validity, but may be subject to diagnostic bias and other problems. Nevertheless, the possibility remains that ADHD is not a discrete syndrome and there is overlap with other areas such as conduct disorder and learning problems (Goldman et al., 1998; Reid, Maag, & Vasa, 1993), as well as internalising problems (e.g. Ronan, 1996). While current criteria may be an improvement on those delineated in earlier editions of DSM (APA, 1968, 1980, 1987), there remains room for further refinement to allow improved diagnosis and differentiation of ADHD - both from normal behaviour and from other clinical disorders (Barkley, 1998b; Orford, 1998).

2.4 Diagnostic protocols

As there is no definitive cause for ADHD, so too there is no single definitive test available to determine whether a child has the disorder. Additionally, those children with ADHD are a heterogeneous group, with much individual variation in symptomatology and chronicity (DuPaul et al., 1991). Therefore, diagnosis is based on clinical judgement combined with a multimethod - multitrait assessment protocol.

2.41 Recommended Diagnostic Protocols

A thorough clinical assessment is recommended (Orford, 1998). The diagnostic protocols for assessing ADHD in New Zealand are currently under review. The forthcoming recommended protocol is based on major literature reviews, consensus documents, and international guidelines (P. Tuohy, Medsafe, personal communication, February 15, 2000). The New Zealand guidelines are likely to follow other international parameters, incorporating use of a comprehensive, multifaceted, multidimensional assessment regime, across situations and from a number of sources (e.g. AACAP, 1997). These include (but are not limited to) the following procedures:

(a) Parent and child interviews covering a full medical, developmental, and family history, including review of parenting style and family functioning.

(b) Interview data should be supplemented with completion of standardised rating scales.

(c) Academic functioning should be assessed through review of available information such as reports, as well as teacher checklists.

(d) A full evaluation of the child, including identification of DSM symptoms, and a full physical examination.

(e) First hand observation of the child is also recommended, preferably in a natural setting (e.g. school, home) (Swanson et al., 1998). Observation in a novel situation (e.g. clinician's office) may not confirm parent and teacher reports, due to potentially suppressed behaviour patterns.

(f) Other likely disorders and external factors (e.g. a bored child in a non-stimulating environment or stressors such as bullying) should be ruled out and comorbid disorders identified.

Although guidelines for comprehensive assessment of ADHD have been available for a number of years, concerns have been raised regarding the thoroughness of diagnostic evaluation procedures in practice (Goldman et al., 1998). For example, concern has been expressed about diagnosis based solely on a checklist of symptoms (Thambirajah, 1998). Clinical diagnoses need to take account of biopsychosocial factors, both current and historical. The symptoms associated with ADHD can be produced by traumatic experiences in the child's life, such as abuse or neglect, or by other psychiatric, medical and neurological disorders (Goldman et al., 1998; Orford, 1998; Thambirajah, 1998). It is essential to view the 'big picture' of the child's life before making a definitive diagnosis.

While a clinical interview with the child's parent (or parents) remains the foundation of recommended assessment process, rating scales are recommended as a source of valuable information (AACAP, 1997). Rating scales can be divided into two general categories, broad- and narrow-range. Broad-range scales assess a variety of dimensions that will often include at least some of the symptoms of ADHD (Cantwell, 1996a). Broad assessment can be useful when there is suspicion of comorbidity (Conners, 1998). One example of a broad-range scale is the Child Behaviour Checklist (CBCL; Achenbach, 1991). The CBCL has three versions; Youth self-report (YSR), Parent, and Teacher versions. Another broad-range scale often used in the assessment of ADHD is the Conners Rating Scale (Conners, 1990), which has both parent and teacher versions. Narrow-range scales assess features specific to ADHD (Cantwell, 1996a). One example is the ADD-H Comprehensive Teacher Rating Scale (ACTeRS; Ullman, Sleator, & Sprague, 1985).

Criticisms of rating scales include their subjective nature and the potential for a small number of items to influence clinical judgements (Carey, 1999). However, rating

scales are intended to be an adjunct in clinical assessment of ADHD and are not designed to stand alone (Conners, 1998). Despite limitations, they are generally reliable and valid sources of information when used correctly (Conners, 1998). Teacher rating scale information is an important factor in making a diagnosis, especially given data which suggests teachers may be more reliable than parents in accurately reporting ADHD features (Gomez et al., 1999).

Making a clinical diagnosis of ADHD may be difficult due to many factors such as the range of possible comorbid conditions and behaviours, the imprecise nature of the diagnostic criteria, and the specialised nature of the assessment of children generally. Confirmation of an ADHD diagnosis by a specialist child psychologist, psychiatrist, or paediatrician is recommended in the literature (e.g. Barkley, 1998b; Werry, 1995). Consistent with this, current New Zealand pharmaceutical regulations now require any General Practitioner (GP) prescription of stimulant medication for ADHD to be endorsed by a psychiatrist or paediatrician. However, specialist referral will not necessarily eradicate diagnostic errors as even specialists have been found to vary in their diagnosis of ADHD-related disorders (Ullman & Doherty, 1984).

To summarise, the current recommended practice regarding diagnosis is for a thorough, comprehensive, multifaceted, and multidimensional assessment regime. However, while recommendations are available, it is more difficult to know how accurately they are being followed by those in actual clinical practice. Assessment of ADHD appears to lack standardisation (Wasserman et al., 1999). Ross & Ross (1982) noted the need for research to document the actual diagnostic protocols of practising clinicians, in order to assess any possible misdiagnosis and diagnostic error. Several U.S. studies have been done (Bennett & Sherman, 1983; Copeland, Wolraich, Lindgren, Milich, & Woolson, 1987; Sandoval, Lambert, & Yandell, 1976; Wasserman et al., 1999; Wolraich et al., 1990; Zarin, Suarez, Pincus, Kupersanin, & Zito, 1998). Only one study pertinent to New Zealand was identified, and this surveyed parents of children with ADHD rather than clinicians (Biddle, 1998). These studies are now reviewed.

17

2.42 Actual Diagnostic Practice

An early study (Sandoval et al., 1976) examined which symptoms were considered by physicians to be primary indicators of hyperactive conditions. Behavioural symptoms such as fidgetiness, restlessness, inattention, impulsivity, task incompletion, aggression, and low frustration tolerance were regarded as prime indicators by over 80% of clinicians surveyed. Diagnosis was made primarily on the presence of such indicators, from information gained from the child's medical and family history rather than from direct examination results. The authors surmised that physicians viewed the disorder as behavioural rather than being neurologically based. Among limitations of this survey were its narrow geographical scope, as it surveyed clinicians from only two counties of one Californian metropolitan area, and the response rate (40%).

A mail survey of 910 primary care physicians (paediatricians, family physicians, and GPs) dealing with diagnosis of hyperactivity found significant differences in practice relating to physician speciality and age (Bennett & Sherman, 1983). Paediatricians saw more children for hyperactive behaviour, used neurological examinations more often, and referred more often to psychologists and less often to neurologists than did physicians in the other two groups. Generally, paediatricians were found to be practising closer to recommended guidelines than were family physicians and GPs. However, a number of clinicians from all disciplines reported using assessment investigations that have been found to be of little help in evaluating hyperactivity. These included allergy evaluations and electroencephalograms (EEGs). Limitations of this study include a restricted geographical area (one U.S. State).

Copeland et al. (1987) examined assessment and treatment practices of American paediatricians regarding ADHD-related disorders. Few respondents reported using DSM criteria (DSM-III at that time) to make a diagnosis, relying rather on general literature descriptions of hyperactivity, impulsivity, and attention deficit symptomatology. The primary indicator for clinicians was the presence of

distractibility (94%), followed by overactivity (84%). Parental history was the most frequent source of information (93%), with 89% of participants also reporting use of teacher information. The majority of those surveyed also utilised rating scale information (58% for parent ratings, 62% for teacher ratings) in the formulation of a diagnosis. Thus, these aspects of diagnostic practice were generally in line with recommended protocols. Of concern though was the finding that 77% of clinicians reported using the child's response to stimulant medication as part of their diagnostic protocol. As research (available also at the time) has identified that normal children respond to stimulant medication similarly to those with ADHD (Peloquin & Klorman, 1986; Rapoport, Zahm, Ludlow, & Mikkelsen, 1978), medication response cannot be taken as confirmation of the presence of ADHD. Also, about half of the participants reported reliance on the presence of soft neurological signs (e.g. fine motor skills deficit, clumsiness, visual-motor difficulty) despite doubtful utility in the diagnosis of ADHD (Camp, Bialer, Sverd, & Winsberg, 1978). Limitations of the study include the possibility of response bias, given the response rate of targeted clinicians (36%), and the lack of verification of self-reported practice.

In their investigation of psychostimulant use by primary care clinicians in the treatment of ADHD, Wolraich and colleagues (1990) found that symptoms of distractibility and inattention were primary indicators for both paediatricians and GPs. Parent report was consistently the most popular source of information. The importance of adding teacher information is highlighted in this study by the finding that only 53% of the sampled children would have received a diagnosis of ADHD when teacher report of symptoms was included in the decision making process (Wolraich et al., 1990). Only a quarter of clinicians relied on DSM criteria. When DSM criteria were used, only 72% of children in the sample would have received a diagnosis of ADHD. Again, findings showed reliance on the child's response to stimulant medication in making clinical diagnosis. This was a reported diagnostic procedure for 73% of paediatricians and 62% of GPs surveyed nationally. Taken together, the results of this study leave cause for concern regarding the use of recommended comprehensive assessment protocols and the subsequent accuracy of

diagnoses. A limitation of the study was that only 23.3% of clinicians surveyed (*n*=164/704) responded with full data.

More recently, Zarin et al. (1998) conducted a survey of APA psychiatrists to ascertain information about the clinical characteristics of children diagnosed with ADHD. As part of this study, data were collected on clinicians' assessment and treatment protocols. Interviews with the child and the parent were the most utilised means of diagnostic information gathering, used by 99% and 97% of clinicians respectively. A further 79% also employed some form of observation, 76% obtained a school report, and 64% utilised rating scales as a source of diagnostic information. However, only 19% of the clinicians surveyed followed the recommended protocol for a comprehensive assessment, covering both child and parent diagnostic interviews, schooling information, rating scales, observation, psychoeducational evaluation, and a full medical examination (AACAP, 1997).

Wasserman and colleagues (Wasserman et al., 1999) also found a lack of standardised assessment for ADHD behaviours in a survey of 401 paediatric and family clinics in the U.S., Canada, and Puerto Rico. Only 36.9% of children assessed for attentional or hyperactive problems were rated using tools such as behavioural checklists. DSM criteria were used for 38.3% of children assessed.

Little information is available on the protocols of New Zealand clinicians. Biddle (1998) surveyed New Zealand families and found that behavioural questionnaires were reported as the most commonly used tool for the assessment of children, with psychological testing also being used for the majority of children over the age of 6. There was wide use of hearing and vision testing. Additionally, a minority of children underwent other procedures such as brain scans, EEGs, and allergy testing. The study did not assess clinician reports of assessments.

Such a low rate of adherence to recommended protocols across these studies raises questions concerning clinicians' perceptions of the utility, or practicality, of such a

20

comprehensive assessment regime (Zarin et al., 1998). However, it must also surely raise concerns regarding the thoroughness of the assessment processes used by practising clinicians and the accuracy of subsequent diagnoses. Overdiagnosis remains a continuing concern (Zametkin & Ernst, 1999b). If it can be difficult to make an accurate diagnosis when using comprehensive assessment protocols, how much more difficult is it to be accurate if clinical diagnosis is based on incomplete information? Accurate diagnosis is important not only in the case of individuals seen in clinical practice, but also in allowing the true prevalence of this disorder to be evaluated.

2.5 Epidemiology

ADHD is considered the most common childhood mental disorder (Swanson, Lerner, & Williams, 1995). The disruptive behaviour disorders generally (ADHD, Conduct Disorder [CD], and Oppositional Defiant Disorder [ODD]) produce the largest group of clinical referrals (Abikoff & Klein, 1992). ADHD alone accounts for as much as half of all child psychiatric clinic populations (Cantwell, 1996a). However, the number of all children who actually qualify for an ADHD diagnosis is difficult to gauge. Estimates from prevalence studies vary according to methodological factors such as diagnostic criteria, ascertainment methods, measures employed, informants, and sampled populations (AACAP, 1997).

2.51 International Prevalence

Culture is an important factor to consider in any assessment process. Cross-cultural findings of differences in prevalence have been mixed and are confounded by other factors such as socio-economic status and differences in assessment and diagnostic cut-offs (Ramirez & Shapiro, 1998). Variation may be due to the culture of the person rating the child's behaviour as much as due to the culture of the child (Holborow & Berry, 1986; Mann et al., 1992; Ramirez & Shapiro, 1998).

Despite some controversy regarding prevalence variation across different cultures, there is consensus that ADHD is an international phenomenon (Barkley, 1998b). It is found in both Western and Eastern cultures (e.g. Leung et al, 1996), and cannot be construed as being related to increased permissiveness in Western culture (Anderson, 1996). Prevalence data shows varying rates of ADHD in different countries. Notably the rate for the United Kingdom is much lower than rates elsewhere (Kaplan & Sadock, 1998). A recent review found variation in international rates to be between 1.7% in England and 16.1% in Puerto Rico (Goldman et al., 1998). However, the use of different operational definitions confuses this picture. Use of ICD criteria is one suggested reason for lower prevalence rates in the U.K. (Kewley, 1998). As previously discussed, reliance on ICD classification identifies only a sub-group of those who would qualify for a DSM diagnosis.

New Zealand rates, taken from community samples and based on DSM criteria, have been estimated to range between 2% and 6.7% (Anderson, Williams, McGee & Silva, 1987; Fergusson, Horwood, & Lynskey, 1993; McGee et al., 1990). This is comparable to the DSM-IV estimate of 3-5% of school age children in the U.S. (APA, 1994).

2.52 Gender Differences

Consistent across studies and countries is the finding that ADHD is more prevalent in boys than in girls. A ratio of at least 3:1, and possibly as high as 9:1, has been suggested (Arnold, 1996; Barkley, 1998a; Gaub & Carlson, 1997;Swanson et al., 1998). Higher rates (from 6:1 to 9:1) are found in clinic-referred samples, with lower rates for community samples (3:1; Gaub & Carlson, 1997).

However, gender differences are subject to the confound of referral bias (Arnold, 1996; Cantwell, 1996a; Swanson et al., 1998). Children with ADHD hyperactive/impulsive type may be more likely to be referred than those with ADHD inattentive type. Symptoms of hyperactivity/impulsivity are more obvious and often

more problematic for the adults involved (i.e. parents and teachers). Thus, the 'squeaky wheel gets the oil' whereas the quieter, primarily inattentive, child is more likely to be overlooked. Since boys with ADHD have higher levels of hyperactivity and externalising behaviour than girls with ADHD (Cantwell, 1996a; Gaub & Carlson, 1997; Swanson et al., 1998), it would follow that more boys are referred for assessment and treatment.

2.6 Comorbidity

ADHD is frequently accompanied by another mental disorder. One recent study found 63% of children with ADHD meet criteria for at least one other psychiatric disorder (Zarin et al., 1998). Most commonly, there is comorbidity with CD, ODD, learning disorders, anxiety disorders, and depression (Anderson et al., 1987; August, Realmuto, MacDonald, Nugent, & Crosby, 1996; Biederman, et al., 1993; Kashani et al., 1987). There is suggestion that children with the predominantly hyperactive/impulsive subtype are more likely to have comorbidity with an externalising behaviour disorder, such as CD or ODD. Those children with predominantly inattentive subtype display more comorbidity with internalising disorders, such as depression and anxiety (Lahey & Carlson, 1991). As boys are more likely to display hyperactive/externalising symptomatology, it is not surprising that boys have a higher rate of CD co-occurrence. Girls with ADHD have higher rates of internalising and learning problems (Gaub & Carlson, 1997).

However, findings here are confounded by the fact that those with uncomplicated ADHD are referred less often to professionals (Werry, 1995) and many studies are based on clinical populations (Jensen, Martin, & Cantwell, 1997). There is also symptom overlap between many childhood mental disorders (de Mesquita & Gilliam, 1994). This may result in *"spurious comorbidity"* (Jablensky, 1999; p.141) where the various symptoms of one clinical diagnoses are mistaken for other independent disorders.

23

2.7 Treatment

Currently, ADHD cannot be 'cured'. However, ADHD can be successfully managed, through a multimodal approach incorporating both psychosocial and medical interventions (Cantwell, 1996a). Within such an approach, individualised treatment plans are required, with decisions based upon a full evaluation of all factors involved (e.g. comorbidity, severity of impairment, and strengths and weaknesses of the child, family, and school situation; AACAP, 1997). A core component of many treatment regimes is pharmacological.

2.71 Pharmacological Treatment

The primary pharmacological treatment for ADHD is prescription of psychostimulants. Other drugs may be prescribed for ADHD (e.g. clonidine, bupropion, antidepressants), especially when there is contraindication or adverse reaction to stimulants. However, psychostimulants remain the first-line medications for ADHD (AACAP, 1997; Connor, 1998). By far the majority of children treated pharmacologically with stimulant medication are prescribed Ritalin (Goldman et al., 1998; Safer, Zito, & Fine, 1996).

Stimulants act on the CNS, enhancing catecholamine activity, which is thought to increase the availability of neurotransmitters in the brain, notably dopamine and norepinephrine (Barkley, DuPaul, & Costello, 1994). Recent research also suggests that serotonin may be implicated (Berger, 1999). Ritalin may work by restoring the balance between levels of dopamine and serotonin in the brain (Gainetdinov et al., 1999). However, the precise action of stimulant drugs is still not well understood (Barkley et al., 1994).

Generally, Ritalin is regarded as a reasonably safe and effective treatment (Goldman et al., 1998; Klein & Wender, 1995; Swanson et al., 1998). Up to approximately 90% of children with ADHD will have a positive response (i.e. improvement of

24

behavioural symptoms; Barkley et al., 1994; Cantwell, 1996a; DuPaul, Barkley, & Connor, 1998; Goldman et al., 1998). Generally speaking, Ritalin improves 'on-task' behaviour (Zametkin & Ernst, 1999b). Effects are not long lasting, however, achieving maximum effect in 1.5-2.5 hours and being totally eliminated within 12-24 hours (DuPaul et al., 1998). As mentioned earlier, normal children have been shown to have a parallel response to Ritalin (Peloquin & Klorman, 1986; Rapoport et al., 1978). Simply, Ritalin generally works, fast and for a few hours – whether the child has ADHD or not.

However, as many as 30% of children with ADHD will show either no response or a worsening of behaviour (DuPaul et al., 1998). Thus, a diagnosis of ADHD should not automatically be followed by a prescription for Ritalin without a full medical assessment and consideration of all issues that may be involved in each unique case. Additionally, it must be remembered that medication does not 'cure' ADHD (Dykman & Ackerman, 1993).

Despite being regarded as a safe medication in the majority of cases, the use of Ritalin is not completely risk-free. Ritalin prescription is contraindicated if various other medical and mental disorders are present, such as anxiety, hyperthyroidism, cardiac abnormality, glaucoma, epilepsy, or a family history of tics or Tourette's syndrome (Medsafe, 1999). However, recent studies suggest that, with careful monitoring, Ritalin can be a safe and effective treatment for many (but not all) children with mild to moderate tic disorder (Gadow, Sverd, Sprafkin, Nolan, & Ezor, 1995; Gadow, Sverd, Sprafkin, Nolan, & Grossman, 1999), although this remains a complicated issue (see Castellanos, 1999).

The most common side-effects of Ritalin are relatively mild and short-lived, responding to dosage or timing adjustment. They include insomnia, lowered appetite, headaches, and stomach aches (DuPaul et al., 1998; Goldman et al., 1998; Medsafe, 1999). Serious side-effects are rare and include convulsions, arrhythmia, liver dysfunction (including hepatic coma), skin disorders, and blood disorders (Medsafe,

1999). Concern has been raised about the effect of long-term Ritalin ingestion on children's growth rates and development. A recent study found small, but statistically significant, height differences between children with ADHD and control subjects but this effect appeared unrelated to medication treatment and tended to disappear by late adolescence (Spencer, Biederman, & Wilens, 1998). As a minority of children may indeed have a slight delay in growth, it remains important to adequately monitor any psychostimulant treatment. The long-term safety and efficacy for Ritalin is not known (Medsafe, 1999) and further longitudinal studies are required (Spencer et al., 1998).

Current knowledge suggests that psychostimulant treatment for ADHD carries no increased risk for development of other illicit substance abuse (Cantwell, 1996a; Zametkin & Ernst, 1999b), although further studies are required (DuPaul et al., 1998). However, abuse of Ritalin itself by youth generally is another matter and questions have been raised by recent media reports of this phenomenon (Aldridge, 1999; Gibbs, 1999). While outside the focus of the present discussion, reports of Ritalin abuse would appear to warrant further investigation and research.

In sum, psychostimulant medication works in most cases, but not all. Effects are fast but not long lasting. The risk-benefit ratio for orally administered psychostimulants is very low but ongoing monitoring for potential side-effects is still required (Zametkin & Ernst, 1999b). Prescription of drugs such as Ritalin may be an important part of an effective treatment package for ADHD. They are not the whole answer, however, and should not be the sole treatment (AACAP, 1997; DuPaul et al., 1998; Goldman et al., 1998; Swanson et al., 1998). Stimulant drugs do not induce lasting behavioural change nor do they address skill deficits in children with ADHD (Bergin & Garfield, 1994). As DuPaul et al. (1998) observe *"medications do not teach the child anything"* (p.542). They may, however, achieve an amelioration of symptoms that may allow for the effective use of psychosocial treatments.

2.72 Psychosocial Treatments

Psychosocial treatments for ADHD include education for the child and their family about the disorder, behaviour modification (including parent and social skills training, and contingency management), family therapy, cognitive-behavioural therapy (CBT) and individual psychotherapy (AACAP, 1997). Choice of intervention is optimally based on the individual requirements of the child in question. However, while individualised treatment is the preferred option in actual practice, most research does not use such an approach (Bergin & Garfield, 1994).

Behaviour modification, including parent training and school management techniques, is probably the most used psychosocial intervention (Barabasz & Barabasz, 1996), although precise rates of its use are difficult to gauge (Whalen & Henker, 1991). Clinicians report more use of behavioural modification than parents report receiving it. Basically, what the clinician intends as behaviour management instruction, parents may see as *"casual advice"* (Wolraich et al, 1990; p.100). Behavioural modification is an adaptable treatment option that can be focussed on a number of areas of concern. However, it does have some limitations, including the complexity of this approach and the difficulty of correct adherence to techniques; non-response by some children; and no generalisation once the programme ceases (Barabasz & Barabasz, 1996). It also may not generalise from one situation to another, such as from home to school (Barabasz & Barabasz, 1996; Whalen & Henker, 1991).

Cognitive-behavioural treatments for ADHD include self-instructional training, academic skills training, anger management, and attribution training (Hinshaw & Erhardt, 1991). There is little evidence of comprehensive efficacy of CBT techniques in the treatment of ADHD (Barabasz & Barabasz, 1996; Bergin & Garfield, 1994), although it may improve on-task, scholastic productivity, and peer relationships (Anastopolous & Barkley, 1992).

27

Family therapy may include an educational component regarding ADHD, the development of a structured home routine, and use of consistent consequences for behaviours (Searight et al., 1995). Family therapy may be particularly useful for adolescents with ADHD, and has been shown to produce significant reductions in conflict, anger, and negative communication between parents and child (Barkley, Guevremont, Anastopolous, & Fletcher, 1992). However, family therapy does not work in all cases and, like all other treatments for ADHD, should form only part of a comprehensive individualised treatment plan.

2.73 Recommended Treatment Protocols

The forthcoming recommended treatment protocol for children with ADHD in New Zealand is likely to follow international 'best practice' guidelines (P. Tuohy, Medsafe, personal communication, February 15, 2000). This incorporates utilising a multimodal, multidisciplinary approach, with simultaneous use of key interventions integrated in a comprehensive and individualised treatment plan (e.g. AACAP, 1997). Considerations in deciding treatment options include diagnosed sub-type of ADHD, severity of impairment, comorbid disorders, the views and resources of the child and family, and the availability of specialist and support services. There should be on-going monitoring of the child's progress, and regular review of their response to treatment.

Successful long-term treatment will optimally consider a combination of pharmacological, behavioural, and psychosocial interventions (Teeter, 1998). However, despite the general acceptance of such recommendations, little empirical evidence is available on the efficacy of such an approach (Swanson et al., 1993). A multisite, longitudinal study is currently being undertaken by the U.S.A. National Institute of Mental Health to examine efficacy of behavioural treatment vs. both drug therapy and combined treatment for ADHD (Arnold et al., 1997; Richters et al., 1995). Preliminary findings indicate some efficacy for both stimulants and behavioural management (S. Hinshaw, personal communication, January 1999).

2.74 Actual Treatment Practice

While computerised pharmacy data allows the tracking of prescription rates for stimulant medication, it is more difficult to know what treatment or combinations clinicians are using for individual clients. Few studies have examined the actual ADHD treatment practice of clinicians. Those that have are North American (Bennett & Sherman, 1983; Copeland et al., 1987; Sandoval et al., 1976; Wolraich et al., 1990; Zarin et al., 1998). Again, the only identified New Zealand research involved a survey of families of children with ADHD (Biddle, 1998).

In their early study, Sandoval et al. (1976) found that physicians were most likely to prescribe stimulant medication for ADHD, with 70% using Ritalin. Approximately two thirds recommended school consultation and half of the respondents referred the child for some form of psychotherapy or counselling. Thus, multiple treatment options appeared to be considered and recommended in actual practice.

Bennett & Sherman (1983), in their survey of paediatricians and GPs, found that a three-pronged approach incorporating stimulant medication, behavioural treatments, and dietary management was common. The inclusion of a dietary component was consistent with the popularity of the Feingold diet around that time. Over 90% of respondents routinely used stimulant medication in the treatment of hyperactivity. One quarter of clinicians had 20 or more children on stimulant drugs, six had 50 or more and four reported treating over 100 children with stimulants (to a maximum figure of 300). Younger clinicians in the study (i.e. qualified post-1960), regardless of discipline, reported larger case loads of hyperactive children, and higher use of stimulant medications, behavioural management, and liaison with schools than did older practitioners.

Copeland et al.'s (1987) survey of paediatricians also found that Ritalin was the most common treatment for ADHD used by practitioners. In all, 79% of respondents saw Ritalin as moderately to frequently important in the management of ADHD. This

was closely followed by behaviour modification, employed by 70% of clinicians. Only a minority of physicians (between 8% and 12%) recommended dietary management. An interesting comparison was made between physicians trained prior to 1971, and those trained after this date. Figures indicated that those trained earlier were more likely to use a drug treatment than behaviour therapy, while those trained after 1971 were slightly more likely to utilise behaviour modification than medication.

Wolraich et al. (1990) compared clinician and parents report of treatment use frequency. Nationwide, physicians reported most frequent use of Ritalin (used by 85% of paediatricians and 79% of GPs). Behaviour modification was reported as being utilised by 77% of paediatricians and 48% of GPs. However, while most parents (88%) agreed that stimulant treatment was prescribed for their children, fewer reported the use of behaviour modification in treatment plans (22%). Few other treatment options were reported, apart from some use of dietary management in a minority of cases.

A more recent study of psychiatrists' practice (Zarin et al., 1998) found high rates of medication use (98%). The majority of those with ADHD also received some form of psychotherapy (60%). A further 25% received psychiatric management (including education, monitoring, and modification of treatment plans). The higher rate of prescribing in this study may well be influenced by another finding of the study - that psychiatrists are more likely to see more severely impaired children than are primary care providers (Zarin et al., 1998).

In New Zealand, families have reported that Ritalin is the most widely used treatment for ADHD across all age groups from birth to 19 years (Biddle, 1998). However, for those children in the 6-10 year age group, use of behavioural modification was reported in 90% of cases compared to 83% receiving Ritalin. Other treatments given to a minority of children included homeopathic remedies and

counselling. Counselling was used more for families with older children (i.e. over 13).

It appears from these studies that Ritalin is consistently the initial treatment of choice for ADHD in the eyes of most medically trained clinicians, followed by behaviour modification. In New Zealand, behaviour modification may be used slightly more than Ritalin for children between the ages of 6 and 10. However, there does not seem to be widespread use of other treatment options such as CBT or family therapy.

Chapter 3: Confirmatory Bias in Diagnosis & Related Issues

"An important determinant of whether a child is diagnosed hyperactive is who is doing the diagnosing" (Ullman & Doherty, 1984; p.211).

3.0 Introduction

In any clinical diagnosis there are at least two parties – the client and the diagnosing clinician (Ullman & Doherty, 1984). The symptoms presented by the client are obviously important in the diagnostic procedure. Of equal importance, but possibly less obvious, is the assessment procedure and reasoning process of the clinician. Given the absence of a definitive standard for determining ADHD, diagnosis of the disorder relies ultimately on the judgement of the clinician. Diagnosis is determined not simply by the presence of certain behaviours, but also by the way the individual clinician weighs and combines presented information. Even among experts, there is considerable variability regarding the diagnosis of hyperactive behaviour (Ullman & Doherty, 1984). Furthermore, clinicians are often unaware of their own reasoning processes. For example, there may be a tendency to overestimate both the number of cues used in reaching a diagnosis and the weight given to cues (Ullman & Doherty, 1984). How a clinician weighs information, some of which may point to different conclusions, is of central importance in making any diagnosis.

Accurate diagnosis of ADHD is important to identify and manage the disorder. Diagnosis of any psychiatric disorder can be a complex process and is full of uncertainties (Schwartz, 1994). It is subject to the same problems and human error which are known to affect reasoning generally, one of which is bias of one sort or another (de Mesquita & Gilliam, 1994; Silverman, 1992). In both research and practice, a clinical decision may be considered biased if there is *"deviation from the normative, decision analytic, approach"* (Schwartz, 1994; p.46). Bias is theorised to

32

be more due to clinicians themselves rather than being due to any technical limitation of the diagnostic process (Guimon, 1989). Experience is no guarantee against bias, as it occurs in both novices and experts (Jordan, Harvey, & Weary, 1988; Strohmer, Shivy, & Chiodo, 1990; Tversky & Kahneman, 1974). There are many types of bias in clinical decision making (Arnoult & Anderson, 1988; Schwartz, 1994). One of these is confirmatory bias (de Mesquita & Gilliam, 1994; Haverkamp, 1993; Strohmer et al., 1990).

3.1 Confirmatory Bias

The phenomenon of confirmatory bias was identified nearly 40 years ago (Wason, 1960). Confirmatory (sometimes confirmation) bias is a broad term, which has come to cover a variety of associated hypothesis-testing and -evaluation concepts (Friedrich, 1993; Klayman & Ha, 1987; Koslowski & Maqueda, 1993). There is a persistent finding amongst studies that people tend to form hypotheses and test predictions by *"seeking information that is likely to confirm expectations or desired beliefs rather than by collecting potentially disconfirming evidence"* (Friedrich, 1993; p.298). Even when openly presented, disconfirmatory evidence is not always taken into account (Koslowski & Maqueda, 1993). Confirmatory bias is thought to have both biological and social foundations (see Robertson, 1995).

Confirmatory bias appears to be a natural human reasoning strategy (Evans, 1990; Silverman, 1992) reflecting a motivation to verify hypotheses rather then falsify them (Green, 1990). Thus, there may be some inherent human resistance to the scientific method that is the foundation of the scientist-practitioner model of psychology and medicine. This is based on the idea of disconfirming hypotheses and falsifying theories (Evans, 1990; Silverman, 1992). While adoption of a disconfirmatory strategy may assist in quicker and more accurate problem-solving (Silverman, 1992), it may be difficult to do in practice. Despite training in diagnostic reasoning, clinicians remain vulnerable to the use of heuristics, or *"cognitive short-cuts"* (Heath & Tindale, 1994; p.1). These include premature pattern recognition,

using 'rules of thumb', and making value judgements (Kenny, 1997; McDonald, 1996).

The term 'confirmatory bias' has been criticised as somewhat of a misnomer (Evans, 1990; Klayman & Ha, 1987). "Positivity bias" (Evans, 1990; p.63) or "positive test strategy" (Klayman & Ha, 1987; p.211) have been suggested as more accurate terms (Evans, 1990). Evans (1990) defines positivity bias as the tendency to direct attention to positive rather than negative data. Klayman & Ha (1987) view a positive test strategy as being the tendency to test those cases which might be expected to include the factor of interest rather than testing those thought to lack that factor. While acknowledging that there is not consensus over nomenclature, the present study will refer to the more commonly used term of confirmatory bias.

3.2 Confirmatory Bias in Diagnosis

In diagnosis, confirmatory bias results when the clinician seeks and attends only to information which confirms an initial hypothesis (de Mesquita & Gilliam, 1994). As a result, there is emphasis on positive findings confirming the working hypothesis rather than on negative findings, such as the absence of certain symptoms. The main concern in this form of confirmatory bias is that clinicians may fail to elicit information supporting an alternative hypothesis (Haverkamp, 1993). Such a bias would be expected to increase the rate of false positive diagnoses (Eli, 1996).

To be fair, it seems a common-sense observation that clinicians will tend to look for the presence, rather than the absence, of symptoms. In the context of actual practice, there is an expectation that clinicians will tend to observe pathology (Jordan et al., 1988). Both the clinician and the client might equally hold such expectations. People do not generally present to a clinician complaining of being well. However, seeing what symptoms are *not* there may be equally as important in making a diagnosis as seeing what evidence is present.

This tendency towards confirmatory bias appears to be influenced by a priori real-world beliefs (Evans, 1990; Evans & Pollard, 1990; Haverkamp, 1993; Strohmer et al., 1990). Preconceived notions may influence diagnosis by not only shaping perceptions but also impeding accurate data processing (Arkes, 1981). Preconceived beliefs may influence what factors are found to be convincing, or even override the data presented (Arkes, 1981). In simple terms, the reasoning here is that if clinicians have a belief that there is a high prevalence of a disorder (e.g. ADHD) then they are more likely to look for it. Confirmatory bias research suggests they will pay more attention to those symptoms fitting their hypothesis and give less attention to (or even ignore) disconfirmatory evidence. In short, the clinician 'finds' ADHD because they are looking for it.

Confirmatory bias is facilitated not only by the use of various heuristics but also by memory inaccuracies. Clinicians tend to remember information better if it fits a preconceived hypothesis rather than if it contradicts that hypothesis (Strohmer et al., 1990). Thus, confirmatory data is more likely to be remembered than disconfirmatory information (Arkes, 1981; Strohmer et al., 1990). Disconfirmatory symptoms have been found to not be remembered when presented (Arkes, 1981). Furthermore, confabulation may occur. Symptoms that were not presented in case information, but which fit a hypothesised diagnosis, may be inaccurately recalled as being present. Thus, reliance on memory only would be expected to exacerbate any confirmatory bias, with increased likelihood of incorrect symptom recall and subsequent inaccurate diagnosis. Symptoms may be more correctly recalled and diagnosis more accurate if there is direct perusal of written notes and information. However, while memory may contribute here, it appears confirmatory bias occurs independently of any memory component (Strohmer et al., 1990). Therefore, while access to written material may help to lessen confirmatory bias when making a diagnosis, it is not the whole answer.

Confirmatory bias may also affect the nature of the questions asked to determine differential diagnosis. In line with the use of heuristics, research shows there is higher likelihood that clinicians will ask hypothesis-consistent questions (Zuckerman, Knee, Hodgins, & Miyake, 1995). Valuable information, which could indicate an alternative diagnosis, might be missed. This situation is further confounded by the finding that respondents are also more likely to provide more 'yes' than 'no' answers to questions asked in an interview (Zuckerman et al., 1995). So a circular process is possible, due to the interplay between the clinician's hypothesis-consistent test strategy and the client's tendency to acquiesce. This may then lead to an increasing belief by the clinician in the accuracy of the hypothesis, as hypothesis consistent questions are asked and answered affirmatively. In such cases, the end result is that the diagnosis becomes a self-fulfilling prophecy (Friedlander & Phillips, 1984).

Confirmatory bias is of added importance when consideration is given to the finding that initial impressions are often made quickly (Dumont, 1993; Haverkamp, 1993; Jordan et al., 1988). Diagnosis is disproportionately affected by which material is presented first (Schwartz, 1994). More accurate diagnosis is likely if the information presented early in the assessment process is consistent with the correct diagnosis (Friedlander & Stockman, 1983). If information that is inconsistent with a correct diagnosis is presented first there is more likely to be resultant misdiagnosis, even though the same material may be presented in both cases. That is, it appears to be the order in which material is presented that is important here. Any confirmatory bias is likely to be strengthened if positive evidence for the preconceived hypothesis is presented early in the assessment procedure.

In line with the importance of initial information are findings that the impressions formed during the first three minutes of an interview may have a significant, and sometimes decisive, impact upon the final diagnosis (Sandifer, Hordern, & Green, 1970). Sandifer et al. (1970) found that the psychiatrists in their study observed one half of the total symptoms noted for a case within the first three minutes, with 43%

of clinicians forming their final diagnosis within this time. Additionally, 75% of participants adhered to their original diagnosis despite presentation of further data, illustrating the effect known as anchoring (Schwartz, 1994). Anchoring describes the tendency to resist changing an initial judgement, despite presentation of further conflicting information, alternate reasoning, or logical challenge (Dumont, 1993). Thus, anchoring effects tend to make it unlikely a preconceived hypothesis will be adjusted, even if disconfirmatory evidence is given and the diagnosis is wrong.

The formulation of multiple initial hypotheses is thought to help avoid confirmatory bias (de Mesquita & Gilliam, 1994; Garb, 1994). If the clinician bears more than one hypothesis in mind, it follows that assessment will not focus exclusively on one possibility and is more likely to elicit a broad range of information. It seems logical that disconfirmatory data may be considered if the clinician is trying to differentiate between several hypothesised diagnoses.

Another strategy which may assist the clinician to avoid bias in diagnosis is paying strict attention to diagnostic criteria (Garb, 1994). Determining whether the required number of criteria are met by assessing the number of positive symptoms present is a more objective diagnostic evaluation process than merely considering whether the person is 'typical' of someone with that disorder. However, determination of criteria may also be subject to confirmatory bias. As many symptoms are common to more than one disorder, there may be a tendency to see positive symptoms in terms of the preferred diagnosis. For example, distractibility is a feature of ADHD but is also a symptom of anxiety. It is important to review all required criteria and information, and to see the 'big picture' when making a diagnosis.

To help avoid bias in diagnosis, assessment should be comprehensive, multiple hypotheses should be considered, and more reliance should be put on notes and documentation rather than on clinicians' memory (Arkes, 1981; Garb, 1994). However, in practice clinicians may not make criterion-based diagnoses (Garb,

1994) and, as mentioned in the previous chapter, assessment practices may be less than comprehensive.

3.3 Confidence in Diagnostic Accuracy

Confidence about a diagnosis and the accuracy of that diagnosis are separate variables. Increased confidence does not mean the diagnosis is more accurate. In fact, there is disconcerting evidence that confidence and accuracy may be inversely correlated, with the highest confidence held by the least accurate diagnosticians (Arkes, 1981).

There is evidence that increasing the amount of available diagnostic information may lead to more revision of clinicians' belief regarding the truth of their hypothesis (Zuckerman et al., 1995). While presentation of further evidence may not alter the diagnosis held, it does seem to increase the confidence clinicians have in the accuracy of that diagnosis (Arkes, 1981; Schwartz, 1994). This effect occurs even when the added evidence is merely restating evidence that is already available (Schwartz, 1994).

However, while it may be that 'bigger is better' in the eyes of clinicians when it comes to diagnostic information (Schwartz, 1994), large amounts of data may not actually be beneficial. Studies show that clinicians do not use all available information when making a diagnosis (Sandifer et al., 1970; Schwartz, 1994; Ullman & Doherty, 1984). Furthermore, as discussed, clinicians may not be aware of, or able to accurately describe, their own thought processes in reaching a diagnosis (Ullman & Doherty, 1984). Thus, while clinicians may be unaware of making an inaccurate diagnosis, or of how that decision was made, they may be quite confident regarding the accuracy of that diagnosis (Schwartz, 1994).

Practitioners' resistance to the suggestion that they could make errors in practice, including diagnosis, may affect confidence in diagnostic accuracy. Confidence may

be higher than warranted if clinicians do not admit they might be wrong. Denial may be due to a number of factors, such as training which emphasises error-free practice, or negative sequelae (both actual and emotional) if mistakes are admitted (Leape, 1994).

Research showing bias in diagnosticians cannot be overgeneralised: evidence suggests that, while it exists, it is not prevalent amongst all clinicians (Holt, 1988). The fact is that confirmatory bias in hypothesis testing is not universally present (e.g. Haverkamp, 1993; Koslowski & Maqueda, 1993; Strohmer & Chiodo, 1984; Trope & Bassok, 1982). Even when bias is present in the diagnostic process, it cannot be assumed it leads to error (Friedrich, 1993). Bias can be equally directed towards a correct diagnosis as to an incorrect one.

In summary, diagnosis involves a complex reasoning process and may be affected by many factors, one of which is confirmatory bias. Clinicians will optimally strive for error-free practice. However, clinicians are human and thus mistakes in clinical practice are inevitable (Leape, 1994). In the interest of client safety, there must be continued awareness by responsible clinicians of the potential for diagnostic error. This includes error due to bias. This awareness should then be followed by consideration of possible corrective processes (Redelmeier & Safir, 1995). As Turk & Salovey (1988; p.251) remark, *"ignorance may be bliss for the clinician but what about the client?"*

Chapter 4: The Present Study

4.0 Overview

ADHD is a heterogeneous syndrome of childhood, with primary symptoms of inattention, hyperactivity and impulsivity. In recent years, the numbers of children being diagnosed and treated for this disorder has burgeoned considerably, with New Zealand following international trends. While there may be many factors associated with this increase, one of particular concern is a possible increase in the numbers of false positive diagnoses.

Diagnoses may be affected by many variables, one of which is confirmatory bias. As discussed, confirmatory bias occurs when the clinician pays more attention to the presence of positive symptoms which confirm an initial hypothesis and give less attention to (or disregard) disconfirmatory factors such as the absence of symptoms.

It is possible that the increased rate in the diagnosis of ADHD may be due to a confirmatory bias by some clinicians. It is important for research to assess the accuracy of anecdotal claims of bias in diagnosis, and to investigate how prevalent and serious any biases may be (Elstein, 1988). The present study sought to address this question as it applies to ADHD, using a quasi-experimental design. Hypothetical case studies, with ADHD symptoms presented as either positive or negative symptoms, were used to investigate whether there is evidence of confirmatory bias in diagnosis by New Zealand clinicians. As confirmatory bias may be influenced by a priori beliefs, clinicians were asked to give their opinion of the real-world prevalence of ADHD. This was to determine whether beliefs were related to paying greater attention to positive symptoms of the disorder, disregarding instances where symptoms were negative, or both.

In addition, this nationwide random sample of clinicians was surveyed to determine their actual diagnostic protocols and procedures used for assessing ADHD in

children who present at their practices. Treatment practice was also assessed. There is currently a paucity of such data available regarding actual clinical practice in this country. Numbers of children seen for assessment of ADHD and the actual numbers diagnosed and treated were gathered, to look at patterns of diagnostic prevalence across clinicians. Additional information was also gathered to determine whether confirmatory bias may be a function of diagnostic practice and other factors (e.g. geography, training, years of experience etc.).

4.1 The Research Questions

The following hypotheses were proposed:

1) That, in hypothetical case studies, there would be evidence of confirmatory bias in the diagnosis of ADHD by clinicians. For the purposes of the present study, confirmatory bias was defined as indication by clinicians that only positive symptoms were taken into account (i.e. those who did not indicate taking negative symptoms into account). Clinicians who gave no indication of what case study information led to their diagnostic decision were excluded from analyses on confirmatory bias.

2) That real-world belief of the prevalence of ADHD would be positively associated with confirmatory bias.

3) That presentation of increasing numbers of positive ADHD symptoms would yield increased rates of ADHD diagnoses.

4) That consideration of disconfirmatory data (i.e. negative symptoms) would result in more accurate diagnosis.

41

Additional analyses examined the following questions, but due to the exploratory nature of the study no actual hypotheses were held.

a) What is occurring in actual practice regarding the diagnosis and treatment of ADHD, especially as relating to confirmatory bias?

b) What factors predict confirmatory bias in diagnosis? (e.g. professional affiliation; specialisation/expertise; level of education regarding ADHD; source of educational material read; professional experience; assessment practices; geographic location, age, ethnicity, or gender of the clinician; size of practice; diagnostic classification system followed, e.g. DSM, ICD).

Chapter 5: Methodology

5.0 Ethics Consent

Prior to beginning the present study, consent was sought and obtained from the Massey University Human Ethics Committee.

5.1 Design of the Study & Participants

A mail survey was chosen as the optimal design method for the study as it allowed a wide geographic distribution on a limited budget (Leavitt, 1991; Mangione, 1995). Mail surveys have a number of potential limitations such as response bias and possible survey design error (Dillman, 1978; Mangione, 1995). However, no other method of gaining information from clinicians nationwide (e.g. face-to-face or telephone interviews) was practical due to budgetary limitations and time constraints for both the participants and the researcher. Other perceived advantages of a mail survey over other data collection methods included no interviewer effects, giving participants ample time to consider the case study information, and greater assurance of confidentiality (Leavitt, 1991).

A total of 600 clinicians currently registered to practice in the New Zealand community were randomly selected to receive the case study/survey material. Research participation was voluntary and no remuneration was provided.

5.2 Sample Selection

Clinicians were selected from groups considered most likely to be actively involved in assessing, diagnosing, and treating children for ADHD. In medical practices, this includes GPs, paediatricians, and psychiatrists (Sandoval et al., 1976). While neurologists may be involved in the assessment of ADHD in the U.S.A. (Sandoval et

43

al., 1976), this is not usual in New Zealand. New Zealand medical workforce figures do not include neurologists as a listed vocational group (MCNewZ, 1998). Therefore, neurologists were not included as part of the survey population. As an added dimension, psychologists, particularly clinical psychologists, were also targeted as a group which could be expected to be involved in the assessment and treatment of children displaying hyperactive symptoms.

A cluster sampling procedure was used (Lee, Forthofer, & Lorimer, 1989). One hundred and fifty clinicians from each discipline (i.e. Paediatricians, Psychiatrists, GPs, and Psychologists) were randomly selected. All respondents were asked to identify precisely their professional affiliation.

5.21 Paediatricians

For the purposes of the present study, paediatricians were defined as those practitioners specified as paediatricians in the Medical Council (MC) listings (i.e. only those given a 'PAEDS' designation). Clinicians whose address indicated they may work in paediatric settings or departments were not included unless they received the 'PAEDS' designation. MC listings as at 12th March 1999 identified 164 paediatricians currently registered to practice in New Zealand, of which 150 were randomly selected to receive the survey. The total sample figure is somewhat short of the figure of the 230 noted in the 1997 workforce survey (MCNewZ, 1998), with the difference due to the omission in the MC listings of temporary registrations for foreign doctors.

5.22 Psychiatrists

Psychiatrists were defined as those clinicians specified as psychiatrists in the MC listings (i.e. receiving a "PSYCH' designation). Practitioners with addresses indicating they worked in mental health or psychiatric settings were not included unless they received the 'PSYCH' designation. Two hundred and sixty-nine

44

psychiatrists were listed. MC figures as at 12th March 1999 indicate that there are 36 specialists in the area of child and adolescent psychiatry. However, only two were identifiable from listing information, with registration under both paediatric and psychiatrist groupings. These two clinicians were placed in the paediatrician sample and so were deleted from the psychiatrist group. Random sampling chose the 150 psychiatrists included in the survey delivery from the 267 psychiatrists listed.

5.23 General Practitioners

A total of 150 GPs were randomly selected to receive the survey. MC figures (as at 12th March, 1998) showed 3007 GP's in New Zealand. Of these, 1560 were members of the College of General Practitioners and specified with a 'GENPRAC' designation on MC listings. Therefore, half of the participants (75) were randomly selected from those designated as GP's on the MC list.

The second group of 75 GPs was randomly selected from the general registration listings. From the list of 4393, 324 were eliminated from the sampling list as information given indicated these clinicians worked in settings such as hospitals, research, universities, industry, and other specialist or adult services. Random sampling was done from the remaining 4069. Selections were cross-referenced to telephone directory listings to determine, to the best extent possible, that the clinician was a currently practising GP. Selection continued in random sequence until 75 clinicians, identified by telephone listings as being either GPs or non-specialists, were chosen.

5.24 Psychologists

A total of 150 psychologists were selected to receive the survey. The publicly available list of practising psychologists does not identify areas of speciality, and thus it was not possible to identify precisely the whole population of clinical psychologists in New Zealand and randomly select a sample. In order to target

clinical psychologists, a decision was made to select all that could be readily identified as such. One hundred and nineteen clinical psychologists were selected from the 124 practitioners included on the New Zealand College of Clinical Psychologists (NZCCP) "Private Practitioners" list. This list gives contact details of those NZCCP members (who may in actuality work in many settings, such as the public sector) who have agreed to release their name for participation in research. Five practitioners on the NZCCP list were excluded, two because of their requested participation in the pilot study and three as an overseas contact address was given. A further 26 clinical psychologists were identified by nationwide business telephone listings and included in the study. The remaining four psychologists were randomly selected from current registration listings held by The Psychologists Board. As the exact designation of all the psychologists surveyed was not known, the questionnaire included specific professional affiliation information to identify precisely the qualifications of respondents.

5.25 Redirection of Undelivered Questionnaires

Of the 600 survey forms initially sent out, 17 were returned undelivered in time to be redirected (addressed to 10 psychologists, 5 psychiatrists and 2 GPs). A further 10 registered psychologists were randomly selected from the general registration list to receive the returned questionnaires, with case studies being randomly assigned. Five psychiatrists and two GPs were randomly selected from Medical Council Listings and sent questionnaires.

5.3 Procedure

A total of 600 surveys were mailed to selected clinicians. Following advice from a medical consultant, the survey was sent in mid-Spring (mid-October). Mailing during winter was avoided. This attempted to reduce non-response by medical practitioners (particularly GPs) due to increased workloads during winter.

Materials included in the first mailing were an introductory cover letter, a survey regarding diagnostic and treatment protocols for ADHD, and a case study with a related questionnaire (see Appendices A-C). Also included were a reply-paid envelope for survey return and an identification form for the clinician to give their name and address if they wished to receive a summary of results at the end of the research. The participants could return this form separately if wished or not complete the identification details if they preferred to reply anonymously.

Two weeks after the initial mailing, a reminder letter requesting completion and return of the questionnaire was sent to those participants who had not returned a completed identification form. This was indicated by literature sources as being within the optimum time period between initial mailing and reminders (Dillman, 1978; Mangione, 1995). Acknowledgement and thanks were extended to those who had returned the questionnaire anonymously. This letter is presented in Appendix D.

5.4 Information Sheet

An information sheet, presented in the format of a cover letter, introduced the study generally and asked practitioners' to complete and return the enclosed survey (see Appendix C).

The introductory letter contained no mention of ADHD or confirmatory bias due to concerns regarding the possibility of inducing a priming effect among participants. Priming occurs when the presentation of a stimulus affects subsequent behaviour (Catania, 1992). Mention of ADHD in the cover letter could have incurred bias. Although there is an admitted inherent artificiality in any case study situation, it was important to attempt, as accurately as possible, to assess the clinician's approach to an unknown case, as might occur in the presentation of a referral letter regarding a real client in practice. Discussion of confirmatory bias may have prejudiced results by inducing change in a clinician's approach to the case study and the subsequent diagnosis. In order to reduce the confound of a priming effect, clinicians were

informed that the purpose of the research was to investigate diagnostic protocols in the current practice of New Zealand clinicians regarding childhood mental health.

Nevertheless, confounds of bias or priming were unable to be completely eliminated. Self-administered surveys allow participants to view all questions before answering (Mangione, 1995). It was, therefore, not possible to completely ensure respondents did not read ahead and become aware that the final part of the survey centred on ADHD.

Participants were informed of their right to leave any question unanswered should they wish to do so. The letter also stated that answering and returning the case study/survey material would be taken as the respondent giving their informed consent to take part in the study.

As one disadvantage of mail surveys is non-response, it was important to utilise various strategies in the letter design shown to help increase response rate (Dillman, 1978; Erdos, 1983; Mangione, 1995). Consultation with research professionals and pilot study participants assisted in making necessary revisions. The letter was limited to one page, and presented on University letterhead. The survey was described as a 'nationwide' study, and the importance of participants' replies in giving a 'complete picture' stated. Information details were given if the participants wished to contact either the researcher or the supervisor of the project with any concerns regarding this study. Return procedures were clarified, and freepost reply envelopes included. Letters were not personally addressed, as this has been shown to be of doubtful value in increasing response rate and may be detrimental by implying less anonymity for respondents (Erdos, 1983; Mangione, 1995). Reminder letters were also used.

5.5 The Research Questionnaire

Due to the nature of the study, an original survey was used. Therefore no researched test-retest reliability or validity information was available. However, the survey was formulated systematically, with the design undergoing numerous revisions following consultations with various health and educational specialists as well as referral to the literature.

In line with recommendations for improved survey quality (Mangione, 1995), questions were kept short, specific, and worded in non-technical jargon. Attempt was made to ensure no unnecessary questions were asked, and that all questions were relevant to the topic, ensuring face validity of the questionnaire. Face validity was further checked by consultation with a medical practitioner. In order to assist response rates, the survey was designed to begin with easy-to-answer information on demographics, then introduce the case study and ask for a hypothesised diagnosis before introducing the topic of ADHD and ending with the collection of information on diagnostic protocols and procedures specific to ADHD.

Once the questionnaire had reached a draft form, a small pilot study was run with a panel of practising clinicians and clinical psychology students. Feedback on format, layout and design was received, with final revisions made on the basis of information given.

5.51 Case Studies

Participants were presented with one of three fictitious case studies, identified in the questionnaire only with pseudonyms. For ease of understanding, these case studies will be referred to here by the number of positive symptoms presented in each (i.e. Case 3, 'Sam Daniels'; Case 5, 'Sam James'; Case 7, 'Sam Philips').

The 150 clinicians in each group were assigned in randomised blocks to receive one of the three case studies. This ensured that 50 clinicians from each discipline received Case 3, 50 received Case 5, and 50 received Case 7. Two hundred of each of the three case studies were respectively assigned to clinicians from the four disciplines. This gives a 3 x 4 design, as illustrated in Table 1.

Table 1: Number of participants in each of four clinician groups randomly assigned to receive one of three case studies.

Clinician group	Case 3	Case 5	Case 7	Total
General Practitioners	50	50	50	150
Paediatricians	50	50	50	150
Psychiatrists	50	50	50	150
Clinical Psychologists	50	50	50	150
TOTAL	200	200	200	**600**

The three case studies presented the case of 'Sam', a 7 year-old boy. Each of the three case studies was identified in the survey by use of a different surname. All details regarding Sam were fictitious, with no basis in any actual case. Case studies were constructed, then evaluated by a senior clinical psychologist and by a panel of post-graduate clinical psychology students to verify the variation of positive and negative symptomatology presented in each case. Further consultation took place with pilot study participants regarding details of the case study. The three case studies, each approximately one page in length, are presented in entirety in Appendix B.

The same 10 diagnostic symptoms from criterion A of the DSM-IV diagnostic criteria for ADHD were included in each narrative, with positivity or negativity of symptoms varying as a function of the case study. In Case Study 3 ('Sam Daniels'), three positive symptoms for the diagnosis of ADHD were presented and seven negative symptoms. In Case Study 5 ('Sam James'), clinicians were presented with an additional two positive symptoms, giving five positive symptoms and five negative symptoms for the diagnosis of ADHD. Case Study 7 ('Sam Philips')

presented a further two positive symptoms, giving seven positive criteria and three negative. The information presented in each study, whether as positive or negative factors, is shown in Table 2.

Table 2: Positive (p) and negative (n) diagnostic information presented in three case studies.

DSM-IV DIAGNOSTIC CRITERIA	CASE 3 (Not ADHD)	CASE 5 (Nearly ADHD)	CASE 7 (ADHD)
(1d) Doesn't finish homework	n	n	n
(1h) Easily distracted	p	p	p
(2a) Fidgetiness	p	p	p
(2b) Leaves seat in class	n	n	p
(2c) Climbs excessively	n	n	p
(2d) Difficulty playing quietly	n	p	p
(2e) "On the go"	p	p	p
(2f) Talks excessively	n	n	n
(2h) Has difficulty waiting turn	n	p	p
(2i) Interrupts others	n	n	n

Case study background information was held constant across the three vignettes. Symptoms were explicitly noted as being present before the age of 7 years, and impairment occurred in two settings, home and school. On advice received from consultation with an educational specialist, significant impairment in academic functioning was indicated by a reading level approximately 18 months behind chronological age. Additionally, in order to meet diagnostic criteria, symptoms must not be better accounted for by a pervasive developmental disorder or another mental disorder. To meet this criterion, a specialist in child clinical psychology was consulted to ensure symptoms were not more indicative of another disorder. Running a pilot study further checked information in the case studies. Thus, the background data met the conditions required for criteria B, C, D, and E of DSM-IV (APA, 1994), allowing for the possibility of an initial diagnosis of ADHD.

The cultural identity of 'Sam' was deliberately not mentioned in the case study for two main reasons. The first was to avoid overlap with a concomitant study planned

51

by another member of the research team specifically addressing cultural aspects in the diagnosis of ADHD. A second reason was the decision to maintain a focus on confirmatory bias as it applies to diagnostic symptoms only. While culture is an important variable in client assessment (APA, 1994), introducing the confound of a specific culture was considered to be a further step following the present exploratory investigation of confirmatory bias. However, clinicians were free to indicate that cultural information was not given and state if this would be required for diagnosis.

DSM-IV (APA, 1994) requires the presence of six or more symptoms from either of two domains, inattention and hyperactivity/impulsivity. Using these criteria, Cases 3 ('Sam Daniels') and 5 ('Sam James') would not qualify for a diagnosis of ADHD (a negative diagnosis). On paper, Case 7 ('Sam Philips') would meet conditions required for a diagnosis of ADHD, predominantly hyperactive-impulsive type (a positive diagnosis). In reality, of course, most clinicians would surely not base diagnosis solely on written data, such as a referral letter, and respondents were free to indicate this.

5.52 Hypothesised Diagnosis

Following presentation of the case study information, clinicians were asked to give their hypothesised diagnosis regarding the case. A false positive diagnosis would occur when a diagnosis of ADHD was given in Cases 3 & 5, where the positive symptoms were insufficient to meet the six criteria required for clinical diagnosis. The absence of a positive ADHD diagnosis for Case 7 would be a false negative diagnosis. Clinicians could indicate tentative diagnostic decisions.

Clinicians were requested to rate their confidence in diagnostic accuracy on a Likert scale from 1 (*not confident*) to 5 (*extremely confident*), and to state how they arrived at their conclusion (i.e. what evidence was taken into account in arriving at the diagnosis).

Reasons for diagnosis were requested in order to investigate which factors clinicians attended to in the decision-making process. Highlighting or underlining the relevant parts of the case study could be used to indicate the diagnostic evidence taken into account. Space was also allowed for any comments that they might wish to make, such as not having enough information for diagnosis. The issue of confirmatory bias was investigated by noting whether both confirmatory and disconfirmatory evidence were presented as part of the reasoning process. As stated, the presence of confirmatory bias was demonstrated when only positive symptoms were noted, with negative symptoms ignored.

Comments were invited in an open manner (i.e. 'Please give any other comments you wish to make …') to attempt to minimise influence on participants by the asking of questions. Clinicians were free to make any comment on the procedure they wished. It was hoped that clinicians taking advantage of this opportunity would elucidate the diagnostic decision making process further.

5.53 Survey Data

A 17-item, five page survey was included alongside the presentation of the case study. The survey is presented in Appendix A. Survey questions were designed to assess demographic information, real-world belief in prevalence and to ascertain current diagnostic and treatment protocols in use by responding clinicians with respect to ADHD.

Participants were asked to complete the enclosed survey form in the order presented. This was necessary to the research as it was desirable that clinicians make a diagnosis for the case study with no bias induced by mention of any specific disorder. No mention of ADHD was made until the final section of the survey form.

53

Demographic information covered the professional affiliation, age and ethnicity of respondents, number of years in practice, geographic area of practice, the estimated size of their practice (total client numbers), and estimated numbers of child clients.

Information specific to ADHD assessed estimated numbers of children referred to their practice within the last 12 months for an opinion regarding a possible diagnosis of ADHD, estimated numbers of children in their practice diagnosed with ADHD over the past 12 months, estimated numbers of children in their practice receiving any type of treatment for ADHD over the past year, their individual current diagnostic protocols regarding the disorder, their preferred options for treatment, their level of knowledge or specialisation regarding ADHD, and their real-world belief of the prevalence of ADHD in New Zealand.

Professional affiliation was assessed by means of a check-list of the clinical professions covered by the research. In order to ascertain as accurately as possible any effects that may occur in the present study as a result of professional affiliation, clinicians were given a number of sub-options beyond the four general populations targeted. General practitioners were asked to indicate if the Medical Council specifically listed them as a GP. Specialist child & adolescent psychiatrists were accorded a check box separately from other specialist and general psychiatrists, as they formed a sub-group of psychiatrists which could be expected to have a more extensive knowledge of ADHD and a subsequently higher case load of clients with the disorder. Psychologists were asked to check whether they were a clinical psychologist. They were also requested to indicate their level of qualification. Clinical psychologists were further asked to indicate if they were on the NZCCP "Private Practitioners" list, with agreement to release their name for research purposes. A separate category was given for specialist child psychologists, who could also be expected to be expert in the area of ADHD.

Number of years in practice since completing their terminal degree, whether part-time or full-time, was ascertained in order to assist in determining an experience

level. Also, this assisted in giving an overall view of whether there were any noticeable differences in the actual practice of clinicians with many years' experience and those more recently graduated, as found in previous U.S. studies (Bennett & Sherman, 1983; Copeland et al., 1987).

Clinicians were also asked to indicate their geographic area of practice. This was to investigate suggested geographical differences in diagnostic and treatment rates (Evening Standard, July 16, 1997). If ADHD is being accurately diagnosed, it was expected that diagnostic rates for the disorder (per client population) would be fairly standard across the country.

The total number of clients in the clinician's current practice, (or an approximation) was requested. Further detail was sought on how many of these clients were children aged up to 12 years inclusive. Twelve was selected here as the cut-off age for childhood, given the social acceptance of approximately 13 as the beginning of the 'teenage' years of adolescence (Papalia & Olds, 1992). Data here provided a benchmark figure against which to measure later data specific to ADHD in order to ascertain an approximate percentage of children in the clinician's current practice diagnosed or treated for the disorder, or both.

Specific questions regarding ADHD began with clarification of the diagnostic criteria followed by the practitioner in diagnosing ADHD. Participants could indicate whether they followed the DSM-IV format, the ICD-10 format, another diagnostic protocol, or any combination of these. Respondents could also indicate they did not diagnose ADHD in their practice, did not work with children, or both.

An assessment of the real-world belief of the clinician regarding the prevalence of the disorder was made by asking participants to give a prevalence percentage figure between 0 and 100, where 0% indicates they believe no children in New Zealand have ADHD and 100% indicates they believe all children in New Zealand have ADHD. It was emphasised that their personal opinion was requested, regardless of

any figures they may have read or be aware of. For estimates outside the 2.8% to 6.7% range of prevalence recorded in the literature (Anderson et al., 1987; Fergusson et al., 1993; McGee et al., 1990) it was hypothesised that diagnoses may be affected.

Participants were asked to assess their level of expertise or specialisation regarding ADHD according to a 5-point Likert scale. This was followed by a checklist of options indicating their source(s) of knowledge or education regarding ADHD. Options included literature linked to the various disciplines represented by the target population (i.e. paediatric, psychiatric, psychological, and General Practice literature). Also included were options linked to training (i.e. specialist & academic training, residency/internship). Additionally, the more publicly available options of parent education literature and media articles were included. Clinicians were asked to specify any other sources of knowledge not covered by the list.

The number of children (aged between 3 and 12 years inclusive) in the practice who had been referred within the past 12 months for an opinion regarding a possible diagnosis of ADHD was assessed. A further question inquired as to how many children in their practice had received a diagnosis of ADHD during the past year, with request for the clinician's best estimates if specific figures were not readily available. This figure, when compared to the total number of children covered by the practice, gave the approximate proportion of children currently diagnosed with ADHD. Collation of this information gave a broad indication of the prevalence of ADHD diagnoses in the practices of the clinicians responding to the survey.

Clinicians were further asked to outline their assessment protocols when considering a diagnosis of ADHD. The reply in total gave an overview of diagnostic decision-making processes involved in assessing ADHD. As an important aim of the survey was to attempt an accurate assessment of current protocols used for the diagnosis of ADHD in New Zealand, the question was phrased in broad terms in order to avoid, as much as possible, leading the response, such as might more readily occur with checklist options. Participants were also asked to prioritise the steps they would take

in ascertaining an ADHD diagnosis in order to further assess the decision-making process.

Questioning regarding the treatment of ADHD followed similar lines to those regarding assessment and diagnosis.

The number of children in their practice currently receiving treatment for ADHD was requested. This data gave a broad view of overall rates and proportions regarding treatment, taken in relation to total numbers of child clients and those seen for an opinion and those diagnosed with ADHD.

The survey also requested participants to list their recommended treatment options for a child with ADHD. Clinicians were asked to give an order of preference for multiple treatment options, with 1 being the most preferred. This was to investigate the range of treatments for ADHD being recommended for children in New Zealand, and to assess what treatments were favoured by clinicians.

5.6 Data Analysis

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS 9.0 for Windows) computer package. Descriptive statistics, chi-square statistics, correlations, and t-tests were used in the analysis of the results. A conventional alpha of .05 was selected as the level of significance for all statistical tests. All analyses were less missing data and included the following: -

(1) Descriptive statistics summarising demographic information and client load figures were computed. This included frequencies, percentages, means, standard deviations, medians, modes, sums, and ranges.

(2) For nominal data, Chi-square analyses were conducted to investigate relationships between frequency based variables. The Chi-square Test for

Goodness of Fit was used to examine single categorical variables. To analyse relationships between two categorical variables, the Chi-square Test for Independence or Relatedness was used.

(3) For correlations between interval data, Pearson's r was used to determine the strength and direction of association between variables.

(4) Independent Sample t-tests for Equality of Means were used to test the significance of differences between the variable of confirmatory bias and interval data (i.e. years of experience; age; personal opinion of ADHD prevalence; total number of child clients; total numbers of children seen for an opinion, diagnosed, and treated; self-assessed level of knowledge regarding ADHD).

Chapter 6: Results

6.0 Return Rates

Of the 600 survey forms sent out, 21 were returned undelivered. As previously mentioned, 17 of these were returned in time to be redirected (to 10 psychologists, 5 psychiatrists and 2 GP's), leaving a non-delivery rate of 4/600 (0.66%). Thus, a total of 596 surveys were delivered.

One hundred and eighty forms were returned in time for analysis, giving a total return rate of 30.2% (n=180/596). Forty-two (7%) of those disseminated were unanswered or returned with demographic data only. Various comments were received for non-participation, with the primary reasons being retirement from practice, clinicians not working with children, and lack of time. Thus, 138 clinicians responded with useable data. However, not all respondents completed every question in the survey form. All analyses were less missing data.

6.1 Demographic Data

Survey response by professional affiliation is presented in Figure 1. As seen, the largest group of respondents was paediatricians (n=57, 41.3%). A total of 30 (21.8%) psychologists replied. This was made up of 11 child/adolescent specialist clinical psychologists (8%), 16 non-specialist clinical psychologists (11.6%) and 3 registered psychologists (2.2%). Twenty-five respondents were psychiatrists (18.1%), made up of specialist child psychiatrists (n=7, 5.1%) and those working in general or other specialist areas (n=18, 13%). Twenty-five GPs replied (18.1%). There was one mixed professional affiliation listed (0.7%). This respondent was both a paediatrician and child psychiatrist.
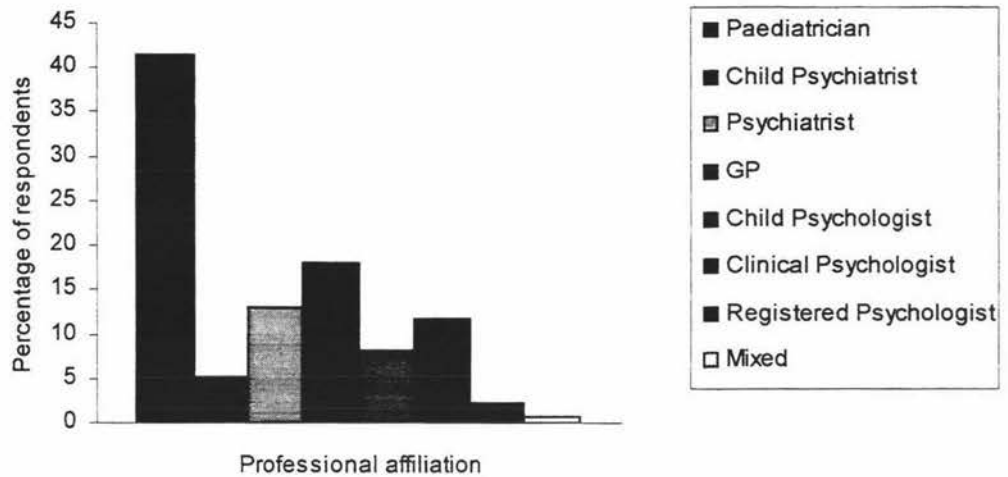
Figure 1: Professional affiliation of survey respondents

The time in practice since respondents gained their indicated professional qualification ranged from 2 years (*n*=5, 3.6%) to 45 years (*n*=2, 1.4%). The mean was 15.9 years (*SD*= 10.14) and the median was 13 years. The mode was 10 years (*n*=10, 7.2%).

A nationwide spread of responses was received, covering all regions of the country from Northland to Southland. The majority of respondents (*n*=176/131, 58.0%) came from the five main centres, Auckland (*n*=36, 27.5%), Hamilton (*n*=6, 4.6%), Wellington (*n*=13, 9.9%), Christchurch (*n*=13, 9.9%) and Dunedin (*n*=8, 6.1%). In total, these clinicians were classified as urban (*n*=79, 60.3%) leaving a further 52 clinicians (39.7%) from other centres who were classified for analyses as rural.

Of the 137 clinicians who answered the survey question regarding their gender, 84 were male (61.3%) and 53 were female (38.7%).

One hundred and thirty-five clinicians indicated their age on the survey form. Age ranged from 27 years (n=1, 0.7%) to 76 years (n=1, 0.7%). The mean age of respondents was 46.84 years (SD= 9.13), with a median figure of 45 years. The mode was also 45 years (n=8, 5.9%).

The majority of respondents (n=118, 85.5%), identified their ethnicity/cultural background as New Zealand Pakeha. Five respondents (3.6%) gave their ethnicity as Asian. Three (2.2%) indicated they were New Zealand Maori. Small minorities of respondents gave various other ethnicities, including European (n=3, 2.2%), Indian (n=3, 2.2%), Scottish (n=2, 1.4%), South African European (n=2, 1.4%), and African (n=2, 1.4%). One reply (0.7%) was recorded for each of: South African Indian, Australian, Irish, Sri Lankan, Manx, and from the United Kingdom. There were no respondents who identified themselves of Pacific Island ethnicity.

6.2 Client Numbers

For all questions regarding client numbers, the majority of responses were figures estimated by participants (between 60.0% and 90.6% of valid replies for the five questions involved). All figures referred to client numbers over the previous 12 months. The mode for all questions relating to child clients was 0. Figures were skewed by the small number of clinicians that indicated large numbers of children seen, diagnosed, and treated for ADHD.

In total, 77,131 child clients were seen by 133 clinicians, giving a mean of 579.9 (SD=757.86).

Five outliers (3.6%) saw a total of 1075 children for an opinion regarding ADHD (M=215.0, SD=171.026). The remainder of respondents (n=132) saw a total of 1470 children for an opinion. The mean number of children seen by these respondents was 11.1 (SD=17.48).

61

Three practitioners (2.2%) diagnosed ADHD in a sum total of 690 children. This gives a mean of 230.0 (SD=153.948). The remaining 132 clinicians diagnosed ADHD in a sum total of 884 children, giving a mean of 6.7 (SD=13.0).

Three clinicians (2.3%) treated a total of 900 children (M=300.0, SD=173.21). The remaining 130 clinicians treated a total of 1327 children, giving a mean of 10.2 (SD=16.86).

In all, 2.5% of child clients (n=1574/77,131) received a diagnosis of ADHD within the past year. Of those referred for an opinion, 61.8% (n=1574/2545) received a positive diagnosis.

6.3 Diagnostic Criteria

The majority of clinicians (n=80/134, 59.7%) reported use of DSM criteria to diagnose ADHD. Few clinicians (n=9, 6.7%) used ICD criteria.

DSM was used by all child psychiatrists (n=7), and the sole paediatrician/child psychiatrist. DSM was also used by the majority of paediatricians (n=43, 78.2%), child psychologists (n=7, 70%), and clinical psychologists (n=10, 66.7%). Less than half of other psychiatrists (n=8/18, 44.4%) reported use of DSM. GPs reported even less use (n=4/25, 16%). No registered psychologists in the survey (n=3) used DSM.

6.4 Level of Knowledge Regarding ADHD

The self-assessed level of knowledge of clinicians ranged from 1, *no knowledge* (n=1, 0.7%), to 5, *expert knowledge* (n=13, 9.5%). The mean level of knowledge reported was 3.4 (SD=0.89), with a mode of 3 (n=50, 36.5%).

There was a significant positive correlation between self-reported level of knowledge and the number of items endorsed as sources of ADHD-related information (r=0.629, p<.001). That is, clinicians that endorsed accessing more sources of relevant literature rated themselves as having higher levels of knowledge.

Appendix E shows the percentages of all clinicians that gained knowledge from various sources. Generally, clinicians tended to read literature from their own discipline.

6.5 Case Studies

As discussed earlier, case studies are referred to by the number of positive (confirmatory) symptoms presented.

Forty-two respondents (30.4%) received Case Study 3 ('Sam Daniels', not ADHD); 43 (31.2%), Case Study 5 ('Sam James', nearly ADHD); and 53 (38.4%), Case Study 7 ('Sam Philips', ADHD). Table 3 gives the percentages of each professional discipline that received each of the case studies.

Table 3: The percentage of each professional group receiving one of three case studies.

Professional Affiliation	Case 3 (not ADHD)	Case 5 (nearly ADHD)	Case 7 (ADHD)
Paediatrician (n=57)	31.6	33.3	35.1
Child Psychiatrist (n=7)	28.6	14.3	57.1
Psychiatrist (n=18)	33.3	44.4	22.2
General Practitioner (n=25)	16.0	32.0	52.0
Child Psychologist (n=11)	27.3	27.3	45.5
Clinical Psychologist (n=16)	43.8	18.8	37.5
Registered Psychologist (n=3)	33.3	33.3	33.3
Paed/Child Psychiatrist (n=1)	100.0	-	-

Note. - = no applicable data

63

6.6 Hypotheses

6.61 Hypothesis One: That there would be evidence of confirmatory bias in the diagnosis of ADHD by clinicians.

Results supported the hypothesis based on two main findings. First, 42.8% of total respondents demonstrated confirmatory bias by indicating only positive symptoms were considered in their diagnostic decision making. The percentage of clinicians showing confirmatory bias increased as the number of positive symptoms increased. Second, more attention was paid to positive symptoms than to negative symptoms across the entire sample. For the six symptoms that were held constant across case studies, there was more attention paid to the three positive symptoms, with significant findings for the two symptoms of fidgetiness and distractibility, and significantly less to all three negative symptoms. For symptoms that varied across case studies, there was significantly more attention paid when symptoms were positive than when negative, with one exception (climbs excessively).

As previously stated, confirmatory bias was defined as indication by clinicians that only positive symptoms were considered in the diagnostic decision making process (i.e. no indication that negative symptoms were considered).

Fifty-nine clinicians from the total sample (42.8%) demonstrated confirmatory bias (Group CB) by giving no indication of having considered disconfirmatory information when making their diagnostic decision. Nearly half of respondents (n=67, 48.6%) indicated some consideration of disconfirmatory data (Group DD). Three practitioners from the total sample (2.2%) made incorrect statements that are not disconfirmatory by DSM criteria, and these data were excluded from further analyses. Nine clinicians (6.5%) gave no indication of what information was taken into account and were also excluded from the confirmatory bias categorisation.

64

The percentages of clinicians receiving each case that either showed confirmatory bias or took disconfirmatory data into account (*n*=126) are presented in Table 4. As seen, the percentages of clinicians evidencing confirmatory bias increased as the number of positive symptoms increased.

Table 4: Percentages of clinicians who received each case study demonstrating confirmatory bias in diagnosis (i.e. not indicating consideration of disconfirmatory data).

Case Study Received	Confirmatory Bias	Disconfirmatory Data
Case 3 (*n*=38)	36.8	63.2
Case 5 (*n*=40)	40.0	60.0
Case 7 (*n*=48)	60.4	39.6
Total (for all cases; *n*=126)	46.8	53.2

Chi-square analyses examining the relationship between case studies and whether confirmatory bias was evident showed a significant difference between Case 3 and Case 7 ($\chi^2[1, n=86]=4.715, p<.05$). There was also a significant difference between Case 5 and Case 7 ($\chi^2[1, n=88]=3.640, p\leq.05$). There was no significant difference between Case 3 and Case 5 ($p>.10$).

Chi-square analyses showed no significant relationship between whether clinicians saw children in their practice and confirmatory bias, nor between use of DSM criteria and confirmatory bias (p's>.10).

Table 5 shows the percentages of clinicians that considered the constant symptoms (i.e. not varied between case studies), both positive and negative.

Table 5: Percentages of all clinicians (n=130) that indicated the presented symptom, whether positive (p) or negative (n), was considered in making their hypothesised diagnosis and the statistical significance for each symptom.

Symptom	Considered (%)	χ^2 (df=1)	n	p
Distractibility (p)	60.0	5.200	130	.023
Fidgetiness (p)	58.5	3.723	130	.054
Hyperactivity - "on the go" (p)	45.4	.938	129	.333
Talkativeness (n)	19.2	49.231	130	.000
Ability to finish tasks (n)	17.7	54.277	130	.000
Interrupts others (n)	16.2	59.569	130	.000

As seen, clinicians paid the most attention to the symptoms that were positive in all cases. Of the 130 clinicians who indicated what information they used in reaching a diagnosis, the majority reported paying attention to symptoms of distractibility (n=78, 60.0%) and fidgetiness (n=76, 58.5%). The third highest rated symptom was hyperactivity, being 'on the go' (n=59, 45.4%). These three symptoms were positive for all three case studies. Least attention was paid to interrupting others (n=21, 16.2%), which was negative in all cases. Twenty-five clinicians (19.2%) reported attending to talkativeness, and 23 (17.7%) to ability to finish tasks, both of which were negative in all cases.

The amount of attention paid was significant for the symptom of distractibility and fidgetiness ($p \leq .05$). Clinicians paid significantly less attention ($p < .001$) to all three constantly negative symptoms.

Chi-square analyses of the significance of relationships between constant positive and negative symptoms may be seen in Appendix F. Four significant relationships were found, with more attention paid to positive symptoms than to negative symptoms in all cases. As shown, distractibility and fidgetiness were both significantly more likely to be attended to than the negative symptom of ability to finish tasks ($p < .001$). A similar relationship was found between the positive

symptom of fidgeting and the negative symptom of interrupting others ($p<.01$). Distractibility was also significantly more likely to be attended to than the negative symptom of interrupting others ($p<.05$).

Table 6 shows which symptoms clinicians attended to in relation to whether the symptoms were positive or negative for each case study.

Table 6: Percentages of clinicians receiving each case study indicating which symptoms were considered in making their diagnosis, according to whether symptoms were positive (confirmatory) or negative (disconfirmatory) in the case studies.

Symptom	Cases where positive	Considered Case 3 ($n=38$)	Considered Case 5 ($n=41$)	Considered Case 7 ($n=51$)
Hyperactivity	all	39.5	51.2	45.1
Fidgetiness	all	55.3	65.9	54.9
Distractibility	all	60.5	70.7	51.0
Inability to play quietly	5 & 7	15.8	39.0	23.5
Inability to wait turn	5 & 7	2.6	68.3	37.3
Inability to stay seated	7	18.4	19.5	37.3
Climbs excessively	7	23.7	7.3	19.6
Inability to finish tasks	nil	18.4	24.4	11.8
Talkativeness	nil	18.4	17.1	21.6
Interrupts others	nil	15.8	19.5	13.7

Clinicians generally paid more attention to positive symptoms than to negative symptoms.

Analyses were performed to examine the relationships between the numbers of clinicians attending to various symptoms which varied in the separate case studies. Several significant relationships were found.

Inability to await turn was attended to less in Case 3 ($n=1/38$, 2.6%) than in Case 5 ($n=28/41$, 68.3%). This was a significant difference ($\chi^2[1, n=79] =36.597$ $p<.001$). It

was also attended to significantly more in Case 7 (n=19/51, 37.3%) than in Case 3 (χ^2[1, n=89]=14.983 p<.001). Comparison of those receiving Cases 5 & 7 also showed a significant difference for attention to this symptom (χ^2[1, n=92]=8.762, p<.01), with more attention given in Case 5.

For the symptom of inability to play quietly, there was a significant difference between the attention paid when it was negative (Case 3) and in Case 5 where it was positive (χ^2[1, n=79]=5.299, p<.05). This symptom was more than twice as likely to be attended to in Case 5 (n=16/41, 39.0%) than when it was negative (Case 3; n=6/38, 15.8%). However, no significant difference was found for attention to this symptom when figures for Case 3 were compared to Case 7, where it was also positive.

The symptom of inability to stay seated was positive in Case 7 and negative in Cases 3 & 5. For Case 3, 18.4% of clinicians (n=7/38) attended to this symptom, compared to 37.3% of clinicians in Case 7 (n=19/51). This was a significant difference (χ^2[1, n=89] =3.735 p≤.05). For Case 5, 19.5% of clinicians (n=8/41) attended to this symptom. When this was compared to figures for Case 7, findings showed a trend towards significance (χ^2[1, n=92] =3.541 p≤.06).

For the symptom of excessive climbing, attention did not vary significantly between cases where it was negative and the case where it was positive. However, a significant difference was found between the two cases where the symptom was negative (χ^2[1, n=79]=4.101 p<.05). In Case 3, 23.7% of clinicians (n=9/38) paid attention to this symptom, compared to 7.3% of clinicians in Case 5 (n=3/41).

68

6.62 Hypothesis 2: That real-world belief of ADHD prevalence would be positively associated with confirmatory bias.

Here, increasing percentages of clinicians demonstrated confirmatory bias as prevalence estimates increased. However, differences were not statistically significant. Thus, the hypothesis was only partially supported. The majority of clinicians gave a prevalence opinion within the range suggested by the literature.

The range of estimates given by clinicians regarding their personal opinion of the prevalence of ADHD was from 0% (n=1, 0.7%) to 15% (n=3, 2.2%). The mean was 3.75% (SD=2.71). The mode was 5% (n=23, 16.7%).

Prevalence opinions were categorised into three groups, those within the range suggested by the literature (i.e. 2%-6.7%), those under the range (i.e. <2%) and those over the range (i.e. >6.7%). Percentages of clinicians giving estimates within these three categories may be seen in Figure 2.
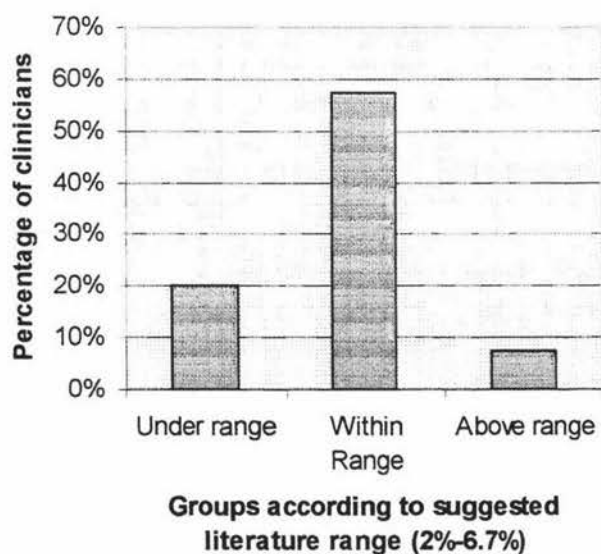
Figure 2: Percentages of clinicians giving real-world belief estimates of ADHD prevalence compared to prevalence rates suggested in the literature.

69

As shown, the majority of all respondents (*n*=79, 57.2%) gave an estimate which was within the range suggested by the literature. Twenty-eight clinicians (20.3%) estimated the prevalence to be lower than 2%, with 17 of these (12.3%) giving an estimate of 1% or less. Ten clinicians (7.2%) thought New Zealand prevalence rates were higher than 6.7%, with four (2.9%) rating it as 10% or above. Six clinicians (4.3%) gave a reply of "don't know". One clinician (0.7%) thought the prevalence was "excessive". Seven clinicians (5.1%) made additional comment within the survey itself indicating that they thought ADHD was overdiagnosed in New Zealand.

When percentages of clinicians showing confirmatory bias were viewed in relation to the three categories of prevalence according to literature parameters (i.e. below, within, above), a consistent pattern was found. As seen in Figure 3, rates of confirmatory bias increased as estimates of prevalence increased.
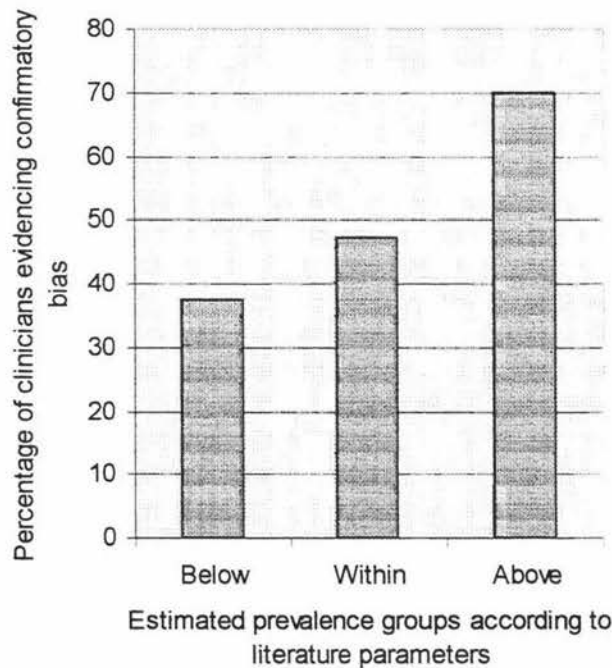
Figure 3: Percentages of clinicians giving prevalence opinions, according to literature parameters, who demonstrated confirmatory bias in diagnostic decision making.

The highest rate of confirmatory bias was found in the high prevalence belief group. All of the 10 clinicians who gave high prevalence belief figures (i.e. above 6.7%)

70

indicated what information was taken into account in reaching their diagnosis, with seven (70%) evidencing confirmatory bias.

The second highest rate of confirmatory bias was seen in those who gave a belief of prevalence within the range suggested by the literature. Of the 76 clinicians giving an estimate within the literature parameters who indicated what data was taken into account in diagnosis, nearly half (n=36/76, 47.4%) showed confirmatory bias.

The lowest rate of confirmatory bias was found in the group of clinicians giving a low estimate of prevalence (i.e. <2%, n=28, 20.4%). Twenty-four of these clinicians indicated what information was taken into account in diagnosis. Nine of these (37.5%) showed confirmatory bias.

Chi-square analyses found there was no significant difference for demonstration of confirmatory bias between those in the high prevalence opinion group and those estimating within the literature range. Nor was there a significant difference between those estimating within the range and those estimating below the range. The difference for demonstration of confirmatory bias between those estimating above the literature range and those estimating below the range showed a trend towards significance (χ^2[1, n=34)=2.993, p≤.08). Clinicians who estimated below the literature range were more likely to take disconfirmatory data into account and those who estimated above the range were more likely to demonstrate confirmatory bias.

Data were examined for those clinicians giving comments of a belief that ADHD is overdiagnosed (n=7/138, 5.1%). No clear positive diagnoses were received from this group. Three clinicians gave a false negative diagnosis for Case 7. These three all took disconfirmatory data into account. The other four clinicians gave tentative diagnoses, two for Case 5 and two for Case 7. Only one clinician demonstrated confirmatory bias in diagnostic decision making.

6.63 Hypothesis 3: That presentation of increasing numbers of positive ADHD symptoms would yield increased rates of ADHD diagnoses.

Results did not support the hypothesis. Specifically, the percentages of clinicians giving clear positive diagnoses of ADHD were higher for Case 5 (nearly ADHD) than for Case 7 (ADHD). In addition, it is noted that a higher rate of negative diagnoses was received for Case 7 than for Case 5. ADHD was likely to be the primary hypothesis for all three case studies. The majority of respondents returned a tentative positive ADHD diagnosis.

A diagnosis of ADHD was rated according to three categories: ADHD diagnosed with no further comment (clear yes), tentative ADHD diagnosis with comments/provisos given, such as the need for further information (tentative yes), and not ADHD (no). Table 7 gives the percentages of clinicians receiving each case study that gave diagnoses of ADHD according to this categorisation. Also included are figures for those who gave any positive diagnosis either with or without comment (clear + tentative), and those who gave ADHD as their primary diagnosis, with or without other comorbidity.

Table 7: ADHD diagnoses given by percentages of clinicians receiving each case study.

Diagnosis of ADHD?	Case 3 (not ADHD) n=42	Case 5 (nearly ADHD) n=43	Case 7 (ADHD) n=52
Yes - Clear	19.0	32.6	23.1
- Tentative	50.0	55.8	57.7
- Total (clear + tentative)	69.0	88.4	80.8
No	31.0	11.6	19.2
Primary hypothesis of ADHD	40.5	69.8	56.6

As seen, the majority of clinicians gave a tentative ADHD diagnosis for all three case studies. False positive diagnoses (clear yes) were offered for the two case

72

studies where DSM diagnostic criteria were not met (for Case 3 n=8, 19.0%; for Case 5 n=14, 32.6%). Additionally, it is noted that false negative diagnoses (clear no) were recorded for Case 7 (n=10, 19.2%). This was higher than the rate of negative diagnoses offered for Case 5 (n=5, 11.6%).

Chi-square statistics showed a significant relationship between ADHD as a primary hypothesis and the case study received (χ^2[2, N=138]=7.414, p<.05). Clinicians were most likely to give ADHD as the primary hypothesis for Case 5 (n=30/43, 69.8%) and least likely to give a primary ADHD hypothesis for Case 3 (n=17/42, 40.5%).

6.64 Hypothesis 4: That consideration of disconfirmatory data would result in more accurate diagnosis.

Results showed that clinicians who demonstrated confirmatory bias were significantly more likely to give a positive versus a negative diagnosis, whether true or false. Those who took disconfirmatory data into account were more likely to give a negative versus a positive diagnosis, although not at a statistically significant level. However, confirmatory bias did not necessarily affect diagnostic accuracy. While not statistically significant, clinicians in Group CB were more likely than those in Group DD to give an accurate diagnosis if the case study met diagnostic criteria, but less likely to give an accurate diagnosis if symptoms were sub-threshold. An inverse relationship approaching significance was found between diagnostic accuracy and clinicians' self-rated confidence in the accuracy of their diagnosis. Use of DSM produced significantly higher rates of positive versus negative diagnoses.

In regard to accuracy of diagnosis, only clear diagnoses were examined (i.e. not tentative). Tentative diagnoses were excluded from analyses as the data were unable to be unambiguously classified according to a true/false positive/negative category. Of the 62 clinicians that gave a clear diagnosis, 34 clinicians gave a clear yes (54.8%) and 28 a clear no (45.2%).

73

Due to the criteria differences between the case studies, only Cases 3 & 5 could receive a true negative diagnosis (accurate) or a false positive diagnosis (inaccurate). These two sub-threshold cases could not receive a false negative or true positive diagnosis. Only Case 7 could receive a true positive diagnosis (accurate) or a false negative diagnosis (inaccurate). As it met diagnostic criteria, Case 7 could not receive a false positive or a true negative diagnosis. In all, a total of 30 clinicians gave an accurate diagnosis (48.4%) and 32 gave an inaccurate diagnosis (51.6%).

The rates of true/false positive/negative diagnoses given by clinicians who indicated a clear diagnosis for Cases 3 & 5 may be seen in Table 8. The clear diagnoses given for Case 7 are presented in Table 9.

Table 8: Percentages of clinicians giving clear true/false positive/negative diagnoses for Cases 3 & 5 (n=40).

	Positive	Negative
True	not applicable	45.0%
False	55.0%	not applicable

Table 9: Percentages of clinicians giving clear true/false positive/negative diagnoses for Case 7 (n=22).

	Positive	Negative
True	54.5%	not applicable
False	not applicable	45.5%

74

Tables 10 & 11 show the rates of clear true/false positive/negative diagnosis given by clinicians in the confirmatory bias group for Cases 3 & 5 and Case 7 respectively.

Table 10: Rates of clear true/false positive/negative diagnoses given for Cases 3 & 5 by clinicians in Group CB (confirmatory bias; $n=16$).

	Positive	Negative
True	not applicable	25.0%
False	75.0%	not applicable

Table 11: Rates of clear true/false positive/negative diagnoses given for Case 7 by clinicians in Group CB (confirmatory bias; $n=12$).

	Positive	Negative
True	66.7%	not applicable
False	not applicable	33.3%

As seen, clinicians in Group CB gave higher rates of positive diagnoses than negative, whether true or false. This was a significant finding ($\chi^2[1, n=28]=5.143, p<.05$). The highest rate of diagnoses for this group was false positives ($n=12/16$, 75.0%), followed by true positives ($n=8/12$, 66.7%). There was a slightly higher rate of false negatives for Group CB ($n=4/12$, 33.3%) than true negatives ($n=4/16$, 25.0%).

Tables 12 & 13 show the rates of clear true/false positive/negative diagnosis given for Cases 3 & 5 and Case 7 respectively, when examined for those who took disconfirmatory data into account.

75

Table 12: Rates of clear true/false positive/negative diagnoses given for Cases 3 & 5 by clinicians in Group DD (took disconfirmatory data into account; $n=18$).

	Positive	Negative
True	not applicable	55.6%
False	44.4%	not applicable

Table 13: Rates of clear true/false positive/negative diagnoses given for Case 7 by clinicians in Group DD (took disconfirmatory data into account; $n=7$).

	Positive	Negative
True	28.6%	not applicable
False	not applicable	71.4%

In contrast to Group CB, those in Group DD tended to give a negative diagnosis, whether true or false. However, this was not a significant finding ($p>.10$). For Group DD, the highest rate of diagnoses was for false negatives ($n=5/7$, 71.4%), followed by true negatives ($n=10/18$, 55.6%). False positive diagnoses were given by 44.4% of clinicians in Group DD ($n=8/18$) and true positives by 28.6% ($n=2/7$).

For clinicians giving a clear diagnosis, comparisons of the two groups showed that those in Group CB gave significantly more positive diagnoses than those in Group DD ($\chi^2[1, n=53] =5.311, p\leq.02$). In Group CB, 20 clinicians (71.4%) gave a positive diagnosis, while 10 clinicians in Group DD (40.0%) gave a positive diagnosis. The rate of true positive diagnoses for Group CB (66.7%) was more than twice that of Group DD (28.6%). This difference showed a trend towards significance ($\chi^2[1,$

76

n=10]=3.600, $p<.06$). Group CB also showed a higher rate of false positive diagnoses (75.0%:44.4%). However, this was not a significant difference ($p>.10$).

Clinicians in Group DD gave higher rates of negative diagnoses than Group CB, but not at a statistically significant level ($p>.10$). In all, 15 clinicians in Group DD (60.0%) gave a negative diagnosis, compared to 8 (28.6%) in Group CB. Group DD had over twice the rates of both true (55.6%:25.0%) and false negative diagnoses (71.4%:33.3%). However, these differences were not statistically significant ($p>.10$).

When data were categorised into a binomial variable based on accuracy, there was a trend towards significance for the relationship between confirmatory bias and diagnostic accuracy for those clinicians receiving the sub-threshold case studies (χ^2[1, n=34] =3.265, $p\leq.07$). For Cases 3 & 5, Group DD were more likely to give an accurate diagnosis (i.e. true negative; n=10/18, 55.6%) than those in Group CB (i.e. false positive; n=4/16, 25%). Although not statistically significant ($p>.10$), clinicians in Group CB receiving Case 7 (n=12) were more likely to give an accurate diagnosis (i.e. true positive; n=8, 66.7%) than those in Group DD (i.e. false negative; n=2/7, 28.6%).

Diagnostic accuracy was further compared to clinicians' level of confidence regarding accuracy, which was rated on a 5-point Likert scale (from 1, *not at all confident*, to 5, *extremely confident*). An inverse correlation was found, which showed a trend towards significance (r=-.245, $p<.07$). That is, clinicians who gave an inaccurate diagnosis had a higher mean confidence level (M=3.3) than did those clinicians who gave an accurate diagnosis (M=2.8). Comparative figures for those clinicians who gave an accurate diagnosis and those that did not may be seen in Table 14.

77

Table 14: Descriptive statistics on confidence for those clinicians who gave an accurate ADHD diagnosis and those who did not.

Statistic	Accurate Group (n=30)	Not Accurate Group (n=32)
Mean level of confidence in accuracy	2.8 (SD=1.076)	3.3 (SD=1.037)
Mode	3 (n=10)	3 (n=9)
Minimum level	1 (n=3, 10%)	2 (n=7, 21.9%)
Maximum level	5 (n=2, 6.7%)	5 (n=5, 15.6%)

Diagnostic accuracy was not significantly associated with use of DSM criteria ($p>.10$). However, clinicians who used DSM were significantly more likely to give a clear positive rather than a negative diagnosis ($\chi^2[1, n=60]=10.884, p\leq.001$). Twenty-five of the 33 clinicians who used DSM (75.8%) gave a positive diagnosis, with 8 (24.2%) giving a negative diagnosis. This was a significant difference ($\chi^2[1, n=33]=8.750, p<.01$). The majority of clinicians who did not report using DSM gave a negative diagnosis ($n=18/27,66.7\%$), and 9 (33.3%) gave a positive diagnosis. This difference was not significant.

There was a significant relationship between use of DSM and true/false positive/negative diagnosis ($\chi^2[3, n=60]=12.366, p<.01$), with a false positive being the most likely diagnosis given by clinicians using DSM. For those using DSM who gave a clear diagnosis ($n=33$), 15 (45.5%) gave a false positive diagnosis, and 10 (30.3%) gave a true positive. True negative diagnoses were given by six clinicians in this group (18.2%). The lowest rate of diagnoses was false negatives ($n=2, 6.1\%$). For clinicians giving a clear diagnosis who did not use DSM ($n=27$), the highest rate of diagnoses were true negatives ($n=10/27, 37.0\%$), followed by false negatives ($n=8, 29.6\%$). Seven of these clinicians (25.9%) gave a false positive diagnosis and two gave a true positive (7.4%).

Thus, those using DSM were significantly more likely to give a positive diagnosis, whether true or false, and least likely to give a false negative. Clinicians who did not

78

use DSM were most likely to give a negative diagnosis, whether true or false, and least likely to give a true positive diagnosis.

In terms of those who see children, the majority of clinicians giving a clear diagnosis who had a child client load (n=26/50, 52.0%) gave an accurate diagnosis. Clinicians with child clients gave equal rates of true negative and false positive diagnoses (for each n=15, 30.0%). More clinicians (n=11, 22.0%) gave a true positive diagnosis than gave a false negative diagnosis (n=9, 18.0%). For those clinicians giving a clear diagnosis and with no child clients, the majority (n=7/9, 77.8%) gave an inaccurate diagnosis. All seven of these clinicians gave a false positive diagnosis. The remaining two clinicians with no child clients (22.2%) gave a true negative diagnosis.

6.7 Actual Practice Regarding the Assessment of ADHD

In all, 126 clinicians responded to the question regarding their assessment practices for ADHD. Clinicians who did not respond generally indicated that the question was not applicable as they did not work with children, assess ADHD, or both. Answers that did not clearly indicate the assessment step taken were not included as positive replies. For example, a reply of 'parents history' was rated as an uncertain reply for parent interview rather than a positive reply, as it was unclear whether the parents would be interviewed regarding the child's history or whether information on the parents' own history would be gathered.

The diagnostic steps given by practitioners were counted but could not be ranked as few clinicians gave any clear indication of the order in which their assessment would proceed. The number of steps used ranged from 1 (n=5, 3.6%) to 19 (n=1, 0.7%). The mean number of assessment steps was 6.9 (SD=3.53), with the mode being 9 (n=16, 11.6%). The majority of clinicians (n=110, 79.7%) used 10 or fewer steps in the assessment of ADHD. No clinician indicated full adherence to the recommended assessment protocol (i.e. child & parent interviews covering full medical,

79

developmental, family history; review parenting style and family functioning; rating scales; teacher/school information; evaluation & observation of the child; exclusion of comorbid disorders and external factors).

There was a significant negative correlation between the number of steps used and confirmatory bias (r=-0.183, p<.05). That is, those who took disconfirmatory data into account used significantly more steps in the assessment procedure. There was no significant correlation between diagnostic accuracy and the number of assessment steps.

The frequencies and percentages of clinicians that indicated using various assessment protocols are tabled in Appendix G. As shown, the most used assessment protocol was information from the school or teacher, such as teacher interview, school reports, or teacher rating scale information (n=104, 82.5%). A majority of clinicians also obtained a history of some kind (n=100, 79.4%). More than half the respondents (n=75, 59.5%) clearly indicated that they would interview the parents or family. Less than one-third of clinicians would interview the child (n=34, 27%). Nearly one-tenth of clinicians (n=12, 9.5%) indicated the use of a trial of medication or Ritalin in their ADHD assessment procedure. Only two clinicians (1.6%) indicated that they would take the child's cultural background into account.

Specialist referral was reported by 53 clinicians (42.1%), with five (4.0%) indicating it as the only assessment step taken. Twenty-three (43.4%) of those indicating specialist referral as part of the assessment process were paediatricians, and 19 (35.8%) were GPs. Paediatricians tended to refer mostly to child mental health services (n=9/23, 39.1%) or to psychologists (n=7/23, 30.4%). GPs referred mostly to child mental health services (n=7/19, 36.8%) or to a paediatrician (n=6/19, 31.6%). Generally, child mental health specialists indicated the least referral to other clinicians.

Apart from the sole paediatrician/child psychiatrist who indicated use of rating scales in assessment, the professional group most likely to use standardised rating scales in assessment of ADHD was child psychiatrists (*n*=5/7, 71.4%). The majority of paediatricians (*n*=36/53, 67.9%) and child psychologists (*n*=7/11, 63.6%) were also likely to use rating scales. Those least likely to use scales were GPs (*n*=2/25, 8%).

The most popular scale used was the Conners Rating Scale, which was used by 39 clinicians (31%). The CBCL was used by four clinicians (3.2%). Six respondents (4.8%) used both the Conners and the CBCL. One clinician (0.8%) used the ACTeRS.

6.8 Actual Practice Regarding the Treatment of ADHD

A total of 123 clinicians answered the question regarding their recommended treatment options for ADHD. The number of treatment options given ranged from 1 (*n*=20, 16.3%) to 13 (*n*=1, 0.7%). The majority of respondents (*n*=89, 72.4%) gave five or fewer treatment options. The mean number of options given was 4.21 (*SD*=2.54). There were multiple modes of 3 and 5 (*n*=20, 16.3%).

The frequencies and percentages of clinicians that gave various treatment options may be seen in Appendix H. The most recommended treatment option was medication (*n*=105, 85.4%), of any type. Ritalin was the most likely specified medication (*n*=63, 51.2%). Eleven clinicians (8.9%) gave medication as their only treatment option. Over half of these were paediatricians (*n*=6/11, 54.5%), with two being psychiatrists (18.2%) and three GPs (27.3%).

Nearly half of respondents (*n*=61, 49.6%) listed behavioural treatment as an option. Various other psychosocial treatments were listed, with the most popular being parent advice/training (*n*=46, 37.4%) and education about ADHD (*n*=36, 29.3%). Over a quarter of clinicians (*n*=31, 25.2%) listed liaison with the school or teacher as part of their recommended treatment practice.

81

Although requested to rank their preference of treatment options for ADHD, a number of clinicians (n=43, 35%) did not assign rankings to the options listed (i.e. indicate the most preferred treatment option). For those who did plus those who gave only one option (n=80), specialist referral or advice was the first choice of treatment (n=20/143, 16.3%). For 10 clinicians, referral or advice from a specialist was the only option given. Comments were noted by eight clinicians (5.8% of the total study responses) remarking on the difficulty in accessing specialist services for children with ADHD. Behavioural treatment was the second most preferred option (n=19/123, 15.4%), with Ritalin given as the third most preferred choice (n=14/123, 11.4%). Ritalin was the only option given by five clinicians (4.1%).

Medical specialists (i.e. paediatricians and psychiatrists) were likely to favour drug treatment. GPs were most likely to refer. Psychologists preferred behavioural treatment. For the 36 paediatricians who rated treatment options, the most popular options were drug treatment (n=12, 33.3%), and behavioural treatment (n=10, 27.8%). Seven paediatricians (19.4%) preferred an educational or psychosocial approach to treatment. Six of 10 psychiatrists (60%) favoured some type of drug treatment.. The majority of GPs (n=14/20, 70%) would refer to a specialist for treatment. The two most preferred options of psychologists were behavioural treatment (n=6/13, 46.2%) and specialist referral (n=3/13, 23.1%). There was no significant association between professional grouping and the number of treatment options given.

6.9 Factors Bearing on Confirmatory Bias

The relationships between confirmatory bias and demographic, training, and practice data (i.e. years of experience; age; level of knowledge; real-world belief of prevalence; number of assessment steps given; numbers of children referred for an opinion, diagnosed and treated; total child clients) were analysed using t-tests. Those between confirmatory bias and nominal data (i.e., professional group; gender; urban/rural location; New Zealand Pakeha ethnicity [frequencies of other ethnicities

being too small for statistical analyses]; criteria used; various sources of ADHD-related knowledge) were tested using chi-square analyses. Relationships between confirmatory bias and various demographic/survey factors are tabled in Appendix I.

As seen in Appendix I, significant relationships were found between confirmatory bias and two sources of knowledge - psychological literature (χ^2[1, n=126] = 6.115, $p \leq .01$) and a residency or internship (χ^2[1, n=126]=3.917, $p<.05$). For those clinicians who gained their knowledge from psychological literature (n=44), the majority (n=30, 68.2%) took disconfirmatory data into account. For those who did not read psychological literature (n=82), the majority (n=45, 54.9%) showed confirmatory bias. For clinicians who gained ADHD knowledge from a residency or internship (n=34), the majority (n=23, 67.6%) took disconfirmatory data into account. For those who did not indicate having gained knowledge from a residency or internship (n=92), a slight majority (n=48, 52.2%) demonstrated confirmatory bias in their diagnostic decision-making.

A significant association was also found between confirmatory bias and assessment comprehensiveness (i.e. the number of steps given) (t [116]=-2.000, $p<.05$). That is, more clinicians in Group DD than in Group CB gave 10-plus assessment steps.

The relationship between confirmatory bias and professional group (i.e. paediatrician, psychiatrist, GP, psychologist) showed a trend towards significance (χ^2[3, n=125]=6.805 $p<.08$). Confirmatory bias was demonstrated by the majority of psychiatrists (n=15/24, 62.5%) and GPs (n=14/23, 60.9%). Disconfirmatory data was taken into account by the majority of paediatricians (n=30/51, 58.9%) and psychologists (n=18/27, 66.7%).

There were no significant relationships between confirmatory bias and experience, gender, age, geographic location, ethnicity, level of knowledge, criteria used, assessment comprehensiveness, size of practice, numbers of children seen, diagnosed or treated, or real-world belief of prevalence.

To summarise, results here indicated that clinicians who gained knowledge from reading psychological literature or from a residency/internship were significantly less likely to evidence confirmatory bias in diagnostic decision making than were other clinicians. In addition, those who took disconfirmatory data into account were significantly more likely to include more steps than those who showed confirmatory bias. No other factors were significantly associated with confirmatory bias, although there was a trend towards significance for professional groups.

Chapter 7: Discussion

7.0 Summary of the Major Findings

The main aims of the present study were two-fold. The first was to investigate whether confirmatory bias was present in the diagnosis of ADHD. Diagnostic decision making was examined for three hypothetical case studies with varying amounts of positive symptoms for ADHD. The second was to survey New Zealand clinicians regarding their actual protocols and practice in assessing and treating ADHD.

7.01 Confirmatory Bias in the Diagnosis of ADHD

Results from the present study showed demonstration of confirmatory bias in the diagnosis of ADHD, with 42.8% of respondents giving no indication of taking disconfirmatory data (i.e. negative symptoms) into account.

In addition, clinicians paid more attention to positive symptoms held constant across case studies and less to constant negative symptoms. The symptoms attended to most by clinicians were distractibility, fidgetiness, and hyperactivity. These three symptoms were positive in all case studies. The least attention was paid to interrupting others, which was negative in all case studies. For the symptoms that varied across case studies, significantly more attention was given when they were positive rather than negative, with one exception (excessive climbing).

The relationship between confirmatory bias and ADHD prevalence estimates showed a trend towards significance. Confirmatory bias (i.e. attention to only positive symptoms) increased as prevalence opinions increased. Those clinicians who opined the prevalence of ADHD to be above literature parameters tended to demonstrate confirmatory bias more than those who underestimated. This finding was

confounded by the fact that the majority of clinicians correctly estimated prevalence figures. Only a small percentage of clinicians gave a belief of prevalence higher than the top figure suggested by the literature.

The majority of clinicians gave a tentative ADHD diagnosis for all three case studies. Results examining the clear diagnoses given to the various case studies suggest the possibility of misdiagnosis (both over- and under-diagnosis) of ADHD in actual practice. Clear (i.e. not tentative) false positive diagnoses were given for the two cases where symptoms were sub-threshold, suggesting some overdiagnosis in cases that do not meet diagnostic criteria. For Case 3, approximately one-fifth of clinicians gave a clear false positive ADHD diagnosis. Nearly a third gave a clear false positive for Case 5. Surprisingly, this rate of positive diagnoses for Case 5 was higher than for Case 7, which on paper met DSM diagnostic criteria. Although not specifically addressed by the hypotheses, it was noted that the rate of false negative diagnoses received for Case 7 was equivalent to the rate of false positive diagnoses for Case 3 (i.e. one-fifth). This suggests further research to examine the possibility of underdiagnosis in some cases where diagnostic criteria are actually met.

Confirmatory bias appears to play some role in false positive diagnostic decisions. Clinicians who demonstrated confirmatory bias were significantly more likely to give a positive diagnosis, whether true or false. Of course, such a diagnosis would be accurate if a child has ADHD and inaccurate if they don't. In this study, the highest rate of diagnoses by the CB group were false and true positives (71.4% total). In the two cases where criteria were not met, 75% offered a clear false positive diagnosis and 25% proffered a true negative diagnosis. In the case where diagnostic criteria were met, 66.7% offered a true positive diagnosis and 33.3% proffered a false negative diagnosis. On the other hand, those who took disconfirmatory data into account were more likely to give a negative diagnosis, although this was not at a significant level. Here, a diagnosis would be accurate if a child does not have ADHD and inaccurate if they do.

Three factors were found to be significantly associated with confirmatory bias – (a) assessment comprehensiveness, (b) gaining ADHD-related knowledge from psychological literature, and (c) completion of an internship or residency. Those who demonstrated confirmatory bias were likely to use fewer assessment steps than clinicians who took disconfirmatory data into account. Those who sourced knowledge from psychological literature or who completed an internship were more likely to take disconfirmatory data into account.

The present findings recorded several clear and consistent patterns. While some findings were at a statistically significant level, others are not when measured against a conventional alpha level (i.e. $p<.05$). Two issues are of note here.

The first is that statistical power was affected by the small sizes of some sub-groups. Significant findings might occur if the sample size was increased. In particular, the exclusion of tentative diagnoses (which were given by the majority of clinicians) from analyses related to accuracy compromised statistical power.

The second issue is the choice of alpha level. As the present study is of an exploratory nature, use of the conventional .05 alpha level to decrease Type-I error (i.e. saying something is happening when it isn't) resulted in increasing the risk of Type-II error (i.e. saying something isn't happening when it is). To counteract this possibility, argument can be made to disregard conventional alpha levels and increase statistical power by adjusting the chosen alpha level to .10, .20, or even higher (Hays, 1973; Podd, Page, Rapley, & Beale, 1998; Whittington & Podd, 1996). Thus, particularly for those findings between $p=.05$ to $p=.10$, further investigation may be worthwhile. These findings are noted through the rest of the discussion.

7.02 Survey on ADHD Assessment and Treatment Protocols

The survey of clinicians' assessment protocols in actual practice showed that the most used diagnostic tool was school or teacher information. The majority of respondents also took some form of history, with parent or family interview used by over half of clinicians. Just under half the respondents incorporated rating scale information into their assessment of ADHD. Many non-specialist clinicians indicated they would refer the child on for specialist evaluation. Less than a third of clinicians interviewed the child. Only two specifically indicated that they would take account of the child's cultural background when making a diagnosis. A trial of Ritalin or other medication was indicated as part of the diagnostic assessment practice by 9.5% of respondents. The number of assessment steps taken ranged from 1 to 19, with the average being between 6-10. There was a significant inverse correlation between confirmatory bias and the number of steps given. That is, clinicians who took disconfirmatory data into account indicated using more assessment steps than those who demonstrated confirmatory bias. This of course makes sense, as collection of disconfirmatory information would take more assessment steps compared to the case where a clinician is satisfied with presented data and seeks no further confirmation.

Findings related to actual treatment practice showed that the majority of all clinicians (both medical practitioners and psychologists) regarded some type of medication or drug treatment as a treatment option for ADHD. Approximately half of respondents recommended Ritalin specifically. Nearly half recommended some type of behavioural treatment such as behavioural modification. There was also a reasonably high level of referral to, or consultation with, other providers. Less specialised clinicians (e.g. GPs) were the most likely to refer clients to other specialist providers. The number of treatment options given ranged from 1 to 13, with a mean of 4. Medical specialists (i.e. paediatricians and psychiatrists) favoured medication. Many paediatricians also recommended behavioural, or educational/psychosocial approaches as their primary choice for treatment. GPs preferred to refer to specialists. Psychologists favoured behavioural treatment.

7.1 Hypothesis 1: That there would be evidence of confirmatory bias in the diagnosis of ADHD.

Results supported the hypothesis that confirmatory bias would be evident in the diagnosis of ADHD.

First, 42.8% of respondents demonstrated confirmatory bias by giving no indication that they considered any disconfirmatory information in the diagnostic decision-making process. That is, attention was given only to positive symptoms. However, while lack of indication of attention to negative symptoms may be taken as evidence of confirmatory bias, the fact that clinicians did not indicate taking disconfirmatory information into account does not necessarily mean that they did not do so. It is possible that clinicians did take disconfirmatory data into account but simply did not report doing so. Alternatively, given research indicating a lack of awareness by clinicians in regard to their diagnostic decision-making process (Ullman & Doherty, 1984), it is also possible that respondents may have taken disconfirmatory data into account but may not have been conscious of doing so.

Second, in regard to the six symptoms that were held constant in all case studies, more attention was paid by clinicians to symptoms that were positive (confirmatory) rather than to those that were negative (disconfirmatory). This result is in line with previous research showing that there is a tendency to select confirmatory rather than disconfirmatory information when testing a hypothesis (Strohmer et al., 1990).

The symptoms that were positive in all case studies (fidgetiness, distractibility, and hyperactivity) were the three primary diagnostic indicators given by clinicians. The symptom that was attended to least by clinicians was interrupting others, which was negative in all case studies.

Furthermore, for those symptoms that varied from negative to positive, significantly more attention was given to symptoms when they were positive than when presented

89

as disconfirmatory evidence. The only exception to this was the symptom of 'climbs excessively'. There was no significant difference in attention to this symptom between the cases where it was negative and the case where it was positive. One possible explanation for this is that risk-taking behaviour, such as excessive climbing, may be a highly visible indicator of ADHD-type behaviour for many clinicians and, therefore, the absence of such behaviour may be particularly obvious.

The present study found that confirmatory bias increased as the number of positive symptoms presented increased, with a trend towards significance shown. This suggests that the more positive information there is, the less likelihood that attention may be given to negative symptoms - even though this information may be available, as in the present study.

Generalisation of these findings to actual practice must be made with due caution. Nevertheless, the possibility is raised regarding the overdiagnosis of ADHD in the practice of New Zealand clinicians, in line with overseas findings (Cotugno, 1993; Sabatino & Vance, 1994; Wolraich et al., 1990). The present results suggest that some clinicians may indeed demonstrate confirmatory bias in the diagnosis of ADHD. This raises the possibility that clinicians could fail to elicit information which would support an alternative hypothesis (Haverkamp, 1993). The result could be increased false positive diagnoses (Eli, 1996). This issue is discussed further in Section 7.4.

7.2 Hypothesis 2: That confirmatory bias would be positively associated with belief of prevalence.

Clinicians who had a belief of higher prevalence (i.e. above literature parameters) showed a tendency towards confirmatory bias, but not at a statistically significant level (i.e. $p \leq .05$). The results did show a trend towards significance, with the percentages of clinicians demonstrating confirmatory bias increasing as prevalence estimates increased. However, findings were limited by the small percentage of

clinicians that gave a figure higher than the range suggested in the literature (i.e. 2%-6.7%).

The majority of clinicians (57.2%) estimated the prevalence of ADHD as being within the range suggested by the literature (i.e. 2%-6.7%; Anderson et al., 1987; Fergusson et al., 1993; McGee et al., 1990). Most thought it to be 5%. This is in line with DSM-IV estimates (APA, 1994). Further exploration of this topic may be beneficial. For instance, asking if clinicians are aware of the NZ prevalence rate, asking what they have read/heard it to be, and eliciting their opinion as to whether the literature figure is correct, may be fruitful avenues. It could also be beneficial to canvass opinions on whether clinicians believe ADHD is an overdiagnosed (or underdiagnosed) disorder, to further investigate bias.

In fact, comments were received during the course of the present study which suggest that some clinicians hold an opinion that ADHD is an overdiagnosed disorder. Such an opinion was given spontaneously by 5% of clinicians in the present survey. Examination of data for this sub-group showed that no clinicians gave clear false positive diagnoses, but three of the seven clinicians gave a false negative diagnosis. All of these three took disconfirmatory evidence into account. Indeed, only one clinician in this sub-group showed evidence of confirmatory bias in diagnosis (but correctly, giving a tentative positive diagnosis for Case 7).

The finding that nearly half the clinicians who consider ADHD to be overdiagnosed took disconfirmatory data into account and gave false negative diagnoses raises the question as to whether there may possibly be a *dis*confirmatory bias by some clinicians against diagnosis of ADHD. That is, clinicians who are biased against an ADHD diagnosis may attend more to disconfirmatory symptoms to prove their negative hypothesis. This would be in line with Haverkamp's (1993) suggestion that *"exposure to a hypothesis at odds with one's preexisting preference may engender more disconfirmatory processing"* (p.313). It may be that clinicians are reluctant to diagnose ADHD in cases where criteria are met. This might be related to

91

consideration that ADHD is an overdiagnosed disorder, in line with Jaffe's (1995) concern of trivialisation of the disorder discussed in the Introduction. Increased media interest in ADHD over recent years, particularly regarding the burgeoning rate of psychostimulant medication usage, may have an influence. No discussion of disconfirmatory bias in diagnosis was found in the literature and the possibility of this phenomenon would appear to merit further investigation. Investigating whether clinicians may hold attitudes that ADHD is overdiagnosed, that children are overtreated, or both, and whether this may in turn relate to a subsequent reluctance to diagnose the disorder, is recommended.

In sum, clinicians offering higher ADHD prevalence estimates gave a higher rate of false positive diagnoses for the disorder, but not at a $p<.05$ level. Findings were confounded by the fact that the large majority of clinicians estimated within the suggested range, and by inadequate information as to the influencing effect of prior knowledge regarding prevalence of the disorder. Some comments on a belief of overdiagnosis were noted. Clinicians in this sub-group gave no clear positive ADHD diagnoses, but some false negative diagnoses. All three that gave a false negative diagnosis took disconfirmatory data into account. This raised the possibility of a disconfirmatory bias.

7.3 Hypothesis 3: That presentation of increasing numbers of positive ADHD symptoms would yield increased rates of ADHD diagnoses.

Results did not support the hypothesis. The majority of clinicians gave a tentative ADHD diagnosis for all cases. This was an encouraging finding from a clinical point of view, suggesting a reluctance by most clinicians to give a more definite diagnosis on the basis of paper case information. For clear diagnoses (i.e. not tentative), the rate of positive diagnosis did increase for the two sub-threshold cases. Approximately one-fifth of clinicians receiving Case 3 gave clear positive diagnoses

of ADHD, increasing to nearly one-third for Case 5. However, there was a lower rate of clear positive diagnoses given for Case 7 than for Case 5. This, in conjunction with higher rates of negative diagnoses given for Case 7 than for Case 5, indicates that fewer clinicians considered 'Sam' to have ADHD when diagnostic criteria were met (Case 7) than when symptoms were below the diagnostic threshold (Case 5). This result was surprising in view of the fact that all the positive symptoms presented in Case 5 were also present in Case 7, with an additional two symptoms changed from negative to positive in Case 7.

Furthermore, it was noted that Case 7 received a false negative diagnosis by approximately one-fifth of clinicians receiving this case study. This rate is equivalent to the rate of clear false positive diagnoses given for Case 3. It is of some concern that approximately one-fifth of clinicians gave a clear false diagnosis, whether positive or negative, for all three case studies.

The finding of higher rates of diagnosed ADHD for Case 5 than Case 7 is puzzling and cannot be adequately explained by present data. Further investigation is recommended. From a clinical point of view, questions are raised as to what reasons might exist for such a finding.

One possible explanation is that the two symptoms that were positive only in Case 7 may have been more indicative of another disorder. However, these two symptoms (climbs excessively and wanders around the classroom) are both related to hyperactivity. A common-sense perspective suggests these two symptoms to have higher face validity for ADHD than for other disorders such as autism, anxiety, or depression.

It could also be that the diagnostic skills of clinicians receiving the three case studies varied independently across or within groups. The factor of expertise is difficult to measure precisely. One suggestion is to replicate the present study with clinicians agreed to be experts in the area of ADHD. However, such a study may still be

subject to the confound of variation even among experts (Ullman & Doherty, 1984) and there may conceivably be problems obtaining consensus as to which clinicians are 'expert'.

Another potential explanation, which links to the findings of false negative diagnoses in Case 7, is the previously discussed possibility of *dis*confirmatory bias by some clinicians against diagnosis of ADHD. Some clinicians may be reluctant to diagnose ADHD in a case where diagnostic criteria are met. While such a phenomenon is by no means proposed as universal, it may be that such a bias is a factor for a minority of clinicians.

Whatever the case, the finding of higher rates of diagnosis for a sub-threshold case than for a case where criteria are met remains unexplained by the present study. Further investigation is recommended to clarify what may be happening here.

While generalisation must be cautious, the implications for actual practice are of possible misdiagnosis, with the worse case scenario suggesting both overdiagnosis and underdiagnosis of the disorder. The possibility of false positive diagnoses would, in practice, lead to children that do not have ADHD being diagnosed with the disorder. False negative diagnoses would mean that children who do have ADHD would not receive a diagnosis. In terms of treatment, this would result in some children receiving potentially unnecessary treatment, while others may not be receiving potentially beneficial treatment.

If findings here generalised to real-world settings, concerns about overdiagnosis of ADHD and overprescription of stimulant medication expressed overseas (Mayor, 1996) may be founded for a minority of cases in this country. However, present results give some hint that problems here might not be a straightforward case of simply overdiagnosis. While some children may be inaccurately diagnosed with ADHD and receive unnecessary treatment (due to false positive diagnoses), others who might benefit from treatment may not be receiving it due to the lack of a

diagnosis (the problem of false negative diagnoses). Thus, there is need to balance the possibility of overdiagnosis and treatment against the possibility of underdiagnosis and treatment.

7.4 Hypothesis 4: That consideration of disconfirmatory data would result in more accurate diagnosis.

Results did not support the hypothesis. Confirmatory bias did impact on diagnosis by significantly increasing the likelihood of a positive diagnosis, but this did not necessarily reduce accuracy as the rates of both true and false positive diagnoses were affected. In fact, for the case where diagnostic criteria were met (Case 7) the effect of confirmatory bias was to *increase* accuracy, with this finding showing a trend towards significance. While there was no significant association between confirmatory bias and diagnostic accuracy per se, a trend towards significance was found for the relationship between confirmatory bias and true positive diagnoses. Clinicians who demonstrated confirmatory bias were more likely than those who took disconfirmatory data into account to give a true positive diagnosis.

In sum, confirmatory bias was significantly more likely to lead to positive ADHD diagnosis, whether true or false. Conversely, taking disconfirmatory data into account was more likely to lead to a negative diagnosis, although here not at a significant level. Thus, confirmatory bias did not necessarily lead to less accurate diagnosis.

Implications for actual practice are that confirmatory bias, as demonstrated here, may produce a higher likelihood of a positive diagnosis. This will mean accurate diagnosis if a child has ADHD (i.e. meets criteria) and inaccurate diagnosis if the child does not (i.e. criteria are not met). Thus, while confirmatory bias may lead to the expected increase in false positive diagnoses (Eli, 1996), it is also likely to lead to an increase in true positive diagnoses. Conversely, looking at disconfirmatory data

95

might, for some, be problematic. Future research needs to examine both the issues of confirmatory bias and disconfirmatory bias.

In line with previous findings (Arkes, 1981), the present research found an inverse relationship, with a trend towards significance, between diagnostic accuracy and clinicians' confidence in the accuracy of their diagnosis. Clinicians giving an inaccurate diagnosis were more confident than those who gave an accurate diagnosis for the case studies.

7.5 Actual Practice – Assessment

In all, 126 clinicians responded to the survey question on assessment protocols. Findings were based on their replies. However, for various reasons, it is possible that clinicians did not fully indicate the steps they would take in their assessment practice regarding ADHD. Just because clinicians did not say they were following certain protocols does not necessarily mean that they are not doing so in actual practice. Any generalisation must therefore be cautious.

The mean number of assessment protocols used by clinicians was 6.9. The majority of clinicians indicated use of 10 or fewer steps in their ADHD assessment practice. Clinicians who demonstrated confirmatory bias used significantly fewer assessment steps compared to those who did not. No clinician indicated full adherence to recommended protocols (i.e. child & parent interviews covering a full history, review of parenting styles and family functioning, rating scale information, school/teacher information, child evaluation & observation, exclusion of comorbid disorders and external factors). The implication for actual clinical practice is that the assessment of ADHD that is occurring may be less thorough than recommended procedures indicate as optimal. Such a finding is in line with previous overseas research (Wolraich et al., 1990; Zarin et al., 1998).

The most utilised tool in the assessment of ADHD was collection of teacher/school information. A large majority would also take some type of history. Over half the clinicians would interview the parent(s) or family.

Rating scales were used by nearly half of respondents. For those who collect rating scale information, the majority gather both parent and teacher information. The most popular rating scale was the Conners Rating Scale (Conners, 1990).

Specialist referral was part of the assessment process for 42.1% of clinicians and the only assessment step noted for five clinicians. There was a significant relationship between professional discipline and referral to another clinician. Not surprisingly, those who tended to refer children least were specialist child mental health clinicians (i.e. child psychiatrists), and those who referred most were not specialist child mental health clinicians (i.e. GPs, paediatricians). This result is in line with the idea of 'best practice'. GPs tended to refer to child mental health services or to paediatricians. Paediatricians tended to refer to child mental health services or to psychologists. Of added note here is the fact that eight clinicians (6.3% of valid replies) gave unsolicited comments pertaining to the difficulty experienced in accessing specialist services for the assessment of ADHD.

The implication for actual practice is the possibility of multiple step-wise referrals for a child suspected of having ADHD, from an initial screening with their GP to a paediatrician and then on to a child mental health service, a psychologist, or both. The potential scenario is one of possible difficulty accessing specialist services, which might be due to a number of factors such as scarcity of specialised practitioners, high demand, multiple appointments for families, waiting list times, finance, and possible travel difficulties. In practical terms, multiple referrals may be problematic for a family that is conceivably already under much stress as a result of dealing with ADHD-type behaviours from their child.

Less than a third of respondents indicated that they would include an interview of the child in their assessment of ADHD. Lack of an interview may be appropriate when a child is at the lower end of the age group stipulated in the present research (i.e. 3-12 years). A child of three may be unable to give much verbal information regarding symptomatology and effects. However, interviewing the child would seem to be of added importance for older children and is a helpful part of any child assessment (Schwartz & Johnson, 1981). Children, particularly those of school-age, may conceivably be able to give information that parents may be unaware of (e.g. internalising symptoms, bullying, abuse). Furthermore, a diagnostic child interview is a component of recommended assessment protocols for ADHD (e.g. AACAP, 1997).

Of concern was the finding that nearly one-tenth of respondents indicated the use of a trial of medication (notably Ritalin) as part of the assessment procedure for ADHD. This finding echoes previous research findings (Copeland et al., 1987; Wolraich et al., 1990). However, a much lesser rate of medication use in diagnosis was reported by clinicians in the present study (9.5%) than was given in the two U.S. studies (77%, Copeland et al., 1987; 62%-73%, Wolraich et al., 1990). This decrease may be related to a trend over time, given the decade-long gap between the previous studies and the present research. Given research that indicates Ritalin can work regardless of whether a child has ADHD or not (Peloquin & Klorman, 1986; Rapoport et al., 1978), it may be better known that a drug trial should not be used as a diagnostic aid. Another difference which may have some effect on this finding is the mixed nature of professionals in the present study sample versus the solely medically trained samples of the two overseas studies. Also, the two overseas studies utilised a recognition, multichoice format, as opposed to the recall, open-ended question format of the present research. Thus, it 'cost' clinicians more time and effort to give this response in the present study.

Also of note was the finding that only two clinicians specifically indicated that the child's cultural background would be taken into account in the assessment process.

Culture helps to determine whether a child's behaviour is considered problematic (Davison & Neale, 1996). What is dysfunctional or 'abnormal' depends, by definition, on what is 'normal'. Thus, culture of the client is an important factor to consider in any mental health differential diagnosis, including the DSM-IV conditions (APA, 1994). It is of concern that this factor was so underreported in the present survey. While it is possible that clinicians simply did not report taking such a factor into account and that culture may be considered in actual practice, the present evidence suggests that at least some clinicians may not be attending to the culture of the client when making their diagnosis.

Overall, these results suggest that the full recommended assessment protocol for ADHD may not be being followed by some clinicians in New Zealand. While some clinicians appear to engage in a rather comprehensive assessment, others appear not to. Non-specialist practitioners were more likely to refer the child on, in most cases to a child mental health service. Findings here are limited by the response rate and by the open-ended nature of the question, which resulted in some clinicians giving non-specific and sometimes unclear responses.

In all, the present survey indicated some signs of good clinical practice, with less specialised clinicians referring children to more specialist practitioners. However, there were also some concerns raised regarding the comprehensiveness of the assessment procedures of clinicians and the continued use inappropriate tools (e.g. response to medication) by a minority of clinicians.

7.6 Actual Practice – Treatment

Responses on treatment recommendations in actual practice were received from 123 clinicians. The mean number of treatment options given was 4.2, with the majority of clinicians giving five or fewer options. As for the previous section, findings need to be interpreted with caution.

The most recommended treatment option for ADHD was medication or drug therapy. Some type of medication treatment was recommended by the majority of respondents. This supports recent findings (Zarin et al., 1998). Ritalin was the most preferred specified medication, noted by 51% of clinicians. This figure was slightly below that of previous research (Copeland et al., 1987; Sandoval et al., 1976; Wolraich et al., 1990).

Also in line with overseas findings, behavioural treatment was the next most popular treatment of choice (Bennett & Sherman, 1983; Copeland et al., 1987; Wolraich et al., 1990). In the present study, behavioural treatment was recommended by nearly half of clinicians. The difference in the present study between the two options of Ritalin and behaviour modification (1.6%) is less than is seen in other research (e.g. 9% difference, Copeland et al., 1987; 8%, Wolraich et al., 1990). However, the actual difference in New Zealand may be larger than the figure of 1.6%, as many clinicians gave 'medication' with no further specification as a treatment option. Conceivably, at least some of these clinicians would prescribe Ritalin, thereby altering the difference between the two options.

Over one-third of respondents also indicated treatment options including consultation or referral to other clinicians, and parenting advice or training. Nearly one-third of clinicians would recommend education about the disorder for the child or family. Approximately one quarter noted they would liaise with the school or teacher and one-fifth would recommend some type of educational assistance for the child. Only one clinician included dietary management as part of the treatment package for ADHD.

Few clinicians in the present study indicated they would monitor medication and even less reported some type of drug or treatment review as part of the treatment process. Only a small minority listed a medical check-up as part of the treatment protocol. If these figures are an accurate reflection of actual practice, concern is raised as regular monitoring and review of medication is a part of recommended

treatment practice (AACAP, 1997). However, a lack of report of monitoring or review does not mean that they do not occur. It may be that clinicians did not report such a procedure, perhaps taking for granted that medication would be followed by monitoring and regular review.

For those clinicians that ranked their order of preference plus those who gave only one option, some type of drug treatment was the most preferred treatment option. This was closely followed by referral to specialist services, which was the only option given by half of those clinicians giving this as their preferred treatment choice. Behavioural treatment was the third most preferred option. Ritalin was the only option given by 4.1% of those who replied to the treatment question.

The implications for actual practice are that medication is likely to be the preferred treatment for ADHD in New Zealand, with Ritalin as the primary drug of choice. Behavioural treatment is also likely to be recommended by many clinicians. Most clinicians indicated multiple treatment options. This is in line with recommended guidelines (e.g. AACAP, 1997). Also in line with good clinical practice, less specialised clinicians (e.g. GPs) appear likely to refer children on to more specialised practitioners. Dietary management looks unlikely to be recommended by many as a treatment option in the management of ADHD. Only a minority of clinicians reported regular monitoring or review of interventions. However, it cannot be known how accurately this reflects actual practice.

7.7 Factors Bearing on Confirmatory Bias

Results indicated that clinicians were more likely to consider disconfirmatory data if they reported reading psychological literature or gained knowledge through a residency/internship.

Clinicians who demonstrated confirmatory bias also used significantly fewer assessment steps than did those who took disconfirmatory evidence into account. In

practice, this may mean confirmatory bias results in less comprehensive assessment and premature identification of the client's problem (Haverkamp, 1993).

Gaining knowledge through completion of an internship or residency could be expected to improve the clinician's understanding of various disorders and the assessment procedures required. Interns or residents are under the supervision of specialist clinicians, with knowledge passed on through actual practice. Additionally, current specialists in child mental health might be more likely to have completed a residency or internship than would a non-specialist, such as a GP. Thus, it is not surprising that a residency or internship could increase the likelihood that a clinician would consider disconfirmatory data in diagnosis. However, it must be remembered that the present analyses address relationships based on correlational data and it is thus not possible to conclude causality.

While there was a significant relationship between gaining knowledge of ADHD via psychological literature and confirmatory bias, it is also not possible to conclude unequivocally that reading psychological literature increases clinicians' ability to take account of disconfirmatory data. It may be that those clinicians that take disconfirmatory data into account are more likely to read psychological literature, or there may be an unknown higher order factor influencing both confirmatory bias and the reading of psychological literature (e.g. conscientiousness). Close examination of literature from different disciplines would be required to determine whether psychological literature on ADHD varies in any noticeable way from other literature relating to the disorder. For instance, does psychological literature stress the need to consider disconfirmatory factors? Or does psychological literature present more evidence against the disorder than does literature from other disciplines? While further investigation would be useful to assist in explaining this finding, it is nevertheless encouraging to find that assessment comprehensiveness, accessing psychological literature, and specialist training are all related to more thorough diagnostic decision making.

102

7.8 Limitations of the Present Study

The present study had a number of limitations.

The greatest single impediment of any mail survey is non-response (Mangione, 1995). This is the case with the present study, due to the low return rate (30.2%) and particularly the low rate of useable survey data returned (23.2%). Therefore, present findings are subject to response bias (Leavitt, 1991; Mangione, 1995; Statistics NZ, 1995) and questions are raised as to the acceptability and reliability of results (Erdos, 1983; Mangione, 1995). The small sample sizes, due partly to the majority of clinicians giving a tentative diagnosis and thereby being excluded from analyses run on clear diagnoses only, reduced the power of statistical analyses.

Response rates for the present study were low in comparison to earlier U.S. surveys of clinicians, which had reported response rates ranging from 36%-80% (Bennett & Sherman, 1983; Copeland et al., 1987; Sandoval et al., 1976; Wolraich et al., 1990; Zarin et al., 1998). However, the study by Wolraich et al. (1990) had full data from only 23.3% of clinicians surveyed, a rate comparable to the present study. Furthermore, when numbers of participants are compared, the present study did have a larger number of usable replies (n=138) than that of Sandoval et al. (1976; n=48) and of Zarin et al. (1998; n=65). There were slightly less useable responses than the study by Wolraich et al. (1990; n=164).

Non-response may be due to many factors such as questionnaire length, difficulty, design, fear of information misuse, or personal issues such as illness. Interest may also be a factor in response (Dillman, 1978). Participants are approximately twice as likely to reply to a survey dealing with a high-interest topic (Martin, 1994). The predominant reasons for questionnaire non-completion given by declining participants in the present study were heavy workloads, retirement, and not working with children. From a common-sense perspective, lack of time to complete the questionnaire, and perceived non-applicability appear the most likely reasons for

non-response. This would be in line with explanations of non-response given in a previous survey on hyperactivity (Sandoval et al., 1976). One GP in the present study made comment that this was the fourth questionnaire on ADHD received within a year. While this clinician did actually respond, it may be that others did not due to a surfeit of questionnaires, echoing overseas findings that GP non-response was linked to feeling swamped by the number of surveys received (MacPherson & Bisset, 1995).

Sample selection was a limitation of the study. A number of clinicians who declined participation were retired or had no child clients. Medical listings give those practitioners currently registered to practice, with no information on retirement or some specialist sub-groups (e.g. child psychiatrists). Psychologist registration lists do not indicate the area of practice of the clinician or the specific qualification held (e.g. Clinical psychology, Educational psychology, Industrial/Organisational psychology). Thus, the sampling procedure netted clinicians for whom the survey was not applicable, with a likely impact on the response rate. More detailed listings of practitioners qualifications and areas of speciality would be helpful in allowing research to target specific sub-groups. A further limitation regarding sampling was the disproportionate numbers represented as potential participants. A much higher proportion of paediatricians (150/164 listed) and psychiatrists (150/269) were mailed surveys compared to GPs (150/5953).

A further limitation related to the sample selection was a modal figure of 0 for all questions relating to child client figures. The questionnaire would seem not directly applicable to those clinicians with no child clients and validity of the data may be compromised. However, only data from nine of these clinicians were included in analyses on accuracy of diagnosis, as other respondents with no child clients either gave a tentative diagnosis or did not answer the question. Several arguments may be made in favour of inclusion of the data from clinicians with no current child client load. For instance, these clinicians will have all received training covering ADHD, which is the most common childhood psychological disorder (Swanson et al., 1995).

Second, clinicians responding to the survey are all able to give the diagnosis in practice, even if they choose not to do so. Third, clinicians with an adult client load also need to be able to recognise symptoms of ADHD, as a diagnosis in adulthood is not precluded and will necessarily include information on the presence of symptoms in childhood (AACAP, 1997; Murphy & Gordon, 1998).

As the survey form was a prototype, there was no validity data previously available for the questionnaire beyond face validity. However, the questionnaire was systematically formulated, in consultation with a GP and a specialist clinical psychologist, with further pre-testing done via a pilot study. In addition, the pattern of many findings overall in some way support validity (i.e. they matched expectations).

The survey design and layout did not appear largely problematic for respondents, with the exception of questions regarding client numbers. Several clinicians were unsure whether this referred to 'new' clients, to the number of new and existing clients, or to the number of client appointments. Thus, the present data figures on client loads are less precise than would be desired. Clarification of what is meant by 'client' would be helpful in future research (e.g. one person = one client, regardless of the number of appointments per year).

Furthermore, due to the wording of the question on numbers treated, it remains unknown how many children received a diagnosis but were not treated for the disorder. Clarification of this situation would be assisted by further questions on client numbers (e.g. Of those diagnosed, how many received treatment of any kind? How many existing clients have an ADHD diagnosis, whether receiving treatment or not?).

Additionally, it may have been useful to define 'child' as being under 14 years, given indications by several clinicians that this was the age group dealt with in the child health services where they worked and so computerised statistical information was

automatically geared to this age range. However, to be of utility, it would be necessary to confirm that this was a widespread definition in practice.

Some difficulty was experienced in coding unclear answers to the questions on assessment and treatment practices. This resulted in missing data. Such problems could have been avoided through use of a checklist type format. However, while such a format was considered in the survey compilation stage, it was decided against as it could have biased response by offering leading choices. A main aim of the study was to survey actual practice. Generally, answers to the questionnaire were in line with the questions asked, giving an overall impression that survey design may not have been a large factor inducing non-response.

Survey 'order effects' cannot be controlled in a mail order survey (Dillman, 1978). Although respondents were requested to reply to the questionnaire in the order given, there can be no guarantee that such an instruction was followed. Additionally, while specific mention of ADHD was avoided in the cover letter, participants were able to read ahead and be aware of the childhood disorder in question (i.e. ADHD). Therefore, it is not possible to be assured of non-biased replies in the diagnoses of the case studies. While there is nothing to stop a participant changing a reply (Dillman, 1978), there was little indication of this occurring in questionnaires received. Few answers were crossed out or rewritten, and none were corrected with liquid paper, indicating that replies were likely to be the clinicians' original responses.

Another limitation of the survey is the veracity of self-report. It is possible that the emphasis given to error-free practice could result in clinicians giving an outline of known recommended assessment protocols rather than actual practice. However, this is argued against by the fact that no respondent gave a 'perfect answer' and outlined all recommended steps. While it is not possible to be certain that clinicians answered truthfully, it also remains equally likely that many did.

Using a hypothetical case study for diagnosis may limit the generalisability of results. Case studies present an artificial illustration in comparison to real clients. There may conceivably be motivational differences for clinicians between diagnosis for a case study and for an actual client (Elstein, 1988). In actuality, most clinicians surely would not diagnose based only on a written case study and many respondents indicated tentative diagnostic decisions. Additionally, the amount of information available to the clinician in a case study is limited only to what is written. However, such a criticism must also take account of the *"cognitive overload"* which occurs in practice (Elstein, 1988; p.38). Clinicians do not use all available information in diagnostic decision making (Sandifer et al., 1970; Schwartz, 1994; Ullman & Doherty, 1984). The aim was to present a case study in everyday language to assess diagnostic decision making procedures. Comments from clinicians regarding the case studies were positive, including a request for the case studies to be made available for teaching purposes in a medical school.

Despite the limitations of case studies, similar written material (e.g. a referral letter) is often part of the diagnostic procedure. As confirmatory bias would, by definition, be present from the very start of the assessment process, information from a referral letter may be of influential importance. Presentation of a written case study decreases reliance on memory, which could compound confirmatory bias (Arkes, 1981; Strohmer et al., 1990). Furthermore, paper case studies are an accepted part of clinical training. In addition, ethical guidelines may preclude use of actual clients in research. While results must be viewed with caution, case study material can be useful in presenting consistent information to large groups of people and in assessing aspects of the diagnostic process.

It is also important to note that data were descriptive and correlational, and thus do not allow for causative inferences. For example, while there was a significant relationship between confirmatory bias and gaining knowledge of ADHD via psychological literature, it is not possible to conclude that reading psychological literature increases clinicians' ability to take account of disconfirmatory data. It may

be that those clinicians that take disconfirmatory data into account are more likely to read psychological literature, or there may be an unknown higher order factor (e.g. conscientiousness) influencing both confirmatory bias and the reading of psychological literature.

7.9 Implications for Future Research

The present study has shown evidence of confirmatory bias in the diagnosis of ADHD. As response rates were low, replication of the study with higher response rates would be beneficial. One factor that might increase response would be to gain the support and endorsement of pertinent professional organisations.

Research could also extend the finding of confirmatory bias to examine other mental health diagnoses and to extrapolate those factors that may be associated with confirmatory bias. One possibility here is heightened awareness of a clinician regarding certain disorders. For example, do diagnostic rates of disorders show any change following the diagnostician's attendance at a course or seminar? Such research could assist in highlighting the issue of bias in diagnosis for both practising clinicians and students.

In particular, further investigation is warranted into the anomalous finding of the present study, where a higher rate of positive ADHD diagnoses were received for Case 5 than for Case 7. This result is puzzling, especially given that the symptoms present in Case 5 were also present in Case 7, and raises the question of whether it may be an initial indicator of *dis*confirmatory bias *against* the disorder. It may be that some clinicians have a reluctance to diagnose ADHD. This could perhaps be due to perceived ill-effects of, or bias against, stimulant treatment. There may also be some link with a belief in the overdiagnosis of the disorder, which includes belief about the validity of an ADHD diagnosis generally. Whatever the case, the possibility of underdiagnosis in actual practice is raised by the finding that clinicians

108

gave fewer ADHD diagnosis in a case which met criteria than in a case which did not, combined with the other findings discussed.

In replicating this study, diagnostic material could be extended to include information on the culture of 'Sam', to examine how much attention is paid by clinicians to this variable and to what extent this affects diagnosis. Case study material could be delivered by showing a video-taped interview, to allow the clinician to observe behaviour. Additionally, it would be interesting to extend the study to include an interview with clinicians. This would help gain more information to explain the diagnostic process and identify factors associated with confirmatory bias. It would also be useful to examine children already diagnosed with ADHD to determine actual diagnostic accuracy.

Thus, there are a number of issues raised by the present study that warrant further investigation. In particular, the phenomenon of false negative diagnoses in a case meeting ADHD criteria and the possibility of disconfirmatory bias against a diagnosis of this disorder deserves further study. Accuracy of diagnosis is of prime importance in clinical practice, for the ultimate benefit of the client. It is hoped that the findings of the present study will assist to heighten clinicians' awareness of the need for diagnostic accuracy, particularly in the area of ADHD, and help to ensure that children receive both accurate diagnosis and appropriate treatment.

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112

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115

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116

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Appendix A: *Research Questionnaire*

Diagnostic Protocols & Procedures - Childhood Mental Health

Please work through this questionnaire in the order presented.

General information

1. What is your professional affiliation? Please mark the most appropriate box or boxes.

Paediatrician... ☐

Child & Adolescent psychiatrist .... ☐

Psychiatrist (general or other specialist area)...................... ☐

General practitioner... ☐

Specified as a GP on the Medical Council Registration List?.... ☐

Child/Adolescent Clinical Psychologist............................ ☐

Clinical psychologist... ☐

On the NZCCP name release list for research purposes?........... ☐

Registered Psychologist.. ☐
Please give your level of qualification or New Zealand equivalent
(e.g. BA(Hons), MA, PhD etc.)

_____

Other - please specify _____

2. How many years since graduating with your professional qualification (as indicated above) have you been in practice, whether full-time or part-time?

_____

3. Where in New Zealand is your practice situated?

Town/City _____

Region/area/province _____

4. How many clients/patients have been seen by you in your practice over the past 12 months (total client load)? Please give your **best estimate** if specific figures are not readily available.

Is this an estimated figure? **Yes   No**

5. How many of the clients/patients seen by you in the last 12 months were children (up to and including 12 years)? Please give your **best estimate** if specific figures are not readily available.

Is this an estimated figure? **Yes   No**

6. Please indicate whether you are

Male...... ☐

Female... ☐

7. What is your age?   _____ years

8. Please indicate your ethnicity / cultural background by marking as many boxes as apply.

Asian...................................... ☐

New Zealand Maori........................ ☐

New Zealand Pakeha / European......... ☐

Pacific Island............................ ☐

Other - please specify _____

Case Study

Please read the following fictitious case study for which you will be asked to give your hypothesised diagnosis.

"Sam James"

"Sam" is a 7 year-old boy brought to you by his mother, Mary, who is "worried about how he is getting on at school". Sam is described as "always on the go, which has always been a bit of a problem at home, but it's now getting in the way of his learning". Although she has had concerns about Sam's behaviour for "a couple of years", Mary has been prompted to finally bring Sam to you following a parent-teacher interview last week with Sam's teacher, Mrs Brown.

Mrs Brown is concerned at Sam's level of activity during class time, especially his "inability to sit still". Sam fidgets when at his desk, although he doesn't actually leave his seat. He is easily distracted by those around him and by other activity in the classroom. Mary is concerned by this as "Sam needs to work hard and concentrate to achieve his best". Although both Mary and Mrs Brown consider him to be a "bright child, with real potential", Sam is "struggling" at school and is a "below-average student". He is in the third of four maths groups in his class and in the lowest of the five reading groups. According to his last school report (2 months ago) Sam is reading at a 5½ year level. He does finish assigned schoolwork although he "often takes quite a long time".

Mrs Brown doesn't find Sam overly talkative in class, which Mary confirms is also the case at home. His speech is normally developed and appropriate. He is "usually polite" and doesn't interrupt when others are speaking.

At home Sam usually plays with his brother (age 9). He "has never been good at playing quietly on his own, so it's a problem when his brother's not around". Sam particularly enjoys playing games on the family computer and playing in the sandpit. He is a keen rugby fan, and plays in a weekend midget rugby team.

Sam often mixes socially with his peers, although Mary expresses concern that he does not as yet have any "best" friend. Sam is good at sport and has represented his school in a number of events. He particularly enjoyed the swimming component of the school sport calendar, but had trouble with the other kids when he would "jump the queue, as usual" to practise diving off the low springboard. Despite being an able swimmer, Sam would not attempt a jump off the high diving board as he "doesn't like heights or climbing".

Sam's developmental history was "pretty normal". The pregnancy was uneventful apart from some mild morning sickness at around three months and Sam's delivery at 39 weeks was a normal birth. He walked at 10 months. Medical history includes measles at age 2, a broken arm as the result of a fall from a trampoline at age 6, and "sore throats and tummy bugs". Sam's hearing and vision are normal.

Sam's parents separated one year ago. Sam sees little of his father, who now lives in another city, with contact being "a week or so at Christmas and the occasional 'phonecall".

1. What is your **primary** hypothesised diagnosis regarding the case of "Sam"? Please check the appropriate box. **N.B.** If you wish to indicate more than one hypothesis, please give the order of preference, with 1 as most preferred hypothesis

Adjustment disorder.................	☐	Separation anxiety disorder......	☐
Anxiety disorder.....................	☐	Learning disorder...............	☐
Motor skills disorder...............	☐	Grief Reaction...................	☐
Attention-Deficit Hyperactivity Disorder	☐	School phobia...................	☐
Parent-child relational problem......	☐	Communication disorder........	☐
Reactive attachment disorder.........	☐	Oppositional Defiant Disorder...	☐
Antisocial behaviour..................	☐	Depression........................	☐
Conduct Disorder...................	☐	Neglect...........................	☐
Abuse-Physical, sexual, emotional ...	☐	Mental retardation..............	☐
Nothing/No disorder.................	☐	Don't know.....................	☐

Other - Please specify

_____

2. Please indicate your level of confidence regarding the accuracy of your hypothesis by circling the number most appropriate for you.

1	2	3	4	5
Not at all confident		Confident		Extremely confident

135

3. How did you arrive at this conclusion? i.e. What evidence did you take into account? (**N.B.** Alternatively, you may choose to highlight/underline the relevant evidence in the case study)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4. Please give any other comments you may wish to make regarding your hypothesised diagnosis of "Sam".

_____

_____

_____

_____

_____

_____

_____

Specific disorder information

The remaining items in this questionnaire focus on all forms of the childhood disorder of Attention-deficit/hyperactivity disorder (**ADHD**). For the purposes of this study, "children" refers to those up to and including 12 years of age.

9. In **your personal opinion**, regardless of any figures you may have read or be aware of, what is the prevalence rate of ADHD in New Zealand children? Please give a percentage figure between the range of 0% (no children in N.Z. have ADHD) and 100% (all children in N.Z. have ADHD).

_____

10. In your work with children, do you diagnose ADHD according to the criteria of

DSM-IV........................ ☐   ICD-10.................. ☐

I do not diagnose ADHD......... ☐   Not applicable........... ☐

Other - please specify _____

11. Please indicate on the following scale your level of knowledge regarding ADHD by circling the number most appropriate for you

1	2	3	4	5
No knowledge				Expert knowledge

12. From which of the following have you gained your knowledge of ADHD? Please tick all that apply.

Parent education literature.......☐   Residency/Internship ... ☐   Academic Training..☐

General practice literature.......☐   Paediatric literature...... ☐   Media articles........☐

Psychological literature ....☐   Psychiatric literature.... ☐   Specialist training...☐
                                                                      (workshops, seminars etc.)

Other - please specify _____

13. In the last 12 months, how many children have been seen by you for an opinion regarding a possible diagnosis of ADHD? Please give your **best estimate** figure if specific figures are not readily available.

_____

Is this an estimated figure? **Yes   No**

14. Over the past 12 months, how many children have you diagnosed as having ADHD? Please give your **best estimate** if specific figures are not readily available.

_____

Is this an estimated figure? **Yes   No**

15. Please **briefly** outline, in order of priority, the steps you would take in determining whether a child currently presenting at your practice had ADHD? (What information would you need and how would you obtain this?)

_____

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16. Over the past 12 months, how many children have you treated (with any treatment type) for ADHD? Please give your **best estimate** if specific figures are not readily available.

_____

Is this an estimated figure? **Yes   No**

17. What would be your usual recommended course of treatment for a child diagnosed with ADHD? **N.B.** If you wish to note more than one treatment method please indicate your order of preference, where 1 is the most preferred treatment option.

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If you wish to receive a personal copy of the summary of research findings from this study please remember to fill out and return the enclosed contact information sheet.

Thank you for your time and input into this study.

Yes, I would like to receive a personal copy of the summary of research findings,

Name : _____

Address : _____

_____

_____

_____

If posting separately, please mail to -

Freepost 86
Ms Julie Mickleson
School of Psychology
Massey University
Private Bag 11 222
PALMERSTON NORTH

Appendix B: Case Studies

Presented below are the three case studies. *For this appendix only,* positive ADHD symptoms are presented in bold and negative symptoms are italicised. In the present study, there was no highlighting or italicisation of presented symptoms in surveys sent to clinicians, and cases were identified only by the pseudonym.

Case Study 3 - "Sam Daniels"

"Sam" is a 7 year-old boy brought to you by his mother, Mary, who is "worried about how he is getting on at school". Sam is described as **"always on the go**, which has always been a bit of a problem at home, but it's now getting in the way of his learning". Although she has had concerns about Sam's behaviour for "a couple of years", Mary has been prompted to finally bring Sam to you following an interview last week with Sam's teacher, Mrs Brown.

Mrs Brown is concerned at Sam's level of activity during class time especially his "inability to sit still". Sam **fidgets when at his desk**, although he *doesn't actually leave his seat*. He is **easily distracted** by those around him and by other activity in the classroom. Mary is concerned by this as "Sam needs to work hard and concentrate to achieve his best". Although both Mary and Mrs Brown consider him to be a "bright child, with real potential", Sam is "struggling" at school and is a "below-average student". He is in the third of four maths groups in his class and in the lowest of the five reading groups. According to his last school report (2 months ago) Sam is reading at a 5½ year level. He *does finish assigned schoolwork* although he "often takes quite a long time".

Mrs Brown *doesn't find Sam overly talkative* in class, which Mary confirms is also the case at home. His speech is normally developed and appropriate. He is "usually polite" and *doesn't interrupt* when others are speaking.

At home Sam usually plays with his brother (age 9) but *"can play okay* on his own". Sam particularly enjoys playing games on the family computer and playing in the sandpit. He is a keen rugby fan, and plays in a weekend midget rugby team.

Sam often mixes socially with his peers, although Mary expresses concern that he does not as yet have any "best" friend. Sam is good at sport and has represented his school in a number of events. He particularly enjoyed the swimming component of the school sport calendar, *lining up time and again* to practise diving off the low springboard. Despite being an able swimmer, Sam would not attempt a jump off the high diving board as he *"doesn't like heights or climbing"*.

Sam's developmental history was "pretty normal". The pregnancy was uneventful apart from mild morning sickness at around three months and Sam's delivery at 39 weeks was a normal birth. He walked at 10 months. Medical history includes measles at age 2, a broken arm as the result of a fall from a trampoline at age 6, and "sore throats and tummy bugs". Sam's hearing and vision are normal.

Sam's parents separated one year ago. Sam sees little of his father, who now lives in another city, with contact being "a week or so at Christmas and the occasional 'phonecall".

Case Study 5 - "Sam James"

"Sam" is a 7 year-old boy brought to you by his mother, Mary, who is "worried about how he is getting on at school". Sam is described as **"always on the go**, which has always been a bit of a problem at home, but it's now getting in the way of his learning". Although she has had concerns about Sam's behaviour for "a couple of years", Mary has been prompted to finally bring Sam to you following a parent-teacher interview last week with Sam's teacher, Mrs Brown.

Mrs Brown is concerned at Sam's level of activity during class time, especially his "inability to sit still". Sam **fidgets when at his desk**, although he *doesn't actually leave his seat*. He is **easily distracted** by those around him and by other activity in the classroom. Mary is concerned by this as "Sam needs to work hard and concentrate to achieve his best". Although both Mary and Mrs Brown consider him to be a "bright child, with real potential", Sam is "struggling" at school and is a "below-average student". He is in the third of four maths groups in his class and in the lowest of the five reading groups. According to his last school report (2 months ago) Sam is reading at a 5½ year level. He *does finish assigned schoolwork* although he "often takes quite a long time".

Mrs Brown *doesn't find Sam overly talkative* in class, which Mary confirms is also the case at home. His speech is normally developed and appropriate. He is "usually polite" and *doesn't interrupt* when others are speaking.

At home Sam usually plays with his brother (age 9). He "has **never been good at playing quietly** on his own, so it's a problem when his brother's not around". Sam particularly enjoys playing games on the family computer and playing in the sandpit. He is a keen rugby fan, and plays in a weekend midget rugby team.

Sam often mixes socially with his peers, although Mary expresses concern that he does not as yet have any "best" friend. Sam is good at sport and has represented his school in a number of events. He particularly enjoyed the swimming component of the school sport calendar, but had trouble with the other kids when he would **"jump the queue, as usual"** to practise diving off the low springboard. Despite being an able swimmer, Sam would not attempt a jump off the high diving board as he *"doesn't like heights or climbing"*.

Sam's developmental history was "pretty normal". The pregnancy was uneventful apart from some mild morning sickness at around three months and Sam's delivery at 39 weeks was a normal birth. He walked at 10 months. Medical history includes measles at age 2, a broken arm as the result of a fall from a trampoline at age 6, and "sore throats and tummy bugs". Sam's hearing and vision are normal.

Sam's parents separated one year ago. Sam sees little of his father, who now lives in another city, with contact being "a week or so at Christmas and the occasional 'phonecall".

Case Study 7 - "Sam Philips"

"Sam" is a 7 year-old boy brought to you by his mother, Mary, who is "worried about how he is getting on at school". Sam is described as **"always on the go**, which has always been a bit of a problem at home, but it's now getting in the way of his learning". Although she has had concerns about Sam's behaviour for "a couple of years", Mary has been prompted to finally bring Sam to you following a parent-teacher interview last week with Sam's teacher, Mrs Brown.

Mrs Brown is concerned at Sam's level of activity during class time especially his "inability to sit still". Sam **fidgets when at his desk**, and often **"wanders around the classroom** when he should be working". He is **easily distracted** by those around him and by other activity in the classroom. Mary is concerned by this as "Sam needs to work hard and concentrate to achieve his best". Although both Mary and Mrs Brown consider him to be a "bright child, with real potential", Sam is "struggling" at school and is a "below-average student". He is in the third of four maths groups in his class and in the lowest of the five reading groups. According to his last school report (2 months ago) Sam is reading at a 5½ year level. He *does finish assigned schoolwork* although he "often takes quite a long time".

Mrs Brown *doesn't find Sam overly talkative* in class, which Mary confirms is also the case at home. His speech is normally developed and appropriate. He is "usually polite" and *doesn't interrupt* when others are speaking.

At home Sam usually plays with his brother (age 9). He "has **never been good at playing quietly** on his own, so it's a problem when his brother's not around". Sam particularly enjoys playing games on the family computer and playing in the sandpit. He is a keen rugby fan, and plays in a weekend midget rugby team.

Sam often mixes socially with his peers, although Mary expresses concern that he does not as yet have any "best" friend. Sam is good at sport and has represented his school in a number of events. He particularly enjoyed the swimming component of the school sport calendar, but had trouble with the other kids when he would **"jump the queue**, as usual" to practise diving off the high board. Mary reports he has **"always loved to climb** - keeping an eye on him can be a nightmare".

Sam's developmental history was "pretty normal". The pregnancy was uneventful apart from some mild morning sickness at around three months and Sam's delivery at 39 weeks was a normal birth. He walked at 10 months. Medical history includes measles at age 2, a broken arm as the result of a fall from a trampoline at age 6, "sore throats and tummy bugs". Sam's hearing and vision are normal.

Sam's parents separated one year ago. Sam sees little of his father, who now lives in another city, with contact being "a week or so at Christmas and the occasional 'phonecall".

143

Appendix C: Letter of Introduction

Clinical Diagnosis of Childhood Mental Disorders

Dear Clinician,

Tena koe. This letter invites your participation in nationwide research regarding New Zealand clinicians' current diagnostic protocols and procedures in assessing childhood mental health. Your input would be a highly valuable contribution to give a complete picture. The study is being undertaken as part of a Masterate thesis and my supervisor for this project is Dr. Kevin Ronan, a senior lecturer at Massey University and a specialist in the area of child and adolescent psychology.

Participation is entirely voluntary, involving completion of the brief survey enclosed and giving your hypothesis for a one-page hypothetical case study. The whole questionnaire will take around 15-30 minutes to fill out. Completion and return of the questionnaire (in the reply-paid envelope provided) will be regarded as giving your informed consent to participate in this study.

Your rights, as stated in the Massey University Code of Ethical Conduct booklet are :
- To decline participation
- To refuse to answer any particular question
- To have privacy and confidentiality protected
- To ask questions at any time
- To be given access to a summary of the findings when the study is concluded

Confidentiality is of vital importance in this research. The questionnaire is anonymous. You may request a summary of research results by completing the enclosed name and address form and returning this with your returned survey. Contact information will be immediately separated from research material, stored securely and separately, and will in no way be linked to survey data. Alternatively, you may send it separately by the freepost return noted. No-one other than the researcher and supervisor will have access to contact information. All contact information will be destroyed at the end of the study.

If you require further details regarding this study you can telephone me on (025)2612208, e-mail Julie.Mickleson.1@uni.massey.ac.nz, or write to me c/o the School of Psychology office, Massey University, Private Bag 11222, Palmerston North. Alternatively, you can contact my supervisor, Dr. Kevin Ronan, on (06) 350 5799 ext.2069.

Please consider completing and returning the enclosed questionnaire.

With regards,

Julie Mickleson

Appendix D: Reminder Letter

Dear Clinician

As you may remember I contacted you by mail a short while ago to request your participation in a nationwide survey involving the diagnostic protocols and procedures of New Zealand clinicians in assessing childhood mental health. Attached to that questionnaire was a return sheet for contact information to assist in providing feedback of research results to participants.

I note that you have not yet returned a contact sheet. I am writing as a reminder to those who may wish to participate in the research but have not yet had time to complete the questionnaire, to request your prompt reply. To those who may have returned the questionnaire anonymously, thank you for your valuable input and for giving your time in assistance of this study.

If you have further queries regarding the questionnaire, or wish to request a replacement copy, please feel free to contact me on (025) 2612208, e-mail Julie.Mickleson.1@uni.massey.ac.nz, or writing c/o the School of Psychology office, Massey University, Private Bag 11222, Palmerston North. Alternatively, you can contact my supervisor, Dr. Kevin Ronan, on (06) 350 5799 ext.2069.

With thanks for your input and participation in this research,

Regards,

Julie Mickleson

Appendix E: Sources of Knowledge for Clinicians from the Various Disciplines

Percentages of clinicians from professional groups who indicated various sources of knowledge regarding ADHD.

Source	Paediatrician (*n*=57)	Child Psychiatrist (*n*=7)	Psychiatrist (*n*=18)	GP (*n*=25)	Child Psychologist (*n*=11)	Clinical Psychologist (*n*=16)	Reg'd Psychologist (*n*=3)
Parent education lit.	17.8	5.7	-	28.0	45.5	31.1	33.3
Residency/Internship	32.1	43.0	27.8	-	54.5	25.0	-
Academic Training	46.4	85.7	50.0	8	81.8	50.0	66.6
General Practice lit.	5.4	14.3	-	80.0	9.1	12.5	33.3
Paediatric literature	98.2	71.4	-	20.0	27.3	31.3	66.6
Media articles	16.1	28.6	11.1	24.0	18.2	18.8	-
Psychological lit.	17.9	71.4	11.1	12.0	100.0	81.3	66.6
Psychiatric literature	37.5	100.0	83.3	4.0	90.9	56.3	-
Specialist training	62.5	100.0	38.9	24.0	27.3	43.8	66.6

Note. - = no data, not applicable

Appendix F: Relationships Between Attention Paid to Positive and Negative Symptoms

Chi-square statistics for relationships between attention paid to symptoms that were positive (p) in all three case studies and symptoms that were negative (n) in all three cases.

	Talkativeness (n)	Ability to finish tasks (n)	Interrupts others (n)
Hyperactivity (p)	$\chi^2 = 1.316$ $n=129$ $p = .251$	$\chi^2 = 2.583$ $n=129$ $p=.108$	$\chi^2 = 2.642$ $n=129$ $p=.104$
Distractibility (p)	$\chi^2 = 1.857$ $n=130$ $p=.173$	$\chi^2 = 14.800$ $n=130$ $p=.000$	$\chi^2 = 4.581$ $n=130$ $p=.032$
Fidgetiness (p)	$\chi^2 = 2.336$ $n=130$ $p=.126$	$\chi^2 = 15.916$ $n=130$ $p=.000$	$\chi^2 = 7.660$ $n=130$ $p=.006$

Note. df=1

Appendix G: Clinicians' Assessment Practice

Frequencies and percentages of clinicians who answered Question 15 (*n*=126) clearly indicating the use of each protocol in their ADHD assessment practice.

Assessment Protocol Used	Frequency	Percentage
School/teacher information (e.g. reports, rating scale, interview)	104	82.5
History (unspecified)	100	79.4
Parent/family interview	75	59.5
Use of any standardised rating scales	59	46.8
Specialist referral	53	42.1
Observation of child (in any setting)	52	41.3
Medical examination of child	49	38.9
Differentiate comorbid conditions	39	31.0
Use of both parent & teacher rating scale information	37	29.4
Child interview	34	27.0
Presence of DSM symptoms	33	26.2
Developmental history of child	33	26.2
Family history	29	23.0
Psychological testing (e.g. I.Q., WISC, neuropsychological testing)	31	22.5
Consultation with other providers (e.g. GP, health nurse)	20	15.9
Medical history of child	19	15.1
Assess relationships with others	19	15.1
Consideration of biopsychosocial stressors (e.g. trauma, abuse)	19	15.1
Look at development and context of symptoms	18	14.3
Behavioural history of child	17	13.5
Multiple setting observations	17	13.5
Observation in clinician's office	16	12.7
Observation at school	13	10.3
Trial of Ritalin or other medication	12	9.5
Interview significant others (e.g. extended family)	10	7.9
Social history of child	9	7.1
Observation at home	7	5.6
Psychiatric history of child and/or family	6	4.8
Assess onset/length of time symptoms have been present	6	4.8
Review parenting skills	5	4.0
Mental status exam	4	3.2
Observation of child with parents/family	4	3.2
Consideration of the child's cultural background	2	1.6

Appendix H: Clinicians' Treatment Practice

Frequencies and percentages of clinicians (*n*=123) giving various options for treatment of ADHD

Treatment Options	Frequency	Percentage
Any medication/drug treatment	105	85.4
Ritalin	63	51.2
Behavioural treatment (e.g. behavioural modification)	61	49.6
Consultation with or Referral to other providers	53	43.1
Parenting advice and/or training	46	37.4
Medication (unspecified)	46	37.4
Education	36	29.3
Liaison with school and/or teacher	31	25.2
Educational assistance/input	25	20.3
Stimulant medication (unspecified by name)	22	17.9
Drug trial	21	17.1
Treatment of comorbid conditions	19	15.4
Psychological treatment (unspecified)	18	14.6
Family therapy	17	13.8
Monitoring of medication	16	13.0
Individual therapy	13	10.6
Dexamphetamine	13	10.6
Social skills training	12	9.8
Medication is only option given	11	8.9
Support group for parents	11	8.9
Treatment/drug review	9	7.3
Cognitive therapy	8	6.5
Adjustment of stress factors at home and/or school	4	3.3
Individualised treatment package	3	2.2
Medical check-up	3	2.4
Play therapy	2	1.6
Dietary management	1	0.8

Appendix I: Factors Bearing on Confirmatory Bias

Relationships between confirmatory bias & demographic and survey factors

Demographic/Survey Factors	Test value	df	p
Professional affiliation	$\chi^2=6.805$	3	.078
Experience (years practice)	$t=.615$	122	.540
Location – urban/rural	$\chi^2=0.82$	1	.775
Gender of clinician	$\chi^2=.372$	1	.542
Age of clinician	$t=.373$	122	.710
Ethnicity – New Zealand Pakeha	$\chi^2=1.136$	1	.286
Personal opinion of ADHD prevalence	$t=.999$	104	.320
Use of DSM criteria	$\chi^2=.065$	1	.799
Use of ICD criteria	$\chi^2=.359$	1	.549
Does not diagnose ADHD in practice	$\chi^2=2.525$	1	.112
Total number of children in practice	$t=-.552$	120	.582
Number of children seen for an opinion	$t=-.963$	123	.337
Number of children diagnosed	$t=-1.504$	121	.294
Number of children treated for ADHD	$t=-1.321$	27	.115
Number of steps in assessment process	$t=-2.000$	116	.048*
Level of knowledge regarding ADHD	$t=-.429$	124	.668
Education source – Parent education literature	$\chi^2=.662$	1	.416
-Residency/Internship	$\chi^2=3.917$	1	.048*
-Academic training	$\chi^2=.105$	1	.756
-General Practice literature	$\chi^2=3.695$	1	.055
-Paediatric literature	$\chi^2=1.893$	1	.169
-Media articles	$\chi^2=1.842$	1	.175
-Psychological literature	$\chi^2=6.115$	1	.013*
-Psychiatric literature	$\chi^2=.839$	1	.360
- Specialist training (e.g. workshops, seminars)	$\chi^2=.120$	1	.730