UNDERSTANDING DRIVING-RELATED FEAR

A thesis presented in partial fulfilment of
the requirements for the degree of
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To my family, who have travelled this road with me,
and some of whom I hope will have a go at reading this thesis
so they can see what it is I've been doing all this time.

ABSTRACT

Driving-related fear (*DRF*) has been investigated predominantly through research on the psychological consequences of motor vehicle accidents. There is a small but growing literature documenting the characteristics of DRF within a broader population. These few studies have described DRF as diagnostically complex and difficult to characterise in terms of clear anxiety disorders. Particularly problematic is the frequent presence of many different foci of fear and fear cognitions that are typically used to distinguish the various anxiety disorders. In addition, driving skills in those who report DRF has been a neglected issue in previous studies. The central aim of the present study was to conduct a comprehensive examination of the clinical characteristics of those who report DRF. Such an investigation would help to generate a clearer understanding of the nature of DRF and subsequently inform approaches to assessment and treatment.

The present research comprised two separate studies. Study One aimed to ascertain the need for more comprehensive research by comparing the characteristics of drivers who were fearful as a result of a motor vehicle accident (*MVA*) with those who developed their DRF through other means. Participants were 85 media-recruited volunteers who reported some degree of DRF. Questionnaire data provided information on the types of concerns and expectations while driving, as well as various measures of anxiety and fear severity. There were few prominent differences between those who attributed their DRF to an MVA and those who reported some other reason for their fear. In addition, the data suggested useful preliminary subtypes of DRF that would benefit from further research attention.

Study One then provided the impetus for Study Two, which entailed a more comprehensive investigation of the clinical characteristics and subtypes of DRF, as well as an examination of the role of driving skills in DRF. Study Two involved a quasi-experimental approach to the analysis of data from media-recruited driving-fearful and control groups each comprised of 50 participants. The control group was matched by average age and years of driving experience. All participants completed an initial questionnaire that provided demographic data as well as information about driving

history and DRF. Various self-report measures of anxiety, fear, and avoidance behaviour were included in the initial questionnaire. Subsequently, those participants who met selection criteria underwent a diagnostic interview, further self-report questionnaires, and a practical driving assessment. Measures of self-rated and instructor-rated participant anxiety and driving skill were completed in conjunction with the driving assessment, mainly to ascertain the potential impact of test anxiety on the assessment results.

Fearfuls were characterised by the reported severity of DRF when compared with controls. Helpseeking behaviour was not reflected in the relatively high levels of fear, anxiety, and avoidance behaviour reported by the fearful group. This was of particular concern given that almost half of the fearfuls met diagnostic criteria for at least one anxiety disorder. Social concerns (i.e., the perceptions of others) as a focus of fear were evident throughout the assessment, and fearfuls rated a higher likelihood of being involved in an MVA than controls, as well as higher levels of concern about the negative reactions of other drivers and injuring other people while driving. Subtypes of DRF were identified and will be an important focus for future research. In what is thought to be the first investigation of driving skills in DRF, the practical driving assessment found that fearfuls made more errors than controls. However, the pattern of errors was identical for both groups, indicating that fear and anxiety may affect the *number* rather than the *type* of errors made. The relationship between DRF and driving skills was discussed and then placed within the context of broader theories of driver behaviour.

While the present research has served to further the understanding of DRFs and, in particular, has provided a starting point for understanding the role of driving skills in such fears, many avenues for future research are suggested. Additional studies will help to further clarify the findings of the present research, and to develop more clearly the kinds of practical and clinical recommendations that form the basis of efficient and effective treatment for DRF.

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PREFACE

> The 20th century will go down in history as a time of incredible change and technological progress. One 20th century phenomenon has transformed the way we live, possibly more than any other - the mass production and wide availability of motor vehicles.
>
> Cars, trucks, and motorcycles have given us freedom of movement, quick and reliable transport and the ability to move goods easily from one place to another. The direct and indirect contribution of automobiles to the global economy is immeasurable.
>
> Unfortunately, the age of the car has also been the age of the car crash. And the trauma of crashes *is* [italics added] measurable. Today there are an estimated 700,000 killed world-wide every year.
>
> Like most countries, New Zealand has been hit hard by road crashes. Since the first known fatal crash in Christchurch in 1908, an estimated 32,700 people have lost their lives on our roads. ("The 20th century road toll", 1999, p. 4)

The above quote succinctly captures the double-edged nature of the invention of the automobile, by highlighting the major economic advancements enabled by such an invention that are coupled with the introduction of fatalities and injuries associated with travel in an automobile.

As at March 12th, 2002, the road toll stood at 82, with 437 killed in the last year on our roads (Land Transport Safety Authority, n.d.). Such statistics are reflected in the wealth of research on survivors of MVAs, which has comprehensively investigated the psychiatric, psychological, social, legal, medical, and cognitive (amongst others) sequelae of MVAs, as well as issues for assessment and treatment (e.g., see Blanchard & Hickling, 1997).

In an attempt to understand the causes of MVAs, researchers have studied an exhaustive array of human factors, including mood, aggression, risk-taking behaviour, fatigue, stress, age, gender, brain injury, drug-taking behaviour, and psychiatric symptomatology (Little, 1970; Shinar, 1978). Anxiety is another factor that has been studied in relation to driving, although has featured more frequently as a *consequence* (such as post-traumatic stress disorder) than a *cause* of motor vehicle accidents.

More recently, researchers have begun to document the presence of anxiety, fears, and phobias related to driving in samples not selected solely for their post-MVA status (Ehlers, Hofmann, Herda, & Roth, 1994; Taylor & Deane, 1999). Furthermore, preliminary research by Taylor and Deane (2000) found a lack of differences between those with MVA- and non-MVA-related driving fears on various measures of fear severity. In light of this finding, Taylor and Deane called for a more comprehensive investigation of DRF. The present research aims to answer this call.

As part of this answer, driving skills are raised as an area to be assessed that has been notably absent from previous research on DRF. This focus necessitates a review of the literature on general theories of driving as well as theory and research on the relationship between anxiety and driving. The intention in reviewing this material is to provide a context for the present study, which is particularly important given the novel consideration of driving skills. This further required an exploratory and descriptive focus to driving skills in the present study.

It was considered important in the first instance to gain detailed information about driving skills in a group of people with DRF, and that this information could then be used, in combination with further studies, to develop a theoretical position on the relationship between driving-related fear and driving performance, based on a collection of research rather than a single study. While the present study therefore did not intend and was not designed to expound a theory about this relationship, attempts were made to locate and integrate the results with existing research and theory.

Finally, various abbreviations are used throughout this thesis. Those for *driving-related fear* (i.e., *DRF*), *motor vehicle accident* (i.e., *MVA*), and *standard deviation* (i.e., *SD*) remain consistent throughout. Abbreviations for psychometric measures are initially presented in relation to the particular measure and are reiterated in later sections for ease of reading. Data are presented rounded to two decimal places, except for some of the results of factor and cluster analyses in which output is given to three decimal places.

Chapter One

INTRODUCTION

Driving can be regarded as a fundamental ability that is frequently utilised on a daily basis in modern society. Driving is often considered essential for travelling to and from places of employment, as well as a means of transport to enable contact with family, friends, and leisure and social activities. In particularly populated and busy urban areas, an inability to drive can have an impact on contact with activities and other people. The ability to drive a car is a means of maintaining independence and mobility, and contributes to quality of life and well-being. Fear of driving has the potential to severely restrict these freedoms.

People who are fearful of driving are an extremely diverse group in terms of severity of fear, the types of situations that provoke fear, avoidance behaviour, and fear symptoms. Although the majority of research on DRF has employed samples of MVA survivors, no studies have compared the severity of symptoms in such samples with those of other groups who report DRF. If DRF is not solely related to MVAs, the potential sample of people with DRF will be much larger and will warrant the same level of research attention that has been afforded MVA survivors. The few existing studies of the broader driving-fearful population have suggested that DRF is a diagnostically complex problem that is difficult to characterise as a single type, and seems to feature many different foci and fear cognitions.

The few studies of samples from the broader driving-fearful population have reported considerable difficulty in differentiating DRF, particularly from other types of anxiety disorders. Similar issues have arisen in research on flying phobia. However, more recently, researchers have begun to identify and examine subtypes of flying phobia, largely based on the focus of fear (McNally & Louro, 1992; Van Gerwen, Spinhoven, Diekstra, & Van Dyck, 1997). It has been suggested that further clarification of these subtypes would better inform the assessment and treatment process. Anxiety and danger expectancies have emerged as defining characteristics of the subtypes of flying phobia. The existence of subtypes may have implications for differential treatment components, with the potential to make the assessment and therapy process more efficient and effective (McNally & Louro, 1992; Van Gerwen et al., 1997). Further research is needed to explore the possibility of subtypes of DRF, and the present study aims to address this need.

An important area that does not seem to have been investigated in studies of fearful drivers is the role of driving skills. Fear and anxiety have the potential to affect driving in a number of ways and to manifest in a variety of skill components. However, it is not known at this point how fearful drivers' skills are affected by anxiety and whether anxiety helps or hinders driving. If a subgroup of fearful drivers does have difficulty with driving skills, or lacks confidence in their ability to drive, then these factors could also have potential implications for assessment and treatment. For example, differing clinical characteristics may help to determine whether a particular individual would benefit from an assessment of their driving skills. Such an assessment may then identify areas of skill deficit that could be addressed as part of an intervention package.

The central aim of the present study was to conduct a comprehensive examination of the clinical characteristics of those who report DRF to obtain a better understanding of the nature of DRF, and subsequently inform approaches to assessment and treatment. The present research comprised two studies. ***Study One*** sought to establish the need for further research by comparing the characteristics of drivers who were fearful as a result of an MVA with those who developed their fear through some other mechanism. In addition, Study One included an exploratory investigation of possible subtypes of DRF. ***Study Two*** was a more comprehensive investigation of subtypes, with the inclusion of both diagnostic and skill assessments. Study Two also examined the role of driving skills in DRF, with a view to identifying factors that would suggest the need for a driving assessment, as well as recommendations for how this assessment might help in specifying the treatment of those with DRF. The present study undertook detailed assessments of groups of media-recruited driving-fearful individuals. The sample for

Study One was obtained through a one-year follow-up of a larger sample used in previous research upon which the present study is partly based (Taylor, 1996). Study Two recruited an additional sample of people with DRF, and this group was compared with a control group who were similar in age and gender, and who had an equivalent number of years of driving experience, but who were not driving-fearful.

Several objectives were proposed in conjunction with the central research aim. Fearful and control drivers were described and compared using a variety of demographic and driving-related variables, diagnostic and self-report psychometric measures, and a practical driving measure. The research identified whether there were any differences between drivers who were fearful as a result of an MVA and those whose DRF developed through some other means, whether there were subtypes of DRF, and how driving skills affected DRF and fitted within the possible subtypes.

Chapter Two reviews the research on DRF, highlighting important definitional issues, reviewing the research on MVA survivors as well as other samples of driving-fearful individuals, detailing the diagnostic issues that have arisen in prior research, and setting Study One in the context of current research findings. ***Chapter Three*** details the methodology, sample, measures, and data analysis procedures used in Study One. ***Chapter Four*** presents and discusses the results of Study One. ***Chapter Five*** then draws on these results to describe the rationale for Study Two. Relevant literature on flying phobia is used to provide a point of comparison for Study Two. A conceptual overview of existing models and theories of driving skills is also presented, followed by a review of the research on the relationship between driving skills and anxiety. Chapter Five concludes with an overview of the aims and objectives of Study Two.

Chapter Six describes the methodology employed in Study Two, along with the sample, measures, and methods of data analysis used. Chapters Seven, Eight, Nine, and Ten present the results and discussion of analyses in Study Two. ***Chapter Seven*** describes the demographic and driving-related variables. ***Chapter Eight*** puts the driving-fearful sample in a context by comparing them with the control group on a wide range of driving-related variables. ***Chapter Nine*** reports the results of the driving skills assessments and examines the relationships between these measures. ***Chapter Ten*** presents the results for a typology of DRF, and discusses the practical implications of such a finding. Here, the relationship between driving anxiety and driving performance is explored. ***Chapter Eleven*** summarises the present findings in terms of the research objectives and discusses the methodological, theoretical, and practical implications, including discussion of the limitations of the present study. Suggestions are made for future research on driving-fearful samples with a view to enhancing our understanding of and clinical approach to this seemingly common presenting problem.

Chapter Two

DRIVING-RELATED FEAR

This Chapter reviews the literature on DRF, which has emerged primarily from studies of MVA survivors as well as media-recruited volunteers. Taylor, Deane, and Podd (in press; see Appendix A-1) have conducted a recent review of the research on DRF, upon which this Chapter is based. Previous research has featured a myriad of different definitions for DRF, and a call is made for more consistent terms of reference. The focus in prior research on MVA survivors is also considered, and the potential for a broader sample of driving-fearfuls discussed. One of the difficulties that has arisen in previous studies with driving-fearful samples is how DRF matches to single diagnoses. The apparent overlap between phobic and panic anxiety in driving-fearful samples has been particularly problematic, and studies have concluded that driving-fearfuls are relatively heterogeneous in nature. Ehlers et al. (1994) have attempted to better understand DRF by developing potential subtypes of clinical characteristics associated with such fear. However, further research is needed to confirm and refine these subtypes which, if validated, may have important implications for assessment and treatment.

INTRODUCTION

The concept of fear has occupied a prominent place in the psychological literature for decades (Hoch & Zubin, 1950). Researchers, theorists, and clinicians from diverse backgrounds have investigated fear, and few other human emotions have been as extensively studied (Gray, 1991; Spielberger & Krasner, 1988). However, there is some ambiguity regarding the nature of fear and how anxiety relates to it (Bamber, 1979; Barlow, 1988). It is important to clarify the concepts of fear and anxiety because of their wide (and often inconsistent) usage in the literature on DRF.

ISSUES OF DEFINITION

Anxiety and Fear

Anxiety is an emotional state that can range in severity and duration, and can help or hinder action and thought (Lewis, 1980). Anxiety manifests as a response involving physiological (e.g., rapid heartbeat or muscle tension), behavioural (e.g., avoidance), and cognitive (e.g., worry or apprehension) components (Bourne, 1990; Levitt, 1980). Distinctions within the concept of anxiety have been made, and one particularly important distinction is that between *state* and *trait* anxiety. Trait anxiety is considered a stable personality characteristic, whereas state anxiety is more transitory and fluctuates across situations, dependent on conditions (Levitt, 1980; Spielberger, 1985; Spielberger & Krasner, 1988; Weissman, 1985). Originally proposed by Cattell and Scheier (1961), this state-trait typology of anxiety brought about a fundamental change in the orientation towards and investigation of anxiety, and the distinction between state and trait anxiety is now widely accepted (Levitt, 1980).

The distinctions between anxiety and *fear* have been enumerated by several authors, although definitions of each concept tend to be rather diverse (Lewis, 1980). Anxiety is generally considered to be an internally-focused response to a vague, distant, or unacknowledged danger, while fear tends to be directed towards some concrete, external situation or object (Bourne, 1990; May, 1950; Wolman, 1994). Attempts to discern the differences between the concepts of anxiety and fear have been based on the stimulus for the reaction, the specificity of the reaction, and the proportionality of the reaction (Levitt, 1980). Although these parameters may be of potential utility in a clinical sense, they tend to be of less value in research and theory (Levitt, 1980; Taylor & Arnow, 1988). In addition, there is little empirical evidence that the symptoms associated with anxiety and fear differ from each other physiologically, behaviourally, or cognitively (Costello, 1982; Nietzel, Bernstein, & Russell, 1988). Therefore, conceptual distinctions between anxiety and fear are ambiguous, and the two terms have been used interchangeably in the general fear literature (e.g., Edelmann, 1992; Rachman, 1968; Rowan & Eayrs, 1987; Withers, 1994; Wolman & Stricker, 1994).

Phobia

While fear may cause anxiety and result in minor interference with everyday life, a *phobia* involves marked interference with daily activity (Agras, 1985; Bourne, 1990). Degree is the primary defining distinction between fears and phobias (Emmelkamp, 1982). A phobia can be defined as a specific kind of fear that is out of proportion to the reality of the situation, cannot be explained away, is largely beyond voluntary control, and leads to avoidance of the feared object or situation (Agras & Jacob, 1981; Emmelkamp, 1982; Kaplan, Sadock, & Grebb, 1994; Mavissakalian & Barlow, 1981; Thyer, 1987). The main classifications for phobias according to the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV; American Psychiatric Association, 1994) are: (1) specific phobia, whose central feature is a marked and persistent fear of a specific object or situation (e.g., flying, heights, animals, seeing blood, or driving); (2) social phobia, whose central feature is an intense fear of being watched or evaluated by others, as well as fear of public embarrassment or humiliation; and (3) agoraphobia, which is a more complex cluster of fears, but relates mainly to fears about being in situations where escape may be difficult or help unavailable in the event of having a panic attack or experiencing panic-like symptoms.

It is relevant to note that these various types of phobia are distinguished in their diagnostic definitions by the focus of *fear*. Because most of the existing research attempts to document the incidence of various anxiety disorders among their samples, the present study uses the term *fear*, which is assumed to incorporate the concept of anxiety. Further, the present research uses the term *driving-related fear* (or *DRF*), primarily because of the diagnostic heterogeneity that is apparent in prior research. This point will become clearer later in this Chapter. Another reason for the use of a more generic term is that the existing research is replete with inconsistent definitions and studies of varying levels of fear, as the following section illustrates.

Usage of Terminology in the Literature on Driving-Related Fear

A confusing array of labels have been associated with DRF, including *amaxophobia*, *ochophobia*, and *motorphobia*, all of which mean *fears of vehicles* (Doctor & Kahn, 1989). Research on the consequences of accidents in general has been conducted, but will only be reviewed briefly here because of the mixture of other types of accidents in addition to MVAs in these studies. Research on DRF has come primarily from studies of survivors of MVAs, but there are also a few studies of other clinical and general community samples. These studies have employed varying definitions of DRF, and such inconsistencies have probably contributed to markedly different findings, particularly with respect to incidence rates (Taylor, 1996).

Table 2.1 provides a summary of the studies on DRF, grouped by the nature of the sample utilised. *General Accident Research* consists of studies of victims of MVAs as well as other types of accidents, such as work-related and industrial accidents. *MVA Research* consists of medical, legal/medical, and clinical studies of survivors of MVAs. This group of studies includes samples who were referred for medical complaints, assessment of pain and other somatic symptoms after an MVA, or for a medico-legal opinion. Other samples had sought medical attention after an MVA, or were referred by physicians to private psychological practices for post-MVA treatment or evaluation. This group of studies also includes samples involved in civil accident litigation. *Non-Clinical Research* comprises studies in which participants were recruited through their responses to advertisements in newspapers or news telecasts on television for people who were afraid of driving. Within each group, studies are listed in alphabetical order.

The various definitions used to capture DRF are also summarised in Table 2.1. It is clear that these definitions differ across studies, and in some cases no definition of the term used is provided. Varying incidence rates of DRF have been found with different definitions and samples. The following sections break down the research based on different terms used to examine the issue of definitional inconsistency in more detail.

Table 2.1. *Summary of the studies investigating driving-related fear.*

Study	Description of sample	Term used	Definition	Incidence
General Accident Research				
Culpan & Taylor, 1973, NZ	71 41 MVAs 38% F *M* age NR	Phobia Anxiety	NR	6% 11%
Jones & Riley, 1987, Australia	327 41% F *M* age NR	Phobia Anxiety disorder Anxiety symptoms	DSM-III-R	22% 6% 82%
Malt, 1988, Norway	113 52 MVAs 25% F *M* age 36	Anxiety disorder Fear of trauma-related stimuli	DSM-III	4% 29%
Parker, 1977, Australia	296 50% F *M* age NR	Phobia	NR	35%
MVA Research				
Blanchard, Hickling, Taylor, & Loos, 1995; Blanchard, Hickling, Taylor, Loos, Forneris, & Jaccard, 1996, USA	158 68% F *M* age 35	Driving phobia	Avoidance of all driving or endurance of necessary driving with subjective discomfort	6%
		Driving reluctance	Avoids MVA site	21%
			Avoids certain driving aspects	14%
			Avoids driving or riding for pleasure	21%
Blanchard, Hickling, Taylor, Loos, & Gerardi, 1994, USA	50 64% F *M* age 34	Driving phobia	Complete avoidance of driving for psychological reasons	2%
		Driving reluctance	Avoidance of certain aspects of driving	100%
Dalal & Harrison, 1993, UK	56 gender/*M* age NR	Phobic travel anxiety Anxiety disorder	NR	11% 18%
Hickling & Blanchard, 1992; Hickling, Blanchard, Silverman, & Schwarz, 1992, USA	20 85% F *M* age 35	Driving phobia	Kuch et al.'s (1985) criteria	60%
Hickling, Blanchard, Schwarz, & Silverman, 1992, USA	12 92% F *M* age 31	Driving phobia	Kuch et al.'s (1985) criteria	42%
Hobbs, Mayou, Harrison, & Worlock, 1996, UK	54 43% F *M* age NR	Phobic travel anxiety	NR	33%

Table 2.1. *(continued). Summary of the studies investigating driving-related fear.*

Study	Description of sample	Term used	Definition	Incidence
Horne, 1993, Australia	7 71% F *M* age 31	Phobic anxiety	Various DSM-III-R PTSD sub-criteria	57%
Kuch, 1989, Canada	80 66% F *M* age NR	Specific post-traumatic phobia	NR	71%
Kuch, Cox, & Direnfeld, 1995, Canada	54 56% F *M* age 41	Accident phobia	DSM-III-R simple phobia and PTSD criteria B (distress) and C (avoidance)	26%
Kuch, Cox, Evans, & Shulman, 1994, Canada	55 66% F *M* age 38	Accident phobia	DSM-III-R simple phobia with onset after an MVA and fear of an MVA	38%
Kuch, Evans, Watson, Bubela, & Cox, 1991, Canada	33 52% F *M* age 43	Accident phobia	DSM-III-R phobic disorder Onset and fear content were related to an MVA Symptoms and behaviour focus on potential repetition of the MVA	49%
Kuch, Swinson, & Kirby, 1985, Canada	30 73% F *M* age NR	Driving phobia	Avoidance of, or reduction in, driving, or endurance of necessary driving with marked discomfort	77%
Mayou, Bryant, & Duthie, 1993, UK	188 21% F *M* age 30	Phobic travel anxiety	Present State Examination criteria	14%
Vingilis, Larkin, Stoduto, Parkinson-Heyes, & McLellan, 1996, Canada	149 38% F *M* age NR	Fear of driving Fear of cars	Self-report during interview	38% 25%
Non-Clinical Research				
Ehlers et al., 1994, USA	56 82% F *M* age 48	Driving phobia	DSM-III-R simple phobia (driving)	70%
Mathew, Weinman, Semchuk, & Levin, 1982, USA	48 81% F *M* age 42	Driving phobia	Interview data (anxiety was inappropriate and excessive and interfered with lifestyle)	100%
Munjack, 1984, USA	30 83% F *M* age NR	Driving phobia	NR	100%

Note. NZ = New Zealand. USA = United States of America. UK = United Kingdom. Description of sample refers to sample size (*n*), percentage of female participants (% F), and mean age in years (*M* age). NR = not reported. DSM-III-R = Diagnostic and Statistical Manual of Mental Disorders-Third Edition, Revised (American Psychiatric Association, 1987). DSM-III = Diagnostic and Statistical Manual of Mental Disorders-Third Edition (American Psychiatric Association, 1980). PTSD = post-traumatic stress disorder. Incidence refers to the percentage of cases meeting criteria according to the term used. All numerical values are rounded to the nearest whole number.

Driving Phobia. Studies using the term *driving phobia* have come from both MVA and non-clinical research. Table 2.2 summarises the studies investigating driving phobia as the phenomenon of interest (extracted from Table 2.1 for ease of examination).

Table 2.2. *Summary of the studies investigating driving phobia.*

Study	Description of sample	Term used	Definition	Incidence
MVA Research				
Blanchard et al., 1995, 1996, USA	158 68% F *M* age 35	Driving phobia	Avoidance of all driving or endurance of necessary driving with subjective discomfort	6%
		Driving reluctance	Avoids MVA site	21%
			Avoids certain driving aspects	14%
			Avoids driving or riding for pleasure	21%
Blanchard et al., 1994, USA	50 64% F *M* age 34	Driving phobia	Complete avoidance of driving for psychological reasons	2%
		Driving reluctance	Avoidance of certain aspects of driving	100%
Hickling & Blanchard, 1992; Hickling, Blanchard, Silverman, et al., 1992, USA	20 85% F *M* age 35	Driving phobia	Kuch et al.'s (1985) criteria	60%
Hickling, Blanchard, Schwarz, et al., 1992, USA	12 92% F *M* age 31	Driving phobia	Kuch et al.'s (1985) criteria	42%
Kuch et al., 1985, Canada	30 73% F *M* age NR	Driving phobia	Avoidance of, or reduction in, driving, or endurance of necessary driving with marked discomfort	77%
Non-Clinical Research				
Ehlers et al., 1994, USA	56 82% F *M* age 48	Driving phobia	DSM-III-R simple phobia (driving)	70%
Mathew et al., 1982, USA	48 81% F *M* age 42	Driving phobia	Interview data (anxiety was inappropriate and excessive and interfered with lifestyle)	100%
Munjack, 1984, USA	30 83% F *M* age NR	Driving phobia	NR	100%

Note. USA = United States of America. Description of sample refers to sample size (*n*), percentage of female participants (% F), and mean age in years (*M* age). NR = not reported. DSM-III-R = Diagnostic and Statistical Manual of Mental Disorders-Third Edition, Revised (American Psychiatric Association, 1987). Incidence refers to the percentage of cases meeting criteria according to the term used. All numerical values are rounded to the nearest whole number.

In these studies, driving phobia has been defined in quite different ways, which has consequently led to a range of findings regarding incidence. The main difference appears to be whether complete avoidance of driving is required. Blanchard and Hickling (1997) define driving phobia "as either complete elimination of all driving or severe restriction of all driving" (p. 87). These stringent criteria have probably led to lower rates of driving phobia among their samples of MVA survivors. Using similar samples, Kuch, Swinson, and Kirby (1985) and Hickling and Blanchard (1992) have employed less restrictive criteria for driving phobia in which complete avoidance is not required, and have subsequently found much higher rates of driving phobia, ranging from 42% to 77%. Non-clinical research has also reported high rates of driving phobia, although this is probably accounted for by the fact that samples in these studies were recruited for the presence of DRF.

Blanchard, Hickling, Taylor, and Loos (1995) have a separate definition for *driving reluctance*, that includes "lesser degrees of avoidance: avoidance of all discretionary (driving for pleasure) driving or riding, and avoidance limited to the accident site or certain classes of driving situations (high-speed highways, rainy or snowy weather, etc.)" (p. 500). They consider that their definition of driving reluctance more closely approximates Kuch, Cox, Evans, and Shulman's (1994) criteria for accident phobia, reviewed below.

Accident Phobia. Table 2.3 provides summary information (from Table 2.1) of studies investigating *accident phobia.* While some authors have defined driving phobia as meeting the Diagnostic and Statistical Manual of Mental Disorders-Third Edition, Revised (DSM-III-R; American Psychiatric Association, 1987) criteria for simple phobia of driving (Ehlers et al., 1994), others have used the same (i.e., DSM-III-R) definition for accident phobia, as well as requiring that the fear onset, content, symptoms, and behaviour be related to an MVA (Kuch et al., 1994; Kuch, Evans, Watson, Bubela, & Cox, 1991). Kuch et al. (1994) diagnosed accident phobia as follows:

> ...when there was an intensification of symptoms associated with exposure to driving, a fear-related substantial reduction of miles normally travelled, when driving was restricted to certain roads, weather conditions, drivers, and seats in the car, and when there was excessive cautioning of the driver by the patient. (p. 183)

In their more recent study, Kuch, Cox, and Direnfeld (1995) also included various criteria for post-traumatic stress disorder (PTSD) in their diagnosis of accident phobia. Incidence rates reported from these studies range from 26% to 49%, even with relatively similar definitions of accident phobia.

Table 2.3. *Summary of the studies investigating accident phobia.*

Study	Description of sample	Term used	Definition	Incidence
MVA Research				
Kuch et al., 1995, Canada	54 56% F *M* age 41	Accident phobia	DSM-III-R simple phobia and PTSD criteria B (distress) and C (avoidance)	26%
Kuch et al., 1994, Canada	55 66% F *M* age 38	Accident phobia	DSM-III-R simple phobia with onset after an MVA and fear of an MVA	38%
Kuch et al., 1991, Canada	33 52% F *M* age 43	Accident phobia	DSM-III-R phobic disorder Onset and fear content were related to an MVA Symptoms and behaviour focus on potential repetition of the MVA	49%

Note. Description of sample refers to sample size (*n*), percentage of female participants (% F), and mean age in years (*M* age). NR = not reported. DSM-III-R = Diagnostic and Statistical Manual of Mental Disorders-Third Edition, Revised (American Psychiatric Association, 1987). PTSD = post-traumatic stress disorder. Incidence refers to the percentage of cases meeting criteria according to the term used. All numerical values are rounded to the nearest whole number.

Other Definitions. The remaining research has used a variety of other terms to refer to DRF, as Table 2.4 shows. These studies have used MVA survivors, and report a range of incidence rates for relatively poorly defined terms, although most refer to *phobic travel anxiety*.

Table 2.4. *Summary of the studies using other definitions for driving-related fear.*

Study	Description of sample	Term used	Definition	Incidence
MVA Research				
Dalal & Harrison, 1993, UK	56 gender/*M* age NR	Phobic travel anxiety	NR	11%
		Anxiety disorder		18%
Hobbs et al., 1996, UK	54 43% F *M* age NR	Phobic travel anxiety	NR	33%
Horne, 1993, Australia	7 71% F *M* age 31	Phobic anxiety	Various DSM-III-R PTSD sub-criteria	57%
Mayou et al., 1993, UK	188 21% F *M* age 30	Phobic travel anxiety	Present State Examination criteria	14%
Vingilis et al., 1996, Canada	149 38% F *M* age NR	Fear of driving	Self-report during interview	38%
		Fear of cars		25%

Note. UK = United Kingdom. Description of sample refers to sample size (*n*), percentage of female participants (% F), and mean age in years (*M* age). NR = not reported. DSM-III-R = Diagnostic and Statistical Manual of Mental Disorders-Third Edition, Revised (American Psychiatric Association, 1987). PTSD = post-traumatic stress disorder. Incidence refers to the percentage of cases meeting criteria according to the term used. All numerical values are rounded to the nearest whole number.

Summary. The existing literature on DRF is characterised by definitional inconsistency, and this has affected reports of incidence rates (Blaszczynski, Gordon, Silove, Sloane, Hillman, & Panasetis, 1998). Studies employing MVA survivors have featured the highest variability of definitions, particularly regarding whether complete avoidance of driving is required for diagnosis. Despite definitional differences, a number of studies on DRF have investigated post-MVA fear and anxiety related to driving. However, there is a need for future research to use consistent definitions to enable better comparisons across studies. These issues have implications for the definition used in the present study. As discussed above, the present study will use the term *driving-related fear* (*DRF*). This term is useful as it incorporates all levels of fear severity and also applies in cases where fear is indirectly related to driving, such as fear of being a passenger in a car (Koch & Taylor, 1995; Mayou, Bryant, & Duthie, 1993).

DRIVING-RELATED FEAR RESEARCH

Motor Vehicle Accident Research

As discussed earlier, a significant proportion of the research on DRF has focused on the psychological consequences of MVAs, particularly PTSD (e.g., Blanchard & Hickling, 1997; Epstein, 1993; Green, McFarlane, Hunter, & Griggs, 1993; Hickling & Blanchard, 1999; Horne, 1993; Koch & Taylor, 1995; Kuch, Cox, & Evans, 1996; Kuch et al., 1985, 1991, 1994; Taylor & Koch, 1995). While such research has greatly enhanced our understanding of the consequences of MVAs, this focus appears to have inadvertently led to a relative neglect of the broader driving-fearful population, as the limited available research in this broader area indicates.

Non-Motor Vehicle Accident Research

There are only a few studies of DRF in general community samples of people who identify themselves as having some degree of DRF, not necessarily related to an MVA. These studies are summarised under *Non-Clinical Research* in Table 2.1, and will be reviewed in more detail here.

Mathew, Weinman, Semchuk, and Levin (1982) appear to have been the first investigators to recognise the need for research on DRF. They recruited 48 people who responded to a newspaper article about DRF and invited participation in a study on the topic. The main criteria for the study were that participants expressed having some degree of anxiety while driving under normal city conditions, identified their fear as inappropriate and excessive, and felt that their fear seriously interfered with their lifestyle. All 48 met these criteria and were therefore considered driving phobic, although the authors did not report whether or not any specific diagnostic criteria were used in the interviews with participants. Driving-fearfuls were represented by more women (81%) than men. Compared with an age- and gender-matched control group, driving-fearfuls reported significantly higher levels of anxiety while driving in both normal and difficult situations, and 48% avoided driving on motorways, in congested traffic, and in fast-moving traffic. In addition, 42% of the driving-fearfuls reported other coexisting phobias, such as fear of leaving home, fear of heights, and claustrophobia, compared with only 6% of the controls. These phobias are often associated with panic attacks (Williams, 1985). Mathew et al. found that about half of the driving-fearfuls could explain their DRF in terms of another fear, such as heights (avoiding overpasses) and claustrophobia (avoiding tunnels), and they therefore suggested that the term *driving phobia* only be used for those whose fear relates specifically to driving.

In an investigation of the onset of driving phobias, Munjack (1984) selected 30 people who were found to have driving phobias from 178 who called a phobia clinic in response to a news broadcast about phobias. During a 20-minute standardised telephone interview, each caller was asked about anxiety and other symptoms, although Munjack did not report the criteria used to diagnose driving phobia. As with Mathew et al.'s (1982) study, most (83%) of the driving-fearfuls were female. The main focus of Munjack's study was on the origin of driving phobias, and 70% of participants reported "a history of a specific conditioning experience - due to a collision, an upsetting occurrence directly associated with driving or 'an endogenous or spontaneous panic attack' " (1984, p. 306). This further supports the notion that factors other than MVAs can contribute to the onset of DRF.

Ehlers and colleagues (Ehlers et al., 1994; Hofmann, 1992; Sartory, Roth, & Kopell, 1992) recruited 56 driving phobics (82% female) and 31 controls (77% female) from advertisements in local newspapers. Participants underwent a rigorous and comprehensive assessment process consisting of a behavioural avoidance test, structured interviews, and a number of self-report questionnaires. Ehlers et al. diagnosed driving phobia according to the DSM-III-R criteria for simple phobia using the Structured Clinical Interview for DSM-III-R (Sandoz version; Spitzer, Williams, Gibbon, & First, 1989, cited in Ehlers et al., 1994) and scores on the Mobility Inventory (Chambless, Caputo, Jasin, Gracely, & Williams, 1985), a measure of agoraphobic avoidance. Of the phobics, 70% ($n = 39$) met criteria for simple phobia of driving, while 14% ($n = 8$) were diagnosed with panic disorder (with or without agoraphobia) and 11% ($n = 6$) with agoraphobia without history of panic disorder. The remaining three phobics did not meet either simple phobia criteria C (immediate anxiety response), D (avoidance or endurance with intense anxiety), or both. None of the controls met criteria for an anxiety disorder. Ehlers et al. found that driving phobics were anxious in a range of situations, especially driving on freeways (i.e., motorways), whether accompanied or driving alone. Driving phobics rated more anxiety and discomfort than controls in all driving situations assessed by the Driving Situations Questionnaire (Ehlers, 1990). Driving phobics also had higher scores than controls on various measures of fear severity. MVAs were reported to be the primary reason for the driving phobia in 15% of cases, while 53% reported panic attacks as the main reason for the driving phobia.

Taylor and colleagues (Taylor, 1996; Taylor & Deane, 1999, see Appendix A-2; Taylor, Deane, & Podd, 1999, see Appendix A-3) have conducted more recent studies on DRF. Using media recruitment, Taylor and Deane assessed 190 driving-fearfuls, the majority of whom were female (92%). Participants completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin of DRF, fear strength, and anxiety response patterns. MVAs were reported as the cause of DRF in 27% of cases, while 15% reported onset events that involved distressing symptoms of anxiety.

In summary, the handful of studies that have investigated DRF in general population samples have found a range of feared driving situations as well as relatively high levels of anxiety and avoidance. These studies have highlighted the role of panic anxiety in DRF, rather than MVAs as the sole onset circumstance. The broader driving-fearful population needs further investigation, particularly to determine whether there are any differences in the clinical characteristics of those whose DRF is attributable to an MVA and those whose fear developed through some other mechanism.

Research Comparing MVA- and Non-MVA-Related Driving Fear

In a preliminary study, Taylor and Deane (2000, see Appendix A-4) attempted to address the apparent gap in the literature where the broader driving-fearful population has been relatively neglected. This study was part of the research by Taylor and Deane (1999) discussed above, and used the same sample for the MVA and non-MVA comparisons. Of the 190 participants, 140 (74%) had experienced at least one MVA (henceforth, *MVA group*), and 50 had not experienced an MVA in their lifetime (henceforth, *non-MVA group*). The two groups were compared on measures of fear severity, interference of fear in daily functioning, and helpseeking behaviour.

There were no significant differences between the two groups on measures of the physiological and cognitive components of fear (the Bodily Reactions and Negative Thoughts scales from Öst and Hugdahl's [1981] Phobic Origins Questionnaire). On the six-item short-form of the State Trait Anxiety Inventory (Marteau & Bekker, 1992), no differences emerged between the MVA and non-MVA groups. There were also no differences in terms of how much the fear interfered with daily functioning and avoidance of obtaining a driver's licence. The MVA group was no more likely than the non-MVA group to have sought prior help from a mental health professional for any personal or emotional problems. In addition, of the 140 participants who had been in MVAs, only 78 (56%) attributed their fear to an MVA. The remaining 62 (44%) who did not ascribe the onset of their DRF to an MVA made other fear-onset attributions, suggesting that an MVA does not necessarily lead to fear onset. When those who attributed their fear to an MVA (n = 78) were compared with those who did not (n = 112), again no differences were found on the measures noted above.

In summary, Taylor and Deane (2000) found no significant differences between MVA and non-MVA groups on various measures of fear severity. It could have been expected that the MVA group would report greater levels of distress and fear severity than the non-MVA group due to the traumatic nature of MVAs and their consequences. The lack of differences found by Taylor and Deane highlighted that, while the non-MVA group exhibits symptoms of a similar severity to those who have experienced an MVA, they have not received the attention in prior studies that has been afforded MVA survivors. It can be concluded from this research that the driving-fearful population appears to be much broader than has been previously realised, and Taylor and Deane suggest that "further studies are needed to investigate the clinical characteristics of this increasingly diverse population" (p. 16). The first aim of Study One in the present research programme was to further clarify whether there were differences between MVA and non-MVA groups.

HETEROGENEITY OF DRIVING-RELATED FEAR

Diagnostic Issues

One of the problems that has arisen in non-clinical studies of DRF is the difficulty with diagnostic conceptualisation. In the only study of the broader driving-fearful population that has included diagnoses based on the DSM, Ehlers et al. (1994) noted that their sample was "not easy to diagnose by DSM-III-R" (p. 335). These researchers described both the heterogeneity of media-recruited driving phobics and the difficulty in relating clinical presentations to single diagnoses (Ehlers et al., 1994; Herda, Ehlers, & Roth, 1993; Hofmann, 1992; Sartory et al., 1992). From their clinical and research experience, they expected that most of their participants would be diagnosed with either panic disorder, where fear of driving would be part of the cluster of agoraphobic avoidance, or simple (specific) phobia, in which driving phobia was post-traumatic in origin, subsequent to an MVA. They also proposed a third possibility, social phobia, where fear of driving was linked with performance anxiety (Herda et al., 1993).

Despite their initial expectations, Ehlers et al. (1994) found that their driving phobics were not able to be classified into single DSM-III-R categories. Hofmann (1992) noted that driving phobia "cannot be defined by a single DSM-III-R diagnosis" (p. 133). Instead, driving phobics tended to meet criteria for multiple diagnoses. Of particular concern was the difficulty in relating these diagnoses to the primary presenting problem of fear of driving (Herda et al., 1993). Ehlers et al. found that driving phobics manifested features of specific phobia and panic disorder with agoraphobia without meeting full criteria for either disorder. For example, 44 (81%; $n = 54$ due to missing data) of the phobics reported panic attacks, but only 8 of them (15%) met full criteria for panic disorder (with or without agoraphobia). Furthermore, panic attacks were often not specific to the driving situation; 19 (35%) participants had panic attacks only in driving situations, 7 (13%) in other than driving situations, and 18 (33%) in both driving and other situations. Ehlers et al.'s diagnoses also differed according to how criterion A for specific phobia was interpreted. Criterion A for DSM-III-R states that specific phobia is a persistent fear of a circumscribed stimulus (object or situation) other than fear of having a panic attack (as in panic disorder) (American Psychiatric Association, 1987). Since 37 (69%) participants who reported panic attacks were afraid of having such attacks in the driving situation, Ehlers et al. could either exclude all participants with a fear of panic attacks in driving situations, or only exclude those who met panic disorder criteria. By excluding all participants with a fear of panic attacks in driving situations, 10 (19%) met criteria for specific phobia, while 30 (56%) were classified into the diagnostic category of anxiety disorder not otherwise specified.

Ehlers et al. (1994) commented that many of their participants were similar to the case study of the "Former Pilot" in the DSM-III-R Casebook (Spitzer, Gibbon, Skodol, Williams, & First, 1989, pp. 188-189). The pilot suddenly became highly anxious during an uneventful flight. He gave up flying after repetition of the anxiety during the next few times he attempted flying. There was no other psychiatric history apart from two unexpected anxiety episodes while driving. In diagnostic terms, the pilot did not meet the criteria for specific phobia because his main fear was of having a panic attack. Neither did he meet the DSM-III-R criteria for panic disorder because he had only one clear attack and two additional possible attacks (Spitzer et al., 1989). There was no persistent fear of another panic attack, as the fear was limited to being at the controls of an aeroplane. His avoidance was limited to flying an aeroplane, thereby excluding him from the diagnosis of agoraphobia without history of panic disorder. Therefore, the authors gave him the diagnosis of anxiety disorder not otherwise specified (Spitzer et al., 1989). Similarly, Ehlers et al. reported that the main fear of their driving phobics appeared to be of anxiety attacks, although most did not meet the full criteria for panic disorder. Simple (specific) phobia was also a questionable diagnosis because of the difficulty in interpreting criterion A, particularly the inability to include fears that are part of panic disorder or agoraphobia.

The advent of DSM-IV may have provided a solution to these problems. One major change in the diagnosis of specific phobia in DSM-IV from simple phobia in DSM-III-R was the requirement in the fourth revision to specify phobia type as *animal* type, *natural environment* type (e.g., heights, storms, or water), *blood-injection-injury* type, *situational* type (e.g., planes, lifts, enclosed places, or driving), and *other* type. These categories were included on the basis of research recommendations (Antony, Brown, & Barlow, 1997) suggesting that subtypes of specific phobia differ on various dimensions, such as etiology, age of onset, gender ratio, and anxiety response patterns (e.g., Craske & Sipsas, 1992; Curtis, Hill, & Lewis, 1990; Curtis, Himle, Lewis, & Lee, 1989; Himle, McPhee, Cameron, & Curtis, 1989; Hugdahl & Öst, 1985). This is very different from earlier conceptualisations of specific phobia as a homogeneous entity. Criteria for specific phobia now allow for the possibility that exposure to the feared stimulus results in a panic attack, although the panic attack is situationally specific, rather than apparent in a variety of situations as in panic disorder (Kaplan et al., 1994). Despite this clarification in DSM-IV, it still appears that driving phobia contains multiple foci of fear that are difficult to separate. Hofmann (1992) noted that:

> In driving phobics anxiety usually rises in anticipation of entering a driving situation and rises further thereafter. The rate of rise may depend on the rate of approach to feared situations. This means that driving phobics are afraid of both aversive increases in anxiety and the driving situation, since the two usually occur together. Driving phobics often describe this increase of anxiety in the fearful situation as 'panic attacks'. (p. 134)

In addition:

> Categorizing phobias by the nature of fear cognitions seems also insufficient. In performance and other situational phobias, the anxiety itself is aversive, the deterioration of performance is dangerous or embarrassing, and the situation usually becomes an object of avoidance. Quantitative variations in the specific balance between categories of fear cognitions are probably unsuitable for assigning phobics to the presumably qualitatively different diagnoses of Panic Disorder (fear of anxiety and its symptoms), Simple Phobia (fear of external situations), Social Phobia (fear of embarrassment), or Generalized Anxiety Disorder (worry about 'life circumstances' such as 'academic, athletic, and social performance'). Driving phobics are afraid of both aversive increases in anxiety and the driving situation, since the two usually go together. (p. 135)

Typically, driving phobics have a mixture of all of these kinds of thoughts, including fear of anxiety, external situations, and embarrassment (Ehlers et al., 1994). Despite attempts to create distinct categories of specific phobia types, it has been suggested that the boundary between particular specific phobias and other anxiety disorders is unclear, particularly in the case of situationally-specific phobias (Curtis et al., 1989). Some researchers (e.g., Curtis et al., 1989; Himle, Crystal, Curtis, & Fluent, 1991) have indicated that situationally-specific phobias share more features of the dimensions of panic disorder and agoraphobia than other specific phobia types. In an overview of the evidence for this relationship, it was noted that similarities between situational specific phobia and agoraphobia have been found in terms of age of onset (mean onset age in the twenties), etiology (occurrence of unexpected panic attacks), and focus of apprehension (physical symptoms) (Antony et al., 1997).

These issues mean that the differential diagnostic distinctions for anxiety disorders appear rather arbitrary for specific performance phobias (Ehlers et al., 1994). Chapman (1997) also notes the difficulty in differentiating specific phobias from agoraphobia, in that some studies have combined fears of tunnels or bridges, crowds, and public transport into an *agoraphobia* category only (e.g., Eaton, Dryman, & Weissman, 1991). However, such fears may also be indicative of specific phobia rather than agoraphobia (Fyer & Klein, 1992, cited in Chapman, 1997), and the procedure has misclassified those with specific phobia as *agoraphobics without panic* (Horwath, Lish, Johnson, Hornig, & Weissman, 1993; McNally, 1997). Some investigators conclude that situational phobias (such as phobias of driving and flying) are not a variant of agoraphobia (e.g., Antony et al., 1997). Other authors have found that it is difficult to distinguish phobic from panic anxiety (Craske, 1991; Himle et al., 1989, 1991). A complicating factor involves the common presentation of DRF as a component of agoraphobic anxiety and avoidance (Kuch & Shulman, 1989). Indeed, some authors consider that driving phobia may occur either as a set of apparently isolated symptoms or more commonly as part of panic disorder and agoraphobia (Himle et al., 1989, 1991).

Problems with the diagnosis of specific phobia for driving using DSM-IV have also been outlined by Blanchard and Hickling (1997). They noted that this diagnosis is problematic for the following reasons:

> (a) the anxiety may be better accounted for by another mental disorder (i.e., PTSD), and (b) the anxiety may not invariably provoke an immediate anxiety response. There may also be occasions when the driving does not expose the individual to the specific triggers necessary for a phobic response. Finally, the response may not be seen so much as a fear than as a situation that triggers uncomfortable memories, affect, and anxiety. (p. 247)

Herda et al. (1993) have presented four clinical vignettes that illustrate the symptomatic and diagnostic complexity of their driving phobics. Case 4 is provided in Appendix A-5 to highlight the issues raised by the above discussion.

In summary, DRF has been found to be diagnostically complex, although the use of DSM-III-R and the associated difficulty in diagnosing specific phobia where panic attacks are specific to the driving situation may have played a role in these findings. Nevertheless, it appears that features inherent in DRF overlap across different diagnostic entities, and that those with DRF tend to have a mixture of fear-related cognitions that would usually be a source of differential diagnosis among the anxiety disorders (Ehlers et al., 1994).

Typology and Driving-Related Fear

The apparent heterogeneity of DRF has led to attempts to identify specific DRF subtypes. This has been pursued to gain a better understanding of the factors that might differentiate among potential subtypes, and to develop more refined assessment and treatment procedures. Ehlers et al. (1994) were the first group of researchers to investigate potential subtypes. They identified subtypes of driving phobics on the basis of the subjective reason for the phobia, or the onset circumstances. Phobics were grouped according to the primary reason they gave for their phobia: 8 who chose *traumatic experiences* were assigned to the *Trauma* group, 29 who chose *panic attack* were assigned to the *Panic Attack* group, and 11 who chose either *generally anxious person* or *generally afraid of high speed or enclosed spaces* were assigned to the *Other Anxieties* group. These three groups accounted for 87% ($n = 48$) of Ehlers et al.'s phobics ($n = 55$ due to missing data).

The groups did not differ in terms of gender, employment, previous treatment for anxiety problems, use of medication, or medical history. There was a difference between the groups in terms of age and years of education. Severity of phobia was also similar across the three groups based on anxiety ratings in various driving situations and avoidance scores on the Mobility Inventory (Chambless et al., 1985). In terms of concerns while driving, the Panic Attack group were more concerned about anxiety symptoms and its consequences while driving than the Other Anxieties group, and the Trauma group was less concerned about losing control than either of the other two groups. Contrary to Ehlers et al.'s (1994) expectations, the Trauma group was no more concerned about car accidents and dangerous traffic situations than the rest of the sample.

The Role of Social Anxiety

As discussed above, determining the focus of DRF can be a complex process that has implications for assessment and treatment. Characteristics of DRF associated with social phobia have been comparatively neglected and underassessed, despite their relevance to the performance component inherent in driving (Taylor & Deane, 2000). Ehlers and colleagues (Ehlers et al., 1994; Herda et al., 1993; Hofmann, 1992) are one of the few research groups to suggest social phobia as contributing to the overall DRF constellation. They predicted that social phobia would be a possible diagnosis among their sample of driving phobics. However, while 10 out of 56 (19%) driving phobics met DSM-III-R criteria for social phobia, the focus of the anxiety was on public speaking or other non-driving situations (Ehlers et al., 1994). Herda et al. (1993) reported a case involving fear of having a panic attack while driving and being ridiculed by others. Thus, there is anecdotal evidence for the influence of social factors such as humiliation or embarrassment as a consequence of perceived negative performance evaluation by others. The role of social phobia or social scrutiny in DRF may be underestimated and has certainly received very little research attention.

The possible relevance of a focus of fear consistent with social phobia was demonstrated by Taylor and Deane (2000). They found that the Driving Situations Questionnaire (Ehlers, 1990) item, *driving with somebody who criticizes one's driving*, was rated with one of the highest levels of anxiety and avoidance among their sample of 190 driving-fearfuls (see Appendix A-4). Furthermore, 51% of the sample reported moderate to extreme anxiety in this situation, suggesting that concerns about criticism and negative performance evaluation may be important areas of assessment and treatment for those who present with DRF.

SUMMARY

As discussed above, the majority of research on DRF has come from studies of the psychological consequences of MVAs. However, research with people who identify themselves as having some degree of DRF has found that MVAs are not the sole onset factor for these fears (Ehlers et al., 1994; Taylor & Deane, 1999). Further, recent research (Taylor & Deane, 2000) reported no significant differences in fear severity in a sample of MVA compared with non-MVA participants. This finding suggests a broader driving-fearful population worthy of the same level of study that has been afforded MVA survivors. Before such studies are conducted, further comparisons between MVA and non-MVA driving-fearfuls are needed.

Research that has used a broader driving-fearful sample has found driving phobia to be relatively heterogeneous and difficult to conceptualise in diagnostic terms. Ehlers et al. (1994) expected their driving phobics to meet diagnostic criteria for either panic disorder (fear of anxiety), specific phobia (fear of danger), or social phobia (fear of negative evaluation). However, this was not possible since driving phobics manifested features of all three diagnostic categories without meeting the full criteria for any of them.

Attempts to address this diagnostic confusion have begun with the exploration of possible subtypes of DRF. Ehlers et al. (1994) found that those who reported a panic attack as the primary reason for their phobia were more concerned about anxiety symptoms and their consequences while driving than those who reported other main reasons. However, Ehlers et al.'s hypothesis that phobics who attributed their fear to traumatic experiences would be more concerned about car accidents and dangerous traffic situations than the rest of the sample was not confirmed. Furthermore, social anxiety did not feature as a main concern for driving phobics in Ehlers et al.'s sample, although it was a prominent focus of anxiety and avoidance behaviour in Taylor and Deane's (2000) sample of driving-fearfuls. Given this confusing picture, further research is needed to determine whether potential subtypes of DRF exist.

STUDY ONE: AIMS AND OBJECTIVES

Taylor and Deane (2000) suggested that further research needs to temporarily step back from the emphasis on diagnosis and focus instead on describing in more detail the clinical characteristics of DRF.

The first aim of Study One was to provide this description, which may help in the development of more comprehensive assessment procedures and interventions that target the different foci of DRF. The second aim of Study One was to examine some of the specific fear characteristics of a driving-fearful sample (particularly the role of social anxiety) and to conduct a preliminary investigation of subtypes of DRF.

Therefore, three research objectives were proposed for Study One.

Objective 1. To describe in detail the clinical characteristics of DRF.

Objective 2. To further compare fear severity for MVA and non-MVA driving-fearfuls.

Objective 3: To explore potential subtypes of DRF.

Chapter Three

STUDY ONE: METHOD[1]

Study One used a descriptive and exploratory design to describe the clinical characteristics of DRF, compare MVA and non-MVA driving-fearfuls, and conduct a preliminary investigation of subtypes of DRF. This Chapter presents the methodology employed, including a description of the sample and the measures and procedures used.

PARTICIPANTS

Study One examined a sub-sample from Taylor and Deane's (2000) research on 190 driving-fearfuls, and was conducted as a one-year follow-up of the original sample. As described in Chapter Two, the original sample of 190 volunteers was recruited through media advertisements that asked for people who had a fear of driving. Follow-up participants were recruited by notifying the original sample of the study when a summary of results from earlier research was sent to them (see Appendixes B-1 and B-2). Of the 190, 61% (n = 115) expressed an interest in participating in the follow-up study, and 85 of these returned the follow-up questionnaire described below. This provided a response rate of 74%. Thus, 45% of the original sample participated in the follow-up study.

To ascertain whether participant attrition caused bias in the follow-up sample, the 85 participants were compared with the 105 who dropped out of the study. The only statistically significant difference found was for age, with the follow-up group having a

[1] Study One investigated the acquisition of DRF, MVA and non-MVA comparisons, and typology of DRF. Details of the study of fear acquisition pathways are not reported here as they are not directly relevant to Study One. A report of the fear acquisition results was published by Taylor et al. (1999) in *Behaviour Research and Therapy*. A copy of this article is provided in Appendix A-3. A report of the remaining results from Study One was published by Taylor, Deane, and Podd (2000) in *Journal of Anxiety Disorders*. A copy of this article is provided in Appendix A-6.

higher mean age ($M = 50.09$, $SD = 15.17$) than the dropout group ($M = 43.56$, $SD = 13.89$), $t(187) = 3.09$, $p < .005$ (two-tailed; Levene's statistic indicated homogeneity of variances, $F = 0.11$, $p = .74$. All subsequent t-tests are two-tailed unless otherwise stated). No statistically significant differences were found for 11 other demographic, driving status, and helpseeking variables, as well as 3 measures of fear severity (see Taylor et al., 1999).

As with the original sample, most (95%) participants were female. The over-representation of women in studies of DRF is common (e.g., Ehlers et al., 1994; Mathew et al., 1982; Munjack, 1984) and may reflect the fact that women are generally overrepresented in clinical phobic samples (e.g., Antony et al., 1997; Himle et al., 1991). A detailed investigation of this issue has recently been undertaken (Craske, 2002) but was unavailable at the time of writing.

MEASURES

Questionnaire

Participants completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin and strength of DRF and anxiety response patterns (see Appendix B-3). The results gained from the sections on fear acquisition pathways and physiological and cognitive components of fear have been reported elsewhere (Taylor et al., 1999; see Appendix A-3) and will not be repeated here as they are not directly relevant to Study One. Table 3.1 presents a summary of the various measures used in Study One, and the following sections describe these measures in more detail.

Table 3.1. *Summary of the measures used in Study One.*

Measure	Description
Driving Concerns Scale (Ehlers, 1990)	14-item self-report measure of concerns while driving. Ratings were made on a 0-10 point scale according to level of concern.
Driving Expectations Scale (Ehlers, 1990)	6-item self-report measure of expectations of negative events while driving. Ratings were made on a 0-100% scale corresponding to the likelihood of a certain driving-related event.
Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986)	16-item self-report measure of fear of anxiety. Ratings were made on a 0-4 point scale.
Mobility Inventory for Agoraphobia (Chambless et al., 1985)	26-item self-report measure of avoidance of various situations. Ratings were made on a 1-5 point scale. Number and severity of panic attacks were also reported.
Comparative Driver Self-Perceptions (McCormick, Walkey, & Green, 1986)	7-item self-report measure of comparative driver ratings using a 1-7 point scale. Participants made ratings of their characteristics by comparing themselves with an "average" and a "very good" driver.
Brief Fear of Negative Evaluation Scale (Leary, 1983)	12-item self-report measure of social-evaluative anxiety. Ratings were made on a 1-5 point scale.

Driving Concerns and Expectations. In order to help characterise the types of concerns participants had while driving (i.e., the focus of their fear), two sets of items used by Ehlers et al. (1994) were used in Study One. These were the *Concerns while driving* and *Expectations while driving* scales. For the purposes of the present study, these scales will be referred to as the *Driving Concerns* and *Driving Expectations Scales*, respectively.

Administration and scoring. The Driving Concerns Scale was drawn from the unpublished structured Driving History Interview (DHI; Ehlers, 1990). The DHI listed 14 possible concerns that some people have while driving (e.g., accident, injury, loss of control over the car, intense and unpleasant bodily symptoms, anxiety impairing driving, other people being critical, car breaking down, and getting lost), and asked participants to rate how concerned they were about each item using a scale from 0 (*Not* *at all concerned*) to 10 (*Extremely concerned*). The Driving Expectations Scale assessed expectations of negative events while driving, and was drawn from the Probability Questionnaire section of the unpublished Driving Situations Questionnaire (Ehlers, 1990). Participants were asked to rate the likelihood of six events while driving (i.e., accident, panic attack, serious bodily symptoms, traffic jam, car breakdown, and inability to drive because of anxiety) on a scale from 0% (*Will not happen*) to 100% (*Will certainly happen*). Each item on both scales was considered a separate score.

Normative data and psychometric properties. No normative data are available for the Driving Concerns and Driving Expectations Scales, other than the results reported by Ehlers et al. (1994). Minimal psychometric information was available for either of the scales. Ehlers et al. conducted a factor analysis examining patterns of phobic concerns. They identified five factors, called *anxiety symptoms while driving*, *danger in driving situations*, *unpleasant driving situations*, *being criticised*, and *losing control*. In Study One, the Driving Concerns and Driving Expectations Scales had an internal consistency reliability of $r = .74$ ($n = 70$) and $r = .71$ ($n = 73$), respectively, thereby providing some evidence of reliability (n was variable due to missing data).

The Driving Concerns Scale was correlated $r = .62$ ($n = 68$) with the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) and $r = .43$ ($n = 69$) with the brief Fear of Negative Evaluation Scale (brief FNE Scale; Leary, 1983), while the Driving Expectations Scale was also correlated with the ASI ($r = .38$, $n = 70$) and the brief FNE Scale ($r = .37$, $n = 69$; n was variable due to missing data, and all correlations were two-tailed and statistically significant at $p < .001$). These correlations provide some evidence for the concurrent validity of the Driving Concerns and Expectations Scales, given that higher levels of concern, for example, would be expected to be related to higher levels of anxiety and fear.

Anxiety Sensitivity Index (ASI). The ASI (Reiss et al., 1986) is designed to measure fear of anxiety, and was used in Study One to assess the possible role of fear of anxiety in DRF.

Administration and scoring. Responses to each of the 16 items on the ASI were made on a scale from 0 (*Not at all*) to 4 (*Extremely*), and a total score was calculated by summing the items, resulting in a range from 0-64. Items reflect misinterpretation of cognitive and bodily symptoms of anxiety, and higher scores suggest a greater fear of these symptoms (Apfeldorf, Shear, Leon, & Portera, 1994).

Normative data and psychometric properties. Although no normative data have been collected for the ASI, Taylor, Koch, and Crockett (1991) found that a cutoff score of 27 maximised the total proportion of correct classifications of panic disorder. The ASI has adequate test-retest reliability ($r = .75$; Reiss et al., 1986), and good construct validity (Taylor et al., 1991) and predictive validity (Maller & Reiss, 1992). The ASI also differentiates between patients diagnosed with panic disorder and other anxiety disorders (Apfeldorf et al., 1994; Taylor et al., 1991). Internal consistency reliability in Study One was $r = .87$ ($n = 80$ due to missing data).

Mobility Inventory for Agoraphobia (MI). The MI (Chambless et al., 1985) is a self-report questionnaire that measures agoraphobic avoidance in a range of different situations, and was used in Study One to provide an initial indication of whether or not DRF was part of wider agoraphobic avoidance.

Administration and scoring. The MI consisted of two sections. The first section concerned avoidance in 26 different situations. The degree of avoidance of each situation was rated on a scale from 1 (*Never avoid*) to 5 (*Always avoid*), and all situations were rated twice, once each in relation to "when accompanied by a trusted companion" and "when alone" (score range 26-130). The second section of the MI pertained to panic attacks. A definition of a panic attack was provided. Participants indicated the number of panic attacks they had experienced in the last seven days, and rated the severity of the attacks on a scale from 1 (*Very mild*) to 5 (*Extremely severe*). Once these ratings were made, the participant was asked to circle the five situations with which they were most concerned.

Normative data and psychometric properties. No normative data have been collected for the MI. The MI has adequate test-retest reliability (r = .62-.90) and individual item reliability (r = .50-.90) (Chambless et al., 1985). Internal consistency reliability for Study One was r = .82 (n = 55) for the *accompanied* ratings and r = .91 (n = 56) for the *alone* ratings (n was variable due to missing data). The MI has good convergent and construct validity (Cox, Swinson, Kuch, & Reichman, 1993; Kwon, Evans, & Oei, 1990) and has been shown to discriminate those with agoraphobia from those with other anxiety disorders (Craske, Rachman, & Tallman, 1986). Some studies have used the MI with driving phobic samples and have found that phobics' mobility was more limited than that of controls', even when the driving items were removed (Ehlers et al., 1994; Sartory et al., 1992).

Comparative Driver Self-Perceptions. Since practical and temporal limitations precluded an assessment of on-road driving skills in Study One, self-perceptions of driving ability were examined. The way in which a driving-fearful person perceives their driving skills may be as important as their actual driving abilities. For example, they may have good driving skills yet perceive themselves as a poor driver. Therefore, a self-report measure of comparative driving ability previously used in New Zealand (McCormick, Walkey, & Green, 1986) was employed in Study One.

Administration and scoring. On the comparative measure of driving ability, the following dichotomies were rated: *foolish-wise*, *unpredictable-predictable*, *unreliable-reliable*, *inconsiderate-considerate*, *dangerous-safe*, *tense-relaxed*, and *irresponsible-responsible*. Participants were required to rate *me as a driver* and the hypothetical constructs of *an average driver* and *a very good driver* on each of the dimensions using a 1-7 point scale. McCormick et al. (1986) found a self-enhancement bias where drivers tended to rate themselves as better than an average driver on all dimensions, but worse than a very good driver.

Normative data and psychometric properties. No normative data or information on psychometric properties could be found for the comparative measure of driving ability, despite its use in a relatively recent New Zealand study (Wood, 1996). Internal consistency reliability for Study One across the seven dichotomies were $r = .91$ ($n = 78$) for *me as a driver*, $r = .92$ ($n = 80$) for *an average driver*, and $r = .93$ ($n = 76$) for *a very good driver* (*n* was variable due to missing data).

Fear of Negative Evaluation (FNE) Scale. The FNE Scale (Watson & Friend, 1969) is a self-report measure of social-evaluative anxiety, and consists of statements involving concern about others' evaluations, avoidance of evaluative situations, distress about negative evaluation, and expectation of being negatively evaluated. The brief 12-item form of the FNE developed by Leary (1983) was used to further investigate the previous finding that high anxiety and avoidance was reported in the situation *driving with somebody who criticises one's driving* (Taylor & Deane, 2000).

Administration and scoring. Each item was rated on a scale from 1 (*Not at all characteristic of me*) to 5 (*Extremely characteristic of me*), resulting in a range from 12-60.

Normative data and psychometric properties. No normative data are available for the brief FNE Scale. The scale correlates highly with the original form ($r = .96$) and has acceptable reliability ($r = .75$-.90) and validity, although there is mixed support for its discriminant validity (Heimberg, Hope, Rapee, & Bruch, 1988; Turner, McCanna, & Beidel, 1987). Internal consistency reliability for Study One was $r = .84$ ($n = 79$ due to missing data).

PROCEDURE

Once participants had volunteered to take part in the follow-up study, questionnaires were mailed to them along with a postage-paid, return-addressed envelope for ease of return of the questionnaire. Questionnaires were treated as confidential at all times and were given a three-digit code number to preserve confidentiality. The study was reviewed and approved by the Massey University Human Ethics Committee.

OVERVIEW OF DATA ANALYSIS

The overall aim of Study One was to further compare MVA and non-MVA driving-fearfuls and explore the viability of subtypes of DRF. The nature of Study One required descriptive and exploratory quantitative analytical techniques to achieve the overall aims and objectives. The quantitative measures were initially summarised through the use of descriptive statistics. Comparisons of MVA and non-MVA driving-fearfuls were conducted using *t*-tests and multivariate analyses of variance (MANOVA). The exploration of possible subtypes of DRF was conducted using a factor analysis with oblique rotation followed by a hierarchical cluster analysis (Hair, Anderson, Tatham, & Black, 1998).

Chapter Four

STUDY ONE: RESULTS AND DISCUSSION[1]

This Chapter presents the results and discussion of the data collected in Study One. The purpose was to describe the driving-fearful sample as a whole, compare MVA and non-MVA driving-fearful groups, and explore a possible typology of DRF. These analyses were primarily exploratory and intended to determine whether further research was warranted.

SAMPLE CHARACTERISTICS

As reported in the previous Chapter, the mean age for the sample was 50.09 years (SD = 15.17) and the sample was primarily female (95%). For the purpose of comparisons based on MVA involvement, the sample was divided into those who reported being involved in at least one MVA (*MVA group*, n = 60, 71%) and those who reported no such MVA experiences (*non-MVA group*, n = 25).

Driving Concerns and Expectations

The results for the Driving Concerns Scale are presented in Table 4.1. The first column shows the rank order of driving concerns. Driving-fearfuls were most concerned about *accident*, *lose control over the car*, *injury*, *very intense and unpleasant anxiety*, and *no control over other people's driving*. Driving-fearfuls were less concerned about *getting lost*, *other people will be critical*, *anxiety will lead to a physical or mental catastrophe*,

[1] Study One investigated the acquisition of DRF, MVA and non-MVA comparisons, and typology of DRF. Results regarding fear acquisition pathways are not reported here as they are not directly relevant to Study One. A report of the fear acquisition results was published by Taylor et al. (1999) in *Behaviour Research and Therapy*. A copy of this article is provided in Appendix A-3. A report of the remaining results from Study One was published by Taylor et al. (2000) in *Journal of Anxiety Disorders*. A copy of this article is provided in Appendix A-6.

traffic jam, and *physical crisis*. Comparisons between the present results and those obtained by Ehlers et al. (1994) are useful because they allow preliminary description of how a media-recruited, non-clinical sample describing themselves as driving-fearful compare with a media-recruited group diagnosed as driving phobic. One-sample *t*-tests were conducted on the Driving Concerns items to evaluate whether the mean was different from that obtained by Ehlers et al. The results can be seen in the remainder of Table 4.1.

Table 4.1. *Means (and SDs) of the Driving Concerns Scale items, compared with those reported by Ehlers et al. (1994) for their 56 driving phobics.*

Concern (0-10)	Study One[a]	Ehlers et al. (1994)	t
Accident	8.13 (3.03)	6.59 (3.05)	4.53***
Lose control over the car	7.96 (2.90)	7.05 (3.11)	2.99**
Injury	7.85 (3.16)	6.09 (3.33)	4.99***
Very intense and unpleasant anxiety	7.69 (2.89)	7.70 (2.77)	0.04
No control over other people's driving	7.43 (3.24)	6.18 (3.16)	3.43***
Anxiety will impair driving	6.10 (3.40)	7.66 (2.69)	4.10***
Dangerous road conditions	5.83 (3.50)	5.02 (3.19)	2.05*
Intense and unpleasant bodily symptoms	5.38 (3.38)	6.80 (3.21)	3.66***
Car might break down	4.62 (3.33)	4.06 (3.63)	1.49
Getting lost	3.73 (3.63)	5.10 (3.69)	3.32***
Other people will be critical	3.69 (3.39)	4.87 (1.41)	3.07**
Anxiety will lead to a physical or mental catastrophe	2.96 (3.40)	4.67 (3.82)	4.44***
Traffic jam	2.90 (3.35)	4.09 (3.76)	3.13**
Physical crisis	2.70 (3.37)	4.41 (3.90)	4.43***
Overall item mean	5.45 (1.54)	5.74 (NR)	1.58

Note. NR = not reported.
[a]n = 70 to 81 because of missing data on individual items.
*$p < .05$. **$p < .01$. ***$p < .001$.

While the overall item mean indicated no difference between samples, driving-fearfuls in Study One reported a higher level of concern about 5 of the 14 situations than Ehlers et al.'s (1994) driving phobics (i.e., *accident*, *lose control over the car*, *injury*, *no control over other people's driving*, and *dangerous road conditions*). However, only *accident* and *injury* remained statistically significant after Bonferroni correction (.05/14

= .004). In contrast, driving phobics were more concerned about anxiety symptoms and their effects (i.e., *anxiety will impair driving*, *intense and unpleasant bodily symptoms*, *anxiety will lead to a physical or mental catastrophe*, and *physical crisis*, all of which remained statistically significant after the same Bonferroni correction), as well as *getting lost, other people will be critical*, and *traffic jam* (again, all of which remained statistically significant after Bonferroni correction).

Data on the driving concerns variables for the MVA and non-MVA groups are shown in Table 4.2. Both groups featured the same five highest rated concerns.

Table 4.2. *Means (and SDs) of the Driving Concerns Scale items for the MVA and non-MVA groups.*

Concern (0-10)	**MVA group**[a]	**non-MVA group**[b]
Accident	8.40 (2.75)	7.46 (3.62)
Lose control over the car	7.90 (3.03)	8.18 (2.59)
Injury	8.25 (2.92)	6.86 (3.60)
Very intense and unpleasant anxiety	7.56 (3.11)	8.18 (2.02)
No control over other people's driving	7.42 (3.13)	7.18 (3.58)
Anxiety will impair driving	6.13 (3.34)	5.55 (3.53)
Dangerous road conditions	6.15 (3.24)	4.82 (3.72)
Intense and unpleasant bodily symptoms	5.06 (3.19)	5.23 (3.62)
Car might break down	4.60 (3.24)	4.14 (3.17)
Getting lost	3.88 (3.58)	4.09 (3.64)
Other people will be critical	4.00 (3.32)	3.50 (3.74)
Anxiety will lead to a physical or mental catastrophe	2.94 (3.26)	2.55 (3.36)
Traffic jam	2.90 (3.14)	3.18 (3.76)
Physical crisis	2.50 (3.15)	2.36 (3.22)
Overall item mean	5.55 (1.55)	5.23 (1.54)

[a]n = 48 due to missing data. [b]n = 22 due to missing data.

Comparisons between MVA and non-MVA groups using a MANOVA (preliminary assumption testing identified no violations) suggested no differences in terms of driving concerns, $F(14, 55) = 0.72$, $p = .75$. However, this result may be due to insufficient statistical power (partial eta squared = .15, observed power = .39). According to Cohen (1988, 1992), to achieve a power level of 80%, a very large sample size ($n > 300$ per group) would be required to produce a statistically significant result. There was no difference between the two groups, however, in terms of the overall concerns item mean, $t(68) = 0.79, p = .43$ (Levene's statistic: $F = 0.06, p = .81$).

Expectations of negative events while driving were assessed on the Driving Expectations Scale, although comparison with Ehlers et al.'s (1994) data was not possible as only the multivariate results (rather than individual item means) were reported. Driving-fearfuls in Study One rated the likelihood of *accident*, *panic attack*, *traffic jam*, *unable to drive because of anxiety*, *car breaking down*, and *serious body symptoms* out of 100% (*Will certainly happen*). Results are shown in Table 4.3. An accident was rated as the most likely negative event. MVA and non-MVA group comparisons are also shown in Table 4.3. Using a MANOVA, preliminary assumption testing identified no violations. No differences were found between the two groups regarding expectations of any of the six negative events, $F(6, 66) = 0.35, p = .91$. However, this result may be due to insufficient statistical power (partial eta squared = .03, observed power = .14), suggesting the need for a far greater sample size to produce a statistically significant effect (Cohen, 1988, 1992). The large variability in these data may also have contributed to lowered statistical power, as shown by the large standard deviations in Table 4.3.

Table 4.3. *Means (and SDs) of the Driving Expectations Scale items.*

Negative event (0-100%)	**Total sample[a]**	**MVA group[b]**	**non-MVA group[c]**
Accident	41.52 (27.18)	42.64 (25.96)	34.50 (29.82)
Panic attack	37.50 (31.88)	37.36 (31.20)	36.00 (34.09)
Traffic jam	35.40 (34.31)	38.68 (34.53)	30.50 (35.02)
Unable to drive because of anxiety	33.90 (33.18)	30.19 (30.67)	25.50 (29.29)
Car breaking down	32.95 (29.41)	34.53 (28.19)	29.00 (33.86)
Serious body symptoms	24.05 (26.27)	25.47 (27.14)	21.00 (24.69)

[a] *n* varies (74 to 82) because of missing data on individual items. [b] $n = 53$ due to missing data. [c] $n = 20$ due to missing data.

ASSOCIATED SYMPTOMS

A number of existing questionnaires were used to assess symptoms that may be associated with DRF. The results from these measures are shown in Table 4.4.

Table 4.4. *Means (and SDs) of questionnaire scores.*

Measure	**Total sample**[a]	**MVA group**[b]	**non-MVA group**[c]
Anxiety Sensitivity Index	21.71 (11.50)	22.67 (11.91)	19.48 (10.36)
Mobility Inventory			
. alone, driving situations	2.78 (1.22)	2.66 (1.18)	3.04 (1.28)
. accompanied, driving situations	1.84 (0.94)	1.86 (0.89)	1.80 (1.06)
. alone, non-driving situations	1.75 (0.67)	1.70 (0.61)	1.88 (0.81)
. accompanied, non-driving situations	1.38 (0.49)	1.38 (0.51)	1.38 (0.44)
Brief Fear of Negative Evaluation Scale	35.37 (10.50)	35.79 (10.70)	34.40 (10.15)

Note. ASI: Range 0-64; MI: Range 0-5; Brief FNE Scale: Range 12-60.
[a]*n* varies (74 to 83) because of missing data on individual items. [b]*n* varies (49 to 58) because of missing data on individual items. [c]*n* varies (20 to 25) because of missing data on individual items.

On the Anxiety Sensitivity Index (ASI), the difference in mean score between the MVA and non-MVA groups was not significant, $t(81) = 1.16$, $p = .25$ (Levene's statistic: $F = 1.30$, $p = .26$). Almost one-third (32%) of the sample scored 27 or higher on the ASI (the cutoff set by Taylor et al., 1991, for panic disorder). The mean score for the total sample can be compared with ASI scores reported in other studies of driving-fearfuls. Antony et al. (1997) reported a mean ASI score of 20.73 ($SD = 9.13$) for a group of 15 driving phobics. In a study of MVA survivors, Kuch et al. (1994) reported ASI scores for a group of 21 accident phobics that were higher ($M = 29.14$, $SD = 14.26$) than for a group of 34 non-phobics ($M = 20.81$, $SD = 10.88$). The difference in ASI scores across these two studies may be due to the different criteria used to define DRF (i.e., driving phobia compared with accident phobia).

Avoidance of driving and non-driving situations was assessed with the Mobility Inventory (MI). The two driving situations on the MI are *car* and *motorways*. Overall, driving-fearfuls indicated the highest levels of avoidance when *alone in driving situations* (see Table 4.4). This was also found by Ehlers et al. (1994), although the mean for their driving phobics was 2.13 (SD = 0.83), lower than that for Study One's sample. Avoidance behaviour appeared to be relatively similar between MVA and non-MVA groups, and a MANOVA (preliminary assumption testing identified no violations) revealed no differences on the MI, $F(1, 64) = 1.20$, $p = .32$. However, this result may be due to insufficient statistical power (partial eta squared = .05, observed power = .27), suggesting the need for a larger sample size (Cohen, 1988, 1992).

The highest-rated situation for the group as a whole on the MI was *driving alone on motorways* (M = 3.20, SD = 1.52), followed by *being alone in high places* (M = 2.89, SD = 1.56), *alone in enclosed places* (M = 2.68, SD = 1.50), *accompanied in high places* (M = 2.44, SD = 1.45), *alone in a car* (M = 2.40, SD = 1.27), and *alone in social situations* (M = 2.38, SD = 1.23).

Panic attacks were reported by 34 (41%; n = 82 due to missing data) participants, 32 of whom had experienced between 1 and 3 panic attacks in the last week. Of those who did report panic attacks, 21 (62%) rated their attacks as of mild or very mild intensity, while 9 (26%) described experiencing moderately severe panic attacks.

Although no studies could be located that have used the original or brief Fear of Negative Evaluation (FNE) Scales with driving-fearful samples, the mean score of the sample in Study One was similar to that reported by Leary (1983) for a sample of 85 non-clinical undergraduate students (i.e., M = 35.70, SD = 8.10). The difference between the brief FNE Scale scores for the MVA and non-MVA groups was not statistically significant, $t(81) = 0.55$, $p = .58$ (Levene's statistic: $F = 0.04$, $p = .85$).

SELF-PERCEPTION OF DRIVING ABILITIES

Table 4.5 shows the mean comparative driver ratings made on the semantic differential scales. Of particular interest were the differences in ratings of *me as a driver* with *an average driver* and *a very good driver*. Individual t-tests were conducted for paired samples on the seven bipolar semantic differential scales. Because the scale design rendered multivariate analysis impossible, these results need to be interpreted with caution because of the potential for inflating alpha levels to influence the analysis. Descriptively, driving-fearfuls rated themselves as more predictable, reliable, considerate, safe, and responsible than *an average driver*, but as less relaxed (i.e., more tense) than *an average driver* ($p < .001$; overall mean difference in ratings = +0.77). This might be expected given the nature of the sample. They also perceived themselves as lower on all dimensions compared with *a very good driver* ($p < .001$; overall mean difference in ratings = -1.42). All ratings for *a very good driver* were higher than those for *an average driver* ($p < .001$; overall mean difference in ratings = +2.04). These results remained statistically significant after Bonferroni correction (.05/21 = .002).

Table 4.5. *Means (and SDs) for driver ratings on the semantic differential scales.*

Scale[a]	***A very good driver***	***An average driver***	***Me as a driver***
Foolish-Wise	6.39 (0.82)	4.27 (1.05)	4.55 (1.55)
Unpredictable-Predictable	6.35 (0.92)	4.18 (1.15)	4.89 (1.47)
Unreliable-Reliable	6.39 (0.88)	4.26 (1.33)	5.00 (1.51)
Inconsiderate-Considerate	6.50 (0.91)	4.11 (1.44)	5.88 (1.15)
Dangerous-Safe	6.41 (0.92)	4.22 (1.28)	5.25 (1.62)
Tense-Relaxed	6.09 (1.06)	4.83 (1.14)	3.39 (1.75)
Irresponsible-Responsible	6.59 (0.79)	4.57 (1.28)	5.84 (1.14)

Note. Item range 1-7 (e.g., 1 = *foolish*, 7 = *wise*).
[a]n = 79 to 83 because of missing data on individual scales.

EXPLORATION OF SUBTYPES OF DRIVING-RELATED FEAR

This part of the analysis was considered exploratory and descriptive *only*, because (a) subtypes of DRF have not been rigorously examined, (b) the sample size in Study One was relatively small, and (c) Study One did not include any formal diagnostic evaluation. The primary aim was simply to determine whether or not any coherent groupings emerged from the data and, if so, to then conduct a separate and more thorough study of potential subtypes. As suggested by Hair et al. (1998), factor and cluster analytic methods were used to identify a typology, with the view that robust results should emerge using varying analytical techniques. Factor analysis provides information about the structure of a set of variables or characteristics, while cluster analysis provides information about the structure of individuals (i.e., participants) or objects (i.e., variables; Hair et al., 1998). Therefore, these two analytical techniques provide distinct sets of information. However, both methods identify structure within a data set, using different methods to achieve this overall aim.

For the factor analysis, the 14-item Driving Concerns Scale was used as a measure of focus of fear. Initially, the dimensional structure of the concerns data was ascertained using factor analysis. The sample size met minimum requirements (n = 70 due to missing data) and there were no outliers that were strong candidates for deletion (Hair et al., 1998). Principal components was chosen as the method of factor extraction, and so multicollinearity and singularity were not relevant (Coakes & Steed, 1997). Linearity was assumed from an examination of the residuals. Bartlett's test of sphericity was significant and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Coakes & Steed, 1997) was greater than 0.6. Therefore, it was considered appropriate to proceed with factor analysis.

An oblique rotation was chosen as the most appropriate rotation option because of the high correlations among factors extracted using varimax rotation (Hair et al., 1998). For the correlation matrix of the 14 concerns, the breaks-in-scree-plot criterion suggested that a four-dimensional structure was appropriate. Since the difference between high and low loadings was more apparent in the pattern matrix, this matrix was interpreted (Hair et al., 1998). According to Hair et al. (1998), loadings of ± 0.5 indicate practical significance and, given the relatively small sample size, this cutoff point for significance was adopted. The rotated factor pattern can be seen in Table 4.6. The concerns items are presented in the order of the factor loadings and structure. Statistically significant loadings appear in bold type. In addition to the factor loadings of each variable on each factor, Table 4.6 shows the eigenvalues (sums of squares), percentage of trace (percentage of variance explained), and communalities (amount of variance in a variable that is accounted for by the factor solution).

Table 4.6. *Factor structure of the Driving Concerns Scale items (n = 70).*

Item	Factors				Communality
	1	2	3	4	
Accident	**.865**		-.102	.252	.87
Lose control over car	**.820**		.136		.68
Injury	**.812**		-.101	.322	.83
Other people critical	.422	.273	.420	-.276	.54
Bodily symptoms		**.871**	-.108		.74
Physical crisis	-.309	**.759**	.130	.181	.68
Anxiety	.378	**.684**	-.279		.68
Anxiety impairs driving	.133	**.623**		-.263	.50
Catastrophe		**.604**	.395		.59
Traffic jam	-.238		**.771**		.66
Getting lost	.123		**.766**		.59
Dangerous road conditions		.207		**.792**	.68
No control over other's driving	.102			**.726**	.56
Car breakdown	.171		.426	.442	.44
					Total
Eigenvalue	3.37	2.61	1.73	1.34	9.05
Percentage of trace*	24.10	18.60	12.40	9.60	64.70

*Trace = sum of eigenvalues/14.

For factor 1, *accident*, *injury*, and *lose control over the car* are statistically significant loadings, and seem to be consistent with the dimension of *danger expectancy*, as identified by Reiss (1980) as anticipations of physical danger, for example. Factor 2 is made up of the variables *intense and unpleasant bodily symptoms*, *physical crisis*, *very intense and unpleasant anxiety*, *anxiety will impair driving*, and *anxiety will lead to a physical or mental catastrophe*. In contrast to factor 1, the variables that load on factor 2 appear consistent with *anxiety expectancy*, as identified by Reiss (1980) as "fears of fear" (p. 389). Factor 3 consists of *traffic jam* and *getting lost*, while *dangerous road conditions* and *no control over other people's driving* load separately on factor 4. These last two factors could be called *unpleasant driving situations* and *dangerous driving situations*, respectively. Considering the significance criterion of ± 0.5, two variables (*other people will be critical* and *car might break down*) load highly but not statistically significantly on two factors. The communality for car breakdown is less than 0.5, suggesting that this variable does not have much explanatory power. *Other people will be critical* does appear to have adequate explanatory power, but is more difficult to interpret because of its loadings on both factors 1 and 3.

Cluster analysis was then performed on the concerns variables to further investigate a possible typology of driving concerns. Cluster analysis is a multivariate procedure for developing meaningful subgroups of individuals or objects that aims to classify a sample into a small number of mutually exclusive groups based on the similarities among the individuals or objects in terms of their characteristics (Hair et al., 1998). Cluster analysis is considered a useful technique for exploratory data analysis when the sample is suspected to be heterogeneous, as it determines the most similar groups that are also the most different from each other (SPSS Inc., 1999). If the classification is successful, the individuals or objects within clusters will be close together when plotted geometrically, and different clusters will be far apart (Hair et al., 1998). Cluster analysis is also referred to as *typology construction*, and involves classification according to natural relationships (Hair et al, 1998). According to Hair et al., "If a proposed structure can be defined for a set of objects, cluster analysis can be applied, and a proposed typology (theoretically based classification) can be compared to that derived from the cluster analysis" (p. 481).

Cluster analysis usually involves at least three steps. The first is the measurement of some form of similarity or association among the individuals or objects to determine how many groups exist in the sample. This is done by using the *cluster variate*, which is a representation of the variables used to compare individuals or objects (Hair et al., 1998). A similarity matrix is then calculated for the distances in cluster variate between all individuals or objects.

The second step is the actual clustering process, in which individuals or objects are partitioned into clusters or groups. This can be done by either hierarchical or non-hierarchical clustering. *Hierarchical clustering* is based on agglomerative or build-up methods, where clustering begins by finding the closest pair of individuals or objects according to their distance measure and combining them to form a cluster. The procedure continues one step at a time, joining pairs of individuals or objects, pairs of clusters, or an individual or object with a cluster, until all the data are in one cluster. The method is hierarchical because once two individuals or objects or clusters are joined, they remain together until the final step (Hair et al., 1998).

In contrast, *non-hierarchical clustering* (also called *K-means clustering*) is used only when individuals are to be clustered, rather than variables. Therefore, although non-hierarchical clustering is not used in Study One, it will be briefly reviewed here for comparison with the hierarchical method. Non-hierarchical clustering begins by using the values of the first *k* individuals or objects in the data file as temporary estimates of the *k* cluster means, where *k* is the number of clusters specified by the user. Initial cluster centres are formed by assigning each individual or object in turn to the cluster with the closest centre and then updating the centre. Then an iterative process is used to find the final cluster centres. At each step, individuals or objects are grouped into the cluster with the closest centre, and the cluster centres are recomputed. This process continues until no further changes occur in the centres or until a maximum number of iterations is reached (Hair et al., 1998).

Hair et al. (1998) recommend that both methods are used to provide a more fine-tuned analysis. Initially, hierarchical clustering can be used to establish the number of clusters, profile the cluster centres, and identify any obvious outliers. Then *K*-means clustering can be used (with the cluster centres previously identified as the initial seed points) to fine-tune the results by allowing the switching of cluster membership. The final step is to profile the individuals in the various clusters to determine their composition.

Hierarchical cluster analysis was used in Study One to identify the appropriate number of clusters and the cluster membership of the driving concerns variables. There did not appear to be any strong outliers in the data that were candidates for deletion, and multicollinearity was not problematic. The similarity (or distance) measure chosen was *squared Euclidean distance*, which is the sum of squared distances over all variables, and is recommended for use with metric variables (Hair et al., 1998). Ward's method was selected as the clustering method as it is recommended for minimising within-cluster differences (Hair et al., 1998). Variables entered into the analysis were the 14 driving concerns variables. No form of standardisation was needed because all variables used the same measurement scale. The cluster analysis was based on $n = 70$ for each variable due to missing data.

main results of a cluster analysis consist of an *agglomeration schedule*, a *vertical icicle plot*, and a *dendrogram*. These aspects of the output are used primarily to identify the most appropriate number of clusters (Hair et al., 1998). The agglomeration schedule shows the results of the cluster analysis, including the individuals or objects being combined at each stage of the process and the agglomeration coefficient (overall similarity measure; Hair et al., 1998). Of most interest is the *change* in agglomeration coefficient as individuals or objects are clustered, and for this reason it is useful to analyse the coefficients as seen in Table 4.7 (see Appendix C-1 for the full agglomeration schedule and description).

Table 4.7. *Analysis of the agglomeration coefficient for the hierarchical cluster analysis.*

Step	Number of clusters	Agglomeration coefficient	Change in coefficient from previous step	Percentage change in coefficient from previous step
4	10	1242.500		
5	9	1759.000	+516.50	41.6
6	8	2281.000	+522.00	29.7
7	7	2819.500	+538.50	23.6
8	6	3483.000	+663.50	23.5
9	5	4214.000	+731.00	21.0
10	4	5042.333	+828.33	19.7
11	3	6078.333	+1036.00	20.6
12	2	7340.125	+1261.79	20.8
13	1	11784.429	+4444.30	60.6

The aim of cluster analysis is to obtain the simplest possible structure that represents homogeneous groupings of individuals or objects (Hair et al., 1998). Selection of a cluster solution is commonly determined by using a stopping rule (similar to the scree test in factor analysis) that evaluates the changes in the agglomeration coefficient at each step of the clustering process (Hair et al., 1998). Little change in coefficient from one step to the next indicates that fairly homogeneous clusters are being merged, while large changes in coefficient indicates that two very different clusters are being merged (Hair et al., 1998). In other words, if the overall similarity measure is monitored as the number of clusters decreases, large increases in the overall measure indicate that the two clusters are not very similar (Hair et al., 1998).

Looking at Table 4.7, the overall similarity measure increases quite a lot over steps 4 and 5, indicating that clusters are being formed that have essentially the same homogeneity as the first cluster. Up to step 12, there is a smaller increase in the overall measure, while step 13 sees the largest increase when combining two clusters into one cluster (60.6%). This large increase indicates that joining two clusters into one cluster resulted in a cluster solution that was markedly less homogeneous. Therefore, the cluster solution of step 12 would be considered much better than that of step 13. The two-cluster solution of step 12 seems to be the most appropriate for a final cluster solution, particularly since the next best solution with three clusters had one very small cluster with only two variables. This can be seen from the vertical icicle plot and dendrogram, which are shown and described in Appendixes C-2 and C-3, respectively (as they were not necessary for determining the appropriate number of clusters). These diagrams provide a visual representation of the analysis by summarising the steps in forming clusters. The hierarchical cluster analysis suggested two clusters with six and eight variables, respectively. The first cluster grouped the following concerns together: *accident*, *injury*, *lose control over the car*, *very intense and unpleasant anxiety*, *dangerous road conditions*, and *no control over other people's driving*. The remaining eight concern variables formed the second cluster: *intense and unpleasant bodily symptoms*, *physical crisis*, *anxiety will impair driving*, *anxiety will lead to a physical or mental catastrophe*, *other people will be critical*, *car might break down*, *traffic jam*, and *getting lost*.

SUMMARY

Study One sought to extend prior research by describing in more detail the characteristics of a driving-fearful sample, comparing MVA and non-MVA driving-fearfuls, as well as investigating possible DRF subtypes. In terms of the first two of these objectives, the driving concerns in the sample focused on the external themes of accident, injury, and control, as well as concerns about internal expectancies, such as very intense and unpleasant anxiety. Although anxiety expectancy was a prominent concern, driving-fearfuls were more concerned about events related to danger expectancy. A limitation of Study One is the lack of diagnostic evaluation, which prevents further discussion about the varying foci of fear across diagnostic categories. Despite this, it can be concluded that the pattern of driving concerns was very similar for MVA and non-MVA groups. Although the MVA group was more concerned about accident and injury than the non-MVA group, both groups rated the same highest concerns. This would suggest that the focus of fear is not necessarily different on the basis of MVA involvement, and that those who have not experienced an MVA also report danger expectancies.

This conclusion is further supported by the finding that the sample had high expectations of negative events, which also showed no differences in terms of MVA involvement. However, these results could have been affected by a lack of statistical power, suggesting the need for further research with sufficient sample sizes. Overall, driving-fearfuls expected to experience an accident or panic attack more often than a traffic jam or car breakdown, indicating that the sample had higher danger and anxiety expectancies than expectancies of what could be assumed to be more likely driving events. The results highlight the importance of assessing both internal and external foci of fear in those who present with DRF.

The third goal of Study One was to investigate potential subtypes of DRF. Although caution is needed in interpreting the factor and cluster analyses for reasons stated previously, the results of both analyses support the notion of two potential subtypes of DRF. The first subtype derived from the cluster analysis contained variables loading on factors 1 and 4 in the factor analysis. This subtype was characterised by danger expectancies (concern about accident, injury, lack of control over the driving situation, and dangerous road conditions). However, confusing this picture was the inclusion of the variable *very intense and unpleasant anxiety* in the first cluster. It was expected that this variable would cluster together with the other anxiety-related variables, and it is difficult to explain the separation of this variable in the cluster analysis. The second subtype derived from the cluster analysis contained variables loading on factors 2 and 3 in the factor analysis, as well as the two variables that were difficult to interpret because they loaded on two factors. This subtype appeared to be characterised by anxiety expectancies (concern about anxiety symptoms and their effects on driving) and unpleasant driving situations. However, further research is required to more formally investigate these possible subtypes of DRF.

Given the prior finding that high anxiety and avoidance ratings were associated with driving with someone who criticises one's driving (Taylor & Deane, 2000), it was expected that a separate subtype would be identified for the *other people will be critical* driving concern variable, indicating a focus of fear consistent with concerns about social situations or negative evaluation. However, this was not found and the *other people will be critical* variable clustered together with the variables representing anxiety expectancy and unpleasant driving situations. Concern that other people will be critical of one's driving could refer to actual or perceived criticism by other people in the same car or people in other cars. It is unclear to whom participants are referring when they make ratings on this item. It could also be assumed that concern about others' criticism is more likely to cluster with concerns about anxiety and unpleasant driving situations than concerns about danger while driving. Although Study One found no support for a subtype of DRF associated with concerns about negative evaluation and criticism, the lack of specificity with regard to critical referents suggests that a more thorough investigation of this area may be warranted.

The results from the driving ability ratings supported the self-enhancement bias reported in previous studies (e.g., McCormick et al., 1986), except that the sample in Study One rated themselves as less relaxed than the average driver. It has been suggested, however, that the measure is problematic because there is no way of knowing what the *average driver* is when people make these relative comparisons (Walton & Bathurst, 1998; Wood, 1996). Although better self-rating measures are emerging (e.g., Walton & Bathurst, 1998), a more objective and relevant way of checking these ratings and assessing driving skills would be to employ ratings made by independent driving instructors during a practical driving evaluation. This method would also enable an assessment of possible differences between *actual* skills (as rated by an instructor) and *perceived* skills (as rated by the individual). Lack of confidence in one's driving skills and abilities may contribute to fear of driving. Such a lack of confidence would be apparent in lower ratings of perceived skill compared to actual skill. In these cases, independent assessments of driving skills may serve as evidence where a component of treatment is to assist the person to make more realistic appraisals of their own skills and abilities. Alternatively, driving skills assessments could identify cases where a *real* skill deficit contributes to or maintains driving fear reactions. Subsequent therapy may then include a component aimed at providing training in the development of the particular skill or skills required (e.g., driving on the motorway, merging, parallel parking, or defensive driving). Further research is needed to explore the role of driving skills in DRF.

The conclusions in Study One are limited by the lack of a comparison control group and diagnostic evaluation. However, the aims were to conduct a preliminary investigation of DRF subtypes and describe in some detail the clinical characteristics of the sample, including comparisons between MVA and non-MVA driving-fearfuls. Study One further supported the contention by Taylor and Deane (2000) that MVA and non-MVA driving-fearfuls do not differ in terms of fear severity. Non-MVA driving-fearfuls deserve as much research attention and assistance as their MVA counterparts have received (e.g., Blanchard & Hickling, 1997). The results also suggest that, while subtypes of DRF seem to focus on danger and anxiety expectancies, further research is needed to confirm these subtypes. Formal diagnostic evaluation would be a useful addition to future research, so that the relationships between various anxiety disorders and DRF can be clarified. Once these subtypes have been more clearly identified, and the role of driving skills in DRF has been clarified, appropriate and comprehensive assessment procedures along with efficient and effective differential intervention packages can be systematically developed.

Chapter Five

TOWARDS A TYPOLOGY OF DRIVING-RELATED FEAR

This Chapter establishes a direction for future research on DRF in light of the results of Study One. Given the emergence of two potential subtypes of DRF from the exploratory analysis in Study One, research aimed at confirming and clarifying such subtypes would be useful. Literature on flying phobia is reviewed as an example of another situational specific phobia that has received similar clarification through the use of typology analysis. Unlike flying, where those who are fearful do not have any control of the aeroplane, driving requires a complex set of skills for its successful accomplishment. Therefore, consideration is given to the potential role of driving skills in DRF. A brief conceptual overview of relevant models and theories of driving skills is presented, followed by a review of the research on the relationship between driving skills and anxiety. The Chapter concludes with a discussion of the aims and objectives of Study Two.

The exploratory identification of potential subtypes of DRF in Study One suggests that a more thorough and comprehensive study is warranted that includes a diagnostic evaluation, as called for by Taylor et al. (in press). The diagnostic complexity found in previous research by Ehlers et al. (1994) has led to attempts to differentiate subtypes of DRF. This research is important because of its implications for assessment and treatment, as the research on flying phobia has demonstrated.

FLYING PHOBIA AS A PARALLEL EXAMPLE

Like driving phobia, flying phobia is classified as a situationally-specific phobia in DSM-IV. Much research effort has focused on trying to understand more clearly the clinical characteristics and treatment of flying phobia (e.g., Borrill & Foreman, 1996; Ekeberg, 1991; Foreman & Borrill, 1993, 1994; Greco, 1989). Like DRF, fear of flying has been found to be diagnostically complex, and studies have examined whether a typology for fear of flying exists that can better inform the assessment and treatment process (McNally, 1997). Fear of flying has proved difficult to fit into traditional phobia categories, although some research has shown that specific phobia and agoraphobia are distinguishable in terms of *focus of apprehension.* McNally and Louro (1992) studied a treatment-seeking sample who were afraid of flying in an attempt to distinguish those who met DSM-III-R criteria for panic disorder with agoraphobia and specific phobia ($n = 17$ per group). These two groups were compared on variables such as symptom profile, relevant etiological factors, and focus of apprehension. McNally and Louro found that behavioural avoidance and most demographic and clinical features did not differentiate agoraphobics and specific phobics. However, the two groups were distinguishable in terms of their focus of apprehension or motivation for flight avoidance. Agoraphobics avoided flying because they feared panic and its consequences (i.e., anxiety expectancy), while specific phobics avoided flying because they feared crashes (i.e., danger expectancy; McNally & Louro, 1992).

Contrasting results were found by Wilhelm and Roth (1997), in that media-recruited flying-fearfuls diagnosed with DSM-III-R panic disorder with agoraphobia (current or past) or specific phobia (of flying) were both equally concerned about external dangers, such as an accident or crash. The panic disorder group was more concerned than controls about internal dangers (such as unpleasant bodily symptoms and panic attacks) and social dangers (such as other people being critical and being humiliated).

Van Gerwen et al. (1997) explored the association of flight anxiety with different types of phobia among 419 people who sought help for fear of flying. Using a non-linear method for the multivariate analysis of categorical data (principal components analysis by alternating least squares, or PRINCALS), they identified four specific subtypes of flying phobics that differed in terms of level of flight anxiety, age, gender, and focus of fear. The first subtype consisted of a relatively young (less than 35 years old) group of phobics with low to moderate flight anxiety and no panic attack symptoms. Their complaints were not tied closely to any other phobic complaint, and they tended to seek help because of fear of a crash and the need to be in control of the situation. Van Gerwen et al. noted that this subtype tended to interpret all plane sounds and movements as a sign of something being wrong with the aeroplane. The second subtype was characterised by a focus on fear of loss of self-control or social anxiety. This group consisted mainly of women under 35 years of age who experienced moderate levels of flight anxiety, were aware of their bodily reactions, and focused a lot of attention on these sensations. The third subtype was characterised by high levels of flight anxiety and avoidance, as well as claustrophobia, agoraphobia, and fear of water. This group reported panic attacks in anticipation of flights, during flights, and in connection with flight-related stimuli, and tended to be over 54 years of age. The fourth subtype consisted mostly of men aged between 35 and 54 years. This group reported moderate to high flight anxiety that was particularly associated with acrophobia, or fear of the height experienced in an aeroplane (Van Gerwen et al., 1997). In summary, the foci of fear that differentiated the four subtypes were: (1) fear of an aircraft accident and the need to be in control of the situation, (2) fear of loss of self-control or social anxiety, (3) fear of water and/or claustrophobia and agoraphobia (with panic attacks), and (4) acrophobia. Because the Van Gerwen et al. study did not include a diagnostic evaluation, it is difficult to compare it to related studies.

Overall, research findings suggest that there are subtypes of flying fear based on focus of fear. It has been suggested that differences between studies are in part due to varying recruitment procedures, which in turn lead to distinct types of samples and fear severities (Wilhelm & Roth, 1997). Nevertheless, the identification of subtypes of flying fear may have implications for treatment (Van Gerwen et al., 1997). In terms of exposure as a therapy component, Wilhelm and Roth suggest that both specific phobias and panic disorder with agoraphobia groups need to be exposed to external stimuli, while exposure to bodily sensations is only required for those with panic disorder with agoraphobia. Howard, Murphy, and Clarke (1983) also note that treatment outcomes may be improved if specific flying fear patterns can be isolated. This would help to determine the best treatment approach for the particular fear, and such an approach may be comprised of specific components rather than a comprehensive intervention that may include irrelevant material.

The two main subtypes of DRF found in Study One were characterised by danger and anxiety expectancies. The subtypes identified by Van Gerwen et al. (1997) with flying phobics also featured such expectancies, in terms of fear of an aeroplane crash in the first subtype, and fear of bodily reactions associated with anxiety in the second subtype (and possibly also the third subtype because of the presence of panic attacks, which feature fear of symptoms as part of the diagnostic criteria; see DSM-IV). Such results support the contention that different treatment interventions may be required for the two subtypes.

EXPECTANCY THEORY OF FEAR

The differential focus on danger and anxiety expectancies has been the subject of much prior research. Reiss (1980) proposed an expectancy theory which holds that common fears and phobias can be understood in terms of two different sources of avoidance motivation, referred to as *danger expectancies* and *anxiety expectancies*. Danger expectancies are seen to motivate people to avoid stimuli associated with potential harm from the external environment, such as fear of an aeroplane crash or a car accident. Danger expectancies are strengthened (or weakened) when the level of danger is surprisingly higher (or lower) than expected. Conversely, anxiety expectancies motivate people to avoid stimuli that are associated with the experience of anxiety, such as worrying about having a panic attack on an aeroplane or while driving (Gursky & Reiss, 1987; Reiss & McNally, 1985). Anxiety expectancies are strengthened (or weakened) when the level of anxiety anticipated and experienced is surprisingly higher (or lower) than anticipated or experienced. The concepts of danger and anxiety expectancies have been distinguished in studies of their factorial validity (Gursky & Reiss, 1987).

The expectancy model proposes that different treatment techniques might be needed for danger-based versus anxiety-based fears. Reiss and McNally (1985) have considered exposure-based therapies and effective placebo procedures (i.e., those that produce an unexpected reduction in anxiety in the presence of the feared stimulus) in relation to expectancy theory. According to Reiss and McNally, exposure therapies should reduce both danger and anxiety expectancies, since they include the harmless presentation of the feared stimulus as well as the requirement to remain in the situation until anxiety decreases. In contrast, placebo procedures should reduce anxiety expectancies but not danger expectancies, as they do not directly address the aspect of anxiety that is danger-related (Reiss & McNally, 1985). If there are subtypes of DRF based on danger and anxiety expectancies, then this may have treatment implications as expectancy theory proposes, particularly regarding which approach will be most efficient and effective for the particular fear.

Studies that have examined the occurrence of thoughts associated with danger and anxiety expectancies in people with DRF are sparse. Williams, Kinney, Harap, and Liebmann (1997) examined the occurrence of different patterns of thinking in vivo for a group of 48 driving phobics. They found that participants were mainly preoccupied with their current anxiety, which was expressed in 30% of the statements recorded periodically during the behavioural test of driving. Self-efficacy was also a feature of thought content (17%), although thoughts of danger or anticipation of future anxiety or panic were relatively rare (both less than 2%). Other research by Ehlers et al. (1994), investigating driving fear-related cognitions, found a mixture of danger- and anxiety-related cognitions in their sample of driving phobics.

In summary, it appears that danger and anxiety expectancies have emerged as separate components in the few previous studies on DRF. Further research is required to clarify the role of anxiety and danger expectancies in DRF, and how these factors might be involved in various DRF subtypes. Additional clarification of these issues would enable recommendations to be made regarding the implications of such findings for assessment and treatment of those with DRF. Study Two partly aimed to address this need.

THE ROLE OF DRIVING SKILLS

Fears that are related to the task of driving are somewhat unique compared to other types of fears in that driving has a performance component. Driving is an activity that is dependent upon the acquisition of a complex set of skills (Groeger, 1988). Not only must drivers be competent at operating their own vehicle, but they must also be proficient at dealing with the environment in which they are driving. For someone who has difficulty acquiring these skills or for some reason loses confidence in their ability to drive, it is plausible that they may develop some anxiety, or even fear, towards the driving task.

However, there is no research that has explicitly investigated whether driving skills play a role in DRF. This is particularly surprising, because the results of such research may have important implications for the assessment and remediation of DRF. For example, if the focus of fear for some driving-fearfuls is on their actual driving skills deficits, then the use of a skills assessment and/or driving instruction may be beneficial and may enhance treatment efficacy and efficiency. Similar utility may be gained where the individual has low self-confidence in their driving ability and perceives their driving ability to be worse than is actually the case upon thorough assessment.

An analogous case is that of social phobia. Social phobia is related to an individual's performance on a particular task or in a certain situation (Wells & Clark, 1997). Similarly, driving can be conceptualised as a performance-related task. Individuals with social phobia fear a variety of social and performance situations because of concerns that they will act in a way that will be humiliating or embarrassing, or that they will show visible anxiety symptoms, such as sweating or shaking (Turner & Beidel, 1989). One of the major theories of the etiology of social phobia suggests that people with social phobia are deficient in verbal and non-verbal social skills, which therefore implicates social skills training as one of the most common components of treatment approaches for social phobia (Andrews, Crino, Hunt, Lampe, & Page, 1994; Barlow, Esler, & Vitali, 1998; Chambless & Hope, 1996; Heimberg, 1989; Wells & Clark, 1997). In summary, training in social skills has been a common part of treatment for people who have social phobia and are deficient in certain social skills.

However, the only aspect of existing DRF research that has approximated the investigation of driving skills is in the few studies that have used *behavioural avoidance tests* (BATs) in the assessment of their driving-fearful samples. A BAT measures a person's ability to remain in the presence of the feared object or situation, and can include an assessment of thoughts, behaviour, and the amount of anxiety experienced during the test (Bellack & Hersen, 1998). For example, a driving BAT might involve a hierarchy of driving tasks that progress from relatively simple to complex situations (e.g., sitting in the driver's seat in a parked car or driving in a parking lot, through to driving on the motorway and changing lanes). Level of anxiety is typically recorded during each task and the test terminated when anxiety prevents the person from proceeding any further.

Ehlers et al. (1994) describe in detail the use of a driving BAT as part of their assessment procedure. Although they report that the BAT took about two hours to complete, the purpose of the testing was not to assess driving skill but to gather physiological data including heart rate, *t*-wave amplitude, respiratory rate, minute volume, respiratory sinus arrhythmia, and body movement. Kuch (1989, 1997) mentions behavioural tests as useful assessment measures, although does not discuss the assessment of driving skills, even though it is suggested that a defensive driving course may be a useful part of the intervention. Although some authors (e.g., Flynn, Taylor, & Pollard, 1992; Kuch, 1988; Levine & Wolpe, 1980; Williams & Rappoport, 1983; Williams, Dooseman, & Kleifield, 1984; Williams et al., 1997; Wolpe, 1982) have noted their use of road tests as part of an assessment and/or exposure programme with driving phobics in both research and case studies, there have been no studies of either the role of driving skills in DRF or the pattern of driving skills that may be predominant amongst driving-fearfuls.

To summarise, no prior research has specifically investigated the driving skills of those who report DRF. It is unclear why this is the case, although there are potential practical difficulties that may have discouraged researchers. For example, recruitment of participants may be difficult given that those who are driving-fearful will likely be reluctant to do the very thing that they fear. It is also possible that the sample may not include more severely anxious individuals who may be less likely to put themselves in a situation that is unpleasant for them. Ehlers et al. (1994) acknowledge this point in their study. The complexity of the traffic situation may also be a deterrent to research. Nevertheless, since driving is a performance-related task, it would seem sensible to ascertain whether driving skills play a role in DRF, particularly in light of the possible implications for efficient assessment and treatment of this group. Before considering the potential role of driving skills in DRF in more detail, it is appropriate to briefly discuss issues pertinent to the conceptualisation of driving skills. Throughout this discussion, the potential role of fear in driving skills will be referred to as *anxiety*, as the relevant research alludes to anxiety as a general concept rather than fear specifically.

Driving Theory

Driving has been conceptualised in many different ways and a number of theories have been proposed to describe and explain driving behaviour. Existing models of driving behaviour fall into two main categories, namely the *traditional* or *non-integrated* approaches and the *holistic* or *integrated* approaches. These models are briefly reviewed here to provide an overview of how driving has been broadly conceptualised, and to provide a context for later discussions of the role of anxiety in driving.

Non-Integrated Driving Models. Traditional driving models describe driving in terms of separate components such as independent driver, vehicle, and road characteristics (Wood, 1996). Michon (1985) has developed a classification system that categorises these driving models into four groups, as shown in Figure 5.1. Non-integrated driving models are structured in *taxonomic* or *functional* terms, and are based on behavioural principles (input-output) or an analysis of psychological variables (internal state) (Michon, 1985).

	Approaches to driving behaviour: Taxonomic	Approaches to driving behaviour: Functional
Input-output (behavioural)	Task analyses	Mechanistic models Adaptive control models • servo-control • information flow control
Internal state (psychological)	Trait models	Motivational models Cognitive (process) models

Figure 5.1. *Matrix classification of traditional (non-integrated) driving models. Adapted from Michon (1985, p. 490).*

Taxonomic driving models. Taxonomic approaches to driving behaviour are "essentially an inventory of facts" (Michon, 1985, p. 490). Task analysis describes the requirements for meeting a range of individual driving tasks (e.g., McKnight & Adams, 1970; van der Molen & Bötticher, 1988). Trait models compile internal state factors that may affect driver behaviour, such as personality variables. Such models have been criticised in the literature, and typologies describing drivers as *accident-prone* and *reckless* have been controversial (e.g., Mihal & Barrett, 1976; Shoham, Rahav, Markovski, Chard, & Baruch, 1984).

Functional driving models. Functional approaches emphasise the dynamic nature of driving and therefore have an advantage over a taxonomy. However, behavioural functional models generally do not include the components of anxiety or fear-related emotional variables. Motivational models approach driver behaviour in terms of risk compensation, risk threshold, and risk avoidance. These models focus on the role of the driver in controlling and maintaining safety margins, and differ mainly in their evaluation of perceived level of risk (Michon, 1985). Motivational models have been applied to attempts to change risky driving behaviour through education programmes (Näätänen & Summala, 1976) and the concept of defensive driving (Michon, 1985).

Cognitive models attempt to explain driving in terms of the basic underlying cognitive processes involved in the driving task. These models are important because they include the driver as a major part of the traffic system, and may therefore be more relevant to understanding how anxiety might affect driving behaviour. For example, Anderson's (1982) ACT Production system is a cognitive model for the acquisition of a complex skill, although was not developed to refer to driving specifically. Other cognitive models emphasise the importance of attention and can therefore be applied to driving. For example, the Influential Model of Attention (Schneider & Shiffrin, 1977) is a two-process theory of human information processing consisting of automatic (unconscious) and controlled (conscious) processing. The model also suggests that errors in focused and divided attention may have a negative impact on the ability to discriminate between relevant and irrelevant stimuli (Schneider & Shiffrin, 1977). Despite the potential benefits of cognitive theories for helping to attain a more complete understanding of driving behaviour, in practice, the basic driving skills at an operational level tend to be the focus of driver testing (Wood, 1996).

Integrated Driving Models. Integrated approaches to driving incorporate the traditional theories as discussed above, and elucidate the driving process with consideration of the interactions between the driver, vehicle, and environment. Because of this more holistic approach, integrated theories are an important development in the driving literature, attempting to explain driving from a more meaningful perspective. There are two relatively recent integrated approaches that can be readily applied to the driving situation, namely the *systems model* (Willumeit, Kramer, & Neubert, 1981) and the *cybernetic model* (Galski, Bruno, & Ehle, 1992).

Systems model. This model proposes the driver-vehicle-environment system, emphasising the interconnections between the three subsystems in vehicle control (see Figure 5.2). The interactions between the three subsystems are mainly characterised by cognitive processes (Kramer & Rohr, 1982). In addition, any change in one of the areas will have an effect on all of the others.

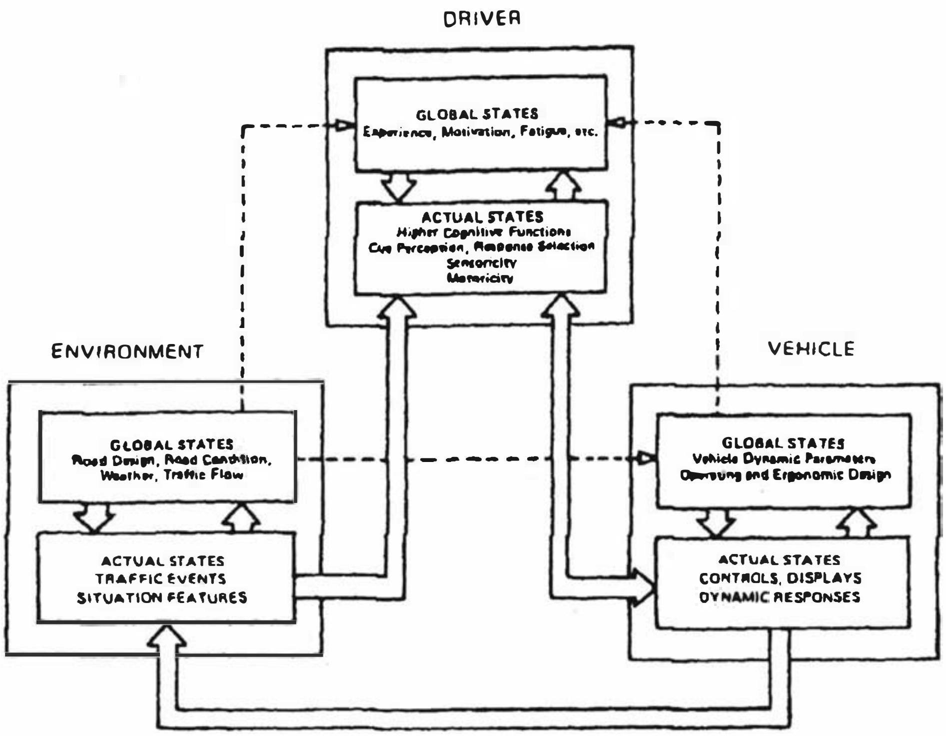

Figure 5.2. *The systems model (Willumeit et al., 1981, p. 44).*

The different variables that make up the systems model are categorised into *global states* and *actual states* according to their temporal relationship (Kramer & Rohr, 1982; Willumeit et al., 1981). The model proposes that driver behaviour depends on the global states of the environment and vehicle (e.g., driving experience, motivation, weather, and vehicle design) as well as the actual response states to which the driver reacts (e.g., vehicle speed and driver steering movements) (Wood, 1996). This inclusion of the system in which a driver operates is considered an important theoretical development (Cantilli, 1981).

Cybernetic model. The cybernetic model was developed to fill a gap in the available theory for the assessment of driving ability after acquired neurological damage (Galski et al., 1992; Galski, Ehle, & Bruno, 1990). This focus meant that the model was designed to assess a variety of cognitive processes including scanning, attention, and information processing, and consists of the requisite perceptual and cognitive processes for driving after cerebral damage (Galski et al., 1992). The model is shown in Figure 5.3.

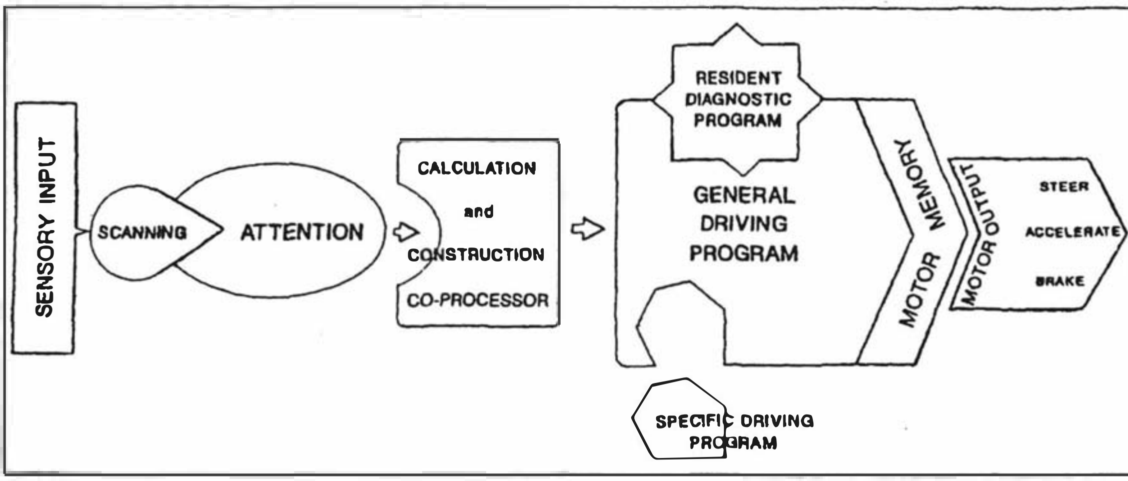

Figure 5.3. *The cybernetic model (Galski et al., 1992, p. 325).*

Components of the model labelled *sensory input*, *scanning*, *attention*, and *calculation and construction co-processor* are assessed using tests of visual acuity and neuropsychological function. The *general driving program* aspect is intended for application to the driver who has some residual memory of driving, and assesses the ability to expand on previous experience, using road knowledge memory tests (Galski et al., 1992). The *resident diagnostic program* component refers to assessment of executive functioning as well as inattention, impulsiveness, and distraction, to name a few. All of the parts of the model can be monitored using simulator and on-road driving measures.

Driving as an Information Processing Task. Information processing theories of driving are perhaps more relevant to the question of how anxiety might affect driving behaviour. Within the driving system, the driver can be considered as an *information-processor*, whose role it is to process information from the driving environment and act on appropriate decisions. This process is depicted in Figure 5.4.

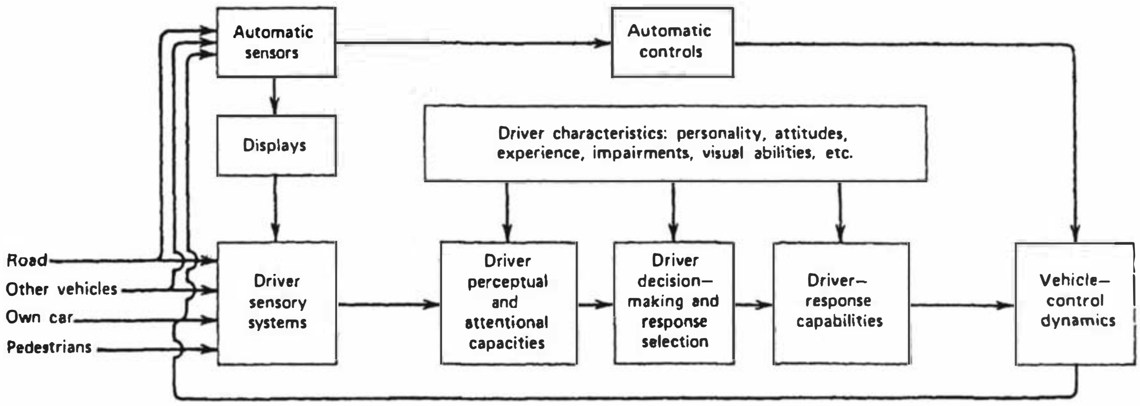

Figure 5.4. *Information processing functions of the driver (Shinar, 1978, p. 3).*

Psychologists involved in traffic-related research consider that driving skill comprises perceptual, decisional, and vehicle handling skills (e.g., Jørgensen, 1993). Within this process, a number of characteristics of the driver influence the way an individual drives, including driver skills, attitudes, level of arousal, experience, motivation, and personality. These characteristics affect the way that information is perceived, the types of decisions that are made, and the capacity to control the vehicle (Rumar, 1985; Shinar, 1978).

Attention, visual search, perception, decision-making, and response capabilities are all important facets of information processing models. Attention is a fundamental part of the driving process, and the level of attention allocated to the driving task can be varied according to the demands of the particular driving situation. In a study by Brown and colleagues that is cited (but not referenced) by Shinar (1978, p. 73), drivers could perform additional mental tasks without any impairment of the driving task when the driving situation required low attentional demands, such as driving in light traffic. However, performance on either the driving task or the additional mental task deteriorated when driving conditions became more demanding. Hancock, Wulf, Thom, and Fassnacht (1990) also demonstrated that processing capacity is reduced when the driving situation demands more complex performance responses. In such situations, visual search is directed toward the centre of the visual field. Similarly, perception can be affected by an overload of information as it depends to a large extent on what the driver attends to in the driving environment.

Decision-making is affected by the time needed to reach a decision as well as the meaning extracted from the perceptual data (Shinar, 1978). In a study of the information processing rate associated with decision-making in driving, Fergenson (1971) found that reaction time was faster if decision time was short, since information processing ability improves with shorter decision times. Alternatively, individuals who are hesitant or require longer decision times may more frequently experience an overloaded processing capacity (Shinar, 1978). Fergenson considered anxiety to be a factor in increasing both simple and choice reaction time. Response capabilities (e.g., steering, acceleration, deceleration, and braking) are also limited by factors such as accuracy of control and time (Shinar, 1978).

Almost all information processing models treat the human as a *limited capacity information-processor*. Consider someone who is driving home at rush hour while simultaneously listening to the car radio. On approaching the motorway, the person begins to visually scan for gaps in the traffic flow. When a safe gap has been identified, the person makes the decision to enter the flow of traffic, during which the appropriate signals and checks are made to ensure a safe manoeuvre. Once the person is moving with the traffic flow, they can begin listening to the radio again, having been unaware of the information the radio was presenting while the driving manoeuvre was being completed. During this process, the person is unable to easily divide attention between the tasks of listening to the radio and entering the motorway during rush hour, which illustrates the limited capacity of human information processing ability (Shinar, 1978). In situations where there is potential for information overload, a decision must be made as to which subset of information requires immediate attention. Depending on the subset attended to, a decision is then made as to whether or not to make a change in driving behaviour, and that decision is selected and carried out.

There is also a limit to the *rate* at which information can be processed, as such functions are generally carried out under the constraints of time (Shinar, 1978). For example, a sufficient amount of time is required to read road signs that are relevant to a particular route. However, if the person is travelling quickly, the amount of time available to glean the relevant information is shortened, and the person may need to slow their speed to process the required information in sufficient time. This limited information processing rate means that attentional and visual search functions are highly important (Shinar, 1978).

In summary, there are many different models of driving that have conceptualised the driving task in a number of ways. Integrated theories more closely approximate the actual driving situation, as they acknowledge the many different factors and dynamic interactions inherent in the driving situation. A few of the theories discussed lend themselves well to explaining the role of anxiety in driving skills. For example, anxiety could form part of the global state of the driver in Willumeit et al.'s (1981) systems model, which in turn affects the driver's actual state in terms of higher cognitive functioning and cue perception. Although this theory allows room for anxiety in the driving system, it does not explain *how* anxiety would affect the driver and their driving behaviour. In contrast, the information processing model specifies the factors that might be affected by anxiety, and acknowledges the limited nature of information processing capacity in the driving situation. However, an important question yet to be investigated explicitly is whether anxiety affects driving skills.

ANXIETY AND DRIVING

Discussions in the general driving literature that have related anxiety to driving have come from broader studies of personality typologies and disorders (e.g., Evans, 1991; Foot & Chapman, 1982; Heimstra, Ellingstad, & DeKock, 1967; Little, 1970; Loo, 1979; Shinar, 1978; Shoham et al., 1984; Silverstone, 1988; Wilson & Greensmith, 1983) and stress (e.g., Gulian, Glendon, Matthews, Davies, & Debney, 1988, 1990; Heimstra, 1970; Hentschel, Bijleveld, Kiessling, & Hosemann, 1993).

Some research suggests that anxiety necessarily impairs driving. Shoham et al. (1984) used a combination of personality variables to predict the likelihood of traffic accident involvement. *Anxious* and *reckless* drivers were identified on the basis of interactions between variables such as impulsiveness, internalisation of norms (attitude towards legal traffic norms), anxiety, and sensation-seeking, together with past history of traffic and criminal offences. Shoham et al. report that drivers characterised as *anxious* manifested high internalisation of traffic norms and high levels of anxiety, and "were found to have lowered bio-psychogenic [*sic*] control over the basic mechanisms required for driving" (p. 184). Shoham et al. also provide a description of the *anxious* driver, referring to the driver's likely behaviour in a traffic situation:

> The driver who is anxious by nature and at the same time has a high level of internalization of traffic norms, is likely to get trapped in a positive feedback cycle as follows:- anxiety will lead to confusion and a drop in activity due to the high internalization of norms, which will in turn increase his [or her] anxiety about the possibility of committing an offense. In this situation the driver will become disorientated and will commit a traffic offense or cause an accident through loss of control of himself [or herself] and of the car. (p. 188)

Although this study was conducted on a sample of recidivist traffic offenders, the authors suggest that *anxious* (and *reckless*) drivers are more likely to cause road accidents, implying the broader population of *anxious drivers*, rather than the smaller group who are involved in traffic accidents. Shoham et al. (1984) do not operationally define the severity of anxiety required for drivers to become higher risk, and do not specify levels of driving anxiety. Thus, it is difficult to determine whether their findings relate to mild, moderate, or severe levels of anxiety. In addition, their description of the driving behaviour of an anxious person appears rather simplistic, and terms such as *confusion* in response to anxiety are not clearly defined.

Other authors have considered that anxiety affects driving in a more complex manner. In an early study, Kottenhoff (1961) found correlations between measures of complex steering skill and simple and complex reaction time for two groups of *neurotics*. Kottenhoff concluded that the "correlation of neuroticism and anxiety scale scores with a driving skill measure suggested these drives might serve to alert Ss [participants]" (p. 290). Thus, Kottenhoff implies that anxiety may have some facilitative or positive effects that are specific to driver behaviour and driving skills. This conclusion is supported by other researchers (e.g., Payne & Corley, 1994). However, it is difficult to ascertain the effect of anxiety from this study because no information was provided regarding the severity of symptoms in the sample, and the terms used to describe the groups were not operationally defined. In a study of the effects of anxiolytics on driving performance, it was found that untreated (i.e., unmedicated) *chronically anxious and tense* patients meeting DSM-III-R criteria for general anxiety disorder or adjustment disorder with anxious mood [*sic*] "were slightly superior drivers than volunteers participating in placebo conditions during the other studies" (O'Hanlon, Vermeeren, Uiterwijk, van Veggel, & Swijgman, 1995, p. 86). Finally, Silverstone (1988) proposed a curvilinear relationship between anxiety and risk of a road accident:

> A certain degree of arousal or anxiety is required for the optimal performance of any task; for example, if we were not at all anxious when driving a car we would probably fail to pay sufficient concern to all the potential hazards associated with driving. It is only when the level of anxiety reaches an intensity at which performance begins to deteriorate that there is an increased risk of an RTA [road traffic accident]. Such intense anxiety is classified as an anxiety state. I know of no studies of the driving abilities in traffic of severely anxious drivers, although laboratory testing shows impairment of psychomotor function. (pp. 62-63)

Therefore, while it has been suggested that anxiety necessarily impairs driving, other research indicates that there may be a curvilinear relationship between anxiety and driving skills.

Anxiety as a Factor Affecting the Driving Task

Although no theories explicitly address the role of anxiety in driving, anxiety can be viewed as a factor that threatens to limit information processing capacity. This is particularly the case when the focus of anxiety is on driving itself. The degree to which anxiety affects a driver's information processing capacity depends to some degree on the severity of anxiety (Silverstone, 1988). The notion that anxiety has different effects on driving performance according to its severity is also consistent with the Yerkes-Dodson law, depicted in Figure 5.5.

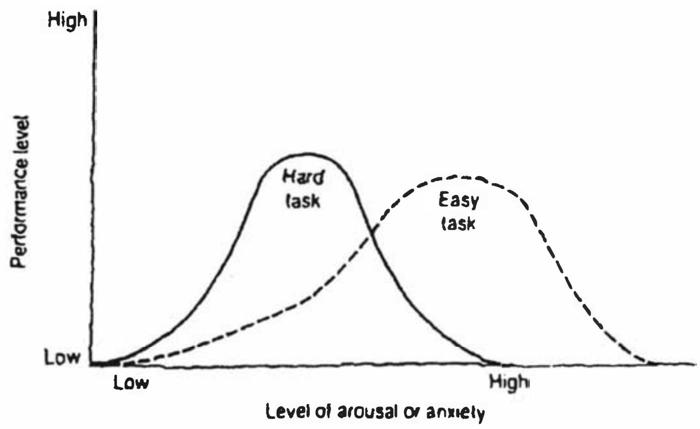

Figure 5.5. *The Yerkes-Dodson law. Adapted from Eysenck and Keane (1995, p. 454).*

The Yerkes-Dodson law describes a curvilinear relationship between anxiety and performance. A moderate amount of anxiety is required for optimal performance on skilled tasks. Increases in anxiety level beyond this moderate point can reduce the capacity for skilled motor movements, complex intellectual tasks, and the perception of new information (Andrews et al., 1994). The law also proposes that the optimal level of anxiety is lower for difficult tasks than for easy ones. Therefore, high levels of anxiety are thought to have more detrimental effects on the performance of difficult or complex tasks as opposed to easy ones.

In the driving situation, it is assumed that too little or no anxiety would result in poor driving performance because the driver would be without the physical, cognitive, and emotional tension necessary to remain alert and attentive to the driving situation. A moderate amount of anxiety enables the driver to carry out all of the basic skills required for driving, as well as to pay sufficient attention to potential hazards so that the appropriate action can be taken if required (Walklin, 1993). According to the Yerkes-Dodson law, excessive amounts of anxiety impair performance, and Silverstone (1988) considers that such high levels of anxiety interfere with driving performance and increase the risk of an MVA. Yinon and Levian (1988) found that anxiety about being in the presence of other drivers leads to the division of attention between self- and task-relevant stimuli. High levels of anxiety can lead to errors, indecision, and hesitation (Walklin, 1993). According to the Land Transport Safety Authority (1999),

> Fear can result in: tentative decision making and actions, missing cues, lack of focus, intimidation by aggressive drivers, [and] increased likelihood of panic reactions. These [factors] could result in the following adverse driving behaviour: failing to keep left, driving through red lights, slow driving, [and] erratic manoeuvres. (p. 55)

However, the Land Transport Safety Authority (1999) do not document the material on which these conclusions are based, and do not justify their predictions. In contrast, one study has found that a sample of untreated people diagnosed with various anxiety disorders were slightly better drivers than a placebo group (O'Hanlon et al., 1995). This is an intriguing finding, and is not explained adequately by the Yerkes-Dodson law, as this law does not identify the main internal or cognitive processes affected by anxiety. However, theories of the relationship between anxiety and performance help to shed more light on this surprising finding, and will be briefly reviewed here.

Theories of the Relationship Between Anxiety and Performance. A number of theories have been proposed to explain the manner in which anxiety affects performance, and to specifically identify the components of the information processing system that are most affected by anxiety (Cameron, 1997; Eysenck, 1992). Three of these theories will be considered here, although the main focus will be on processing efficiency theory, as it has developed from the criticisms levelled at the other two theories.

Cognitive interference theory argues that worry and self-preoccupation impair performance, especially on difficult tasks that require more attention than relatively simple ones (Sarason, Sarason, & Pierce, 1990). Although these predictions have generally been supported, it has been argued that cognitive interference theory exaggerates the importance of self-preoccupation and worry, and over-simplifies the interaction between anxiety and task difficulty (Eysenck & Keane, 1995). *Information processing theory* states that a number of factors determine the effect of anxiety on performance, including situational moderators, personality states, motivational direction and intensity, information processing resources, and the specific cognitive tasks involved (Humphreys and Revelle, 1984, cited in Eysenck, 1992). This theory considers the effects of anxiety on performance, particularly in terms of sustained information transfer and short-term memory, although has been criticised mainly because it does not include a control system to monitor and adjust the functioning of the information processing system (Eysenck, 1992).

Eysenck and Calvo (1992) proposed *processing efficiency theory*, which explains the anxiety-performance relationship more fully than previous theories. Processing efficiency theory assumes that worry and self-concern have an important influence on performance, but that this influence is not necessarily a negative one (Eysenck & Calvo, 1992). Instead, the theory proposes that worry has both positive and negative effects. The negative effects occur because worry serves to pre-empt some of the resources of the working memory system, which allows concurrent transient storage of information and ongoing processing of task information (Eysenck, MacLeod, & Mathews, 1987). The working memory system is thought of as a three-part system that temporarily holds and manipulates information while cognitive tasks are performed. It is composed of an articulatory loop for rote rehearsal, a visuospatial sketch pad for storing visual and spatial information, and a central executive system that integrates information from the other two components, deciding which deserves attention and which should be ignored (Baddeley, 1992a, 1992b, 1994). The negative effects of worry are determined partly by the demands the task makes on the central executive and the articulatory loop. The positive effects occur because of the motivational function that worry serves. The presence of worry about task performance can mean that extra processing resources or effort is allocated to the task in an attempt to improve performance and thereby reduce worry (Eysenck, 1992).

These assumptions lead to an important theoretical distinction between *performance effectiveness* and *processing efficiency*. Performance effectiveness refers to the quality of task performance, while processing efficiency represents the relationship between the effectiveness of performance and the corresponding effort or processing resources invested in performance (Eysenck, 1992). According to the theory, anxiety can have different effects on both performance effectiveness and processing efficiency. As Eysenck and Keane (1995) state:

> More specifically, the worry associated with anxiety reduces processing efficiency because it uses up valuable resources of the working memory system, but the compensatory use of additional effort will often prevent anxiety from impairing performance effectiveness. Thus, the central prediction of processing efficiency theory is that anxiety will generally impair processing efficiency more than performance effectiveness. (p. 456)

Several studies have supported the predictions made by processing efficiency theory (see Eysenck, 1992; Eysenck & Calvo, 1992).

Processing Efficiency Theory, Anxiety, and Driving

Processing efficiency theory can be used to explain the effects of anxiety on driving performance. It is particularly helpful in identifying the components of the information processing system that are most affected by anxiety, most notably the working memory system. According to the theory, high anxiety reduces the capacity of the working memory system because anxiety tends to lead to worry and other task-irrelevant thoughts. In terms of other aspects of the information processing system, Beck and Emery (1985) argue that:

> Because the [anxious] patient 'uses up' a large part of his [or her] cognitive capacity by scanning for threatening stimuli, the amount available for attending to other demands is severely restricted. (p. 31)

Anxious people may allocate more processing resources to monitoring and attending to the environment (or internal states), thereby impairing processing efficiency (Eysenck, 1992). For those who are anxious when driving, this is likely to result in additional demands on processing resources evidenced by increased scanning, searching ahead, risk estimation, anticipation of the traffic situation, and excessive attention to threat. These behaviours may be considered to be evidence of additional effort allocated to compensate for impaired processing efficiency. Processing efficiency theory thereby helps to explain cases where anxiety has no detrimental effect on driving performance, and increased effort may be countering the effects of anxiety on processing efficiency.

Therefore, processing efficiency theory helps to explain the different effects that anxiety may have in the driving situation. The theory allows for the fact that anxiety can both impair driving performance as well as improve it or have a neutral influence on it. In addition, the theory may lend itself well to the consideration of possible subtypes of DRF. The effects of anxiety on processing efficiency may be mediated by the subtype of DRF, particularly whether the focus of fear is on internal or external stimuli. Processing efficiency might be less affected by anxiety if the focus is on danger expectancies (external) rather than anxiety expectancies (internal), as the driver's focus is already on external stimuli, rather than divided between internal and external stimuli. Some research has found that an internal focus of attention is more likely to interfere with task performance than other types of cognitive load (e.g., Lewis & Linder, 1997). These applications of processing efficiency theory are important to Study Two as they highlight the potential relevance of an investigation that can begin to assess and identify the specific effects of anxiety on driving skills. Although Study Two was not designed to explicitly test any of the theories that have been discussed, the findings will be related broadly to theories of driving and specifically to the role of anxiety in driving performance.

Similarly, Matthews and colleagues (see Matthews, 2001, for a review) appear to have referred to processing efficiency theory in explaining their driving simulation results. In contrast to research on the more general effects of anxiety on driving, Matthews and colleagues have attempted to identify the information processing functions that mediate the effects of stress (including anxiety) on performance impairment in driving. Stress variables used were based on factor analyses of the Driving Behaviour Inventory (DBI, 97 items; Glendon, Dorn, Matthews, Gulian, Davies, & Debney, 1993; Gulian, Matthews, Glendon, Davies, & Debney, 1989) and its revision, the Driver Stress Inventory (DSI, 83 items; Matthews, Desmond, Joyner, Carcary, & Gilliland, 1997), considered to represent vulnerabilities to different types of stress outcome. These analyses identified a factor on both measures called *Dislike of Driving*, which has been characterised as corresponding to anxiety responses to driving and, at the extreme, to driving phobia (Matthews, 2001). The types of items loading onto this factor on the DSI included *I feel tense or nervous when overtaking another vehicle*, *I find myself worrying about my mistakes when driving*, and *I am disturbed by thoughts of an accident or the car breaking down.* Other factors identified were *Aggression*, *Hazard Monitoring*, *Thrill-Seeking*, and *Fatigue*. Matthews et al. (1997) reported evidence for criterion and discriminant validity of the DSI. In particular, "Dislike of Driving was associated with negative, emotion-focused strategies such as self-criticism, which may be distracting, but also lead to greater behavioural caution" (Matthews et al., 1997, p. 323).

Dislike of Driving has been associated with a lower incidence of speeding convictions (Matthews, Dorn, & Glendon, 1991; Matthews, Tsuda, Xin, & Ozeki, 1999). Although those with high scores for Dislike of Driving were safer in terms of lower self-reported speed, they tended to make more self-reported driving errors (Matthews et al., 1991, 1997). While it was possible that drivers high in Dislike of Driving could be genuinely deficient in driving skills, results from objective driving performance indicated no such general skill deficit (Matthews, 2001). Dislike of Driving was most strongly associated with *emotion-focused coping*, which consisted of strategies such as *blamed myself for getting too emotional or upset*, *wished I was a more confident and forceful driver*, and *criticised myself for not driving better* (Matthews, 2001). Matthews considered that such distracting effects of emotion-focused coping might account for the relationship between Dislike of Driving and error proneness. From the model of the relationship between driver stress traits, information processing, and driver behaviour proposed by Matthews, Dorn, Hoyes, Davies, Glendon, and Taylor (1998), Matthews considers that:

> Dislike of Driving relates to negative appraisals of driving competence and control and to use of emotion-focused coping strategies such as self-criticism, especially when driving conditions are demanding (e.g., poor visibility). Negative self-appraisals generate tension and depression and cognitive interference, which may impair attention and safety. However, such appraisals may compensate for these effects through biasing strategy choice towards behavioral caution, tending to increase safety. The compensation hypothesis explains the patterning of behavioral consequences evident in the self-reports of high Dislike drivers: more errors, slower speed, and no net affect on overall accident risk. (p. 149)

The prediction from this model, that Dislike of Driving should relate to attentional impairment, was then investigated by Matthews, Sparkes, and Bygrave (1996) using a driving simulator. Hypotheses regarding attentional impairment were derived from *multiple resource theory* (Wickens, 1984), in that performance impairments were considered to be associated with Dislike of Driving due to reduced resource availability. Briefly, Wickens postulated that there were three dimensions along which task demands and cognitive processes compete, namely, stages of processing (varying from encoding and central processing or working memory operations versus responding; e.g., an encoding and responding task can be performed perfectly at the same time, but two encoding tasks will suffer from interference), codes of processing (spatial versus verbal; e.g., a spatial and a verbal task can be easily combined, but two spatial or two verbal tasks will compete for the same resources), and input and response modalities (e.g., input: visual versus auditory; response: manual versus vocal). Later, Wickens (1991) only distinguished stages and codes, while modalities were omitted as they appeared more dependent on structural characteristics than central processing mechanisms.

Therefore, multiple resource theory attempts to explain how task characteristics influence dual task performance. Extrapolated to the driving situation, the theory predicts greater likelihood of interference in a dual-task situation (and hence impaired performance) when the individual tasks draw on the same pool of processing resources, for example, both demanding spatial processes (within-code competition), across any stage (Hancock et al., 1990; Ranney, 1994; Wickens, 1991). This interference is enhanced if within-code competition is also imposed within a stage (e.g., spatial perception and spatial memory) rather than between stages (e.g., spatial perception and a manual response). While multiple resource theory seems to overlap with processing efficiency theory, no literature could be found linking the two models.

Matthews et al. (1996) found that participants high in Dislike of Driving showed significantly poorer control (in terms of degrees of heading or lateral tracking error) in single-task driving than those low in Dislike of Driving. In contrast with predictions from multiple resource theory, there were no differences between groups on dual-task performance. This suggested that the anxiety-related impairment in performance was stronger when the driving task was relatively undemanding (Matthews, 2001). Dislike of Driving was also related to detrimental effects on driving performance on straight rather than curved road sections. Matthews explained these results by arguing that drivers may adapt well to demanding dual-task situations by increased effort, thereby suppressing the effects of cognitive interference. In single-task driving situations, the driver may consider the task less demanding of effort and fail to sustain sufficient effort to maintain performance, instead diverting their attention to processing associated with worry (Matthews, 2001; Matthews & Desmond, 2001). Many other studies have been conducted to assess the effects of dual-task driving situations on performance, although none of these are specifically related to anxiety (e.g., Janelle, Singer, & Williams, 1999; Recarte & Nunes, 2000; Wetherell, 1981).

SUMMARY

Despite the relatively short lifespan of the extant literature on DRF, some important advancements have taken place recently that have fuelled interest in the area (e.g., Ehlers et al., 1994; Taylor & Deane, 2000). The research has focused on the practical and clinical implications of findings for people who are seeking help for DRF. Increasing attempts have been made to clarify the nature, etiology, and clinical characteristics of this population to facilitate a better understanding of the clinical presentation of DRF and to improve the efficiency and efficacy of assessment, diagnosis, and treatment.

As indicated in Chapter Two, DRF is a complex phenomenon. Various diagnostic presentations have complicated the way that DRF is understood. However, recent attempts to investigate a typology of DRF have found potential subtypes that are associated with different clinical presentations based on the focus of fear. This research parallels similar studies on flying phobia, lending support to the notion that DRF, another situationally-specific fear, might also consist of varying subtypes. Study Two aims to expand on the exploratory findings of Study One, in which two subtypes emerged based on the focus of fear, and were broadly categorised as danger and anxiety expectancies.

As the present Chapter has shown, driving is a highly complex process. As information-processors in the driving system, drivers must constantly receive, process, and respond to information derived from a constantly changing environment, and therefore require efficient cognitive function. Anxiety is a factor that, depending on severity, can either enhance or impair a driver's cognitive function (or processing efficiency). It may also impair driving performance, unless the driver allocates additional effort to the driving task to reduce the effect of anxiety. Research by Matthews and colleagues (see Matthews, 2001) has perhaps provided the most comprehensive study to date of the possible impact of anxiety on driving, specifically in terms of the way in which anxiety might affect driving performance.

STUDY TWO: AIMS AND OBJECTIVES

The first aim of Study Two was to examine whether there are subtypes of DRF, using a comprehensive assessment procedure including diagnostic information. The second aim was to investigate the relationship between driving-related anxiety and driving skills. The results of Study Two should enable recommendations for the assessment and treatment of people with DRF to be made.

Study Two involved a detailed assessment of drivers who describe themselves as having some degree of fear about driving, compared with a group of control drivers without such fears. Within this research context, the following exploratory and descriptive research objectives were proposed, based on the preceding Chapters.

Objective 1. **To describe and compare the two groups using a range of demographic information, driving-related variables, diagnostic information, self-report psychometric measures, and practical driving measures.**

This objective serves a descriptive purpose to locate the two groups within a broader context of demographic, driving, and fear severity characteristics.

Objective 2. **To explore whether there are any differences between those who fear being a driver the most and those who are most fearful of being a passenger.**

No research could be found that has compared symptom severity amongst those who are most afraid of being a driver versus being a passenger.

Objective 3. **To further investigate whether there are subtypes of DRF.**

Based on the findings of Study One, further investigation of potential subtypes of DRF was warranted. Whilst Study One identified participants with danger and anxiety expectancies as potential subtypes, the findings were exploratory and not sufficiently robust to hypothesise these as subtypes in Study Two.

Objective 4. To investigate the relationship between driving-related anxiety and driving skills.

Based on the research by Matthews and colleagues (see Matthews, 2001), it is expected that the relationship between driving-related anxiety and driving performance is complex (e.g., curvilinear). For example, fearfuls could make fewer driving errors if their symptoms result in caution while driving. Alternatively, greater errors could be made if symptom level overloads information processing capacity. Further differences may be apparent depending on the difficulty of the driving task, as reported by Matthews. Study Two represents the first investigation of driving skills in DRF, and aims to explore and describe the relationship between driving-related anxiety and driving skills, using previous research to help explain findings where possible.

Chapter Six

STUDY TWO: METHOD

Study Two used a quasi-experimental design and detailed descriptive and multivariate analyses to address the aims and objectives. This Chapter presents the methodology employed, including description of the two participant groups, as well as the measures and procedures used. The questionnaire, diagnostic, and driving measures are described in detail, including justification for their inclusion in Study Two. Procedures for the piloting of the research are described, as well as information regarding the administration of measures, ethical considerations, and analytical techniques employed.

RESEARCH DESIGN

Most of the existing research has focused on describing driving-fearful samples with a view to enhancing the understanding of the clinical characteristics of this group. In a few cases, a control group has been used to help establish the severity of symptoms reported by driving-fearful samples (Ehlers et al., 1994; Hofmann, 1992; Sartory et al., 1992). This is the approach taken in Study Two, using a quasi-experimental design to compare fearful and control groups across various dimensions.

Existing research on DRF has not matched participant groups on important characteristics such as age, gender, and driving experience. A strength of Study Two is the attempt to ascertain the impact of DRF on driving skills, thereby necessitating the use of various measures of driving skill. The use of both practical and self-report measures of driving skill are unique contributions to the existing research on DRF. The inclusion of a driving skills assessment meant that additional design considerations had to be addressed. The fearful and control groups were matched for gender, average age, and average number of years of driving experience. Although some of the prior research on these variables as they relate to driving is equivocal, it was important to control for their potential effect. For example, Wood (1996) concluded in a review of the existing research that there seemed to be gender differences in driving ***behaviour*** rather than driving *performance*. Shinar (1978) made the distinction that "driving performance is probably more indicative of the limits of our capabilities, while driving behaviour determines actual behaviour somewhere below these limits" (p. 26). In addition, age appears to be an important variable in relation to driving, although the nature of this relationship is unclear (Wood, 1996). Differing age-related effects have been reported for measures of driver performance and driver behaviour (Wood, 1996). Finally, driver experience also appears to be an important variable in driving studies, although between-study comparisons are limited by inconsistencies with the measurement and definition of the concept of driver experience (Wood, 1996).

PARTICIPANTS

Study Two involved two groups of licensed drivers. The driving-fearful and control groups consisted of 50 participants each. Potential participants were initially contacted through newspaper advertisements asking for interested volunteers in the general population to contact the researcher (see Appendix D-1 for advertisements). A toll-free telephone line was established enabling a wide range of volunteers to have the opportunity to participate. The advertisements addressed both fearful and control drivers, and asked for people who had a fear of driving in some or all situations, as well as people who did not have DRF. These were placed in one free newspaper in Palmerston North (population approximately 75,000) as well as the main Wellington (population approximately 250,000) newspaper. These advertisements generated other media interest, and a number of local and national newspapers published articles about the study (see Appendix D-2). A local radio station conducted a brief (5-10 minute) interview with the researcher about the study. The research was also described in a road safety publication (see Appendix D-3).

Insufficient participants were recruited from the first wave of advertisement, and only one male volunteered himself as a fearful driver. In contrast, 62% of the control volunteers were male. The predominance of females identifying themselves as fearful of driving (consistent with previous research; e.g., Ehlers et al., 1994; Mathew et al., 1982; Munjack, 1984) and the lack of female volunteers for the control group led to a second recruitment aimed at female drivers only. Again, advertisements were placed in the same newspapers as for the initial recruitment (see Appendix D-4), and these generated the required sample sizes.

In all of the media coverage, the nature and purpose of the study was briefly explained along with information about how interested volunteers could participate. When potential participants contacted the researcher by telephone, they were able to have any questions answered and were then sent a copy of the appropriate questionnaire for the group to which they were assigned (Part One), along with a postage-paid, return-addressed envelope. This questionnaire was used to select participants for Part Two, which involved completion of a diagnostic interview, self-report questionnaires, and a practical driving assessment.

MEASURES

Questionnaire

Table 6.1 presents a summary of the various questionnaire measures used in the order that they were administered. As described above, Part One of the study involved the administration of a questionnaire for fearfuls and controls that consisted of the first eight measures in Table 6.1. The initial questionnaire was the same for both fearful and control drivers, except that the control group did not receive all of the section on Driving Fear Information (see Table 6.1). Full copies of these initial questionnaires are presented in Appendixes E-1 and E-2. The rest of the measures in Table 6.1 were administered in Part Two of the study (described later in this Chapter). These questionnaires are presented in Appendix E-3. All measures are described in detail in the following sections.

Table 6.1. *Summary of the measures used in Study Two.*

Measure	Description
Background Information	Group of items regarding demographic characteristics.
Driving Information	Group of items regarding driving history, including current driving frequency, pattern, and location, as well as accident and driving offence history.
Driving Fear Information	Group of items regarding severity of DRF, probability of MVA involvement, and helpseeking behaviour.
Driving Cognitions Questionnaire (Ehlers, 1990)	49-item self-report measure of thoughts associated with DRF. Ratings were made on a 0-4 point scale.
Short form of the State-Trait Anxiety Inventory (Marteau & Bekker, 1992; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983)	6-item self-report measure of state anxiety. Ratings were made on a 1-4 point scale.
Driving Situations Questionnaire (Ehlers, 1990)	209-item self-report measure of anxiety and avoidance in a range of driving situations. Ratings were made on a 0-4 point scale.
Trait scale of the State-Trait Anxiety Inventory (Spielberger et al., 1983)	20-item self-report measure of trait anxiety. Ratings were made on a 1-4 point scale.
Fear Questionnaire (Marks & Mathews, 1979)	Self-report scale measuring avoidance in various situations. Ratings were made on a 0-8 point scale.
Test Anxiety Inventory (Spielberger, Gonzalez, Taylor, Anton, Algaze, Ross, et al., 1980)	20-item self-report measure of test anxiety. Ratings were made on a 1-4 point scale.
Beck Depression Inventory-Second Edition (Beck, Steer, & Brown, 1996)	21-item self-report measure of the severity of symptoms of depression. Ratings were made on a 0-3 point scale.

Background Information. This group of items consisted of demographic questions included for the purpose of describing the sample. Questions were asked concerning gender, age, marital status, ethnicity, years of education, years of driving experience, current employment status, medical conditions, medication, and pregnancy. The final question asked whether participants had been involved in previous research conducted by the researcher (Taylor & Deane, 2000; see Chapter Two). This question was not included for control drivers, as the previous research did not comprise a control group. The demographic items consisted mainly of alternate-choice items. An open-ended question was also used regarding medication details to assist with determining exclusion criteria.

Driving Information. Items in this section elucidated aspects of participants' driving histories that might be relevant to DRF. Questions were primarily of a multiple-response format. Participants were asked their age when they started to learn to drive, how they learnt to drive, how long they had possessed a driver's licence, and how many times they sat the licencing test. Measures of driving frequency, major patterns of driving (purpose, place, and traffic density), and history of driving incidents were adapted from Wood (1996), who developed the items from previous driver research. Also included was an item about whether participants had completed a defensive driving course.

Driving Fear Information. A group of items was developed to obtain basic information about DRF. Participants were asked whether they considered themselves to have a fear of driving, and to rate how fearful they were about driving on a scale from 0 (*Not at all fearful*) to 10 (*Extremely fearful*). Using percentages, they were also asked to rate the perceived likelihood that they would have an MVA when they got into a car. These three questions were asked of both fearful and control drivers, while the remainder of the section was applicable only to fearful drivers.

Fearful drivers were asked to describe in their own words what it was about driving that they feared the most. This question was intended as a qualitative description that could assist interpretation of the data, as previous research has shown that open narrative and set format responses can produce different results (Taylor & Deane, 2000). In addition to rating the likelihood of an MVA, fearfuls were asked to also rate the likelihood of the occurrence of their most-feared situation. One item asked fearfuls to associate their most intense DRF with either being a driver or a passenger, or whether their DRF was equally applicable to both situations.

The rest of the driving fear section contained questions about helpseeking behaviour, and was mostly of multiple-response or Likert scale format. These questions were included as an alternative method of assessing how problematic the DRF may be with regard to the need to seek professional help. Questions included the extent of interference of DRF with daily activity, discussion with various people about the fear, previous receipt of professional psychological help for the fear, perceived need for such help, and likelihood of seeking such help. These items have been used in other studies of helpseeking behaviour (Deane & Chamberlain, 1994; Deane & Todd, 1996). Questions concerning perceived need for and previous receipt of professional driving instruction for the fear were also asked of the fearful drivers. A final question asked both fearful and control drivers to rate how fearful they were about sitting tests in general, using a scale from 0 ("Not at all fearful") to 10 ("Extremely fearful"). This item was used as part of a control procedure for test anxiety (described later in this Chapter).

Driving Cognitions Questionnaire (DCQ). The DCQ is an unpublished instrument developed by Ehlers (1990) consisting of 49 items that are various thoughts or ideas that might pass through one's mind when driving. The items were identified and developed through a combination of information that driving-fearfuls provided during structured clinical interviews (Ehlers, 1990) as well as features that Ehlers believed to be relevant to driving fear (personal communication, April 19, 1999). Minor changes were made to the DCQ for use in Study Two. The second use of the word *will* in an item in Ehlers' version (*I will lose control of myself and will act stupidly or dangerously*) was removed for ease of reading. The last section from the original version that asks participants to circle three sentences that best describe the most frequent ideas when driving was also removed because it was not important for the purposes of Study Two, and results for these items were not reported in the original study (Ehlers et al., 1994; Hofmann, 1992).

Administration and scoring. Each item on the self-report DCQ was rated according to how often each thought (i.e., item) occurs while driving, using a 5-point Likert scale from 0 (*Never*) to 4 (*Always*). Study Two used the same instructions as those specified by Ehlers (1990). A sentence was added to the instructions for those fearfuls who were not currently driving. This was included in an attempt to minimise missing data from drivers whose fear was so severe that they had discontinued driving altogether. Scoring of the DCQ used the overall item mean, ranging from 0-4 (Hofmann, 1992). According to Ehlers (personal communication, April 19, 1999), a total score was not reported in previous research because of missing data. The DCQ was expected to take about 10 minutes to complete.

Normative data and psychometric properties. Normative data have not yet been gathered for the DCQ. The only available data are the means and standard deviations reported by Hofmann (1992), where a significant difference was found between driving phobics and controls, $t(66) = 4.60$, $p < .0001$ (phobics: $M = 0.9$, $SD = 0.8$, $n = 43$; controls: $M = 0.3$, $SD = 0.2$, $n = 30$). Because of its limited use, there have been no extensive investigations of the reliability and validity of the DCQ. Hofmann (1992) has provided the only available information, comprising internal consistency for driving phobics ($r = .97$), controls ($r = .95$), and the combined sample ($r = .98$). Internal consistency reliability for Study Two was $r = .96$, .94, and .94 for the full sample, fearful group, and control group, respectively.

Justification for use. Ehlers et al. (1994) have been the only researchers to develop instruments specific to the assessment of DRF and to report them in scholarly journals. Therefore, the scope of potential assessment instruments is severely limited, and other investigators must decide whether to use an existing but underdeveloped instrument or develop their own. Because of the limited timeframe available for Study Two, the DCQ was used to assess the types of cognitions that fearful drivers experience, and therefore inform the possible subtypes of DRF associated with different foci of fear. Although this is by no means an ideal situation, the measure showed promise, and Study Two was an opportunity to build on prior efforts and develop the DCQ further. For Study Two, the DCQ was the only measure available to address the requirement for a measure of DRF cognitions.

State-Trait Anxiety Inventory (STAI). The STAI (Form Y; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) is a self-report anxiety scale that has been widely used in research and in clinical practice. It consists of a 20-item state scale that measures how the participant feels *right now* (STAI Form Y-1, or STAI-S), and a 20-item trait scale that assesses how the participant *generally* feels (STAI Form Y-2, or STAI-T). The STAI has well-documented psychometric properties, including test-retest and internal consistency reliability, and construct, concurrent, and divergent validity. Marteau and Bekker (1992) have also developed a six-item short-form state scale of the STAI (STAI Form Y-6, or STAI-6) consisting of the least number of state scale items producing the highest correlation with the original 20-item scale. For the purpose of a brief measure of state anxiety and a measure to assess the relationship of trait anxiety with DRF, Study Two used both the short-form state scale (STAI-6) and trait scale (STAI-T) of the STAI.

Administration and scoring. The STAI-6 and STAI-T presented a number of statements for which ratings were made according to how the participant felt *right now* (STAI-6) or *generally* (STAI-T). Ratings were made using a 4-point Likert scale from 1 (*Not at all*) to 4 (*Very much*). Because the STAI-6 was included as a measure of state anxiety related to driving, the instructions for this scale were changed accordingly, and participants were asked to imagine the last time they drove and to rate the items based on the degree of anxiety they experienced at that time. The total score on the STAI-6 was obtained by adding the ratings for each item (items 1, 4, and 5 were reverse-scored), ranging from 6- 24. Scoring for the STAI-T was similar, except that scores were reversed for items 1, 3, 6, 7, 10, 13, 14, 16, and 19, and the total trait score ranged from 20-80. The STAI-T took about 10 minutes to complete, while the STAI-6 required only a few minutes to fill out.

Normative data and psychometric properties. Extensive normative data have been collected for the STAI-T in the United States, and Knight, Waal-Manning, and Spears (1983) have developed normative data based on a large New Zealand sample. In this study, females scored more highly than males and scores were inversely correlated with age, indicating the importance of using appropriate norms for the relevant sample. No normative data could be found for the STAI-6.

Test-retest reliability is relatively high for the STAI-T. Conversely, it is low for the STAI-S, as would be expected for a measure that assesses changes in anxiety as a result of situational stress (Spielberger et al., 1983). Internal consistency estimates for the STAI are also high, ranging from r = .87-.93 (Knight et al., 1983; Spielberger et al., 1983). Marteau and Bekker (1992) found that the STAI-6 correlated r = .95 with the STAI-S and had acceptable internal consistency (r = .82). Internal consistency reliability for Study Two was: for the STAI-6, r = .94, .90, and .80 for the full sample, fearful group, and control group, respectively; and for the STAI-T, r = .93, .92, and .87 for the full sample, fearful group, and control group, respectively. Validity for the STAI-6 was assessed using concurrent validity procedures and found to be acceptable and sensitive to different degrees of anxiety (Marteau & Bekker, 1992).

Justification for use. The STAI-6 was included in Study Two as a brief measure of driving-related anxiety that could also be used both before and after the driving assessment in order to gauge anxiety-related changes and the possible impact of test anxiety in the assessment situation (described in more detail later in this Chapter). The STAI-T was used to assess levels of trait anxiety, as previous research with driving phobics and fearfuls has not measured levels of general anxiety.

Driving Situations Questionnaire (DSQ). The DSQ is an unpublished instrument developed by Ehlers (1990). The 211-item DSQ asked participants to rate their degree of anxiety and avoidance in response to a range of driving situations and circumstances. These were all rated with respect to the person *driving alone*, *driving accompanied*, and *with another person driving*. In short, anxiety and avoidance were both rated three times for each situation.

The DSQ covered an extensive list of driving situations that occur when driving in residential areas (e.g., *right turn*, *stopping at a four-way stop*, and *seeing children or* *pets on the sidewalk*), busy urban thoroughfares (e.g., *changing lanes* and *traffic jam*), freeways (e.g., *merging*, *fast lane*, and *being passed by another car*), and other areas (e.g., *winding road*, *bridge*, and *tunnel*). Ehlers (1990) also included a category of special circumstances comprising *heavy traffic*, *driving at night*, *driving in an unfamiliar car*, *fog*, *rain*, *snow*, *driving when tired*, *driving when stressed for reasons other than driving*, *driving with somebody who criticizes your driving*, *driving with children in the car*, and *being looked at while driving*.

Administration and scoring. The DSQ is a self-report measure. Ratings on the anxiety scale ranged from 0 (*No discomfort or anxiety*) to 4 (*Extreme discomfort or anxiety*), and from 0 (*Never avoid*) to 4 (*Always avoid*) on the avoidance scale. As stated above, three sets of ratings for both anxiety and avoidance were made for each situation. Scoring of the DSQ involved collapsing the ratings into a mean rating for each main situation (i.e., residential area, freeways, etc.) as a function of the various driver situations (i.e., alone, accompanied, or as a passenger) (Ehlers et al., 1994).

Normative data and psychometric properties. Normative data have not yet been gathered for the DSQ. The only available data for the scale are the means and standard deviations reported by Ehlers et al. (1994), where a significant difference was found between driving phobics and controls on all of the driving situations rated. Because of its limited use, there have been no extensive investigations of the reliability and validity of the DSQ. Internal consistency reliability for Study Two is reported in the next section due to the use of two forms of the DSQ.

Justification for use. As discussed above, measures that have specific application to a driving-fearful population are scarce. Taylor and colleagues (Taylor, 1996; Taylor & Deane, 2000) used a modified version of the DSQ to compare the ratings obtained for their sample with the clinical sample of Ehlers et al. (1994). The DSQ was modified for use by Taylor and Deane mainly because of its length, and was rearranged to make the presentation clearer and completion of the scale more efficient (see Appendix E-4 for a copy of the original 211-item DSQ). The modified 84-item DSQ was divided into two parts, one each for ratings of anxiety and avoidance. Driving situations were then listed with ratings to be made for *driving alone*, *driving accompanied*, and *other person driving*. The number of specific driving situations listed was also shortened to those that were rated highly in the study by Ehlers et al. Ten items were removed because of redundancy or inapplicability. Slight wording changes were made so as to make the modified DSQ more appropriate for a New Zealand sample (i.e., *freeways* was changed to *motorways*, and *residential* to *suburban*). The final DSQ contained 15 driving situations, one of which was an *other* category for participants to rate their anxiety and avoidance in a situation that they specified (this resulted in 90 items, as each situation was rated for anxiety and avoidance when driving alone, accompanied, and with another person driving). Driving-fearfuls rated relatively high levels of anxiety in response to a range of situations on the DSQ, and *driving with somebody who criticises one's driving* was rated the highest for levels of anxiety and avoidance (see Appendix A-4). Driving-fearfuls were also most anxious and avoidant of driving alone, as opposed to driving accompanied or travelling with another driver.

Study Two made further modifications to the DSQ. The avoidance section was removed, as other parts of the questionnaire for Study Two addressed general driving avoidance (see the Fear Questionnaire, discussed below). For the purposes of Study Two, only the comparisons between anxiety when driving alone and as a passenger were required, so the DSQ was used in two forms. One form asked participants to rate their anxiety when they are driving (DSQ-Driver), and the other asked participants to rate their anxiety when they are a passenger (DSQ-Passenger). The DSQ-Driver was included in the mail-out questionnaire, while the DSQ-Passenger was administered during Part Two (described later in this Chapter). As with the DCQ, a sentence was added to the instructions for those fearfuls who were not currently driving. The 39 items selected for the modified DSQ were thought to reflect a wide variety of driving situations, and used a simplified response format that made presentation of the DSQ clearer and completion more efficient. This also shortened the completion time to around 10 minutes. Internal consistency reliability for Study Two was: for the DSQ-Driver, r = .99, .96, and .96 for the full sample, fearful group, and control group, respectively; and for the DSQ-Passenger, r = .98, .98, and .99 for the full sample, fearful group, and control group, respectively.

Fear Questionnaire (FQ). The FQ (Marks & Mathews, 1979) is a brief, standard self-rating form that has been widely used in research on anxiety disorders. The FQ comprised four different sections, although one of its main sections (items 2-16) has also been referred to as the FQ. This reflects the way in which the FQ has been generally used in prior research, although, strictly speaking, items 2-16 form only part of the FQ as a whole.

Section 1 of the FQ consisted of the single item *main target phobia*, which required the participant to write down the specific phobia of concern and rate it on a 0-8 scale to indicate the extent to which the phobic stimulus is avoided due to fear or other unpleasant feelings. This section has also been called *main phobic avoidance* and *main phobia* (Marks & Mathews, 1979). Section 2 consisted of items 2-16 of the FQ, which were rated for extent of avoidance in the same way as the main target phobia. Section 3 was the *anxiety-depression scale* (FQ-A/D), which consisted of five items measuring more general affective disturbance. Section 4 was the *global phobia scale* (FQ-GP), a single item rated on a 0-8 scale reflecting the degree of disturbance and/or disability with respect to phobic symptoms. This section has also been termed *global phobic rating* and *global phobic distress* (Marks & Mathews, 1979).

Administration and scoring. Responses on the main target phobia, anxiety-depression, and global phobia scales were used as standalone ratings. A total phobia score (FQ-TOT) was derived from the sum of the main FQ items (2-16), with a range from 0-120. Within these 15 items, three subscales were comprised of five items each: the agoraphobia (FQ-Ag; items 5, 6, 8, 12, and 15), social phobia (FQ-Soc; items 3, 7, 9, 11, and 14), and blood-injury phobia subscales (FQ-B/I; items 2, 4, 10, 13, and 16). Total scores for the separate subscales ranged from 0-40.

Normative data and psychometric properties. Despite its widespread use, only a few studies have collected normative data for the FQ, and these have employed general American community samples (Mizes & Crawford, 1986; Trull, Nietzel, & Main, 1988), and an Australian sample of 251 anxiety disorder patients (Oei, Moylan, & Evans, 1991). In their review of the literature on the FQ, Moylan and Oei (1992) noted that most agoraphobic and socially phobic patients have a mean score of at least 20 on the relevant FQ subscales, with agoraphobic patients scoring slightly higher.

The FQ has been found to be relatively stable over time. Marks and Mathews (1979) reported high test-retest reliabilities after a one-week interval (FQ-Soc: $r = .82$, FQ-B/I: $r = .96$). Michelson and Mavissakalian (1983) reported variations in test-retest correlations over 4-, 10-, and 16-week intervals. All measures showed a gradual increase in reliability over time, although the FQ-Ag subscale and FQ-GP scale were found to be the most stable, with test-retest correlations of $r = .86$ and $r = .82$, respectively. Stanley, Beck, and Zebb (1996) also found that subscale and total scores on the FQ changed over time, although this was based on a sample of older adults aged 55-81 years. The internal consistency of FQ items ranges between $r = .68$ and $r = .87$ (van Zuuren, 1988). Internal consistency reliability of the main FQ items in Study Two was $r = .81$, .83, and .71 for the full sample, fearful group, and control group, respectively.

The discriminant validity of the FQ has been supported by various studies (e.g., Cox, Swinson, & Shaw, 1991; Lee & Oei, 1994; Mavissakalian, 1986; Mizes, Landolf-Fritsche, & Grossman-McKee, 1987; van Zuuren, 1988), in which agoraphobic and social phobic patients scored highest on the respective FQ subscales. Oei and colleagues also found that the FQ differentiates agoraphobic and social phobic patients from other anxiety disorder groups, such as panic disorder and generalised anxiety disorder (Oei, Gross, & Evans, 1989; Oei et al., 1991). However, the FQ-TOT score, FQ-A/D subscale, and FQ-GP score did not differentiate diagnostic groups (Oei et al., 1991). Moylan and Oei (1992) state that "the literature suggests that the FQ has some reliability and validity for anxiety disorder populations of Australia, the Netherlands, Britain, and the USA" (p. 46). They recommend the use of the FQ subscales, especially the FQ-Ag and FQ-Soc subscales, although suggest that "the FQ may be streamlined by removing the FQ-A/D and FQ-GP measures" (p. 48).

Justification for use. The FQ was used in Study Two as a brief measure of the severity of other types of fears frequently associated with DRF, namely, agoraphobia, social phobia, and fear of injury. As recommended by Moylan and Oei (1992), the FQ-A/D and FQ-GP measures were removed, leaving the main target phobia item and the FQ items. In addition, other measures of depression severity and global anxiety ratings were included in Study Two, as discussed later in this Chapter. The only change to the form was that, for the main target phobia item, "driving" was written on the form rather than requiring participants to fill in the item. The FQ took about five minutes to complete.

Test Anxiety Inventory (TAI). The TAI (Spielberger, Gonzalez, Taylor, Anton, Algaze, Ross, et al., 1980) is a 20-item self-report measure of test anxiety as a situation-specific personality trait. The TAI also assesses the concepts of *worry* and *emotionality* as important components of test anxiety. Participants were asked to rate how frequently they experienced various symptoms of anxiety before, during, and after tests or examinations. The directions can be modified when the assessment of test anxiety involves particular tests or time periods (Spielberger et al., 1980).

Administration and scoring. The TAI was completed in about 10 minutes. Ratings were made using a 4-point Likert scale from 1 (*Almost never*) to 4 (*Almost always*), representing how frequently participants generally experienced symptoms of anxiety in test situations. The total score on the TAI scale (TAI Total scale) was obtained by adding the ratings for each item (item 1 was reverse-scored), and scores ranged from 20-80. In addition to the total score, the TAI gave subscale scores for worry (TAI/W) and emotionality (TAI-E). Each subscale consisted of eight items and scores ranged from 8-32.

Normative data and psychometric properties. Norms for the TAI are available for large American samples of college undergraduates, college freshmen, and high school students, as well as a smaller sample of community college students. These normative samples enable comparison with appropriate reference groups, since the TAI was developed primarily for use with students.

Test-retest reliability coefficients for the TAI Total scale have been reported to be r = .80 or higher for intervals of two weeks to one month. Internal consistency reliability for the Total scale is also uniformly high for both males and females (r = .92 or higher), and coefficients for the subscales are satisfactory (r = .88 and r = .90 for the TAI/W and TAI/E, respectively). Internal consistency reliability for Study Two was r = .96, .97, and .91 for the full sample (n = 85), fearful group (n = 42), and control group (n = 43), respectively (n was variable due to missing data). The concurrent and construct validity of the TAI has been demonstrated in comparisons with other measures of test and general anxiety (Spielberger et al., 1980).

Justification for use. The TAI was included in Study Two as a measure of general test anxiety. As will be discussed later in this Chapter, test anxiety was a potential confounding variable during the driving assessment, and hence the TAI was included as a control variable in Study Two.

Beck Depression Inventory-Second Edition (BDI-II). The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report inventory designed to measure the presence and severity of symptoms of depression. It has been used extensively in research and clinical practice. The BDI-II was developed to assess symptoms that were consistent with DSM-IV criteria for depressive disorders.

Administration and scoring. The BDI-II consisted of 21 items for which participants were asked to endorse the most characteristic statements covering the timeframe of the past two weeks, including the day of completion of the BDI-II. There were four statements for each item that represented an increase in symptom severity. Endorsements were made on a 0-3 scale. The BDI-II took about 10 minutes to complete. A total score was derived from summing the item scores, ranging from 0-63.

Normative data and psychometric properties. Cutoff scores have been derived for the BDI-II. Scores from 0-13 are within the *minimal depression* range, 14-19 in the *mild depression* range, 20-28 in the *moderate depression* range, and scores above 29 are considered to be indicative of *severe depression.*

The BDI-II has shown high internal consistency reliability for both outpatient (r = .92) and student (r = .93) samples, and has a one-week test-retest stability of r = .93 (Beck et al., 1996). Internal consistency reliability for Study Two was r = .87, .88, and .74 for the full sample, fearful group, and control group, respectively. The BDI-II has content validity because items assess the DSM-IV criteria for depression. Construct validity of the BDI-II has been demonstrated through studies of its convergent and divergent validity (comparisons with earlier versions of the BDI and other psychological tests measuring depression, hopelessness, suicidal ideation, and anxiety). The BDI-II has been shown to discriminate patients with mood disorders from those with anxiety, adjustment, or other disorders. In addition, patients with more severe depression have been found to obtain generally higher scores on the BDI-II than those with less serious disorders (Beck et al., 1996). These sound psychometric properties have also been a feature of previous versions of the BDI (Beck, Steer, & Garbin, 1988).

Justification for use. The BDI-II was used in Study Two to assess the presence and severity of symptoms of depression among driving-fearfuls, and to ascertain to what extent such symptoms play a role in the presentation of those with DRF.

Diagnostic Information

The results of Study One recommended diagnostic evaluation as an important component of identifying subtypes of DRF, particularly with respect to clarifying the relationships between various anxiety disorders relevant to DRF. Therefore, Study Two also assessed fearful and control drivers diagnostically.

One of the most widespread tools used for diagnostic evaluation in research has been the structured clinical interview (Morrison, 1988; Segal & Falk, 1998; Spitzer, Williams, Gibbon, & First, 1992; Weiss, 1993). Structured clinical interviews have been employed extensively in the assessment of anxiety and fear (Barlow, 1988; DiNardo, O'Brien, Barlow, Waddell, & Blanchard, 1983; McGlynn & Rose 1998; Nietzel et al., 1988; Spitzer & Williams, 1988). The use of structured interviews has enabled researchers to eliminate some of the interviewer sources of unreliability by inquiring about symptoms in a standard manner and forming diagnoses based on a standard algorithm.

Two types of structured diagnostic interviews have been developed. The first type provide question structure but require the interviewer to make clinical judgements based on agreed criteria as to whether the interviewee's answers meet diagnostic criteria and therefore whether there is a need to ask additional questions about a particular diagnosis. However, these types of interviews do not eliminate problems with inter-rater reliability since clinical judgement is still required.

The second type of interview addresses this problem. In addition to questions being fully specified, interviewers are required to follow set routes (when asking questions) that change according to the response of the interviewee. Scoring of the interview is based solely on the interviewee's responses and does not involve clinical judgement, thereby reducing sources of unreliability. The *Composite International Diagnostic Interview* (*CIDI*) is an example of this type of interview, and was the one used in Study Two.

The Composite International Diagnostic Interview (CIDI). The CIDI was developed jointly by the World Health Organisation (WHO) and the former United States Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA). It is a comprehensive, structured diagnostic interview for assessing psychiatric disorders that provides current and lifetime DSM and International Classification of Diseases and Related Health Problems (ICD) diagnoses through computerised algorithms (Andrews & Peters, 1997; Robins, Wing, Wittchen, Helzer, Babor, Burke, et al., 1988). Although primarily intended for use in epidemiological studies, the CIDI is being used increasingly for clinical purposes as well as other types of research. The paper-and-pencil version of the CIDI can be administered by trained lay interviewers. Revisions to the CIDI are completed by an international advisory committee, so that the CIDI is updated according to changes in diagnostic criteria and improvements in psychometric properties. The most recent version is the *CIDI 2.1*, which provides diagnoses according to DSM-IV and ICD-10 criteria (World Health Organisation, 1997). The CIDI 2.1 is available in lifetime and 12-month versions.

During an interview using the CIDI (the average administration time is 75 minutes), interviewees are asked questions about the symptoms of psychiatric disorders. If a positive response is provided, additional questions from the *Probe Flow Chart* are asked to determine whether the symptom is clinically significant and is not due to medication, drugs or alcohol, or a physical illness or injury. Negative responses often mean that later questions are skipped. If sufficient symptoms have been endorsed to suggest a diagnosis, questions are then asked about the onset and recency of the cluster of symptoms.

The reliability of the paper-and-pencil version of the CIDI has been demonstrated (Andrews & Peters, 1998; Andrews, Peters, Guzman, & Bird, 1995; Wittchen, 1994; Wittchen, Kessler, Zhao, & Abelson, 1995; Wittchen, Robins, Cottler, Sartorius, Burke, Regier, et al., 1991; Wittchen, Zhao, Abelson, Abelson, & Kessler, 1996), as has its validity (Andrews & Peters, 1998; Wittchen, 1994). Research has reported good diagnostic concordance between DSM criteria checklists and CIDI diagnoses, particularly for the depressive disorders, substance use disorders, and phobic and anxiety disorders (Janca, Robins, Bucholz, Early, & Shayka, 1992; Janca, Robins, Cottler, & Early, 1992).

Despite this, there are significant barriers to the use of the CIDI in routine clinical practice and certain research situations, particularly because of its lengthy administration time, the extensive training required, and the time required for data entry and scoring (Andrews & Peters, 1997).

The Computerised Interview: CIDI-Auto. With these limitations in mind, a computerised version of the CIDI has been developed, called the *CIDI-Auto.* The CIDI is particularly amenable to computerisation because of its systematic structure and logic, and this type of administration reduces potential errors from data entry. The CIDI-Auto can also be administered by the interviewee themselves, thereby removing the need for an interviewer and the subsequent drain on staff and researcher time. The CIDI-Auto therefore deals with the limitations associated with the paper-and-pencil version of the CIDI (Janca, Üstün, & Sartorius, 1994). The CIDI-Auto is available in six languages including English, and other language versions are in preparation.

Computerised diagnostic interviews are being used increasingly in research and clinical practice because of the advantages to cost, time, and reliability (Andrews, 1995; Erdman, Klein, & Griest, 1985; Farrell, Camplair, & McCullough, 1987; Hedlund & Viewig, 1987; Rodney, Prior, Cooper, Theodoros, Browning, Steinberg, et al., 1997). In addition, Andrews (1995) found a high degree of patient acceptance of versions of the CIDI-Auto, even among those who have never used a computer before. Andrews and Peters (1997) suggested that the self-administered CIDI-Auto provides patients with an opportunity to reveal more personal and potentially embarrassing symptoms, or symptoms about which they had not previously been asked.

The CIDI-Auto 2.1. Study Two used the third and most recent version of the CIDI-Auto, called the *CIDI-Auto 2.1.* The CIDI-Auto 2.1 was released in January 1997 and is consistent with DSM-IV.

Administration and scoring. The CIDI-Auto 2.1 can be self-administered or an interviewer can read the questions as they appear on the screen and enter the interviewee's responses. Study Two used the interview in an individual, self-administered format, although the researcher was available at all times to deal with any questions raised or problems encountered by the participant. Prior to the commencement of the interview proper, participants were presented with a screen informing them that the interview was a licensed copy. This screen was followed by 12 screens of tutorial instructions that provided information about the types of questions to be asked and gave opportunities to practice how to respond to the various types of questions.

All questions were worded on the screen exactly as in the paper-and-pencil version. The Probe Flow Chart and skip decisions were automatically implemented by the computer programme. Coded responses were written to a file in a form that allowed them to be scored using the same algorithms as those used for the paper-and-pencil version. Output files were produced for the various diagnoses met according to DSM-IV criteria, and all responses made during the interview were recorded in a separate file.

Psychometric properties. Because of the relatively recent development of the CIDI-Auto 2.1, no studies of the psychometric properties of this version have been published. Therefore, the reliability and validity of previous versions of the CIDI will be briefly reviewed here. Studies of the reliability of the CIDI-Auto have compared the consistency of diagnoses made across time and, for the interviewer-administered version, across interviewers. The CIDI-Auto (version 1.1) has been found to have acceptable test-retest reliability when administered by an interviewer, ranging from k = .32 to k = 1.00 over an average interval of 10.82 days (Peters, 1998, cited in Andrews & Peters, 1998). In addition, a good to excellent agreement has been found between the self- and interviewer-administered versions of the CIDI (version 1.1). For anxiety disorders, coefficients ranged from k = .54 for DSM-III-R panic disorder to k = .92 for social phobia (Peters, Clark, & Carroll, 1998). Percentage agreement between the CIDI and the CIDI-Auto ranged from 84% for specific phobia to 96% for social phobia. Peters et al. (1998) concluded that the self-administered CIDI-Auto is an acceptable substitute for a human-administered interview when the anxiety and depressive disorders are being assessed. Finally, Andrews and Peters (1997) reported that the one-week test-retest reliability coefficients for the draft of the CIDI-Auto 2.1 were acceptable to excellent for most items, and those that were unreliable were rewritten for the final version.

The validity of the CIDI was assessed with regards to the accuracy of CIDI-based diagnoses according to DSM criteria (Peters & Andrews, 1995). Therefore, the validity of the diagnostic constructs themselves is not at issue, but rather the validity of the procedure through which such diagnoses are obtained. Thus, the process of validating a diagnostic procedure is called *procedural validity* (Spitzer & Williams, 1980). Procedural validity refers to the extent to which the output of a new diagnostic procedure is similar to that of an established one (Peters & Andrews, 1995). However, the standard against which the CIDI is compared has been a contentious issue, as the existing procedure (i.e., clinical interviews) have imperfect reliability, and are therefore an inappropriate basis for validity comparisons (Andrews & Peters, 1998). Spitzer (1983) suggested that a *LEAD* standard diagnosis would enhance the standard for comparison of structured diagnostic interviews. LEAD is an acronym for the three components used to reach a clinical diagnosis, whereby information is collected over a *longitudinal* period of time by *experts* who reach a consensus diagnosis based on *all data* available. The LEAD standard has been found to be a useful and robust criterion against which to measure other diagnostic procedures (Peters & Andrews, 1995). Peters and Andrews compared the self-administered version of the CIDI-Auto (using the anxiety and depression modules) with LEAD standard diagnoses on a sample of 98 patients at an anxiety disorders clinic. While the CIDI-Auto detected 88% of the LEAD standard diagnoses, the overall agreement was lower than expected (k = .40) because the CIDI-Auto identified twice as many diagnoses as did the LEAD standard. Nevertheless, canonical correlation analysis suggested that these discrepancies were not attributable to different diagnoses being made, but rather the CIDI-Auto possibly having a lower threshold for anxiety disorder diagnoses than experienced clinicians (Peters & Andrews, 1995). Peters and Andrews concluded that the CIDI-Auto has acceptable validity. Rosenman, Korten, and Levings (1997) have questioned the validity of the CIDI-Auto, especially with hospitalised patients of acute psychiatric services. They found poor agreement between psychiatrists and the CIDI-Auto, with total agreement on general diagnostic class in 56% of cases, while two psychiatrists agreed with each other in 83% of cases.

Justification for use. The CIDI-Auto 2.1 was used in Study Two as a resource-efficient method for obtaining DSM-IV diagnostic information that may assist in the development of a typology of DRF (as recommended in Study One). Diagnostic information was also considered important in characterising the extent to which a media-recruited sample met criteria for DSM-IV diagnoses. The self-administered version was used, and the method of administration followed the procedures set out in the administration manual.

Practical Driving Measures

No research could be found that has investigated the driving skills of those who report some degree of DRF, despite the potential implications of this kind of research for assessment and treatment. Study Two was partly intended as an initial starting point for such research.

Methods of driving measurement include driving simulation, analysis of accidents, driver self-ratings, and on-road testing. Driving simulation has been the focus of much research, particularly with advances in modern technology and the advent of computerised simulation. Simulator-based research has proven very useful for assessing driving-related cognitive abilities in a controlled manner (Gianutsos, 1994). However, simulation methodology is typically associated with high cost, participant discomfort, and perhaps most importantly, constraints on ecological validity (Wood, 1996). Driving simulation can only reproduce certain aspects of the driving task, emphasising individual skills. The broader driving environment as highlighted by the various integrated driving models presented in Chapter Five is more difficult to simulate. However, with the rapid development of concepts such as virtual reality, the use of simulation is likely to become more realistic and externally valid (Wood, 1996).

Simulation was considered but not pursued for the purposes of Study Two, primarily because of problems with external validity. There was a risk that driving-fearfuls would not experience similar levels of anxiety in the relative safety of a simulated driving situation.

A range of studies have focused on accident data, accident analysis, and human factors in driving behaviour, although there are many constraints over the use of such data as correlates or predictors of driving behaviour (Ash, Baehr, Joy, & Orban, 1988; Forbes, Nolan, Schmidt, & Vanosdall, 1975; Wood, 1996). More recently, self-report data have been used that have focused mainly on independent and comparative driver self-perceptions on dimensions such as driver safety, responsibility, and competence (Cutler, Kravitz, Cohen, & Schinas, 1993; Glendon et al., 1993; McCormick et al., 1986; Walton & Bathurst, 1998; West, French, Kemp, & Elander, 1993). Although these driver self-ratings are an interesting new area of research, the use of comparative self-ratings in particular has been criticised for the lack of clarity with which self-other comparisons are defined (Walton & Bathurst, 1998).

Practical driving evaluation forms the main part of the driver licencing test, and can comprise both formal and informal methods of assessing an observable driving sample (Wood, 1996). Formal on-road driving tests are generally used as part of the licencing criteria to assess driver competencies, and generally make up the majority of all practical driving assessments. As Shinar (1978) notes, "all licencing programmes are basically tests that evaluate the potential driver's ability to negotiate safely on the road and in the presence of other drivers" (p. 131).

As with other assessment tools, the use of on-road driving tests has been plagued by methodological concerns, most notably inadequate operational definitions and ill-defined criteria for driving competence (Evans, 1991; Haladyna, 1994; Norcini, 1994). Reliability of driving tests is also at issue. No two driving tests are identical because of variations in testing situations, routes, assessors, traffic, and numerous other factors, making replicable measurement almost impossible (Wood, 1996). However, the use of on-road driving tests substantially reduces the problems with ecological validity inherent in alternative assessment measures (Michon & Fairbank, 1969). Given the nature of the sample used in Study Two, it was important to select a driving measurement tool that was externally valid, as driving-fearfuls may be less likely to exhibit symptoms of fear and anxiety in a false driving environment. The ability to detect the effects of anxiety on driving performance was dependent on a realistic measure of driving. Table 6.2 presents a summary of the practical driving measures used in Study Two, and these measures are described in more detail below.

Table 6.2. *Summary of the practical driving measures used in Study Two.*

Measure	Description
Advanced Driver Assessment (Advanced Driver Assessment Manual, 1998)	A standardised and independent driving evaluation to identify and analyse driver error, and hence identify training needs. Conducted on drivers who hold a current driver's licence. Based on 40 minutes of continuous driving. Number of errors and error patterns across various driving behaviours were provided.
Participant Self-Rating	A global subjective rating by the participant on a 7-point Likert scale of how they would rate their driving skills overall based on the driving assessment just completed.
Driving Instructor Rating	A global subjective rating by the instructor on a 7-point Likert scale of how they would rate the participant's driving skills overall based on the driving assessment just completed.

Advanced Driver Assessment (ADA). The Land Transport Safety Authority's ADA (Advanced Driver Assessment Manual, 1998) was used in Study Two as it is the only available independent driving evaluation for licensed drivers in New Zealand. Other available on-road tests are the licencing test, the Defensive Driving Course, and the test required for re-licencing when a driver reaches 76 years of age. The ADA was introduced to provide a standardised assessment procedure for analysing driver error and to subsequently guide driver training and re-training. It is primarily designed to identify training needs in a range of traffic situations for licensed drivers. Driving instructors are trained in the use of the ADA by approved Land Transport Safety Authority officers. The ADA has been in widespread use throughout New Zealand. Changes to the driver licencing system in May 1999 have seen the ADA dropped as a means of reducing the learner licence period, meaning that the ADA will probably be used less frequently as an assessment tool.

Administration and scoring. The ADA involved the driver being observed over 40 minutes of on-road driving, with at least 20 minutes of this time spent in medium to heavy traffic conditions. A standard route was followed that was preset by the driving instructor. Drivers were required to show their skill in the areas of *search*, *hazard identification*, *manipulating controls*, and *observing traffic regulations*. The operational definitions for these four components are provided in Appendix F-1. The four skill areas were examined in the ADA across seven different driving situations, comprising *moving into the traffic*, *moving on the road*, *moving with the traffic flow*, *moving through traffic*, *moving past other traffic*, *moving back in traffic*, and *moving out of the traffic*. These terms are operationally defined in Appendix F-2. According to the manual, "drivers will be considered competent when they can consistently apply the skills identified to all seven driving situations" (Advanced Driver Assessment Manual, 1998, p. 4).

The ADA rating form (see Appendix F-3) was used to record each error detected for the four skill areas across the seven driving situations. The skill areas were further broken down into sub-categories on the form so that the assessment was more accurate and informative (Wood, 1996). The analysis of errors was based on the identification of patterns or driver behaviour that would suggest a training requirement. Frequency of errors were noted for each of the skill areas across the seven driving situations. Given the inconsistencies in prior use of the ADA, Harwood (1992) operationally defined an error pattern as a total of three (or more) errors marked in any box or three (or more) errors in any vertical column.

Normative data and psychometric properties. Although it has been used widely within New Zealand, the ADA does not have normative data. However, some limited data have been collected on a small sample of neuropsychologically-impaired, professional, and control drivers (Harwood, 1992; Wood, 1996).

The ADA has not been subjected to extensive formal investigation of its reliability and validity. Harwood found that there was a wide range of variability in recorded errors between instructors, and this was mainly reflected in different error criteria and individual tendencies to favour different parts of the assessment form for scoring (Harwood, 1992). Wood reported average inter-rater reliability coefficients of $r = .62$ for errors and $r = .53$ for error patterns.

Because the design of Study Two necessitated the use of two driving instructors (i.e., assessment was carried out in Palmerston North and Wellington), there was a need to ensure inter-rater reliability between instructors. This was initially achieved with the use of two written hypothetical driving assessments (see Appendix F-4), which is also the method used in the training guide (Advanced Driver Assessment Manual, 1998). The average inter-rater reliability for the two examples was $r = .80$, which was considered acceptable for the purposes of Study Two. The main data collection occurred about four months after the completion of the pilot study, and is discussed later in this Chapter. Therefore, inter-rater reliability was re-assessed prior to the main data collection, but this time using actual on-road assessment of the researcher. To keep ratings separate and independent, one of the assessors was in the front passenger seat and the second was positioned in the left rear passenger seat. Number of error patterns were used to compare agreement, consistent with the formal procedure for analysing driver error. Inter-rater reliability was again $r = .80$, and was considered acceptable for the purposes of Study Two.

Limited validity data for the ADA relates to problems of reliability. The design of the assessment is based on the principles taught in the New Zealand Defensive Driving Course, providing support for the criterion-related validity of the ADA. The instrument was also influenced by the skills across situations that were identified in overseas training models (Farhlehrer-Briefe, 1978). Driver evaluation during the ADA is continuous throughout the assessment period, thereby increasing the validity of the instrument as a dynamic measure of driving behaviour (Wood, 1996). Concurrent validity has not been investigated against other measures (i.e., those used with learner drivers) because the ADA is typically administered to licensed drivers (Harwood, 1992).

Justification for use. The ADA was used in Study Two as the most appropriate, available, and ecologically valid on-road test for licensed drivers. The skill areas identified and assessed by the ADA were thought to tap in well to the types of errors that driving-fearfuls might be expected to make, such as errors in speed and guiding the vehicle on the road. In addition, the ADA allowed for the possibility of identifying areas of increased effort in response to overloaded information processing. For example, an absence of errors in the areas of search and hazard identification could be due to hypervigilance in these areas. The functional nature of the data collected from the ADA was seen to have potential for suggesting avenues for future research into driving fear-related behaviours, and may be of practical use for assessing fearfuls for driving as part of an intervention procedure. In Study Two, the number of errors recorded per box was limited to six, compared with three as specified in the manual (Advanced Driver Assessment Manual, 1998), so that more detailed information about number of errors could be provided.

Driving Instructor Rating. A subjective global rating of the driver's overall driving skills was made by the driving instructor following each ADA. The instructor was required to rate each driver's driving skills on a 7-point Likert scale from 1 (*Excellent*) to 7 (*Very poor*) based on the assessment just completed. This rating was included as a global rating by an experienced professional, and could also be compared with the results of the formal testing and a similar self-rating by the driver.

Participant Self-Rating. A subjective global rating of overall driving skills was also made by each participant following their ADA. The participant was required to rate their driving skills on the same 7-point Likert scale from 1 (*Excellent*) to 7 (*Very poor*) based on the assessment they had just completed. This rating was included as a global self-rating, and could also be compared with the results of the formal testing and the global instructor rating.

Controlling for Test Anxiety. It was important to control for any potential impact of test anxiety about the driving assessment on ratings of driving-related anxiety. It was likely that participants, whether fearfuls or controls, might experience some degree of evaluation apprehension when faced with the prospect of a driving assessment, as they knew that their driving was being evaluated. Therefore, test anxiety could be viewed as a potential confounding variable that could effectively inflate anxiety ratings and influence the relationship between driving-related anxiety and driving performance (Wine, 1971, 1980, 1982). Only one study could be found that has explicitly investigated the concept of test anxiety in driving assessments. Strohbeck-Kühner (1999) aimed to examine the relationship between test anxiety and outcome on psychophysical performance tests in the context of appraisal of fitness to drive. No correlation was found between various anxiety measures and driving performance, and emotionality and worry were found to be consequences rather than causes of deficits in driving performance (Strohbeck-Kühner, 1999).

It was considered highly unlikely that procedures could be implemented to eliminate all test anxiety from the assessment. Therefore, the approach taken was to include a number of measures to investigate the potential impact of test anxiety. This would then allow for the effects of test anxiety to be partialled out from the analyses. The methods used were fourfold. Firstly, the information sheets attempted to minimise test anxiety by reassuring participants about the research purposes of the assessment, and that the instructor was an experienced professional who was bound by confidentiality. This was again reiterated before participants embarked on their driving assessment. Secondly, the Test Anxiety Inventory was used to assess overall levels of general test anxiety, and was administered within 10 minutes of the driving assessment.

Thirdly, the short-form of the State-Trait Anxiety Inventory (STAI-6) was employed in the initial mail-out questionnaire, as well as immediately prior to and following the driving assessment. These items appeared on the pre- and post-driving assessment questionnaires, which are provided in Appendixes G-1 and G-2, respectively. These questionnaires also asked participants to rate their current level of anxiety on a 0 (*Not at all anxious*) to 10 (*Extremely anxious*) scale both immediately before and after their driving assessment. In addition, on the post-driving assessment questionnaire, participants rated how typical their driving was of their usual driving performance, as well as whether (and in what way) anxiety affected their driving performance. The driving instructor also completed a similar questionnaire after the driving assessment had been completed (see Appendix G-3), rating the participant's anxiety during the assessment using both the STAI-6 and the 0-10 anxiety rating, as well as whether (and if so, in what way) anxiety affected the participant's driving performance.

Fourthly, after the driving assessment, participants were asked to complete in their own time the same route they took for the driving assessment, unaccompanied by the instructor, and re-rate their anxiety during this drive. This was seen as the best available method of obtaining a measure of driving anxiety during the drive without the presence of test anxiety, even though it was impossible to ensure identical conditions during the drive. Nevertheless, attempts were made to minimise the effect of varying driving conditions by asking participants to complete the drive within a month of their driving assessment, at the same time of day as their assessment, and preferably by themselves. Anxiety was rated on the STAI-6 both immediately prior to and following the drive, as shown in Appendix G-4. This procedure would enable direct comparisons of the anxiety ratings for the two drives to assess whether test anxiety impacted on ratings in the assessment drive.

PROCEDURE

Study Preparation and Data Collection

Study Two was divided into two parts. Part One consisted of the mail-out questionnaire. Participants received the questionnaire with a letter thanking them for volunteering their time (see Appendix H-1) and an Information Sheet explaining the study (see Appendix H-2). The questionnaire was expected to take about 30-45 minutes to complete. After returning the questionnaire, participants were selected for Part Two of Study Two based on their responses to the first two items in the section on Driving Fear Information. For item 1 (*Do you consider yourself to have a fear of driving?*), fearfuls were required to answer *Yes* while controls had to respond *No*. For item 2 (*How anxious are you about driving?*, rated on a 0-10 scale), fearfuls were required to make a rating of 3-10 for selection into Part Two of Study Two, while controls had to rate their anxiety about driving from 0-2. No prior research had been conducted to inform these cutoffs, but a broad range of ratings was chosen for the fearful group since different levels of fear were of interest.

Participants who met these criteria were then invited to participate in Part Two of Study Two, which consisted of administration of the remaining questionnaires (i.e., Driving Situations Questionnaire-Passenger, Test Anxiety Inventory, and Beck Depression Inventory-Second Edition), the diagnostic interview, and the practical driving measures. A letter of invitation (see Appendix H-3), Information Sheet (see Appendix H-4), and Consent Form (see Appendix H-5) were sent to all participants who met the criteria for Part Two. Those giving consent were telephoned to set up a convenient time for data collection. Participants were mailed a letter confirming their appointment time (see Appendix H-6) along with a map locating the research venue.

Data collection for Part Two took place at the Palmerston North and Wellington campuses of Massey University. Provision was made for parking facilities for participants and the arrival and departure of driving instructors and their vehicles. Within both premises, a comfortable interview room was available for participants during data collection. On arrival in the parking area, participants were greeted by the researcher and escorted to the interview room. This provided another opportunity for the details of Part Two to be explained and for participants to ask any further questions.

Upon arrival in the interview room, participants were informed of the order of events for their assessment. They were offered refreshments before data collection began, and at other appropriate times as necessary. The following sections detail the procedure employed at different stages of data collection during Part Two of Study Two.

Diagnostic Interview Procedure

The diagnostic interview (CIDI-Auto 2.1) was introduced by the researcher and self-administered by the participant. The researcher was available at all times to clarify and discuss any questions or problems that may have arisen during interview completion. The CIDI-Auto 2.1 was introduced as an interview that asks about a range of problems that might be relevant to DRF. The types of questions asked during the interview were discussed, so that participants were prepared for the personal nature of some of the questions, and participants were reminded of their right to skip any questions they did not wish to answer. To deal with any anxiety about using a computer, participants were told about the brief tutorial that they would complete, and were reassured that it was their responses that were important to the purposes of the research rather than their computing skills.

At this point, both the researcher and participant sat down in front of the computer and the researcher completed the set-up procedures for the interview, which involved entering gender, age, and birthdate data. The computer then displayed a screen explaining the licence information and confidentiality assurance that was read by the participant. The participant was shown a written letter of authorisation indicating that the researcher had been authorised by the site licensee for the instrument to administer the interview (see Appendix I-1). The participant then completed the tutorial and interview, which took about an hour on average. Any issues that may have arisen during interview completion were addressed and dealt with in a short debriefing session at the conclusion of the diagnostic interview part of the data collection.

Questionnaire Procedure

The questionnaire component of data collection was administered by the researcher, who was again available to respond to any questions that arose during questionnaire completion. The standardised instructions written on the front of each questionnaire were read by participants. Participants received the Driving Situations Questionnaire-Passenger first, followed by the Test Anxiety Inventory, and then the Beck Depression Inventory-Second Edition. It was made clear to all participants that they were not obliged to answer any questions that they did not wish to answer. Responses to items 2 (*Pessimism*) and 9 (*Suicidal Thoughts or Wishes*) on the latter measure were checked before proceeding to the next part of data collection. In no instance did any participant indicate intentions to commit suicide on this measure. Completion time for the questionnaires was approximately 10-15 minutes. As with the interview, any issues that might have arisen during questionnaire completion were addressed in a short debriefing session after the data were collected.

Practical Driving Procedure

After completion of the questionnaires, participants were introduced to the driving assessment. The purpose of the driving assessment was reiterated, along with the participant's right to stop at any time. It was emphasised that the instructors were senior professionals who had had prior experience with anxious drivers, and that the assessment would be terminated if the driver or instructor had any concerns regarding the participant's emotional state. Participants were informed that the driving instructors were bound by confidentiality, and were shown a copy of the relevant confidentiality agreement (see Appendix I-2).

The driving instructors were blind as to which group participants belonged. Participants were asked not to tell the instructor this information, although instructors were nevertheless aware of the general composition of both participant groups. This prior knowledge was justified on the basis of the ethical concern regarding the safety of assessors who might not be adequately vigilant if told they were evaluating "normal" drivers (van Zomeren, Brouwer, Rothengatter, & Snoek, 1988). This procedure was also used by Wood (1996) in an assessment of neuropsychologically-impaired drivers. However, it was acknowledged that, in some cases, instructors may have become aware of participants' group membership because of cues given by participants, such as visible displays of anxiety or requests for reassurance.

The initial procedure involved the participant being introduced to the driving instructor and escorted to the testing vehicle. In most cases, participants completed the assessment in their own vehicle, although some participants from both groups required the use of the instructor's vehicle for the assessment. In all cases, the type of vehicle (own or instructor's, and manual or auto) was recorded at the top of the assessment form. Immediately prior to commencement of the driving assessment, the participant completed the pre-driving assessment questionnaire (see Appendix G-1).

All driving assessments were conducted over the same course in Palmerston North and Wellington and comprised urban and open-road driving over a 40-minute period. Therefore, there were two different routes for the driving assessments, and it was thereby impossible to ensure an identical testing route across the two centres. Nevertheless, attempts to minimise differences in the types of driving situations were made. For example, motorway driving was not available in the Palmerston North area. However, the skills required for such driving were assessed as best as possible using an overpass where merging into two-laned traffic was required as part of the route.

The driving assessment commenced and ended from the same location in the Massey University campus carpark where participants arrived for the study. After returning from the drive, the researcher greeted the participant and instructor and sat in the back seat of the car. In some cases, the original interview room was available and was used for the feedback session. At this point, the post-driving assessment questionnaires were administered to both the participant and instructor (see Appendixes G-2 and G-3, respectively), and the instructor was required to guess which group he thought the driver belonged to by writing a letter representing the group at the top of the assessment form (*F* for *Fearful group* and *C* for *Control group*). The instructor then provided the participant with appropriate feedback on their performance in accordance with a regular testing situation. As it was being given, the instructor wrote the feedback onto a sheet for the participant to take away for their own information (see Appendix I-3), and feedback was structured to include positive aspects as well as safety or other issues as deemed appropriate.

In a regular testing situation, drivers who complete an Advanced Driving Assessment to a required standard are issued with a certificate of completion. If the participant's performance during the driving assessment was consistent with these standards as deemed by the instructor, the participant was issued with a certificate. This occurred with only two participants who were both from the control group. Following the feedback, the instructor left the premises and the researcher discussed the follow-up drive with the participant, and provided them with the follow-up driving questionnaire for pre- and post-anxiety ratings (see Appendix F-4) if they agreed to this final part of data collection. The researcher was then available for additional debriefing and support for the participant.

Debriefing

At the conclusion of data collection, the researcher spent a few minutes with each participant providing an overall debriefing. The participant was asked about their experience and any issues raised were discussed. Each participant was informed that they would be mailed a summary of the results when available. The participant was reminded of the confidential treatment of their data and that the results were strictly for research purposes only. Finally, the participant was thanked for taking part in the study. A summary of the results was mailed to participants in December 2000 after data collection had been completed.

ETHICAL CONSIDERATIONS

A number of ethical considerations were addressed in Study Two and approval was provided by the Massey University Human Ethics Committee (application MUHEC 99/86).

Informed Consent

Informed consent was obtained prior to commencement of data collection, and detailed what participants could expect from volunteering and their right of withdrawal during any phase of Study Two (see Appendixes H-1 through H-5). Issues concerning informed consent were raised at various points, and are discussed in the following sections on anonymity and confidentiality, treatment of data, and potential harm to participants.

Anonymity and Confidentiality

Because Study Two involved face-to-face contact, it was not possible for the participants to be anonymous to the researcher. However, in all cases, confidentiality was upheld by the researcher within the boundaries set out in the Code of Ethics of the New Zealand Psychological Society and New Zealand College of Clinical Psychologists. The researcher was aware of the sensitivity and potential implications of assessment data, particularly regarding the Advanced Driver Assessment. Participants were reminded of the confidential nature of the research at all stages of data collection. The driving instructors conducting the driving assessments were required to sign a confidentiality agreement (see Appendix I-2).

Treatment of Data

All data collected were given a three-digit code number to preserve confidentiality and were kept in a locked room. All final research reports were presented in summary form, stratified across relevant variables, and presented so that no individual was identifiable. Participants were offered the opportunity of being sent a copy of the results of the research, which was designed to be comprehensible to the general population and did not include complex technical terms.

Potential Harm to Participants

An important ethical concern was for the potential of participation in the study to engender distress in the participants. Based on prior experience in administering very similar questionnaires (e.g., Taylor, 1996), it was likely that participants would experience no harm as a result of the questionnaire and interview portions of the study. Any issues that may have arisen from this part of data collection were dealt with in the debriefing session. In terms of the driving assessment, it was emphasised that both instructors were experienced and professional. Participants were informed of their right to stop the assessment at any time (although none did).

It was acknowledged that some participants could have concerns that the practical driving assessment might somehow affect their driver's licence status. They were reassured that the assessment was for research purposes only and was entirely voluntary, and were shown the confidentiality agreement signed by the instructors.

OVERVIEW OF DATA ANALYSIS

The overall aim of Study Two was to investigate a typology of DRF and the relationship between DRF and driving skills. Within this research design, the goal was to identify subtypes of DRF, as well as examine the potential utility of a practical driving assessment as part of a comprehensive assessment for DRF. It was thought that these two aspects of the study could then be used to inform assessment and treatment for people who report DRF. Therefore, the nature of Study Two required a number of qualitative and quantitative analytical techniques to achieve the overall aims and objectives. The qualitative description of a range of participant variables including demographic, driving, and diagnostic information was used as an adjunct to the quantitative data, such as self-report and practical driving measures. The quantitative measures were initially summarised through the use of descriptive statistics. Additional analyses were conducted using t-tests, Pearson product-moment correlations, cluster and factor analysis, and non-linear principal component analysis. Most aspects of the data analysis were exploratory and, thus, some risk of Type I error in addition to Bonferroni correction was considered acceptable. Some statistical tests were more important than others, but for the sake of completeness and to support thorough exploration, statistical significance was tested where possible. In addition, multivariate analyses were used where appropriate as a means of controlling for Type I error. All numerical data were analysed using SPSS 9.0.1 for Windows (SPSS Inc., 1999), and all comparisons were based on 50 participants in each group, unless otherwise stated.

Descriptive Statistics

Since the sample for Study Two was recruited from a general community population, it was important to obtain a relatively detailed description of characteristics in order to place the sample within a context and enable comparison of the participant pool with those used in other studies on DRF. Descriptive statistics were therefore used for the purpose of describing the demographic and clinical characteristics of the fearful and control groups. Qualitative analysis of errors on the Advanced Driver Assessment was also used to supplement the numerical data generated by the on-road assessment, as these have been found to provide useful additional information (Wood, 1996). Simple descriptive statistics, including means, standard deviations, and ranges, were used in Study Two to summarise the data, and the results provided the basis for additional inferential procedures.

Inferential Statistics

From the basic descriptive statistics, independent groups and paired samples t-tests were conducted to provide support for conclusions about differences (or the lack thereof) between fearfuls and controls. All t-tests were two-tailed unless otherwise specified. In some cases, the standard deviations indicated some variability in mean ratings. Therefore, separate variances were used for the analysis, although this produced the same result as would have been obtained with equal variances. Results are therefore presented accompanied by those for Levene's statistic for homogeneity of variances.

Correlation tables were used to examine the relationship between the DRF and anxiety measures and the practical driving measures, both separately and together. The purpose of using correlation analyses was to investigate the relatedness of: (1) the measures of anxiety, (2) the practical driving test and the informal skill ratings, and (3) the measures of driving anxiety and the practical driving measures.

For the typology analysis, a combination of analytical techniques were used to generate and confirm possible subtypes of DRF. The initial approach was guided by the method used by Van Gerwen et al. (1997) in their study of flight phobia. They employed a principal component analysis by alternating least squares (PRINCALS) to "assess associations of flight anxiety with different types of phobia and to develop a typology of flying phobics" (Van Gerwen et al., 1997, p. 245). Principal component analysis (PCA) is designed to analyse the interrelationships among a large number of variables and explain those variables in terms of their common underlying themes or dimensions (Hair et al., 1998). The ultimate goal of PCA is to represent the relationships between variables using a smaller number of dimensions, with minimal loss of information. PRINCALS is also designed with this in mind. However, PRINCALS differs from normal PCA in that variables with different levels of measurement (i.e., nominal, ordinal, and interval data) can be analysed simultaneously using the PRINCALS technique (Gifi, 1990). This allows categorical variables such as self-reported focus of fear to be included in such an analysis, which was the reason Van Gerwen et al. used the technique. As will be explained in a later Chapter, the values of the category quantifications can be plotted and examined visually, which consequently enables the representation of the relationship between nominal, ordinal, and interval variables at the same time. As a result, non-linear relationships between variables can be modelled. PRINCALS is also variously referred to as *categorical principal components with optimal scaling* and *non-linear principal components analysis* (Gifi, 1990). It is a method that deals primarily with variance (Millon, 1987). Each principal component is mathematically generated and selected sequentially so that the first component accounts for the maximum variance of the correlational matrix, and each subsequent component accounts for successively lesser amounts (Millon, 1987). PRINCALS is explained in more detail in Chapter Ten.

Variables included in the PRINCALS analysis conducted by Van Gerwen et al. (1997) included the Fear Survey Schedule (Third Edition) subscales, Fear Questionnaire item 1 (plane avoidance), a panic attack checklist, flight anxiety scales (measuring anticipatory flight anxiety, in-flight anxiety, and generalised flight anxiety), age, sex, and reasons for fear of flying. Scores on the scales used in the analysis were divided into equal percentile scores, whereby each participant was categorised as *high* or *low* on each scale. Reasons for fear of flying were derived from the first of the top two self-reported reasons gathered during an interview. These reasons were then categorised and each participant allocated to a single category based on their highest phobic fear, such as loss of control, social anxiety, fear of water, fear of accidents, need for control, acrophobia (fear of heights), and claustrophobia (fear of enclosed places). PRINCALS was used in a similar manner in Study Two, although *diagnosis* was also added into the variable pool, as this was a limitation identified in the Van Gerwen et al. study.

Once PRINCALS had been used to identify a typology of DRF, additional analyses were conducted to confirm the results. Factor and cluster analytic methods were used for this purpose, with the view that a robust typology should emerge using varying analytical techniques (Hair et al., 1998). The Driving Cognitions Questionnaire was used as a measure of focus of fear, as it assesses the frequency of various fear-related cognitions experienced while driving. Initially, the dimensional structure of the data was ascertained using factor analysis.

While factor analysis is primarily concerned with grouping variables, the main aim of cluster analysis is to group objects, or individuals in the case of Study Two (Hair et al., 1998). Cluster analysis was performed to further investigate a possible typology of concerns while driving, or focus of fear. Cluster analysis comprises measures of similarity designed to group apparently heterogeneous individuals into clusters of relatively homogeneous types (Millon, 1987). The goal is to maximise homogeneity within the clusters while also maximising the heterogeneity between the clusters (Hair et al., 1998). Therefore, a successful classification is characterised by the individuals within clusters being close together in a geometric plot, while different clusters appear far apart from each other. Cluster analysis has also been referred to as *Q analysis*, *typology construction*, *classification analysis*, and *numerical taxonomy*. Cluster analysis uses the concept of a *cluster variate*, which is the set of variables representing the characteristics used to compare individuals in the cluster analysis (Hair et al., 1998; see Chapter Four for a detailed explanation).

Chapter Seven

STUDY TWO

DEMOGRAPHIC AND DRIVING-RELATED VARIABLES: RESULTS AND DISCUSSION

This Chapter presents the results and discussion of the demographic and driving-related characteristics of the fearful and control groups. The two groups were described and compared in terms of age, marital status, ethnicity, educational background, employment status, and medical status. Comparisons between the groups were also made using a number of driving-related variables, including driving experience, driving history, and current driving patterns, with a view to examining their potential role in DRF. The theoretical, methodological, and practical implications of the results are discussed in Chapter Eleven.

DEMOGRAPHIC VARIABLES

Data were collected for a range of demographic variables, which enabled detailed description of the fearful and control groups. This was considered important (as for Study One) because the sample was recruited through media advertising. The inclusion of a control group in Study Two also permitted clearer descriptions of the fearful group compared with those without DRF. There were 50 participants in each group, and the groups were comparatively similar for age and years of driving experience.

Since only one male volunteered as a fearful driver, both groups consisted solely of female participants. This was also a finding of Study One, where 95% of participants were female, and further supports the contention that women appear to be over-represented in studies of DRF (e.g., Ehlers et al., 1994) as well as general clinical phobic samples (e.g., Antony et al., 1997; Himle et al., 1991).

Age

Table 7.1 presents the data on age for the fearful and control groups. Since age was considered to be an important contributing factor to driving experience (Wood, 1996), control participants were selected to approximate the fearful participants in terms of age. Therefore, both groups reflected a similar mean age and age range, and any age differences between the groups were not statistically significant, $t(98) = 0.74, p = .46$ (Levene's statistic: $F = 0.18, p = .67$). The mean age for the fearful group in Study Two was lower than that for the fearful sample in Study One, which was 50.09 years (SD = 15.17).

Table 7.1. *Descriptive statistics for age.*

	Fearful group	**Control group**
Mean (*SD*)	43.60 (14.99)	41.36 (14.95)
Range	18-75	17-73

Marital Status

Table 7.2 shows the marital status of the two groups, indicating no group differences, $\chi^2(2) = 1.95, p = .38$. Most (82%) of the participants in both groups identified themselves as either single or in a marital or de facto relationship.

Table 7.2. *Frequency data for marital status.*

	Fearful group	**Control group**
Single	11	17
Married/De Facto	30	24
Separated/Divorced/Widowed	9	9

Ethnicity

Most of the sample identified themselves as Pakeha (92% of the fearful group and 98% of the control group). There was one participant in each group who identified themselves as Pakeha/Maori, while two fearful participants identified as British and one as Samoan.

Educational Background

Descriptive statistics for years of education for the two groups are shown in Table 7.3. Data for the fearful group are based on 48 participants, as there were 2 participants with missing data. Both groups reflected a similar mean number of years of education, $t(96) = 0.29, p = .77$ (Levene's statistic: $F = 2.16, p = .15$).

Table 7.3. *Descriptive statistics for number of years of education.*

	Fearful group	Control group
Mean (*SD*)	12.17 (3.25)	12.38 (3.95)
Range	7-24	5-27

Employment Status

In terms of current employment status, 28 participants in the fearful group and 29 in the control group reported being in paid employment, while 22 and 21 (respectively) were not in paid employment. These small differences were not statistically significant, $\chi^2(1) = 0.04, p = .84$.

Medical Status

Participants were asked several questions related to their current medical status. Cardiovascular problems were reported by one fearful and two control participants, while two fearfuls and one control reported a history of nervous system damage or disorder. These factors were not deemed to interfere with driving performance as the participants remained with full driver's licence status. None of the participants were pregnant. There were 19 fearfuls (38%) who reported taking regular medication for one or more of the following conditions: anxiety, depression, thyroid, shortness of breath, blood pressure or heart, diabetes, hernia, arthritis, and allergies. Only two of these participants were taking medication for anxiety. In comparison, 10 controls (20%) were taking regular medication for one or more of the following conditions: depression, thyroid, blood pressure or heart, arthritis, allergies, and asthma. This difference in level of medication was statistically significant, $\chi^2(1) = 3.93, p = .05$, with a higher proportion of fearfuls taking medication. However, the types of medication being taken were unlikely to affect the results of the driving assessment since only two participants were taking anxiolytics, and these participants did not obtain extreme scores on the driving assessment.

DRIVING-RELATED VARIABLES

A number of driving-related variables were assessed to provide information about driving experience, driving history, and current driving patterns between the two groups. These variables were considered relevant to the assessment of people with DRF, and of potential clinical utility. Ehlers et al. (1994) included an assessment of these kinds of variables in their study of DRF, and the results for Study Two will be compared with these studies (where applicable) for their clinical sample of driving phobics. Bonferroni correction was made for the analyses of the driving-related variables (.05/9 = .006).

Driving Experience

Participants were asked about years of driving experience and how long they had had their current driver's licence. As with age, control participants were selected to approximate the fearful participants in terms of number of years of driving experience. Table 7.4 shows the number of years of driving experience and number of years licensed for the fearful and control groups.

Both groups were similar for mean years and range on both variables. Mean differences between the groups were not statistically significant for either variable; years of driving experience: $t(98) = 0.94, p = .35$ (Levene's statistic: $F = 2.34, p = .13$); number of years licensed: $t(98) = 0.39, p = .70$ (Levene's statistic: $F = 1.28, p = .26$).

Table 7.4. *Descriptive statistics for driving experience.*

	Years of driving experience		Number of years licensed	
	Mean (*SD*)	**Range**	**Mean (*SD*)**	**Range**
Fearful group	20.36 (14.38)	1-50	21.54 (13.91)	1-50
Control group	22.94 (12.98)	1-54	22.58 (12.69)	1-53

Driving History

Learning to Drive. Participants provided information about their age when they started to learn to drive, as shown in Table 7.5. Participants in the control group started to learn to drive at an earlier age than those in the fearful group, $t(98) = 3.78$, $p < .001$ (Levene's statistic: $F = 4.30$, $p = .04$). Ehlers et al. (1994) reported similar results; their 56 phobics began to learn to drive at an average age of 19 years ($SD = 6.1$), while the 31 controls began to learn at age 16 ($SD = 3.4$).

Table 7.5. *Descriptive statistics for participants' age when started to learn to drive.*

	Fearful group	Control group
Mean (*SD*)	20.46 (6.11)	16.28 (4.90)
Range	14-39	9-35

Participants were also asked about how they learnt to drive. They were provided with various response options and were able to endorse more than one method of driving instruction. Table 7.6 shows the number of participants who endorsed various methods of driving instruction. Significance testing was not conducted for *driving instruction in school* and *other* because of the low observed frequencies. More control participants (86%) reported being taught to drive by a family member or a friend than fearful participants (58%), $\chi^2(1) = 9.72$, $p = .002$. As also reported by Hofmann (1992), there were no group differences for learning to drive through a driving school, $\chi^2(1) = 3.24$, $p = .07$.

Table 7.6. *Frequency data for the method of driving instruction.*

	Fearful group	Control group
Driving instruction in school	3	3
Taught by a family member or friend	29	43
Driving school	30	21
Other	1	3

Driver's Licence. Most participants in both groups (38 fearfuls and 46 controls) took the test to obtain their driver's licence only once. However, eight fearfuls and four controls took the test twice, while four fearfuls took it three times before passing. Collapsing across the categories greater than taking the test once, these differences were not statistically significant, $\chi^2(1) = 0.03, p = .03$. All participants had a current driver's licence, which was classed as a full licence for 47 participants in each group and a restricted licence for three participants in each group (significance testing was not conducted because of the low observed frequencies in some of the cells).

Defensive Driving Course. Of the fearful group, 11 (22%) had completed a defensive driving course, as had 24 (48%) control participants, a statistically significant difference, $\chi^2(1) = 7.43, p = .006$.

Driving Accidents and Incidents. Participants were asked about their recent (i.e., in the last three years) accident history as well as total number of charges for various driving offences. Table 7.7 shows the number of minor incidents that damaged the participant's vehicle or personal property (such as scraped paint and small dents). More control participants reported having had at least one minor incident than fearfuls, $\chi^2(1) = 10.30, p = .006$.

Table 7.7. *Frequency data for the number of minor incidents in the last three years.*

	Number of minor incidents		
	Never	Once	A few times
Fearful group	34	12	4
Control group	18	23	9

Table 7.8 presents the number of accidents as a driver and passenger in the last three years. Significance testing was not conducted for number of accidents as a passenger because of the low observed frequencies in some of the cells. Number of accidents as a driver was collapsed across the categories greater than zero to conduct a chi-square analysis, and the two groups did not differ in terms of number of accidents as a driver, $\chi^2(1) = 1.00, p = .32$.

Table 7.8. *Frequency data for the number of accidents as a driver and passenger.*

	Number of accidents				
	As the driver			As a passenger	
	0	**1**	**2**	**0**	**1**
Fearful group	38	10	2	49	1
Control group	42	7	1	45	5

There were nine participants in each group who had sustained injuries from MVAs, most of which were minor (such as bruising). A number of items asked participants how many times they had been charged with various traffic offences. One or more parking offences were reported by 19 fearfuls (range 1-6) and 36 controls (range 1-10), while 12 fearfuls (range 1-3) and 22 controls (range 1-6) reported one or more speeding offences. One instant traffic fine was reported by three fearfuls and five controls, and one control had received three such fines.

In terms of minor traffic offences (such as failure to pay fines) two fearfuls and two controls reported single charges, and one control reported two charges for minor traffic offences. Single charges for major traffic offences (such as drink-driving or dangerous driving causing injury) were reported by one fearful and two control participants, and one control participant reported being charged with four major traffic offences. None of the differences were large. Again, significance testing was not conducted for these variables because of the low observed frequencies in some of the cells.

Current Driving Patterns

Current patterns of driving were ascertained through a number of questions about driving frequency, purpose, locality, and traffic density. Significance testing was not conducted because of the low observed frequencies in some of the cells. Manual cars were driven by 24 fearfuls and 39 controls, while 17 fearfuls and 4 controls preferred automatic transmission. Both types of cars were driven by five fearfuls and seven controls, and four fearfuls did not currently drive.

Driving frequency between the two groups was quite variable, as Figure 7.1 shows. Most (n = 49) controls drove at least several times a week, compared with 33 fearfuls. There were seven fearfuls who only drove several times a year, and two who last drove between one and two years ago. Data on driving frequency were missing for two fearful participants.

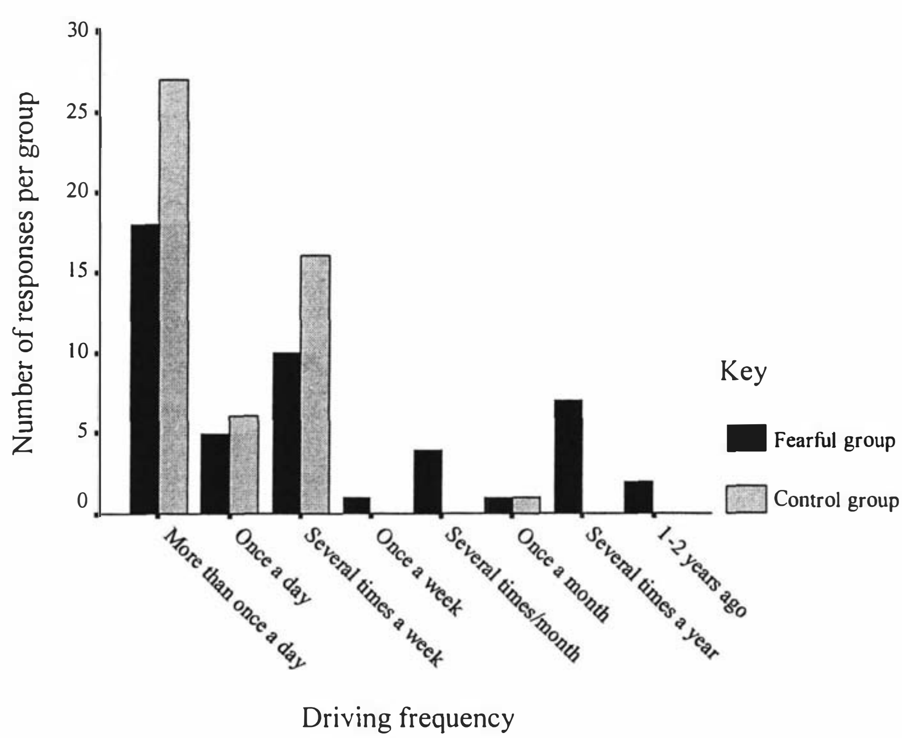

Figure 7.1. *Frequency data for patterns of driving frequency.*

Patterns of main driving are presented in Figure 7.2. As participants were able to endorse more than one response for this item, the data are presented separately for the number of participants who endorsed single or multiple choices. For Figure 7.2, *To/from work* refers to travel to and from work or study, *Local* refers to local routes, and *Job* refers to main driving as being part of one's job. There were three fearfuls with missing data on this item.

No participants reported their main driving as being part of their job. For about half of the participants in both groups (26 fearfuls and 21 controls), main driving was restricted to local routes, as Figure 7.2 shows.

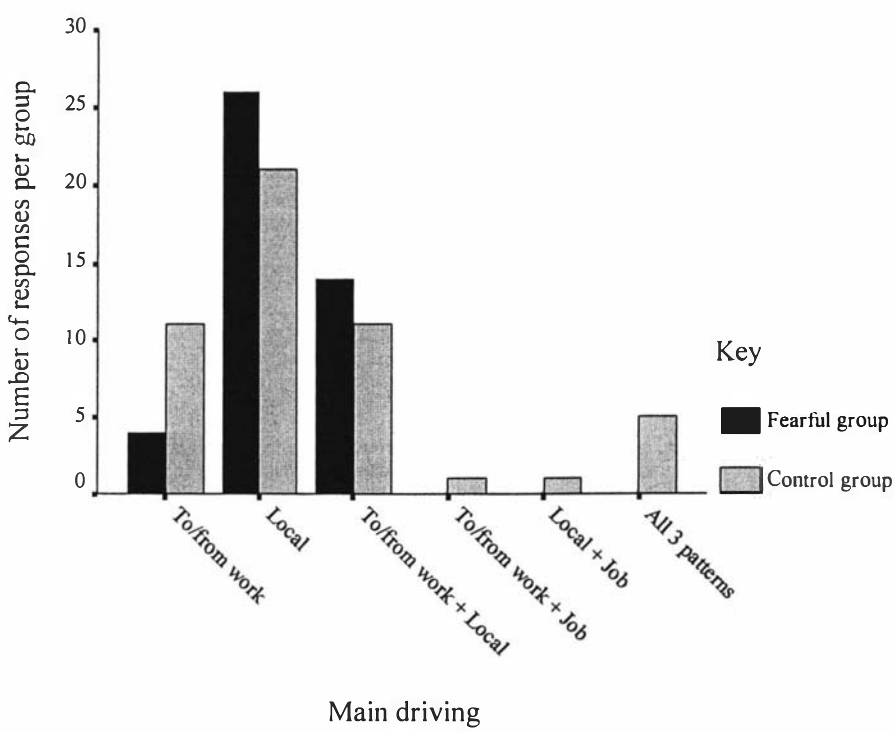

Figure 7.2. *Frequency data for patterns of main driving.*

Some differences between the groups were also apparent in terms of driving patterns across various driving localities (Figure 7.3) and traffic densities (Figure 7.4). There were three fearfuls with missing data on these items. Participants were again able to endorse more than one response for these items, and the data are presented separately for the number of participants who endorsed single or multiple choices for their typical driving locality and traffic density driving patterns. From Figure 7.3, the most notable difference in terms of typical driving locality appeared to be that nine fearfuls and no controls drove solely in suburban areas.

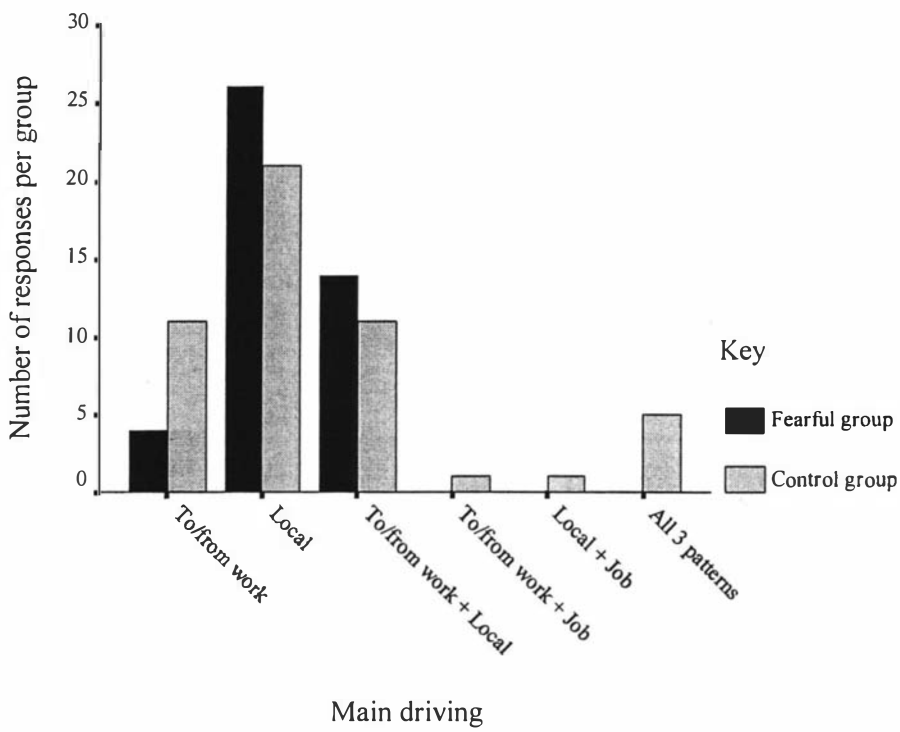

Figure 7.3. *Frequency data for patterns of driving locality.*

In terms of traffic density driving patterns (Figure 7.4), both groups typically drove in a variety of situations. However, there were two large group differences. Firstly, more fearful participants tended to prefer driving in minimum traffic periods than controls, and none typically drove in peak traffic. Secondly, more control participants usually drove in a mixture of all four types of traffic density.

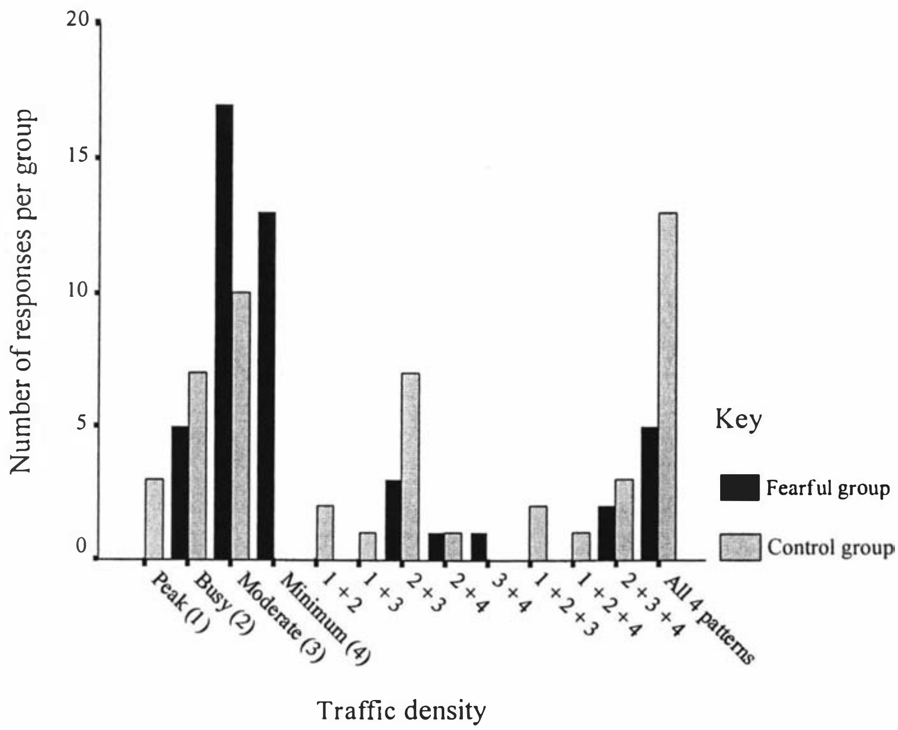

Figure 7.4. *Frequency data for traffic density driving patterns.*

SUMMARY

There were no statistically significant differences between the fearful and control groups on most of the demographic variables, including age, gender, marital status, ethnicity, educational background, and employment status. The mean ages for the fearful and control groups were 43.60 (SD = 14.99) and 41.36 (SD = 14.95) years, respectively. All participants in both groups were female, which reflects the fact that women appear to be over-represented in studies of DRF, a finding consistent with other phobias (Antony et al., 1997; Himle et al., 1991). Most (82%) of the participants in both groups identified themselves as either single or in a marital or de facto relationship, and as Pakeha (92% of the fearful group and 98% of the control group). Both groups shared an average of just over 12 years of education, and were relatively evenly distributed in terms of current employment status. Just over one-third of fearfuls were taking regular medication, and this was more than that for controls. However, only two fearful participants were taking medication for anxiety.

Fearfuls and controls had a similar number of average years of driving experience, with 20.30 (*SD* = 14.47) and 22.94 (*SD* = 12.98) years, respectively. Number of years licensed was also similar between the two groups. However, driving history was somewhat different between the two groups; most notably, controls started to learn to drive on average four years earlier than fearfuls. The reasons for such a difference are unclear and were not assessed. However, this difference could reflect early fearfulness. Alternatively, such a delay in learning to drive could also lead to reduced driving experience compared with controls and, hence, greater levels of DRF. Future research should further investigate this difference, particularly given that the findings corroborate those of Ehlers et al. (1994). It is also of note that more controls than fearfuls learned to drive through family members or friends and completed a course in defensive driving, although it is unclear whether these factors might contribute to the development of DRF.

More control participants reported having had at least one minor driving incident than fearfuls, although there were no differences between groups for recent accidents as a driver and passenger or injuries sustained from MVAs. Hofmann (1992) found that driving phobics reported having *less* MVAs than controls, which suggests that other factors also play an important role in the onset of DRF. Finally, more control participants reported being charged for various traffic offences overall than fearful participants.

STUDY TWO

PSYCHOLOGICAL ASSESSMENT: RESULTS AND DISCUSSION

This Chapter presents the results and discussion of the various psychological assessment measures used in Study Two. Initially, results are provided for the various DRF variables. Results of the diagnostic assessment are given for both the fearful and control groups. The groups are also compared and contrasted on the results from the self-report measures used. The relationships between the diagnostic assessment and the self-report measures are explored in Chapter Ten. The theoretical, methodological, and practical implications of the results are discussed in Chapter Eleven.

DRIVING-RELATED FEAR VARIABLES

Fear Description and Characteristics

Participants were asked a range of questions about DRF, and fearfuls provided further information about their specific DRF and fear severity. All fearfuls and no controls considered themselves to have a fear of driving. Bonferroni correction was made for the analyses of DRF variables (.05/7 = .007). Table 8.1 presents the data for ratings of *fear* of driving in general for the two groups, which was rated on a scale from 0 (*Not at all fearful*) to 10 (*Extremely fearful*). Fearful participants rated themselves as more fearful about driving in general than controls, $t(98) = 21.43, p < .001$ (Levene's statistic: $F = 36.15, p < .001$).

Participants also rated *anxiety* about driving in general using the same scale. This additional item was included in response to previous studies that have used the terms *anxiety* and *fear* interchangeably, to ascertain whether participants make similar or different ratings regarding driving-related fear and anxiety. As with DRF, fearfuls rated themselves as more anxious about driving in general than controls, $t(98) = 15.26, p < .001$ (Levene's statistic: $F = 57.15, p < .001$). Ratings for fear and anxiety about driving were then compared separately for the two groups using paired samples *t*-tests. The two variables correlated statistically significantly (both $p < .001$) for fearfuls ($r = .82$) and controls ($r = .53$). In addition, there was no difference between ratings made by fearful participants ($t[49] = 1.29, p = .203$) or control participants ($t[49] = 2.28, p = .03$).

Table 8.1. *Descriptive statistics for fear and anxiety about driving in general.*

	Fear about driving		**Anxiety about driving**	
	Mean (*SD*)	**Range**	**Mean (*SD*)**	**Range**
Fearful group	6.98 (1.94)	3-10	6.68 (2.81)	1-10
Control group	0.64 (0.78)	0-2	0.40 (0.76)	0-3

Fearful participants were then asked to describe what it was about driving that they feared the most. Responses were coded into categories generated by the researcher before being categorised by an independent coder. Guidelines developed for coding the responses are provided in Appendix J-1. The percentage agreement between the researcher and independent coder was 96%, and this level of agreement was considered acceptable. Table 8.2 shows the number of fearfuls grouped into the various categories of self-reported DRF.

Almost half (42%) of the fearful participants' most-feared driving-related situations involved an MVA or injury to self or others. This was followed by 26% who were most afraid of specific driving situations, conditions, or manoeuvres. Fears related to having a panic attack or anxiety symptoms and social concerns were rated most-feared by 14% and 16% of the fearful participants, respectively. Most ($n = 39$, 78%) fearful participants feared being a driver the most, while 18% ($n = 9$) were most afraid of being a passenger, and 2% ($n = 1$) feared both situations. There were missing data for one participant on this item.

Table 8.2. *Self-reported DRF for fearful participants.*

Category of DRF	Definition	*n*
Panic Attack/Anxiety Symptoms	Fear related to experiencing a panic attack or intense anxiety symptoms while driving.	7
MVA/Injury	Fear related to ultimately having a motor vehicle accident (MVA). Includes: (1) concern about causing injury to self or others or being in an accident caused by others; or (2) describing a set of events or situations that could lead to an accident, such as losing control of the vehicle.	21
Social Concerns	Fear related to worries about the reactions of other drivers. Includes: (1) concern about the negative reactions of others to one's driving (i.e., fear of negative evaluation and criticism); (2) feeling under pressure from or impeding other drivers; or (3) describing performance anxiety or lack of self-confidence related to driving.	8
Specific Driving Situations/Conditions/ Manoeuvres	Fear related to specific situations, conditions, or manoeuvres, such as driving at speed, at night, in unfamiliar areas, over bridges, through tunnels, on steep roads, on open roads, merging, and changing lanes.	13
Other	Feared situations that cannot be coded into the above categories.	1

After describing their most-feared driving-related situation, fearfuls were asked to rate the likelihood of their most-feared situation occurring each time they drove, from 0% (*Will not happen*) to 100% (*Will certainly happen*). There was one participant with missing data on this item. The mean rating was 51.02% (SD = 29.24, range = 0-100). In other words, fearful participants considered that, on average, there was just over a 50% likelihood that they would encounter their most-feared driving-related situation each time they drove.

Both groups also rated the likelihood that they would be involved in an MVA each time they drove. Table 8.3 shows these data, and fearfuls rated a higher likelihood of being involved in an MVA than controls, $t(98) = 6.76$, $p < .001$ (Levene's statistic: $F = 70.82$, $p < .001$).

Table 8.3. *Descriptive statistics for likelihood of MVA involvement (%).*

	Fearful group	Control group
Mean (*SD*)	36.00 (28.28)	7.80 (8.40)
Range	0-90	0-50

As Figure 8.1 shows, 25 (50%) fearfuls reported that their DRF sometimes interfered with things they wanted to do, while more frequent interference was noted by 23 (46%) fearfuls. Only 2 (4%) fearful participants reported that their DRF never interfered with things they wanted to do. On a scale from 1 (*Never*) to 4 (*All the time*), the mean extent of interference was 2.60 (*SD* = 0.83, range = 1-4).

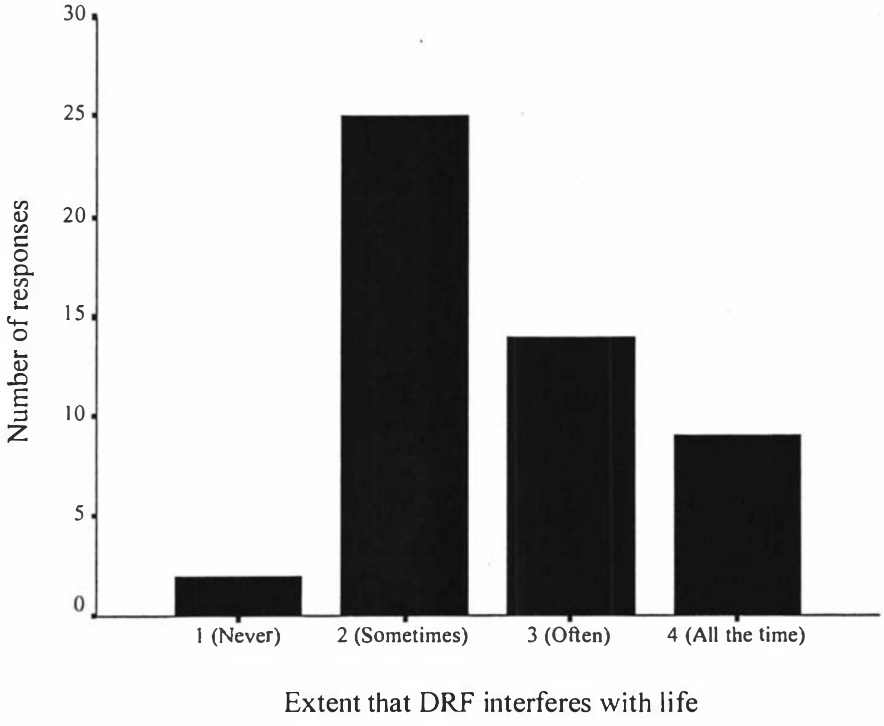

Figure 8.1. *Degree of interference of DRF on life for fearful participants.*

Helpseeking Behaviour

Fearful participants were asked a number of questions about helpseeking behaviour in relation to their DRF, including who they had spoken to about their DRF, whether they had received professional psychological help or driving instruction for their DRF, and their perceived need for such help. The majority of fearfuls had spoken to friends (n = 39, 78%) and their partner or spouse (n = 35, 70%) about their DRF, while 29 (58%) had spoken to other family members. Few fearfuls had discussed their DRF with a mental health professional (n = 10, 20%), and even fewer had spoken to a medical professional about their DRF (n = 8, 16%).

Only eight (16%) fearful participants had received psychological help from a mental health professional for their DRF. Figure 8.2 shows the perceived need for professional psychological help for DRF from a psychologist or counsellor among fearful participants.

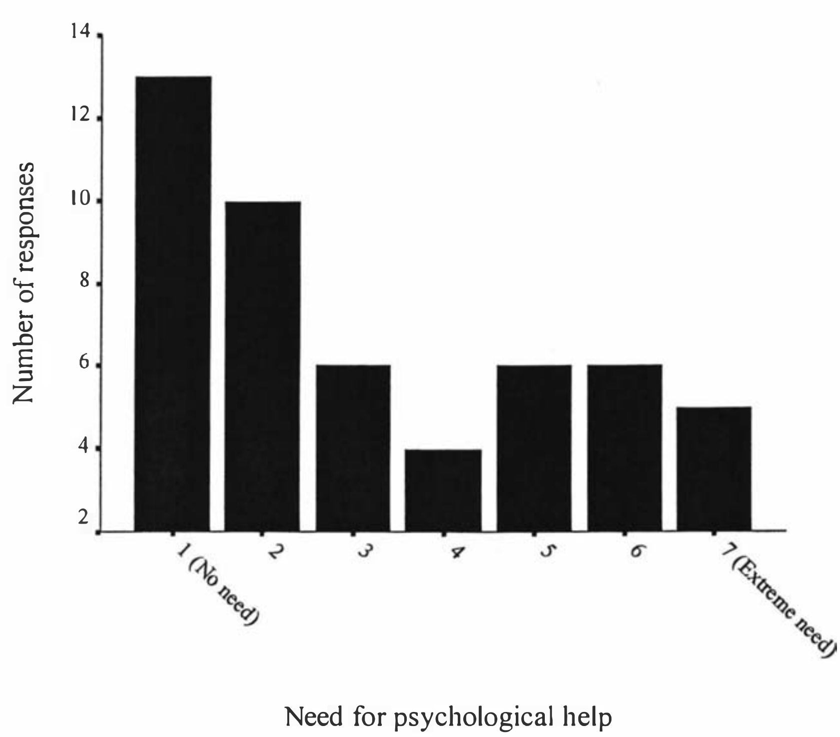

Figure 8.2. *Fearfuls' perceived need for professional psychological help for their DRF.*

More than half of the fearfuls (n = 29, 58%) rated a low need (ratings of 1-3) for professional psychological help for their DRF. However, about one-third (n = 17, 34%) of fearfuls reported a moderately high or extreme need (ratings of 5-7) for such help. The mean rating was 3.36 (SD = 2.11, range = 1-7).

Despite this, the majority of fearful participants reported that they would be unlikely to seek professional psychological help for their DRF, as Figure 8.3 shows. Almost two-thirds (n = 37, 74%) of fearfuls reported a low likelihood (ratings of 1-4) to seek professional psychological help, while only 9 fearfuls (18%) indicated a moderate to extreme likelihood (ratings of 6-9) to seek such help. The mean rating was 3.04 (SD = 2.47, range = 1-9).

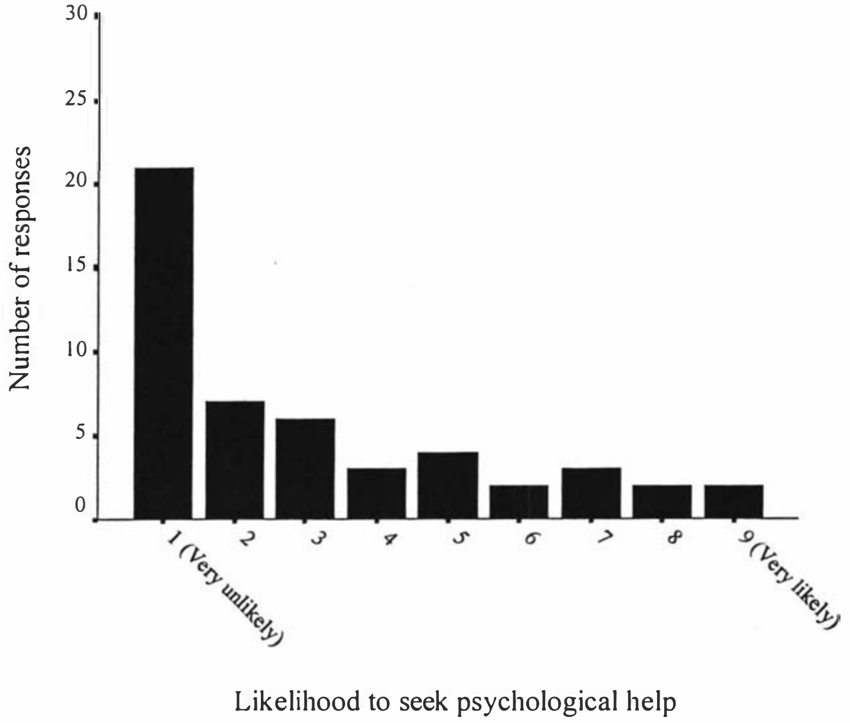

Figure 8.3. *Fearfuls' perceived likelihood to seek professional psychological help for their DRF.*

Similar items asked about helpseeking in relation to professional driving instruction. Only 7 (14%) fearful participants had received professional driving instruction for their DRF. Figure 8.4 shows the perceived need for professional driving instruction for DRF among fearful participants. More than half (n = 28, 56%) perceived a low need for professional driving instruction, although slightly more than one-third (n = 18, 36%) rated a moderate to extreme need for such instruction to help with their DRF. The mean rating was 3.48 (SD = 2.02, range = 1-7).

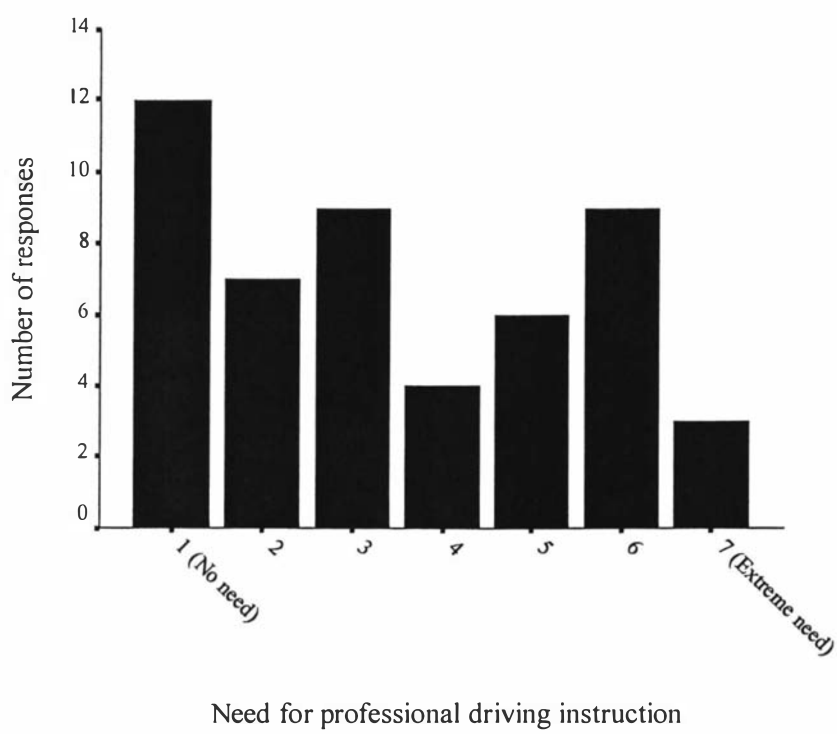

Figure 8.4. *Fearfuls' perceived need for professional driving instruction for their DRF.*

There were three fearfuls (6%) who had sought other types of professional help, including one who saw a psychiatrist and two who sought alternative therapies such as hypnotism and homeopathy.

DIAGNOSTIC ASSESSMENT

The Composite International Diagnostic Interview-Auto 2.1 (CIDI-Auto 2.1) was used in Study Two as a resource-efficient method for obtaining DSM-IV diagnostic information that may assist in developing a typology of DRF, as recommended in Study One. No control participants met criteria for any disorder, as this was part of the selection criteria for the control group. Of the 50 fearful participants, 23 (46%) met criteria for an anxiety disorder, while the remaining 27 did not meet criteria for an anxiety disorder (although 6 did meet criteria for a substance use disorder).

Table 8.4 shows the number of fearfuls who met DSM-IV criteria for current (i.e., in the last 12 months) anxiety disorders based on the CIDI-Auto 2.1. There were a number of cases with multiple diagnoses; hence, the total number of diagnoses in Table 8.4 (i.e., 33) is greater than the number of fearfuls meeting diagnostic criteria (i.e., 23). Of the 23 fearfuls meeting diagnostic criteria, 10 met criteria for a single anxiety disorder only, 5 met criteria for multiple anxiety disorders only, and 8 met criteria for at least one anxiety disorder as well as at least one other, non-anxiety disorder (5 with one anxiety disorder and 3 with two anxiety disorders; see Table 8.5 for information about the other, non-anxiety disorders).

Table 8.4. *Current (in the last 12 months) DSM-IV anxiety disorder diagnoses for fearful participants based on the CIDI-Auto 2.1.*

Current DSM-IV anxiety disorder diagnosis	*n*
Specific Phobia, situational type[a]	6
Specific Phobia, natural environment type[b]	6
Specific Phobia, blood-injection-injury type	3
Social Phobia	6
Panic Disorder	5
(without Agoraphobia)	(2)
(with Agoraphobia)	(3)
Agoraphobia without History of Panic Disorder	2
Generalised Anxiety Disorder	4
Post-Traumatic Stress Disorder	1

[a]Flying or being in a closed space like a cave, tunnel, or elevator. [b]Heights, storms, thunder or lightning, or being in still water like a swimming pool or lake.

Table 8.5. *Current (in the last 12 months) DSM-IV diagnoses (non- anxiety disorder) for fearful participants based on the CIDI-Auto 2.1.*

Current DSM-IV diagnosis (non-anxiety disorder)	***n***
Major Depressive Disorder	5
Dysthymic Disorder	1
Hypochondriasis	1
Brief Psychotic Disorder	1
Delusional Disorder	1

Although the CIDI-Auto 2.1 provided comprehensive diagnostic information for the fearful group, it was not always possible to determine whether the diagnosis matched with the DRF presentation as the interview was computerised and participants were not required on all occasions to describe the focus of the fear. In addition, driving as a potentially feared situation was not specified under specific phobia (situational type) on the CIDI-Auto 2.1, whereas it is specified in DSM-IV which states that the "[situational] subtype should be specified if the fear is cued by a specific situation such as public transportation, tunnels, bridges, elevators, flying, driving, or enclosed places" (American Psychiatric Association, 1994, p. 406).

Nevertheless, the CIDI-Auto 2.1 provided valuable information regarding current DSM-IV diagnoses. Almost half of the fearful group met criteria for a current anxiety disorder. Most prominent were diagnoses of specific phobia (both situational and natural environment types) and social phobia, and five fearfuls met criteria for two or three anxiety disorders. A further eight fearfuls met diagnostic criteria for at least one anxiety disorder as well as other non-anxiety disorders. Overall, these results indicate a high proportion of non-clinical driving-fearfuls whose symptoms are sufficiently severe to warrant an anxiety disorder diagnosis. These results further support the previous finding by Ehlers et al (1994) of high problem severity among media-recruited samples. This pattern of symptom severity suggests the need for additional research aimed at improving the identification, assessment, and treatment of people with DRF.

Further analyses were conducted to investigate whether the proportion of fearfuls who met diagnostic criteria were those who indicated greater interference of DRF in daily life as well as some need for professional psychological help (see Figures 8.1 to 8.4). The results are presented in Table 8.6, along with the results for the fearful group as a whole for comparison purposes. Fearfuls with a diagnosis rated a higher fear about driving ($t[48] = 2.89, p = .006$; Levene's statistic: $F = 0.14, p = .71$), degree of interference of the DRF on their daily life ($t[48] = 2.59, p = .01$; Levene's statistic: $F = 0.02, p = .89$), perceived need for professional psychological help ($t[48] = 5.34, p < .001$; Levene's statistic: $F = 2.26, p = .14$), and perceived likelihood to seek professional psychological help ($t[48] = 5.23, p < .001$; Levene's statistic: $F = 26.64, p < .001$). After Bonferroni correction (.05/6 = .008), all of these comparisons remained statistically significant, except for the degree of interference of the DRF in daily life. There was no difference between the groups in terms of years of driving experience ($t[48] = 0.95, p = .35$; Levene's statistic: $F = 1.89, p = .18$) or perceived need for professional driving instruction ($t[48] = 1.12, p = .27$; Levene's statistic: $F = 0.20, p = .66$).

These results indicate that DRF of sufficient severity to warrant a diagnosis is not distinguished from less severe DRF by driving experience. Further, fearfuls meeting diagnostic criteria perceive a higher need for and likelihood to seek professional psychological help rather than professional driving instruction.

Table 8.6. *Means (and SDs) for fearfuls with and without a diagnosis on years of driving experience, severity of DRF, and helpseeking variables.*

Variable	**Overall ($n = 50$)**	**With diagnosis ($n = 23$)**	**Without diagnosis ($n = 27$)**
Years of driving experience	20.30 (14.47)	18.26 (12.76)	22.15 (15.65)
Fear about driving*	6.98 (1.94)	7.78 (1.83)	6.30 (1.79)
Degree of interference of DRF on life*	2.60 (0.83)	2.91 (0.79)	2.33 (0.79)
Need for psychological help**	3.36 (2.11)	4.74 (1.84)	2.19 (1.55)
Likelihood to seek psychological help**	3.04 (2.47)	4.70 (2.65)	1.63 (1.01)
Need for driving instruction	3.48 (2.02)	3.83 (2.06)	3.19 (1.98)

$^{*}p < .01$. $^{**}p < .001$.

PSYCHOMETRIC ASSESSMENT

Driving Cognitions Questionnaire (DCQ)

On the DCQ, participants rated the frequency when driving of 49 cognitions using a scale from 0 (*The thought never occurs*) to 4 (*The thought always occurs when I am driving*). Table 8.7 presents the results from the DCQ in rank order for the fearful group, including only those items with a mean rating from 1-4. Equivalent control group data are also shown.

Table 8.7. *DCQ mean (and SD) item ratings in rank order for fearfuls, with equivalent data for controls.*

Item		Fearful group	Control group
3.	I will not be able to react fast enough	2.38 (1.26)	0.52 (0.61)
16.	People will think I am a bad driver	2.28 (1.28)	0.34 (0.52)
37.	I will hold up traffic and people will be angry	2.10 (1.36)	0.22 (0.42)
44.	I cannot control whether other cars will hit me	1.88 (1.51)	0.90 (0.86)
10.	I will lose control of myself and act stupidly or dangerously	1.80 (1.43)	0.10 (0.36)
5.	People I care about will criticise me	1.74 (1.43)	0.24 (0.43)
46.	Other people will notice that I am anxious	1.74 (1.29)	0.04 (0.20)
23.	People riding with me will be hurt	1.70 (1.27)	0.66 (0.59)
11.	I will not be able to stop	1.68 (1.25)	0.66 (0.63)
36.	I will not be able to think clearly	1.62 (1.34)	0.10 (0.30)
2.	I will get stuck in traffic	1.62 (1.28)	1.16 (0.92)
6.	I will injure someone	1.50 (1.22)	0.46 (0.61)
31.	The way I drive will endanger others	1.48 (1.28)	0.52 (0.51)
38.	I will cause an accident	1.44 (1.36)	0.36 (0.49)
9.	I will be injured	1.44 (1.30)	0.56 (0.76)
8.	If I have an accident, it will cause financial problems	1.40 (1.49)	0.52 (0.89)
40.	People with laugh at me	1.26 (1.32)	0.06 (0.24)
18.	The engine will break down	1.18 (1.17)	0.72 (0.83)
49.	I will hit an animal	1.10 (1.18)	0.64 (0.60)
24.	I will be too far from home	1.06 (1.36)	0.36 (0.85)
28.	I will get lost	1.04 (1.31)	0.48 (0.74)
32.	I will be stranded	1.00 (1.26)	0.34 (0.63)
17.	I will die in an accident	1.00 (1.33)	0.64 (0.56)
Mean item rating		1.04 (0.58)	0.35 (0.28)
Total score (sum of item ratings)		50.98 (28.41)	17.14 (13.81)
Range		11-136	1-66

Items 3, 16, and 37 were rated the highest for the fearful group (all rated above 2, *The thought occurs during half of the times I drive*). Two of these items (*People will think I am a bad driver* and *I will hold up traffic and people will be angry*) were related to social concerns, or concerns about being negatively evaluated by other drivers and annoying other drivers. The only item similarly rated by fearfuls and controls was *I will get stuck in traffic*.

Fearful participants had a higher mean item rating than controls, $t(98) = 7.58, p < .001$ (Levene's statistic: $F = 25.86, p < .001$). Comparison with Ehlers et al.'s (1994) results were made using the mean item rating, as these were the only data reported by Ehlers et al. Using one-sample t-tests, the mean item rating for fearfuls and controls was not different from that found by Ehlers et al. (1994); using Ehlers et al.'s driving phobic group as a comparison: $M = 0.90$, $SD = 0.80$, $n = 43$, $t(49) = 1.72, p = .09$; using Ehlers et al.'s control group as a comparison: $M = 0.30$, $SD = 0.20$, $n = 30$, $t(49) = 1.25, p = .22$.

Internal consistency reliability for the DCQ was $r = .94$ for fearfuls, $r = .94$ for controls, and $r = .96$ for the combined sample, compared with Ehlers et al.'s (1994) coefficients of .97, .95, and .98, respectively. Given the large number of items on the DCQ and the lack of data regarding its psychometric properties, a factor analysis was conducted using the DCQ items. A secondary aim was to identify factors that could be used in the analysis of a typology of DRF, as well as to determine whether the DCQ could be better represented by a smaller number of items. The analysis was considered exploratory as the sample size did not meet minimum requirements ($n = 100$; Hair et al., 1998). Only responses from the fearful group were included on the basis that it is inappropriate to apply factor analysis to a sample of differing groups for a set of items known to differ because of group membership (Hair et al., 1998). According to Hair et al.:

> When the two subsamples…are combined, the resulting correlations and factor structure will be a poor representation of the unique structure of each group. Thus, whenever differing groups are expected in the sample, separate

> factor analyses should be performed, and the results should be compared to identify differences not reflected in the results of the combined sample. (p. 100)

However, in Study Two, results for the control group were not meaningful since almost all responses for control participants on the DCQ were zero responses, and the lack of variability made interpretation of the factor analysis suspect.

Principal components was chosen as the method of factor extraction, and so multicollinearity and singularity were not relevant issues (Coakes & Steed, 1997). Factorability of the correlation matrix was considered acceptable, given that a visual examination of the correlations showed a number exceeding $r = .3$, and Bartlett's test of sphericity was statistically significant, confirming the absence of non-zero correlations. However, the KMO measure of sampling adequacy was lower than 0.6, indicating the need for caution in interpreting the results (Hair et al., 1998). This may have been a function of the presence of outliers. Although the extremes of the rating scale (0-4) could be statistically considered as outliers, omission of the outliers was not justified as these extreme values were expected in the fearful group. A varimax (i.e., orthogonal) rotation was chosen as the most appropriate rotation option, given that the primary aim of the factor analysis was to reduce the number of original variables (Hair et al., 1998).

The latent root criterion indicated that 13 factors could be retained. The scree test, however, suggested that 5 factors may be appropriate. Explanatory power increased by less than 5% after the fifth factor (see Appendix J-2). According to Hair et al. (1998), loadings of $\pm$ 0.5 indicate practical significance and, given the relatively small sample size, this cutoff point for significance was chosen. The rotated factor pattern can be seen in Table 8.8.

Table 8.8. *Factor structure of the DCQ for the fearful group (n = 50).*

Item		Factors					Communality
		1	2	3	4	5	
26.	My heart will stop beating	**.919**					.93
22.	I will be unable to catch my breath	**.881**					.86
19.	I will have a heart attack	**.789**					.72
39.	I will hyperventilate	**.736**					.88
24.	I will be too far from home	**.711**					.75
4.	I am going to faint	**.683**					.79
10.	I will lose control of myself and act stupidly or dangerously	**.520**		.301		.380	.81
34.	I will be crippled in an accident		**.876**				.88
42.	The car will be wrecked		**.859**				.84
48.	I will have an accident and end up in a coma		**.817**				.88
41.	My face will be disfigured in an accident		**.803**				.87
17.	I will die in an accident		**.777**				.89
9.	I will be injured		**.754**				.86
16.	People will think I am a bad driver			**.856**			.88
46.	Other people will notice that I am anxious			**.819**			.89
5.	People I care about will criticise me			**.757**			.84
40.	People will laugh at me			**.734**			.75
37.	I will hold up traffic and people will be angry			**.675**			.78
28.	I will get lost				**.871**		.87
45.	I will not find my way home				**.815**		.82
35.	The car will run out of gas				**.770**		.77
18.	The engine will break down				**.726**		.80
8.	If I have an accident, it will cause financial problems		.330		**.571**		.85
32.	I will be stranded	.464			**.525**		.83
6.	I will injure someone		.304			**.769**	.85
31.	The way I drive will endanger others			.433		**.736**	.84
23.	People riding with me will be hurt					**.712**	.81
38.	I will cause an accident			.419		**.698**	.88
27.	I will be arrested for unsafe driving					**.601**	.82
43.	I will not be able to move		**.611***				.94
36.	I will not be able to think clearly	**.529***	.489*				.86

Note. Only items with at least one loading of 0.5 or greater are included. All of the loadings for each item are shown for completeness. Loadings marked with a * indicate that there was a higher loading for the variable on another factor not included in the analysis (outside the scree plot

The items are presented in the order of the factor loadings and factor structure. Statistically significant loadings appear in bold type. In addition to the factor loadings of each variable on each factor, the table shows the communalities (the amount of variance in a variable that is accounted for by the factor solution) for each variable. The eigenvalues (sums of squares) for each factor were 12.97, 5.68, 4.10, 3.90, and 2.50, respectively. The factor solution accounted for 59.6% of the total variance, with the individual factors explaining 26.5%, 11.6%, 8.4%, 8.0%, and 5.1%, respectively.

Factor 1 seemed to consist mostly of physical symptoms of anxiety. Item 10 was discarded because it was a complex variable (loading on three factors). Item 24 (*I will be too far from home*) did not appear to fit well with the rest of the items as it was not directly related to physical symptoms of anxiety, and was therefore discarded in favour of item 4 which also had a very high loading on the factor. Factor 1 therefore consisted of five items to do with experiencing physical symptoms of anxiety while driving, and was called *physical symptoms.*

Factor 2 was made up of six items with clear loadings that focused on injury to self due to an accident. However, item 42 (*The car will be wrecked*) did not seem to fit well with the other items, and focused more on the consequences to the vehicle than self in an accident. Therefore, this item was dropped. Factor 2 contained five items and was named *injury to self.*

Factor 3 was composed of five items with clear loadings, all concerning *others' negative reactions.*

Factor 4 had four items with clear loadings that focused on the possibility of being stranded for various reasons. There were two items with more complex characteristics. These were item 8 (*If I have an accident, it will cause financial problems*) and item 32 (*I will be stranded*). Item 8 did not fit well with the other factor items as it focused on the financial consequences of an accident rather than issues of being stranded, and item 32 was considered to fit better with the other items loading on factor 4, *stranded.*

All the items on factor 5 had clear loadings, broadly representing *injury to others*. The remaining two items in Table 8.8 had higher loadings on other factors that were not extracted, and were therefore discarded.

Overall, the factor analysis resulted in the extraction of five factors composed of five items each. The factors were *physical symptoms*, *injury to self*, *injury to others*, *others' negative reactions*, and *stranded*. These factors were then calculated as factor scores for use in further analysis, with scores ranging from 0-20. Comparisons between fearfuls and controls on their total scores on these factors are shown in Table 8.9. After Bonferroni correction (.05/5 = .01), all of these comparisons remained statistically significant. Fearfuls reported more frequent cognitions in all five domains. The negative reactions of other people were of most concern, followed by concerns about injury to others.

Table 8.9. *Means (and SDs) and group comparisons for the DCQ factor scores.*

Factor	Fearful group	Control group	t	p
Others' negative reactions	9.12 (5.49)	0.90 (1.15)	$t(98) = 10.37$	.001
Injury to others	6.72 (4.92)	2.16 (1.80)	$t(98) = 6.16$	.001
Stranded	4.64 (4.72)	2.50 (2.49)	$t(98) = 2.84$	.006
Injury to self	4.04 (4.63)	1.56 (1.68)	$t(98) = 3.56$	.001
Physical symptoms	2.50 (4.45)	0.28 (0.93)	$t(98) = 3.45$	.001

Note. Levene's statistic (respectively): $F = 86.61, 35.20, 16.63, 28.14$, and 27.98; all $ps < .001$.

State-Trait Anxiety Inventory (STAI)

Table 8.10 presents the data for both the six-item short form (STAI-6) and trait scale (STAI-T) of the STAI. Fearfuls obtained higher scores on the STAI-6 ($t[98] = 10.28$, $p < .001$; Levene's statistic: $F = 43.15$, $p < .001$) and the STAI-T ($t[98] = 6.98$, $p = .001$; Levene's statistic: $F = 11.67$, $p = .001$), suggesting higher levels of both situation-specific and general trait anxiety among fearfuls.

Table 8.10. *Means (and SDs) for the STAI-6 and STAI-T.*

Measure	Fearful group	Control group
STAI-6	15.42 (5.35)	7.20 (1.84)
STAI-T	43.02 (10.91)	30.32 (6.81)

Note. STAI-6: Range 6-24. STAI-T: Range 20-80.

Driving Situations Questionnaire (DSQ)

Table 8.11 presents the results for the DSQ. Fearfuls were more anxious than controls about driving in the various situations ($t[98] = 14.21, p = .001$; Levene's statistic: $F = 20.20, p < .001$) as well as being a passenger in the same situations (albeit to a lesser extent ($t[98] = 3.07, p = .003$; Levene's statistic: $F = 3.84, p = .05$). In addition, a paired t-test revealed that fearfuls were more anxious about being a driver than being a passenger, as their DSQ-Driver total score was higher than that for the DSQ-Passenger, $t(49) = 6.62, p < .001$. Although controls obtained lower scores overall than fearfuls, they were more anxious about riding as a passenger than driving compared with fearfuls, $t(49) = 2.78, p = .008$. All of these comparisons remained statistically significant after Bonferroni correction (.05/4 = .01).

Table 8.11. *Means (and SDs) for the DSQ.*

Measure	Fearful group	Control group
DSQ-Driver	85.48 (28.92)	20.08 (14.92)
DSQ-Passenger	49.30 (32.66)	30.58 (28.12)

Note. Total score range 0-156.

Table 8.12 presents the results for the highest-rated DSQ-Driver items. Fearfuls were most anxious as a driver about *passing*, *being tailgated by another car*, and *driving past a truck*. Controls only rated two situations as a driver above 1 (the minimum rating was 0): *being tailgated by another car* and *driving in the fog*. Ratings for anxiety as a passenger in the same situations were lower than those for anxiety as a driver, and the highest ratings for fearfuls as a passenger were for *driving fast* ($M = 2.24$, $SD = 1.35$) and *being tailgated by another car* ($M = 2.12$, $SD = 1.37$).

Table 8.12. *Mean (and SD) highest-rated DSQ-Driver item ratings (range 0-4) for fearfuls, with and equivalent data for controls.*

Item		Fearful group	Control group
26.	Passing	3.28 (0.90)	0.90 (0.79)
34.	Being tailgated by another car	3.02 (1.12)	1.52 (1.07)
36.	Driving past a truck	3.00 (1.05)	0.90 (1.00)
16.	Driving on a motorway	2.92 (1.28)	0.52 (0.79)
18.	Driving in heavy traffic	2.92 (1.10)	0.66 (0.75)
38.	Merging into traffic	2.84 (1.08)	0.56 (0.68)
33.	Driving fast	2.82 (1.19)	0.54 (0.84)
9.	Driving in an unfamiliar car	2.82 (1.14)	0.98 (0.69)
19.	Driving at night	2.80 (1.07)	0.58 (0.73)
2.	Driving in the fog	2.72 (1.05)	1.44 (0.73)
35.	Driving in strong winds	2.62 (1.07)	0.98 (0.87)
37.	Driving on a narrow road	2.62 (0.95)	0.74 (0.80)

Fear Questionnaire (FQ)

As shown in Table 8.13, fearfuls obtained higher scores than controls on all of the FQ measures, although the relative order differed between the two groups. Fearfuls scored highest on the social phobia subscale, followed by the blood-injury and then agoraphobia subscales. In contrast, controls obtained similar scores for the social phobia and blood-injury phobia subscales, and the mean agoraphobia scale score was relatively low.

Table 8.13. *Means (and SDs) and group comparisons for the FQ.*

Measure	Fearful group	Control group	t	p
FQ-Total	28.18 (17.64)	18.32 (10.95)	$t(98) = 3.36$	.001
FQ-Agoraphobia	6.78 (7.53)	2.72 (3.68)	$t(98) = 3.43$	.001
FQ-Social phobia	11.86 (7.51)	7.74 (4.88)	$t(98) = 3.25$	.002
FQ-Blood-injury phobia	9.54 (7.72)	7.86 (6.00)	$t(98) = 1.22$	.23

Note. FQ-Total: Range 0-120. Subscales: Range 0-40. Levene's statistic (respectively): $F = 11.03$, $p = .001$; $F = 21.73$, $p < .001$; $F = 9.23$, $p = .003$; and $F = 2.86$, $p = .09$.

On a 0-8 scale, fearfuls' mean rating for avoidance of *driving* was 3.80 (SD = 2.67), and this was higher than that for controls (M = 0.08, SD = 0.34), $t(97)$ = 9.67, p = .001 (there was one fearful participant with missing data on this item; Levene's statistic: F = 129.65, p < .001). *Being criticised* was rated next highest for avoidance (M = 3.56, SD = 2.19), followed by *speaking or acting to an audience* (M = 3.36, SD = 2.82), and *being watched or stared at* (M = 2.88, SD = 2.27). *Speaking or acting to an audience* was also the highest rated item for controls (M = 2.56, SD = 2.22).

Beck Depression Inventory-Second Edition (BDI-II)

Table 8.14 shows that the fearful group obtained a higher mean score on the BDI-II than controls, $t(98)$ = 4.23, p = .001 (Levene's statistic: F = 33.96, p < .001). According to the manual for the BDI-II (Beck et al., 1996), these scores lie in the *minimal depression* range, and reflect the overall absence of severe depression symptoms among the fearful group.

Table 8.14. *Means (and SDs) for the BDI-II.*

Measure	Fearful group	Control group
BDI-II	7.28 (6.83)	2.78 (3.16)

Note. BDI-II: Range 0-63.

DRIVER-PASSENGER COMPARISONS

As indicated above, 39 fearfuls reported being most afraid of being a driver, while 9 feared being a passenger the most and 1 feared both situations equally (1 had missing data). While the relatively small sample size for those who most feared being a passenger precluded the use of inferential statistical analyses for group comparisons, the means for the two groups on basic demographics, driving history, and various measures of DRF severity could still be compared for descriptive purposes. These results are provided in Table 8.15.

Table 8.15. *Means (and SDs) for the driver-passenger comparisons.*

Measure	Fear being a driver the most (n = 39)	Fear being a passenger the most (n = 9)
Age (years)	43.10 (15.08)	45.89 (18.55)
Years of driving experience	19.33 (15.12)	24.00 (13.22)
Age when learnt to drive	20.51 (5.56)	20.33 (8.68)
Fear about driving (0-10)	7.28 (1.93)	5.56 (1.59)
Anxiety about driving (0-10)	7.23 (2.60)	4.11 (2.67)
Likelihood of MVA involvement (%)	37.69 (30.30)	26.67 (15.81)
STAI-6	16.97 (2.72)	16.89 (1.76)
STAI-T	41.59 (10.55)	48.67 (11.21)
DCQ-Total	51.50 (32.73)	46.44 (18.15)
DSQ-Driver	84.94 (31.82)	73.78 (21.24)
DSQ-Passenger	42.38 (31.13)	64.44 (26.72)
FQ-Total	27.69 (18.57)	27.44 (11.58)
FQ-Agoraphobia	5.94 (7.13)	5.22 (2.91)
FQ-Social phobia	12.22 (7.56)	11.22 (6.92)
FQ-Blood-injury phobia	9.53 (8.72)	11.00 (4.69)
BDI-II	5.88 (6.31)	9.22 (8.00)

Descriptively, those who feared being a driver the most considered themselves to have a higher likelihood of being involved in an MVA than those who feared being a passenger the most. As would be expected, those who feared being a driver the most had a higher score on the DSQ-Driver, while the higher DSQ-Passenger score was obtained by those who most feared being a passenger.

SUMMARY

Psychological assessment measures provided detailed information regarding the severity of DRF in the fearful group. Fearfuls rated more fear and anxiety about driving in general. Four categories were generated from fearfuls' narrative (i.e., written) descriptions of their most-feared situations: fear of an MVA or injury to self or others; fear of specific driving situations, conditions, or manoeuvres; fear of having a panic attack or anxiety symptoms; and fears related to social concerns. Fearfuls did not consider fear and anxiety about driving to be different, and made similar ratings using the two concepts.

Fearfuls believed that their most-feared situation would occur just over half of the times they drove, and they rated a higher likelihood of being involved in an MVA than controls. Despite the relatively frequent interference of DRF in daily life, only 16-20% of the fearful group had spoken to a mental health or medical professional about their DRF, and few had sought professional psychological help or received professional driving instruction. The lack of helpseeking behaviour was of particular concern given that, using the CIDI-Auto 2.1, 46% ($n = 23$) of fearfuls met DSM-IV criteria for at least one anxiety disorder. However, those meeting diagnostic criteria perceived a higher need for and a higher likelihood to seek professional psychological help than those who did not meet any diagnostic criteria. There were no differences between those with and without a diagnosis in terms of years of driving experience or perceived need for professional driving instruction.

Fearfuls obtained higher scores than controls on all of the self-report measures except for the blood-injury phobia subscale of the Fear Questionnaire. On the Driving Cognitions Questionnaire, fearfuls reported having the most frequent cognitions while driving about reacting too slow, other people thinking they are a bad driver, and holding up other traffic and making people angry. Social concerns were also evident on the Fear Questionnaire, as the social phobia subscale had the highest total of the Fear Questionnaire subscales. Issues around social concerns as a factor in DRF have not previously been detailed, and the results for Study Two have clear implications to include social concerns in assessment and, if relevant, treatment.

Factor analysis of the Driving Cognitions Questionnaire showed the promise of the measure as a briefer form. Although the results need to be interpreted with caution due to the small sample size, five factors emerged that were labelled *others' negative reactions*, *injury to others*, *stranded*, *injury to self*, and *physical symptoms*. Further research is needed to replicate these results before the shorter form of the measure can be used for assessment of those with DRF.

Descriptive comparisons between those who feared being a driver versus being a passenger the most were largely unremarkable, other than the higher perceived likelihood of an MVA among the former group. As driver-passenger comparisons were unable to be formally tested in Study Two due to small sample sizes, this will be an interesting area for future research.

Chapter Nine

STUDY TWO

DRIVING ASSESSMENT: RESULTS AND DISCUSSION

This Chapter presents the results and discussion of the driving assessment measures used in Study Two. The relationships between relevant driving measures and other assessment variables are explored in the typology analysis in Chapter Ten. Theoretical, methodological, and practical implications of the results are discussed in Chapter Eleven.

DRIVING ASSESSMENT

Advanced Driver Assessment (ADA)

The ADA was used in Study Two as a procedure for identifying driver error. As a brief reminder, the ADA measures errors in four areas: *search*, *hazard identification*, *manipulating controls*, and *observing traffic regulations*. Each of these areas can be further broken down into 15 sub-categories. These errors are assessed across seven different driving situations, comprising *moving into the traffic*, *moving on the road*, *moving with the traffic flow*, *moving through traffic*, *moving past other traffic*, *moving back in traffic*, and *moving out of the traffic* (see Appendixes F-1 and F-2 for operational definitions of these terms).

Overall results on the ADA are represented as total errors and error patterns (i.e., three or more errors marked in any one box or three or more errors in any vertical column; see Appendix F-3 for the rating form). Qualitative analysis of errors can also be performed by examining the skill areas and driving situations to identify which account for the most errors.

The results for the ADA are presented in Table 9.1, and are divided into three blocks. The first block presents the summary error data for the two groups. Total number of errors was greater for the fearful group according to both recording criteria. Error patterns were also greater for fearfuls. These differences remained significant after Bonferroni correction (.05/3 = .017).

The second block of results in Table 9.1 provides a breakdown of error results according to the various skill areas and driving situations assessed by the ADA that had the largest group differences. The largest mean differences occurred for *search techniques* and *power and velocity*, but also for *correct action taken*, *uses correct lanes*, *slowing and stopping*, *uses correct position*, and *communication and signalling*, with fearfuls making more errors in these areas than controls. Controls made more errors than fearfuls for *applies 2 second rule.* In terms of driving situations, *moving on the road* (i.e., holding on the road), *moving through traffic* (i.e., going through intersections), and *moving into traffic* (i.e., entering the traffic flow) had the largest mean differences.

The third block of results in Table 9.1 provides the specific errors (i.e., area by situation) made most frequently for the two groups, and these are the only ones that had a mean error rate greater than 2. Interestingly, both groups featured the same pattern of results, with the most errors being made predominantly in *search techniques* at intersections (i.e., *moving through traffic*), but also errors in *search technique* in other driving situations, including entering the traffic flow (i.e., *moving in*), holding on the road (*moving on*), and maintaining position in the traffic stream (i.e., *moving with*). Errors in *slowing and stopping* when *moving with traffic* were the next highest in frequency for the two groups. Despite the potential implications of the driving skills results for assessment and treatment of those with DRF, explanation of the particular skill areas and driving situations that produced more errors than others is more difficult. Since the five most frequent errors were identical for both fearfuls and controls, it does not appear that fearfuls were making *different types* of errors than controls, but rather were making *more* such errors. Further analysis and discussion of this issue follow in Chapter Ten.

Table 9.1. *Error rate means (and SDs) and group comparisons on the ADA.*

Error category		Fearful group	Control group	t	p
Total errors (6 per box)		38.82 (14.40)	30.56 (11.80)	$t(98) = 3.52$	.001
LTSA total errors (3 per box)		30.40 (10.57)	23.64 (8.36)	$t(98) = 3.55$	.001
Error patterns		4.68 (1.88)	3.58 (1.33)	$t(98) = 3.38$	.001
Area				**Difference**	
Search	Search techniques	2.03 (0.95)	1.67 (0.88)	.36	
Manipulating Controls	Power and velocity	0.50 (0.53)	0.23 (0.27)	.27	
Hazard Identification	Correct action taken	0.26 (0.29)	0.11 (0.14)	.15	
Observes Traffic Regulations	Uses correct lanes	0.21 (0.22)	0.07 (0.13)	.14	
Manipulating Controls	Slowing and stopping	0.47 (0.47)	0.34 (0.31)	.13	
Observes Traffic Regulations	Uses correct position	0.21 (0.38)	0.08 (0.13)	.13	
Observes Traffic Regulations	Communication and signalling	0.47 (0.46)	0.34 (0.32)	.13	
Hazard Identification	Applies 2 second rule	0.17 (0.25)	0.28 (0.38)	-.11	
Hazard Identification	Reacts in time to situation	0.13 (0.19)	0.04 (0.09)	.09	
Search	Applies 12 second rule	0.15 (0.19)	0.09 (0.18)	.06	
Situation				**Difference**	
Moving	On the road	0.71 (0.36)	0.48 (0.31)	.23	
	Through traffic	0.83 (0.37)	0.64 (0.37)	.19	
	Into traffic	0.36 (0.23)	0.25 (0.19)	.11	
	With the traffic flow	0.72 (0.39)	0.66 (0.30)	.06	
	Past other traffic	0.03 (0.07)	0.01 (0.03)	.02	
	Back in traffic	0.00 (0.01)	0.00 (0.00)	.00	
	Out of the traffic	0.01 (0.05)	0.00 (0.01)	.01	
Area	**Situation**			**Difference**	
Search techniques	Moving through	4.86 (1.76)	3.88 (1.91)	.98	
Search techniques	Moving in	3.14 (2.16)	2.62 (2.16)	.52	
Search techniques	Moving on	3.08 (2.82)	2.62 (2.59)	.46	
Search techniques	Moving with	2.90 (2.85)	2.52 (2.54)	.38	
Slowing and stopping	Moving with	2.36 (1.98)	2.10 (2.02)	.26	

Note. LTSA = Land Transport Safety Authority. An increased error threshold per recording box than that specified in the Advanced Driver Assessment Manual (1998; 6 as opposed to 3) was allowed for Study Two as the volume of errors was of interest as well as error type. Levene's statistic (respectively): $F = 2.95, p = .09$; $F = 3.85, p = .05$; and $F = 4.81, p = .03$.

Participant Self-Ratings and Driving Instructor Ratings

Participants and driving instructors provided global ratings of driving skill after each ADA using a scale from 1 (*Excellent*) to 7 (*Very poor*). Mean results for the two groups are shown in Table 9.2. Consistent with the results of the ADA, controls were rated as having better overall driving skills by both themselves and the driving instructor. Also of interest was the consistency in ratings between participants in both groups and the driving instructor. Using paired *t*-tests, self-ratings and instructor ratings were not different for either fearfuls ($t[49] = 1.68, p = .10$) or controls ($t[49] = 1.16, p = .25$). This seems to indicate that, regardless of group membership, participants considered their overall driving skills in a similar way to how the instructors viewed their overall driving skills, thereby providing some validity for the use of self-report ratings of driving skill. Correlations between self-ratings and instructor ratings are examined later in this Chapter.

Table 9.2. *Means (and SDs) and group comparisons for global ratings of driving skill.*

	Fearful group	**Control group**	***t***	***p***
Self-rated driving skill	4.20 (0.90)	2.86 (0.97)	$t(98) = 7.15$	.001
Instructor-rated driving skill	4.48 (1.47)	2.64 (1.01)	$t(98) = 7.29$	.001

Note. Item range 1-7 (e.g., 1 = *excellent*, 7 = *very poor*). Levene's statistic (respectively): $F = 0.04, p = .84$ and $F = 13.32, p < .001$.

In addition to global ratings of driving skill, participants and driving instructors also made ratings of the anxiety level of the participant. Table 9.3 shows the results for these anxiety ratings made before and after the ADA. Fearfuls rated themselves as more anxious than controls at each point of data collection using both the 0-10 anxiety rating and STAI-6 score. The instructors also considered fearfuls to be more anxious than controls overall. All of these differences remained statistically significant after Bonferroni correction (.05/8 = .006), and are confirmed by multivariate analyses reported later in this Chapter. It is notable that the instructors' assessment of anxiety level closely matched the perceptions of participants, irrespective of group membership.

This finding probably reflects the instructors' ability to be sensitive to participants' anxiety, providing some validity for the use of instructor ratings of anxiety during a driving assessment.

Table 9.3. *Means (and SDs) and group comparisons for pre-test and post-test ADA anxiety ratings.*

	Fearful group	Control group	*t*	*p*
0-10 anxiety rating-pre-test	5.54 (2.35)	1.68 (1.58)	$t(98) = 9.63$	.001
0-10 anxiety rating-post-test	4.24 (2.41)	1.14 (1.73)	$t(98) = 7.39$	.001
0-10 anxiety rating-instructor[a]	5.36 (2.90)	1.54 (1.79)	$t(98) = 7.93$	.001
STAI-6-pre-test	15.24 (3.47)	9.16 (2.94)	$t(98) = 9.46$	.001
STAI-6-post-test	12.56 (3.39)	8.78 (3.32)	$t(98) = 5.63$	.001
STAI-6-instructor[a]	15.30 (4.33)	8.42 (2.62)	$t(98) = 9.61$	.001

Note. Levene's statistic (respectively): $F = 10.76, p = .001$; $F = 9.52, p = .003$; $F = 17.64, p < .001$; $F = 1.31, p = .26$; $F = 0.13, p = .72$; and $F = 27.73, p < .001$.
[a]Post-test rating.

Test Anxiety

The potential impact of test anxiety was an important consideration in analysing the results of the driving assessment, as it could affect the performance of both participant groups. A number of steps were taken to assess this possible effect. Firstly, the results for both groups on the Test Anxiety Inventory (TAI) are shown in Table 9.4. Although fearfuls obtained a higher mean score on the TAI than controls ($t[98] = 3.40, p < .001$; Levene's statistic: $F = 11.45, p = .001$), the score obtained for both groups was within the average range compared with all normative samples reported in the manual (Spielberger et al., 1980).

Table 9.4. *Means (and SDs) for the TAI.*

	Fearful group	Control group
TAI Total score	38.92 (14.69)	30.74 (8.60)

Note. TAI: Range 20-80.

Secondly, on a scale from 1 (*Much better*) to 7 (*Much worse*), both groups reported that their driving performance during the ADA was typical of their usual performance (fearfuls: $M = 4.06$; $SD = 0.91$; controls: $M = 3.98$; $SD = 0.43$; $t[98] = 0.56$, $p = .58$; Levene's statistic: $F = 10.93$, $p = .001$).

Thirdly, no comparisons could be made for the optional solo drive that participants were asked to complete after the ADA as only six participants in each group returned these data. However, at a descriptive level, the above results suggest that test anxiety impacted equally on both fearfuls and controls.

Finally, a repeated measures MANOVA was conducted to examine differences in pre-test and post-test anxiety scores for both groups. Separate analyses were performed for each of the anxiety scores (i.e., 0-10 anxiety rating and STAI-6 score; the dependent or within-factor variable). The independent or between-factor variable was *group* (i.e., fearful or control).

For the MANOVA using the 0-10 anxiety rating, preliminary assumption testing identified violations of the assumptions of homogeneity of variance-covariance matrices (Box's M statistic = 17.96, $p < .001$) and homogeneity of variance (pre-test score: Levene's statistic = 10.76, $p < .001$; post-test score: Levene's statistic = 8.95, $p = .004$). According to Hair et al. (1998), a violation of the equality of variance-covariance matrices "has minimal impact if the groups are of approximately equal size" (p. 348). Violation of the equality of variance assumption resulted in setting a more conservative alpha level for determining statistical significance for the anxiety scores of $p = .01$ (Pallant, 2001). The multivariate test was statistically significant for the combined DVs ($F[1, 98] = 15.10$, $p < .001$; partial eta squared = .13, observed power = .97), indicating a difference between pre-test and post-test scores across the groups. There was also a statistically significant between-factor effect for *group*, $F\,(1, 98) = 109.01$, $p < .001$ (partial eta squared = .53, observed power ≈ 1.00). These results suggest an interaction effect, whereby the pre-test 0-10 anxiety rating was higher than the post-test rating, but only for the fearful group.

For the MANOVA using the STAI-6 score, preliminary assumption testing identified no serious violations. The multivariate test was statistically significant for the combined DVs ($F[1, 98] = 20.19, p < .001$; partial eta squared = .17, observed power = .99), indicating a difference between pre-test and post-test scores across the groups. There was also a statistically significant between-factor effect for *group*, $F(1, 98) = 76.61, p < .001$ (partial eta squared = .44, observed power ≈ 1.00). These results also suggest an interaction effect, whereby the pre-test STAI-6 score was higher than the post-test score, but only for the fearful group.

In light of the above results, further analyses were conducted to ascertain the impact of the findings regarding test anxiety on the overall driving skills results. The pre-test and post-test measures of anxiety were used as covariates in a one-way multivariate analysis of covariance (MANCOVA) to determine whether the overall group differences remained statistically significant when controlling for test anxiety. The independent variable was *group* (i.e., fearful or control). Firstly, a MANOVA was conducted to provide a comparison for the MANCOVA analyses (essentially a multivariate test confirming the *t*-test results in Table 9.3). Initially the 15 skill areas were used as the dependent variables (DVs). However, this produced excessive multivariate outliers in the process of assumption testing, and the MANOVA did not proceed any further. This result may have been due to the presence of an excessive number of DVs (Pallant, 2001).

Therefore, the analysis was repeated with the DVs as the 15 separate skill areas pooled into the four overall skill groups (i.e., *search*, *hazard identification*, *manipulating controls*, and *observes traffic regulations*; see Appendix F-3), resulting in four DVs. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. There was a difference between fearfuls and controls on the combined DVs, $F(4, 95) = 3.10, p = .02$ (partial eta squared = .12, observed power = .79). When the results for the DVs were considered separately, the only difference to reach statistical significance using a Bonferroni-adjusted alpha level of .013 (i.e., .05/4) was *observes traffic regulations*, $F(1, 98) = 6.75, p = .01$ (partial eta squared = .06, observed power = .73). The lack of other univariate effects may be due to insufficient statistical power: *search*: $F(1, 98) = 5.35, p = .02$ (partial eta squared = .05, observed power = .63); *hazard identification*: $F(1, 98) = 1.65, p = .20$ (partial eta squared = .02, observed power = .25); *manipulating controls*: $F(1, 98) = 5.58, p = .02$ (partial eta squared = .05, observed power = .65). An inspection of the mean scores indicated that fearfuls made slightly more errors in observing traffic regulations ($M = .23$, $SD = .02$) than controls ($M = .17$, $SD = .02$).

The analysis was then repeated using three test anxiety variables as covariates: the total TAI score and the differential between the pre-test and post-test 0-10 anxiety ratings and STAI-6 scores (the latter two differentials were considered separately for each anxiety measure rather than combined due to the less well established psychometric nature of the 0-10 anxiety rating compared with the STAI-6 score). The pre-post differential measures were used rather than the pre-test measures only because a *during test* estimate of test anxiety was sought. Furthermore, it could be assumed that driving skill errors might be affected by test anxiety at the start of the test, but less as the test progresses. During data collection, a number of participants commented anecdotally that they relaxed more as the test progressed and slipped into their typical driving habits.

Using the total on the TAI scale as a covariate, the multivariate test was statistically significant for the combined DVs, $F(4, 94) = 2.58, p = .04$ (partial eta squared = .10, observed power = .71). The univariate results for the DVs considered separately were not statistically significant (again using the Bonferroni adjusted alpha level of .013). However, this result may be due to insufficient statistical power: *search*: $F(1, 97) = 4.39, p = .04$ (partial eta squared = .04, observed power = .55); *hazard identification*: $F(1, 97) = 3.03, p = .09$ (partial eta squared = .03, observed power = .41); *manipulating controls*: $F(1, 97) = 3.06, p = .08$ (partial eta squared = .03, observed power = .41); *observes traffic regulations*: $F(1, 97) = 5.20, p = .03$ (partial eta squared = .05, observed power = .62).

Using the pre-post 0-10 anxiety differential as a covariate, the multivariate test was statistically significant for the combined DVs, $F(4, 94) = 3.57$, $p = .009$ (partial eta squared = .13, observed power = .86). The univariate results for the DVs considered separately (using the Bonferroni adjusted alpha level of .013) were statistically significant for *search* ($F[1, 97] = 7.29$, $p = .008$; partial eta squared = .07, observed power = .76) and *observes traffic regulations* ($F[1, 97] = 7.84$, $p = .006$; partial eta squared = .08; observed power = .79). The lack of other univariate effects may be due to insufficient statistical power: *hazard identification*: $F(1, 97) = 2.21$, $p = .14$ (partial eta squared = .02, observed power = .31); *manipulating controls*: $F(1, 97) = 4.95$, $p = .03$ (partial eta squared = .05, observed power = .60).

Finally, using the pre-post STAI-6 score differential as a covariate, the multivariate test was statistically significant, $F(4, 94) = 2.96$, $p = .024$ (partial eta squared = .11, observed power = .77). The univariate results for the DVs considered separately were not statistically significant (using the Bonferroni adjusted alpha level of .013). However, this result may be due to insufficient statistical power: *search*: $F(1, 97) = 5.93$, $p = .02$ (partial eta squared = .06, observed power = .67); *hazard identification*: $F(1, 97) = 3.03$, $p = .09$ (partial eta squared = .03, observed power = .41); *manipulating controls*: $F(1, 97) = 3.64$, $p = .06$ (partial eta squared = .04, observed power = .47); *observes traffic regulations*: $F(1, 97) = 5.43$, $p = .02$ (partial eta squared = .05, observed power = .64).

Therefore, all analyses provide evidence that there are overall higher errors on the ADA for fearfuls compared with controls, even when test anxiety is controlled for using three different measures. Although test anxiety appears to wash out some of the specific univariate effects, it does not wholly account for the overall multivariate effect that retained differences in error rates overall between the two groups (however, it must be borne in mind that the power to detect many of these univariate effects was low). These results lend further support to the lack of serious effect of test anxiety on the driving skills assessment findings.

Relationships Between the Driving Measures

Table 9.5 shows the correlations among the practical driving measures and the self-ratings and instructor ratings of overall driving skill, calculated for the sample as a whole. For the ADA, there was high internal consistency between errors and patterns, which is to be expected given that these two scores are inherently linked (see Chapter Six; in addition, Land Transport Safety Authority [LTSA] total errors are a subset of total errors, hence the very high correlation). These results are consistent with those found by Wood (1996). Self-ratings and instructor ratings of overall driving skill were moderately correlated. Relatively low yet statistically significant correlations were found between self-rated driving skill and the various ADA measures. These correlations were much stronger for instructor-rated driving skill, most probably because these ratings were made by the same driving instructor for the same driving experience.

Table 9.5. *Correlations between the driving measures (one-tailed; n = 100).*

	Total errors	LTSA total errors	Error patterns	Self-rated driving skill[a]	Instructor-rated driving skill[a]
Total errors	1.00	.96**	.70**	.36**	.61**
LTSA total errors		1.00	.75**	.35**	.63**
Error patterns			1.00	.22*	.57**
Self-rated driving skill				1.00	.53**
Instructor-rated driving skill					1.00

Note. LTSA = Land Transport Safety Authority.
*$p < .05$. **$p < .01$.
[a]Item range 1-7 (e.g., 1 = *excellent*, 7 = *very poor*).

SUMMARY

On the practical driving assessment, fearfuls overall made a greater number of errors than controls and, as a result, obtained a higher number of error patterns on the ADA. While errors were made in a range of skill areas and driving situations, certain patterns emerged through a qualitative analysis of the specific errors made (i.e., in certain skill areas and certain driving situations). In particular, most errors were predominantly made in search techniques, primarily at intersections, but also in other driving situations such as entering the traffic flow, holding on the road, and maintaining position in the traffic stream. Perhaps of special interest for Study Two was that, while fearfuls made more errors than controls, the pattern of specific errors was identical for both groups. It might have been expected that fearfuls would make quite different types of errors than controls because of the levels of DRF (for example, errors in speeding or hesitation), but the results of Study Two failed to support such an expectation. While this finding may suggest that anxiety does not necessarily affect the *types* of errors made, it would support the conclusion that a higher *number* of errors are made when someone is anxious about driving. Potential explanations for this finding are explored further in Chapter Ten.

Controls were rated as having better overall driving skills by both themselves and the driving instructors, which was consistent with the results of the practical driving assessment. These results also supported modest validity of the use of self-report ratings of overall driving skill. Ratings of anxiety immediately before and after the practical driving assessment indicated that fearfuls were more anxious than controls at both assessment points, and this was consistent for both self-ratings and instructor ratings. As with the driving skills ratings, ratings of anxiety were similar between the instructors and the participants, irrespective of group membership. This result further supported the validity of instructor ratings of anxiety.

The potential impact of test anxiety on the practical driving assessment was a concern for Study Two, and it was considered important to ascertain whether test anxiety was a confounding variable in the driving assessment results. Various methods were employed in this process, including the use of the Test Anxiety Inventory, self-reported typicality of driving performance, comparison of pre-test and post-test anxiety scores, and analysis of errors using various measures of test anxiety as covariates. Overall, these analyses indicated that test anxiety had a minimal impact on the results of the practical driving assessment. However, some of the MANOVA analyses suggested insufficient statistical power, and therefore additional research would require larger sample sizes (Cohen, 1988, 1992).

Finally, an analysis of the relationships between the driving measures indicated high internal consistency between errors and error patterns on the ADA and instructor-rated driving skill, as expected. Correlations between self-ratings and instructor ratings of driving skill were moderate; relationships between self-rated driving skill and ADA errors and error patterns were smaller yet still statistically significant. The relationship between DRF and ADA performance is explored in the next Chapter.

Chapter Ten

STUDY TWO

TYPOLOGY OF DRIVING-RELATED FEAR: RESULTS AND DISCUSSION

This Chapter presents the results and discussion of the analysis for a typology of DRF. The aim of this exploratory analysis was to identify variables that may play a role in distinguishing between possible subtypes of DRF. In addition, further analyses were conducted to extrapolate potential explanatory variables for the driving skills results. Theoretical, methodological, and practical implications of these exploratory analyses are discussed in Chapter Eleven.

TYPOLOGY ANALYSIS

Grouping Variables

To assess the associations of DRF with different types of phobia as well as driving skills, and to develop a typology of DRF, a principal component analysis by alternating least squares (PRINCALS) was initially used. PRINCALS was also used by Van Gerwen et al. (1997) to identify subtypes of flying phobia. As this method is not well documented in the literature, an explanation of PRINCALS is provided prior to presenting the results of the analysis for Study Two.

Consistent with standard principal component analysis (PCA), PRINCALS represents the relationships between variables using a smaller number of components or dimensions. The distinction from standard PCA, however, is that PRINCALS analyses variables measured on a *nominal* or *categorical* level rather than an *interval* one (for example, *diagnosis*) (Gifi, 1990). PRINCALS is also known as *categorical principal components with optimal scaling*, and the procedure simultaneously quantifies categorical variables while reducing the dimensionality of the data (SPSS Inc., 1999).

The goal is to reduce a set of categorical variables into a smaller set of uncorrelated components that represents most of the information found in the original variables (SPSS Inc., 1999). As with standard PCA, the technique is particularly useful when effective interpretation of relationships is prohibited by a large number of variables, and instead a few components are interpreted by reducing the dimensionality. Scaling or quantification is *optimal* if it enhances the properties of the data that the researcher wants to bring into focus (van de Geer, 1993a). Since the optimal scaling approach allows variables to be scaled at different levels, categorical variables are optimally quantified in the specified dimensionality, and as a result, non-linear relationships between variables can be modelled (SPSS Inc., 1999). The main output of the analysis is a visual representation of the solution in terms of the relationships between various categories of the variables, and this will be discussed further in conjunction with the results of the analysis for Study Two. The next section describes the setup and results of the PRINCALS analysis, along with an explanation of the interpretation of the analysis.

The main variable of interest for the typology analysis that was inherently categorical was *diagnosis* (categorised as *no diagnosis*, *single anxiety disorder*, *multiple anxiety disorder*, and *mixed disorders*). To keep the analysis relatively simple by having consistent measurement levels across all variables (i.e., *single ordinal*, as with *diagnosis*), the remaining variables to be included in the analysis were recoded into categories using median splits into *high* and *low* scores (the mean was not used because of the skewness of some distributions). Variables included as high/low categories were the five Driving Cognitions Questionnaire factors, the three Fear Questionnaire subscales, total errors on the Advanced Driver Assessment, and the 0-10 DRF rating. *Age* was also added by recoding it into three age groups, as the age group rather than specific age was of interest. In total, there were 12 single ordinal variables entered into the analysis. All variables were treated as single ordinal because their categories clearly had a meaningful order (i.e., *no diagnosis* to *mixed diagnoses*, low to high scores on a particular scale, and age). For the single ordinal PRINCALS solution, $p = 2$ dimensions were asked for, as this produces the simplest solution (van de Geer, 1993a). Results are shown in Table 10.1.

Table 10.1. *Results for the ordinal PRINCALS solution in two dimensions.*

Variable		Category (label and name)	Frequency	Category Quantification	Single Co-ordinate Points Dimension 1	Single Co-ordinate Points Dimension 2	Multiple Co-ordinate Points Dimension 1	Multiple Co-ordinate Points Dimension 2
Diagnosis	1	No diagnosis	27	-.92	.56	-.26	.55	-.26
	2	Single anxiety disorder	10	1.05	-.63	.29	-.80	.61
	3	Multiple anxiety disorders	5	1.05	-.63	.29	-.11	.06
	4	Mixed disorder	8	1.14	-.69	.32	-.80	.08
Physical symptoms	1	Low	25	-1.00	.58	-.30	.58	-.30
	2	High	25	1.00	-.58	.30	-.58	.30
Injury to self	1	Low	27	-.92	.52	.20	.52	.20
	2	High	23	1.08	-.61	-.24	-.61	-.24
Others' negative reactions	1	Low	25	-1.00	.47	-.64	.47	-.64
	2	High	25	1.00	-.47	.64	-.47	.64
Stranded	1	Low	27	-.92	.28	.31	.28	.31
	2	High	23	1.08	-.32	-.36	-.32	-.36
Injury to others	1	Low	25	-1.00	.65	-.25	.65	-.25
	2	High	25	1.00	-.65	.25	-.65	.25
FQ-Agoraphobia	1	Low	26	-.96	.53	.54	.53	.54
	2	High	24	1.04	-.58	-.59	-.58	-.59
FQ-Social phobia	1	Low	25	-1.00	.46	.47	.46	.47
	2	High	25	1.00	-.46	-.47	-.46	-.47
FQ-Blood-injury phobia	1	Low	27	-.92	.46	.40	.46	.40
	2	High	23	1.08	-.54	-.46	-.54	-.46
Total driving errors	1	Low	26	-.96	.20	.55	.20	.55
	2	High	24	1.04	-.21	-.60	-.21	-.60
0-10 DRF rating	1	Low	27	-.92	.46	-.34	.46	-.34
	2	High	23	1.08	-.53	.40	-.53	.40
Age	1	<35	16	-.62	-.37	.10	-.16	.04
	2	35-54	20	-.62	-.37	.10	-.54	.15
	3	>54	14	1.60	.96	-.26	.96	-.26

Note. FQ = Fear Questionnaire.

The first three columns are relatively self-explanatory and list the variables involved in the analysis, the labels and names for each category of each variable, and the number of participants who could be classified into those various categories. The fourth column is called *category quantification*, and refers to the value for the optimal quantification of the category. It is also referred to as *single quantification*, which specifies solutions where only one optimal quantification is given to the categories of each variable, as opposed to *multiple quantification* in which a different optimal quantification can be taken for each dimension of the solution (van de Geer, 1993a).

According to van de Geer (1993b), it is often the case that an ordinal PRINCALS solution merges adjacent categories. For variables with equal frequencies in each category, the categories obtain the same quantification and are therefore merged. For the variable *diagnosis*, categories 2 and 3 obtain the same quantification and therefore are merged, as are categories 1 and 2 for *age*. All variables except *diagnosis* and *age* are quantified as binary variables because they only have two categories. Consequently, when these variables are represented in the solution on the transformation graph, there are only two points on the graph and these are always located on a straight line (van de Geer, 1993b). This tendency for PRINCALS to merge adjacent categories is explained by van de Geer:

> Results will almost invariably show that the single ordinal treatment of a variable produces a quantification in which some adjacent categories are merged. The reason is that the PRINCALS program will start with a first guess in which the variable is treated as nominal. If it happens that this solution is ordinal, no further correction is needed. However, if in the nominal solution some categories are in the wrong order, a correction can be made by merging those categories. In other words, nominal treatment of a variable accepts a transformation plot in which there are zigzags. In an ordinal solution such zigzags are forbidden. The easiest way to get rid [*sic*] of them is to flatten the transformation curve by merging categories that

> form a zigzag. …the ordinal solution always flattens the irregularities in the nominal solution by merging adjacent categories. (pp. 61-62)

The final two sets of columns in Table 10.1 are less useful for understanding the results of the present PRINCALS analysis but, as they are part of the SPSS output, will be briefly explained here for the sake of completeness. The data in these columns are the coordinate points for the corresponding categories of the variables (one for each dimension), and both *single coordinate points (SC points)* and *multiple coordinate points (MC points)* are provided, relating to the type of quantification (i.e., single or multiple) chosen, as discussed above. In the present analysis, only the SC points were relevant, since MC points are meaningless if a variable is treated as single (van de Geer, 1993b).

The SC points for each category of each variable are derived by multiplying the category quantification by the *component loading* for that variable on the relevant dimension. The component loadings for the present analysis are shown in Table 10.2, and will be explained shortly. As an example of the generation of SC points, take the first example in Table 10.1 of the *no diagnosis* category for the *diagnosis* variable. The SC point for dimension 1 is -.92 (category quantification in Table 10.1) x -.603 (component loading for dimension 1 in Table 10.2) = .56, which corresponds to the SC point for dimension 1 in Table 10.1. Similarly, the SC point for dimension 2 is -.92 x .278 = -.26, again as seen in Table 10.1. SC points provide a visual representation of the clustering of objects (i.e., participants) across the dimensions (van de Geer, 1993b).

Because there are no missing data, component loadings are equal to the square root of *single fit* per variable per dimension. The concepts of *fit* and *loss* apply in PRINCALS as in other multivariate techniques to refer to the extent to which the solution best represents the data, with the least information lost. Overall, the better the fit of the solution to the data, the smaller the loss of information and the larger the spread of SC points around the origin (van de Geer, 1993b). Again, although fit and loss can be either single or multiple in PRINCALS, the present analysis required only single fit since single quantification was chosen.

Table 10.2. *PRINCALS component loadings.*

Variable	Dimension 1	Dimension 2
Diagnosis	-.603	.278
Physical symptoms	-.576	.303
Injury to self	-.565	-.219
Others' negative reactions	-.474	.643
Stranded	-.299	-.333
Injury to others	-.645	.248
FQ-Agoraphobia	-.555	-.566
FQ-Social phobia	-.461	-.470
FQ-Blood-injury phobia	-.499	-.429
Total driving errors	-.204	-.572
0-10 DRF rating	-.493	.365
Age	.596	-.165

Note. FQ = Fear Questionnaire.

Table 10.3 shows the measures of fit, initially per variable per dimension, calculated as the squared component loadings. For example, the single fit for *diagnosis* on dimension 1 is the squared component loading (from Table 10.2), equal to $-.603^2 = .363$, as shown in Table 10.3. At the bottom of the table, measures of fit are shown averaged over the 12 variables for each dimension (i.e., *mean fit*, also known as the *eigenvalue*), and then added over dimensions (i.e., *total fit*) by adding the mean fit for each dimension.

Relative loss (or *single loss*) refers to the decrease of fit if MC points are replaced by SC points and, since in the present case SC points were used, relative loss is very small, and is calculated as the difference between multiple and single fit. As an aside, the small relative loss indicates that little would have been gained by treating the variables as multiple nominal instead of single ordinal (van de Geer, 1993b).

Table 10.3. *PRINCALS measures of fit.*

Variable	Single Fit		Multiple Fit	
	Dimension 1	**Dimension 2**	**Dimension 1**	**Dimension 2**
Diagnosis	.363	.077	.398	.112
Physical symptoms	.332	.092	.332	.092
Injury to self	.319	.048	.319	.048
Others' negative reactions	.225	.413	.225	.413
Stranded	.089	.111	.089	.111
Injury to others	.417	.062	.417	.062
FQ-Agoraphobia	.309	.321	.309	.321
FQ-Social phobia	.213	.221	.213	.221
FQ-Blood-injury phobia	.249	.184	.249	.184
Total driving errors	.042	.327	.042	.327
0-10 DRF rating	.243	.133	.243	.133
Age	.355	.027	.380	.029
Mean	.263	.168	.268	.171
Total fit	.431		.439	
Relative loss	.008			

Note. FQ = Fear Questionnaire.

Consistent with the concepts of best fit and smallest loss mentioned above, the goal of PRINCALS is to find a first solution that has SC points with the largest possible *spread* on the dimension (averaged over all variables), followed by a second solution that has the same principles but is as far away as possible from the first solution (van de Geer, 1993b). Spread is expressed in the value of eigenvalues (sums of squares), as with standard PCA. A *bad* solution with an eigenvalue close to zero for a dimension would show a dimension on which the SC points are crowded close to the origin (van de Geer, 1993b). In contrast, a *good* solution with an eigenvalue away from zero would show a dimension on which the SC points are distant from the origin and show the largest possible spread on the dimension (van de Geer, 1993b). The larger the eigenvalue, the larger the spread of the SC points, averaged over all variables. On the second dimension, there will be a smaller eigenvalue, which means that the spread of the SC points over all variables becomes smaller (van de Geer, 1993b).

In the present analysis, dimensions 1 and 2 had eigenvalues of .263 and .168, respectively. These values are considered sufficient for exploratory analyses (Gifi, 1990). The PRINCALS solution therefore accounted for 43.1% of the variance, which is represented by the value for total (single) fit in Table 10.3. Component loadings and SC points are plotted separately for visual interpretation of the results. Since SC points are partly comprised of component loadings, a separate plot for component loadings can help to simplify the interpretation. The plot of component loadings is shown in Figure 10.1.

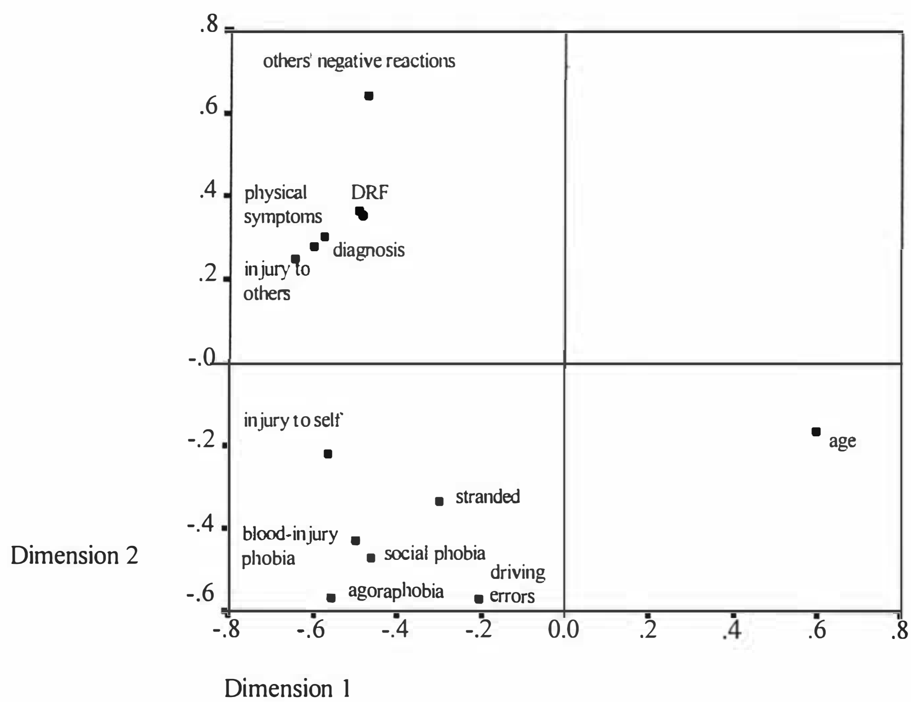

Figure 10.1. *PRINCALS component loadings.*

The points in the plot for each variable correspond to the loadings on each dimension in Table 10.2. Dimension 1 is scaled on the abscissa, and is interpreted by comparing variables that appear on the left hand side of the graph with those on the right (van de Geer, 1993b). In Figure 10.1, dimension 1 separates *age* from all of the other variables. All loadings in Table 10.2 are negative except for *age* which is positive on dimension 1. Dimension 2 is scaled on the ordinate, and is interpreted by comparing variables that appear at the top of the graph with those along the bottom. In Figure 10.1, dimension 2 distinguishes all Fear Questionnaire subscales, total driving errors, concerns regarding injury to self and being stranded, and *age* from the remaining variables. This suggests that DRF is more associated with a diagnosis and concerns about physical symptoms, injury to others, and others' negative reactions.

When the results for all category coordinates are considered, the specific results are shown in Figure 10.2. This graphs the SC points (from Table 10.1), enabling a visual representation of each category of each variable. The SC point for each category is represented by a filled square on the graph.

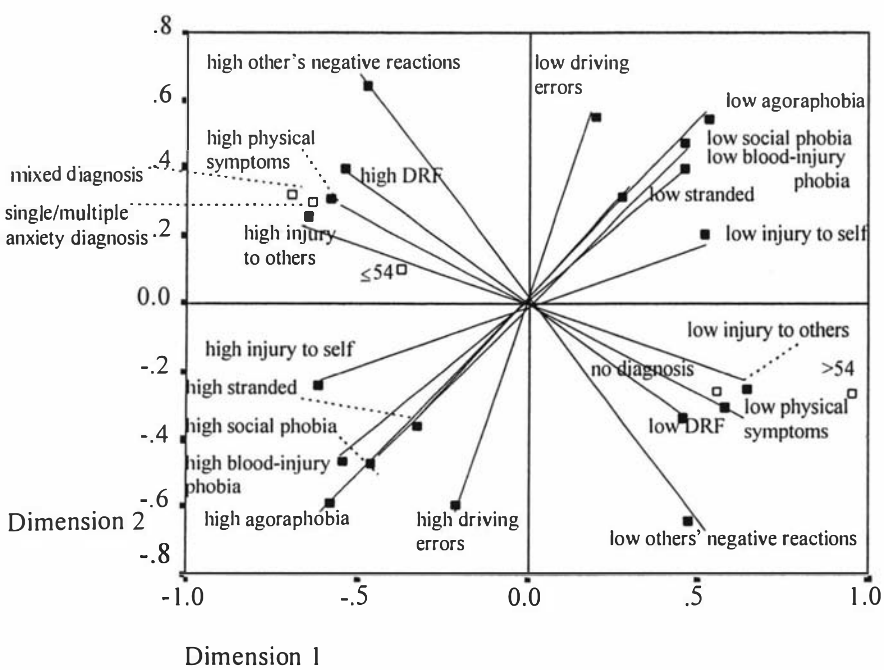

Figure 10.2. *PRINCALS solution (all category coordinates).*

SC points on a graph are located on a straight line because the coordinates are proportional to the category quantifications and thus also to each other (van de Geer, 1993b). Therefore, for ease of visual inspection and because some coordinates are more clustered than others, lines have been drawn between the binary variables. Variables with more than two categories (i.e., *diagnosis* and *age*) are represented by open squares on the graph. Broken lines link category coordinates with their category labels where there was limited space in the graph for their inclusion together.

As with Figure 10.1, dimension 1 is scaled on the abscissa, and is interpreted by comparing categories on the left hand side of the graph with those on the right. In Figure 10.2, dimension 1 distinguishes between participants who score highly on all variables, meet criteria for a diagnosis, and are aged 54 years or younger, as opposed to those who obtain low scores on all variables, have no diagnosis, and are aged over 54 years. Dimension 2 is scaled on the ordinate, and is interpreted by comparing categories along the top of the graph with those along the bottom. Interpretation of this dimension is less clear, which may be explained by its lowered eigenvalue compared with dimension 1.

Each of the four quadrants of Figure 10.2 can be interpreted in terms of a typology (as conducted by Van Gerwen et al., 1997). The upper left quadrant contains participants who experience high levels of DRF that is associated particularly with concerns about physical symptoms and injury to others, as well as concerns about others' negative reactions. This group tend to meet diagnostic criteria for an anxiety disorder, and to be aged 54 years or younger. As this quadrant is adjacent to those with high and low driving skills errors, participants in this group tend to obtain a more moderate number of errors on the Advanced Driver Assessment. For the same reason, they also show moderate levels of broader phobic concerns.

The upper right quadrant also consists of fearfuls aged 54 years or younger, although this group experiences a relatively moderate level of DRF, as they are in the quadrant adjacent to high and low levels of DRF. They have relatively low scores on broader phobic concerns as well as concerns about injury to self and being stranded. They also show a relatively lower rate of errors on the Advanced Driver Assessment. The lower right quadrant consists of participants with low levels of DRF, whose symptoms are not closely related to a broader set of phobic complaints. These fearfuls tend to be older (over 54 years) and meet no diagnostic criteria. They also obtain a low to moderate number of errors on the Advanced Driver Assessment. The lower left quadrant is characterised by concerns about injury to self and being stranded, as well as a cluster of broader phobic complaints. Fearfuls in this group experience moderate levels of DRF, and tend to be older (over 54 years). A high rate of errors on the Advanced Driver Assessment also characterises this group. These results are summarised in Figure 10.3.

High DRF Concerns about physical symptoms Concerns about injury to others Concerns about others' negative reactions Diagnosis ≤ 54 Moderate driving errors Moderate phobic concerns	Moderate DRF ≤ 54 Low driving errors Low phobic concerns
Moderate DRF Concerns about being stranded Concerns about injury to self > 54 High driving errors High phobic concerns	Low DRF No diagnosis >54 Moderate driving errors Low phobic concerns

Figure 10.3. *Summary of the quadrants of the PRINCALS solution.*

Finally, concerns related primarily to a focus on the self (i.e., injury to self and being stranded) are associated more closely with high driving errors and high levels of general phobic concerns, as well as moderate levels of DRF. In contrast, concerns related mostly to a focus on others (with the exception of physical symptoms; injury to others and others' negative reactions) are more closely linked with high levels of DRF and a diagnosis, as well as more moderate levels of driving errors.

These relationships were examined more closely by inspecting patterns of correlations (see Table 10.4). Consistent with the PRINCALS results, DRF was more closely associated with concerns about injury to others, others' negative reactions, and physical symptoms. Although all correlations with total Advanced Driver Assessment errors were low and not statistically significant, concerns about injury to self and being stranded were more closely related to driving errors than the other concerns. Overall, high levels of broader phobic concerns were more closely associated with concerns about being stranded, injury to self, and physical symptoms, and all results except for the latter were consistent with the PRINCALS analysis.

Additional correlations were calculated and indicated that all concerns except for the concern about being stranded were correlated with Driving Situations Questionnaire-Driver scores. In contrast, none of the correlations for Driving Situations Questionnaire-Passenger scores were statistically significant. State Trait Anxiety Inventory-Trait Scale scores had moderate correlations with concerns about physical symptoms and being stranded, while the Beck Depression Inventory-Second Edition only correlated with concerns about injury to self. All correlations at $p < .001$ remained statistically significant after Bonferroni correction (.05/60 = .0008).

Table 10.4. *Correlations between DCQ factor scores and other variables (1-tailed).*

Variable	DCQ Factors				
	Physical symptoms	Injury to self	Others' negative reactions	Stranded	Injury to others
0-10 DRF rating	.32*	.25*	.32*	.16	.46****
Total driving errors	.09	.22	.12	.20	.16
FQ-Total	.43***	.26*	.15	.53****	.10
FQ-Agoraphobia	.64****	.26*	.05	.31*	.15
FQ-Social phobia	.16	.15	.29*	.40**	.07
FQ-Blood-injury phobia	.21	.19	.01	.52****	.02
DSQ-Driver	.28*	.42***	.37**	.21	.46****
DSQ-Passenger	.14	.20	-.13	.23	.06
STAI-T	.44***	.32*	.20	.43***	.05
BDI-II	.20	.39**	.20	.18	.18

Note. FQ = Fear Questionnaire; DSQ = Driving Situations Questionnaire; STAI-T = State-Trait Anxiety Inventory-Trait Scale; BDI-II = Beck Depression Inventory-Second Edition.
$^{*}p < .05$. $^{**}p < .005$. $^{***}p = .001$. $^{****}p < .001$.

Grouping Cases

As a variant of standard PCA, PRINCALS identifies the structure of relationships among the set of variables or characteristics, with the objective in Study Two of summarising those characteristics across the fearful group. Since the analysis examines relationships between *variables* rather than *participants*, it was considered appropriate to use an additional analytical technique to identify the structure of relationships among participants.

The two data analysis options available for identifying groupings of participants were *Q factor analysis* and *cluster analysis*. Both techniques aim to condense a sample of people into distinctly different groups based on particular characteristics. They both compare a series of responses to a number of variables and place the participants in several groups (Hair et al., 1998). Q factor analysis identifies groups or clusters of individuals that show a similar pattern on the variables included in the analysis (Hair et al., 1998). Groupings are based on the intercorrelations between the means and standard deviations of the participants, resulting in groups with similar variance structures (Hair et al., 1998). In comparison, cluster analysis devises groupings based on a distance measure between the participants' scores on the variables being analysed, and is therefore sensitive to the distances among scores and groups the closest pairs (Hair et al., 1998). Since computational difficulties have led to the infrequent use of Q factor analysis (Hair et al., 1998), cluster analysis was chosen as the analytical method for detecting groupings of fearful participants in Study Two (refer to Chapter Four for a detailed description of cluster analysis).

For the present analysis, the recommendations made by Hair et al. (1998; discussed in Chapter Four) were followed. That is, hierarchical clustering was initially used to establish the number of clusters, profile the cluster centres, and identify any obvious outliers. Then *K*-means clustering was used (with the cluster centres previously identified as the initial seed points) to fine-tune the results. The final step involved profiling the participants in the various clusters to determine their composition.

From the hierarchical cluster analysis, there did not appear to be any strong outliers in the data that were candidates for deletion, and multicollinearity was not problematic. The similarity (or distance) measure chosen was *squared Euclidean distance*, which is the sum of squared distances over all variables, and is recommended for use with metric variables (Hair et al., 1998). Ward's method was selected as the clustering method as it is recommended for minimising within-cluster differences (Hair et al., 1998).

Variables chosen for the analysis were the five Driving Cognitions Questionnaire factors, total score on the Fear Questionnaire, total driving errors, and the 0-10 DRF rating. All variables were standardised into *z*-scores (having a mean of 0 and a standard deviation of 1) as they were expressed on different measurement scales. Hair et al. (1998) note that variables with large values contribute more to the calculations of distance measures than those with small values (see Appendix J-3 for an illustration). Within-case standardisation was not considered appropriate because the magnitude of values is an important element of the objectives of the cluster analysis (Hair et al., 1998).

The analysis of the change in agglomeration coefficient (i.e., overall similarity measure) as cases are clustered is shown in Table 10.5 (see Appendix J-4 for the full agglomeration schedule and description). As a brief reminder from Chapter Four, if the overall similarity measure is monitored as the number of clusters decreases, large increases in the overall measure indicate that the two clusters being joined at a particular step are not very similar (Hair et al., 1998).

Looking at Table 10.5, the overall similarity measure increases gradually over steps 40 to 45, indicating that other clusters are being formed that have essentially the same homogeneity as the existing clusters. In step 46, which moves to four clusters, there is a larger increase, although this is not the largest percentage increase. Step 47 again represents only a small change in the overall measure, while step 48 sees the largest increase when combining three into two clusters (19.3%). This large increase indicates that joining three into two clusters resulted in a cluster solution that was markedly less homogeneous, and the clusters became more heterogeneous with the final step into one cluster. Therefore, the cluster solution of step 47 would be considered much better than that of steps 48 and 49. The three-cluster solution of step 47 seems to be the most appropriate for a final cluster solution, particularly since the next best solution with five clusters had one very small cluster with only three participants. The output for cluster membership indicated three clusters with $n = 12$, $n = 26$, and $n = 12$, respectively. The vertical icicle plot and dendrogram are shown and described in Appendixes J-5 and J-6.

Table 10.5. *Analysis of the agglomeration coefficient for the hierarchical cluster analysis.*

Step	Number of clusters	Agglomeration coefficient	Change in coefficient from previous step	Percentage change in coefficient from previous step
40	10	125.408		
41	9	138.121	+12.71	10.1
42	8	151.461	+13.34	9.7
43	7	165.468	+14.01	9.3
44	6	180.755	+15.29	9.2
45	5	196.188	+15.43	8.5
46	4	221.056	+24.87	12.7
47	3	249.561	+28.51	12.9
48	2	297.826	+48.27	19.3
49	1	329.000	+31.17	10.5

The three-cluster solution was then carried into the *K*-means cluster analysis (since the hierarchical analysis only supported a three-cluster solution) to obtain the final cluster solution (Hair et al., 1998). Again, since the scales on which the variables were measured differed markedly, *z*-scores were used as required by the *K*-means procedure. Cluster 1 consisted of 26 participants, while there were 8 participants in cluster 2 and 16 in cluster 3. Therefore, participants were not equally distributed across clusters, and this indicates that there were more participants of the type represented by cluster 1 than there were of the type found in cluster 2. Table 10.6 shows the cluster membership for each case and the distance from the cluster centre. Case 43 is furthest from its cluster centre (3), with a distance of 3.803. Case 36 is closest to its cluster centre (1), with a distance of 0.827.

Table 10.6. *Cluster membership and distance from the cluster centre for the K-means cluster analysis.*

Case Number	Cluster Membership	Distance from Cluster Centre
1	2	1.457
2	2	3.174
3	3	2.313
4	3	2.485
5	3	2.448
6	3	3.464
7	1	2.717
8	3	1.909
9	2	3.199
10	1	1.582
11	3	2.235
12	2	2.557
13	3	1.909
14	3	2.250
15	1	1.989
16	3	2.599
17	3	2.190
18	1	1.327
19	3	1.971
20	1	1.538
21	1	1.361
22	1	1.554
23	1	1.206
24	3	2.424
25	1	2.477
26	2	2.776
27	1	1.265
28	1	2.236
29	1	2.031
30	2	3.400
31	1	1.911
32	1	1.909
33	2	1.934
34	1	1.909
35	1	1.231
36	1	0.827
37	2	2.182
38	1	2.127
39	1	2.262
40	1	1.285
41	1	2.877
42	3	2.924
43	3	3.803
44	1	1.411
45	1	1.596
46	1	1.350
47	3	3.379
48	3	1.822
49	1	2.736
50	1	1.794

Table 10.7 shows the final cluster centres for the analysis, reporting the means of the standardised variables for each cluster (which in turn define the cluster centre). Cluster 1 participants have scores on variables that are all below the overall sample mean. For example, their 0-10 DRF rating is 0.64 standard deviations below the mean for all participants. Participants in cluster 3 have the highest DRF ratings, which are almost 1 standard deviation (i.e., 0.82) above the overall mean. They also have higher scores on the Driving Cognitions Questionnaire factors of injury to others, others' negative reactions, and injury to self, suggesting that such cognitions may lead to higher levels of DRF. Members of cluster 2 have a more moderate DRF rating but score much higher than the other clusters on the Driving Cognitions Questionnaire factors of physical symptoms and being stranded. This group of participants also have scores on the Fear Questionnaire that are almost 1.5 standard deviations above the overall mean, which may indicate multiple fears and greater overall fearfulness. In summary, cluster 1 participants have low scores on all variables. Members of cluster 2 have moderate levels of DRF but high levels of concern about physical symptoms and being stranded, as well as multiple fears compared with the overall sample. Cluster 3 participants have high levels of DRF compared with the overall sample, as well as high levels of concern about injury to others and others' negative reactions. Degree of concern about injury to self is more moderate although still 0.5 standard deviations above the overall mean. Cluster 3 also have the highest level of driving errors compared with the overall sample, although this is only 0.3 standard deviations above the overall mean.

Table 10.7. *Final cluster centres for the K-means cluster analysis.*

Variable (*z*-scores)	**Cluster 1 (*n* = 26)**	**Cluster 2 (*n* = 8)**	**Cluster 3 (*n* = 16)**
0-10 DRF rating	-.64	.46	.82
Physical symptoms	-.43	1.64	-.12
Injury to self	-.31	-.02	.51
Others' negative reactions	-.57	.58	.63
Stranded	-.37	1.12	.04
Injury to others	-.65	.09	1.01
Total driving errors	-.25	.18	.31
Fear Questionnaire-Total	-.31	1.49	-.24

Note. Negative values denote a cluster centre below the mean, while positive values indicate a cluster centre that is above the mean.

In terms of the distances between the final cluster centres, the means of clusters 1 and 2 are furthest apart (3.613), while clusters 1 and 3 are closest together (2.751). The distance between the means of clusters 2 and 3 is 2.915.

For each variable individually, SPSS computes a one-way analysis of variance (ANOVA) using the final clusters as groups, as shown in Table 10.8. The *between-cluster mean square* is displayed in the column labelled *Cluster*, and the *within-cluster mean square* is displayed in the column labelled *Error*. The ratio of these two mean squares is the usual ANOVA F statistic (Hair et al., 1998). It is important to note that the significance levels in the final column should be ignored, since the clusters are formed to characterise differences (SPSS Inc., 1999). Instead, the F statistic is used, with higher values indicating a larger difference across the clusters than smaller values. The means of concerns about injury to others differ the most across the three clusters (from Table 10.8, $F = 29.66$), followed by concerns about physical symptoms ($F = 27.63$) and the 0-10 DRF rating ($F = 20.89$). In comparison with the other variables, the means for total driving errors ($F = 1.74$) and concerns about injury to self ($F = 3.73$) differ little across the three clusters.

Table 10.8. *ANOVA results for the K-means cluster analysis.*

	Cluster		**Error**			
Variable (*z*-scores)	**Mean Square**	***df***	**Mean Square**	***df***	***F***	***p***
0-10 DRF rating	11.53	2	.55	47	20.89	<.001
Physical symptoms	13.24	2	.48	47	27.63	<.001
Injury to self	3.36	2	.90	47	3.37	.031
Others' negative reactions	8.67	2	.67	47	12.87	<.001
Stranded	6.75	2	.76	47	8.94	.001
Injury to others	13.67	2	.46	47	29.66	<.001
Total driving errors	1.69	2	.97	47	1.74	.187
Fear Questionnaire-Total	10.61	2	.59	47	17.94	<.001

Figure 10.4 provides a scatterplot of the participants based on cluster membership and distance from their respective cluster centres. This helps to identify any participants that are far from their cluster centres, indicating that they are not representative of the cluster

to which they have been assigned (SPSS Inc., 1999). From the figure, it appears that there are no participants that are clearly dissimilar from the rest of those in the respective clusters. Participants seem to be generally spread out over a range of values within each cluster.

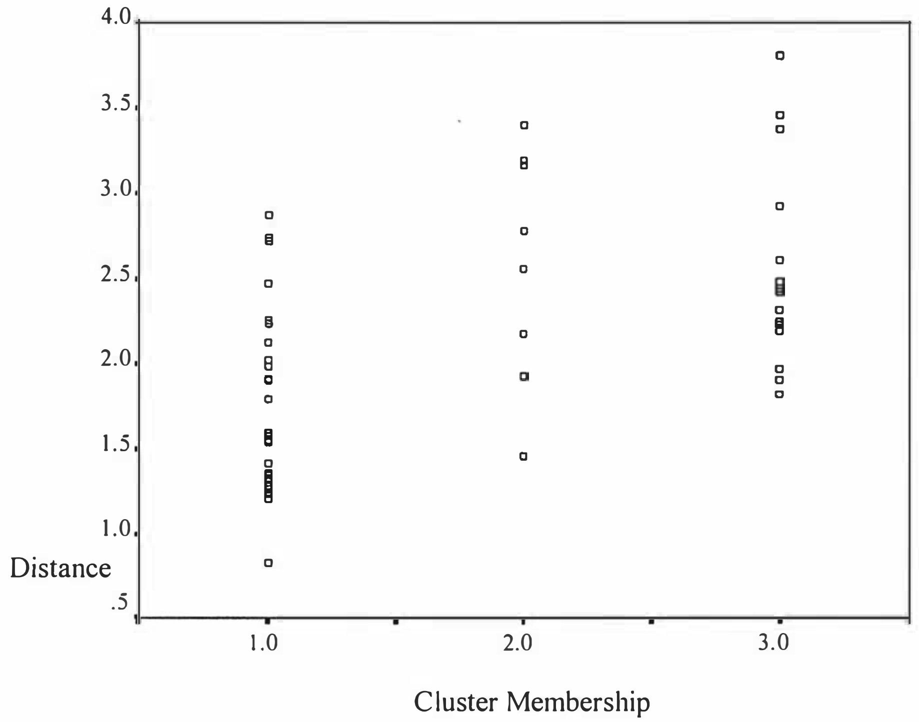

Figure 10.4. *Scatterplot of cluster membership by distance from the cluster centre.*

Finally, Table 10.9 provides a profile summary of the mean values of a range of variables across the clusters. A one-way ANOVA was conducted to explore age across the three clusters. The assumption of homogeneity of variance was supported (Levene's statistic = 20.40, $p = .14$). There was no statistically significant difference in age for the three clusters, $F(2, 47) = 1.20$, $p = .31$. The effect size (calculated using partial eta squared, or the between groups sum of squares divided by the within groups sum of squares) was .05.

Table 10.9. *Means (and SDs) of variables across the clusters.*

Variable	Cluster 1	Cluster 2	Cluster 3
n	26	8	16
Age	46.81 (17.19)	39.75 (10.47)	40.31 (13.61)
0-10 DRF rating	5.73 (1.59)	7.88 (0.99)	8.56 (1.37)
Physical symptoms	0.54 (0.86)	9.75 (6.74)	1.94 (2.72)
Injury to self	2.65 (3.17)	4.00 (3.93)	6.44 (5.97)
Others' negative reactions	6.00 (3.90)	12.25 (4.46)	17.56 (5.37)
Stranded	2.81 (2.62)	9.88 (5.87)	4.75 (5.12)
Injury to others	3.73 (2.01)	7.38 (4.31)	11.94 (4.46)
Total driving errors	36.50 (13.64)	42.50 (13.44)	44.44 (14.90)
FQ-Total	22.42 (13.05)	54.50 (17.80)	23.75 (12.44)
FQ-Agoraphobia	4.23 (4.53)	18.63 (8.57)	4.81 (5.27)
FQ-Social phobia	10.81 (7.22)	17.75 (10.44)	10.69 (4.92)
FQ-Blood-injury phobia	7.39 (5.96)	18.13 (9.37)	8.25 (7.16)
% probability of MVA	21.15 (20.26)	47.50 (17.53)	54.38 (31.19)
STAI-6	17.27 (1.51)	17.75 (2.77)	16.63 (3.24)
STAI-T	39.73 (8.65)	55.00 (4.28)	42.25 (12.70)
DCQ	31.27 (14.80)	78.75 (26.45)	69.19 (22.52)
DSQ-Driver	68.65 (23.38)	102.13 (23.21)	105.63 (22.82)
DSQ-Passenger	44.35 (32.24)	62.13 (31.09)	54.63 (32.60)
BDI-II	6.00 (5.71)	7.25 (7.05)	8.88 (8.08)
No diagnosis	19	3	5
Single anxiety disorder	3	3	4
Multiple anxiety disorder	2	1	2
Mixed disorders	2	1	5

Note. FQ = Fear Questionnaire; STAI-6 = State-Trait Anxiety Inventory-Short Form; STAI-T = State-Trait Anxiety Inventory-Trait Scale; DCQ = Driving Cognitions Questionnaire; DSQ = Driving Situations Questionnaire; BDI-II = Beck Depression Inventory-Second Edition.

Members of cluster 1 again generally obtain the lowest scores on all variables. Members of cluster 2, in addition to higher levels of broader phobic complaints (especially higher levels of agoraphobia on the agoraphobia subscale of the Fear Questionnaire), concern about physical symptoms and being stranded (also typical agoraphobic reactions; see DSM-IV), and higher proportions of an anxiety disorder, also have generally higher scores on the Trait Scale of the State-Trait Anxiety Inventory. Cluster 3 participants consider themselves to have a higher likelihood of being involved in an MVA, in addition to higher levels of DRF as well as concerns about injury to others and others' negative reactions. These participants also have a greater proportion of mixed disorder diagnoses, although both single and multiple anxiety disorder diagnoses are also apparent in Cluster 3. Total driving errors and concerns about injury to self do not differentiate well across the clusters, and Table 10.9 shows relatively similar mean scores for these variables over the three clusters.

Summary

The exploratory PRINCALS analysis was conducted to identify subtypes of DRF consistent with Van Gerwen et al.'s (1997) use in identifying subtypes of flying phobia. The present PRINCALS analysis identified four subtypes of DRF, based on the structure of relationships among variables across the fearful group. The first subtype featured high levels of DRF, diagnosis, and concern about physical symptoms, injury to others, and other's negative reactions, as well as moderate driving errors, moderate broader phobic concerns, and an age range of less than or equal to 54 years. The second subtype was also characterised by an age range of 54 years or less, as well as moderate levels of DRF and low levels of driving errors and broader phobic concerns. The third subtype featured low levels of DRF and broader phobic concerns, moderate driving errors, no diagnosis, and an age range greater than 54 years. The fourth subtype was characterised by moderate levels of DRF, concerns about being stranded and injury to self, high driving errors and broader phobic concerns, and an age range greater than 54 years.

In the PRINCALS analysis, high levels of DRF were associated with concerns about others' negative reactions, physical symptoms, and injury to others. Concerns about injury to self and being stranded were more specifically associated with high levels of other phobic fears.

In contrast to the PRINCALS analysis, the cluster analysis was used specifically to identify the structure of relationships among participants in the fearful group. The cluster analysis identified three clusters in the sample. Cluster 1 participants had low scores on all variables, and were dominated by a lack of diagnostic criteria for an anxiety disorder. Cluster 1 seemed to include similar groupings as the third subtype from the PRINCALS analysis. Members of cluster 2 had moderate levels of DRF but high levels of concern about physical symptoms and being stranded, as well as broader phobic complaints, which are consistent with an agoraphobic reaction (see DSM-IV). Cluster 2 also showed a predominance of single and multiple anxiety disorder diagnoses. Participants in cluster 3 had high levels of DRF, as well as high levels of concern about injury to others, others' negative reactions, and moderate concern about injury to self. Cluster 3 was dominated by mixed diagnoses. Although cluster 3 also had the highest score for driving errors in the sample, driving errors and concerns about injury to self did not differentiate well across the clusters. Clusters 2 and 3 seemed to be clearer groupings than those identified from the remaining subtypes in the PRINCALS analysis.

Overall, the cluster analysis identified subtypes within the fearful sample that appear to be coherent. While the results need to be replicated in other studies, there are practical implications of such findings. The concerns of those in cluster 2 that are related to physical symptoms and being stranded could be considered consistent with an internal focus of fear or anxiety expectancy, and appeared as though DRF were part of a more general agoraphobic-type fear response. In contrast, the concerns of participants in cluster 3 seemed more consistent with an external focus of fear or danger expectancy, given the high levels of concern about injury to others and others' negative reactions. As suggested by Wilhelm and Roth (1997), this may have implications for the kinds of exposure tasks that are effective in treatment. For example, exposure to external stimuli may be ineffective for those in cluster 2 whose primary concern is experiencing physical symptoms of anxiety. Conversely, exposure to internal stimuli may be equally ineffective for members of cluster 3 whose main concerns are injuring others and other people's negative reactions to their driving. As seen in Table 10.9, physical symptoms represent the lowest-rated concern for those in cluster 3. The differences in scores on the physical symptoms concern factor for cluster 2 compared to the other two groupings is of substantial magnitude and would thus have utility in clinical settings in helping to differentiate clients in assessment. Therefore, these distinctions may assist in making treatment interventions more targeted to symptom dimensions and subsequently more efficient and effective.

In terms of the utility of driving instruction as a treatment component, the present findings indicate that no one subtype requires professional driving instruction more than another, as errors on the practical driving assessment did not differentiate well across the clusters. However, since fearfuls made a higher number of errors overall compared with controls, a driving assessment may be of use as part of a general assessment process for those with DRF.

THE RELATIONSHIP BETWEEN DRIVING ANXIETY AND DRIVING PERFORMANCE

Following the typology analyses, further exploratory analyses were undertaken to examine the relationship between DRF and driving performance across the sample as a whole. Rather than exploring the relationship of driving performance and general measures of DRF, it was considered important for these analyses to use a measure of *actual* driving anxiety taken as close as possible to the practical driving assessment. Since both pre-test and post-test anxiety measures had been obtained (0-10 DRF rating and State Trait Anxiety Inventory-Short Form [STAI-6] score), and test anxiety appeared to have had a negligible impact on these measures, the average of the pre-test and post-test measures was considered appropriate as a best estimate of actual anxiety during the driving performance. To minimise the number of analyses performed, the STAI-6 measure was used given its established psychometric properties.

Initially, the average STAI-6 score was correlated (using 2-tailed Pearson correlation coefficients) with the 15 Advanced Driver Assessment (ADA) errors to check that there were no large or significant negative correlations, as this would affect the remaining analyses. One of the hazard identification skills, *applies 2 second rule*, had a correlation of $r = -.13$ ($p = .11$) with the average STAI-6 score for the full sample. There were three other negative correlations with the anxiety measure that were very close to 0. *Applies 2 second rule* was therefore removed from the total error score and instead a new total error score based on the remaining 14 driving skills was used for all subsequent analyses.

Correlations between the average STAI-6 score and total driving errors are shown in Table 10.10. The only statistically significant correlation is for the full sample, suggesting too little variability in the distribution of scores when the two groups are considered separately, as would be expected given the nature of the two groups. That is, it would be expected that the fearful group would obtain higher scores and that the control group would obtain lower scores. Similar results were found when the instructor-rated STAI-6 score was used, with a statistically significant correlation obtained for the full sample ($r = .37, p < .001$), but not for either the fearful group ($r = .18, p = .11$) or control group ($r = .22, p = .07$). Further analyses used the full sample given insufficient variability in the separate fearful and control groups.

Table 10.10. *Correlations (one-tailed) between driving anxiety (average STAI-6 score) and driving performance (total driving errors).*

Sample	***n***	***r***	***p***
Full sample	100	.29	.002
Fearful group	50	.14	.17
Control group	50	.02	.45

The correlation between driving anxiety and driving performance suggests a relatively modest linear relationship (as opposed to a curvilinear one as proposed by the Yerkes-Dodson curve). To check for any curvilinear quality, quadratic and cubic functions were fitted to the data (SPSS Inc., 1999). The variance accounted for by the linear function was only 7.6% (adjusted R square; SPSS Inc., 1999), and the quadratic and cubic functions only added another 7.1% and 7.0%, respectively. As shown by Figure 10.5, all functions provide almost the same representation of the relationship. Despite a statistically significant correlation, the overall relationship between driving anxiety and performance is modest.

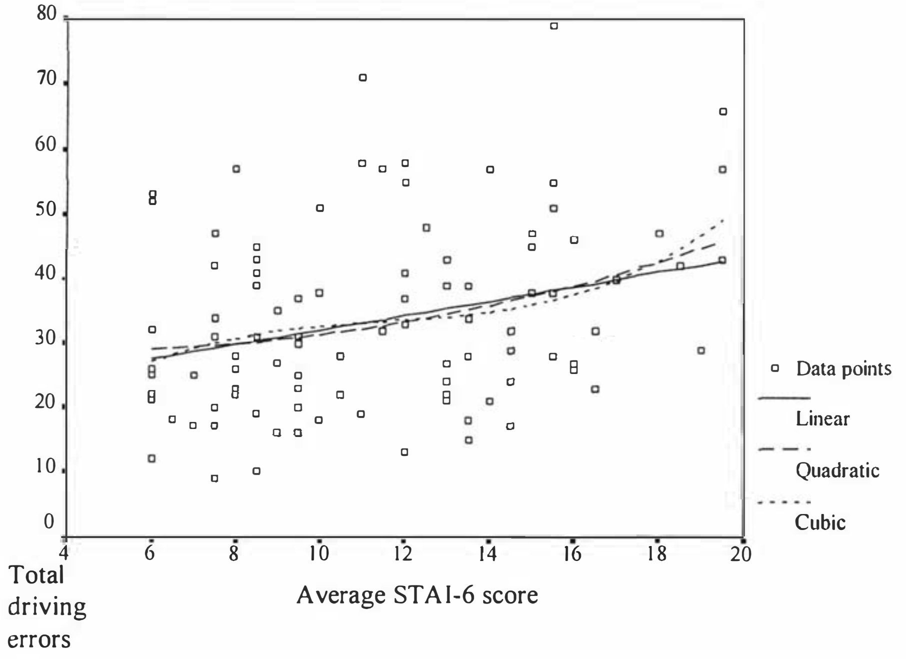

Figure 10.5. *Curve fit for average STAI-6 score on total driving errors.*

The latter results were supported by additional analyses. The average STAI-6 score was split into three relatively equal groups for the full sample to represent *low*, *moderate*, and *high* levels of driving anxiety (these cut points were then used to split the fearful and control groups, which resulted in unequal group sizes). Total errors were then calculated for each of these groups, and an ANOVA used to check for differences. The assumption of homogeneity of variance was supported (Levene's statistic: $F = 0.60$, $p = .57$). The results are presented in Table 10.11.

Table 10.11. *Means (and SDs) for total driving errors across levels of driving anxiety (average STAI-6 score).*

Level of driving anxiety	Total driving errors: Full sample		Fearful group		Control group	
	n	Mean (*SD*)	*n*	Mean (*SD*)	*n*	Mean (*SD*)
Low	35	29.51 (12.59)	2	44.00 (18.38)	33	28.64 (11.99)
Moderate	32	34.56 (14.85)	18	38.78 (14.04)	14	29.14 (14.56)
High	33	37.24 (14.73)	30	38.30 (15.03)	3	26.67 (3.22)

There was no statistically significant difference in errors across the different levels of driving anxiety for either the full sample (although this almost reached statistical significance: $F[2, 97] = 2.66, p = .08$; partial eta squared = .05), the fearful group ($F[2, 47] = 0.14, p = .87$; partial eta squared = .006), or the control group ($F[2, 47] = 0.05, p = .95$; partial eta squared = .002). As demonstrated by the scatterplot in Figure 10.6, the pattern of mean errors for the full sample gradually increased as driving anxiety increased, rather than as would be predicted by the Yerkes-Dodson curve (i.e., high errors at low and high levels of anxiety, while more moderate levels of anxiety produce lower levels of errors).

Although the relationship between driving anxiety and driving performance seemed to be relatively modest, it was of interest to explore whether particular types of errors are more affected by driving anxiety than others because theory and prior research would suggest differential effects on different driving tasks. Correlations between driving anxiety (both self- and instructor-rated) and the broad and specific skill areas from the ADA are presented in Table 10.12.

Looking at the first four rows of Table 10.12, both measures of driving anxiety have statistically significant correlations with *hazard identification*, *manipulating controls*, and *observes traffic regulations*, while *search* is statistically significant only for instructor-rated driving anxiety. The remainder of Table 10.12 provides a breakdown of correlations across specific skill areas. Using Bonferroni correction (.05/14 = .004 for each variable), it appears that only a few specific skill errors have moderate and statistically significant correlations with both measures of driving anxiety. Among the specific *hazard identification* skills, *reacts in time to situation* and *correct action taken* emerge, as well as *power and velocity* among the specific *manipulating controls* skills and *uses correct lanes* among the specific skills for *observes traffic regulations*. In summary, higher levels of driving anxiety are related to more errors in reacting in time to situations, taking the correct action, power and velocity, and using the correct lanes. Driving anxiety is clearly not correlated with errors in obeying speed limits, applying the four second rule, steering and guiding, obeying signs, or applying priority rules.

Table 10.12. *Correlations (r [p]; one-tailed) between driving anxiety (average self-rated STAI-6 score and instructor-rated STAI-6 score) and driving performance (n = 100).*

	Measure of driving anxiety	
Error variable	**Self-rating**	**Instructor rating**
Search (S)	.15 (.07)	.20 (.02)
Hazard Identification (HI)	.28 (.002)	.37 (.001)
Manipulating Controls (C)	.21 (.02)	.32 (.001)
Observes Traffic Regulations (OTR)	.22 (.02)	.21 (.02)
Search techniques (S)	.13 (.10)	.15 (.07)
Applies 12 second rule (S)	.10 (.16)	.24 (.008)
Applies 4 second rule (HI)	-.01 (.46)	-.04 (.36)
Reacts in time to situation (HI)	.24 (.007)	.30 (.001)
Correct action taken (HI)	.28 (.002)	.40 (.001)
Power and velocity (C)	.28 (.002)	.51 (.001)
Steering and guiding (C)	.00 (.50)	-.10 (.17)
Slowing and stopping (C)	.15 (.06)	.31 (.001)
Uses correct lanes (OTR)	.33 (.001)	.37 (.001)
Uses correct position (OTR)	.13 (.11)	.21 (.02)
Communication and signalling (OTR)	.20 (.02)	.10 (.17)
Obeys signs (OTR)	-.06 (.29)	.09 (.20)
Applies priority rules (OTR)	.05 (.32)	.07 (.23)
Obeys speed limits (OTR)	-.04 (.36)	-.10 (.17)

Note. STAI-6 = State-Trait Anxiety Inventory-Short Form.

Why would higher levels of driving anxiety impair performance in these areas more than others? While many studies have concluded that anxiety impairs performance depending on the complexity and difficulty of the task (e.g., Britt & Blumenthal, 1993; Butki, 1994; Calvo & Ramos, 1989; Eysenck & Byrne, 1992; Jones & Cale, 1997; Payne & Corley, 1994; Terelak, 1990), these studies have been mainly conducted in the laboratory using specific psychophysical and motor performance capacities rather than reflecting the complex nature of driving.

In comparison, research by Matthews and colleagues (see Matthews, 2001, for a review) has more direct relevance for Study Two. As reviewed in Chapter Five, anxiety responses to driving were associated with a lower incidence of speeding convictions but a higher proportion of driving errors (Matthews et al., 1991, 1997, 1999). These results are consistent with the findings of Study Two. Matthews also found that results from objective driving performance indicated no general skill deficit that might account for the findings. Instead, it was considered that anxiety responses to driving related to attentional impairment (Matthews, 2001). Borrowing from multiple resource theory (Wickens, 1984; see Chapter Five for a review), Matthews et al. (1996) found that anxiety-related impairment in performance was stronger when the driving task was relatively undemanding, suggesting that drivers may adapt well to demanding dual task situations by increased effort, thereby suppressing the effects of cognitive interference (Matthews, 2001). In single task driving situations, the driver may consider the task less demanding of effort and fail to sustain sufficient effort to maintain performance, instead diverting their attention to processing associated with worry (Matthews, 2001).

It is difficult to relate the above results to the findings in Study Two, primarily because of the different methods used to assess driving errors (i.e., on-road assessment in Study Two, as opposed to simulator-based assessment in Matthews et al., 1996). While an on-road assessment captures the dynamic nature of driving, it is also associated with generally less control and specificity of driving tasks at any one point in time, compared to simulator-based driving assessment. Although the finding in Study Two of anxiety being associated with more errors in power and velocity and using the correct lanes might be considered consistent with Matthews' (2001) suggestion of greater errors in single task situations, this depends to some extent on what such tasks involve in an on-road driving assessment.

Matthews et al. (1996) considered *worry* to be an important factor in helping to ascertain the impact of anxiety on driving performance, and that perhaps the diversion of attention to processing associated with worry causes an interference effect. The relatively modest relationship between driving anxiety and performance may be due to a moderating factor, such as worry. In Study Two, the Driving Cognitions Questionnaire (DCQ) was used as a measure of driving-related cognitions, although any analyses using this measure with measures of actual driving anxiety need to be treated with caution since the DCQ was not administered at the time of the driving assessment. Nevertheless, the degree of relation between the two measures is of interest. (While the STAI-6 contained a worry item, this was considered to reflect general worry as opposed to the repetitive and specific cognitions related to driving that cause distress as measured on the DCQ.) Table 10.13 shows the correlations between various measures of driving-related worry as measured by the DCQ and driving anxiety. The overall correlation with both measures of driving anxiety is moderately strong.

Using a Bonferroni correction (.05/5 = .01) for each driving anxiety measure, all DCQ factors were correlated with both measures of driving anxiety. *Others' negative reactions* and *injury to others* produce strong correlations, whereas the correlations associated with *physical symptoms* are relatively less related. The results are consistent with the cluster analysis in that cluster 3, characterised by the highest mean errors, also features the highest *worry* components from the DCQ, in terms of concerns about *injury to self* and *others' negative reactions*, rather than *physical symptoms*.

Table 10.13. *Correlations (r [p]; one-tailed) between measures of driving-related worry and driving anxiety.*

Worry variable		**Average self-rated STAI-6 score**	**Instructor-rated STAI-6 score**
DCQ Total score		.58 (.001)	.63 (.001)
DCQ factors:	Physical symptoms	.23 (.01)	.20 (.02)
	Injury to self	.39 (.001)	.38 (.001)
	Others' negative reactions	.59 (.001)	.66 (.001)
	Stranded	.26 (.004)	.37 (.001)
	Injury to others	.57 (.001)	.63 (.001)

Note. DCQ = Driving Cognitions Questionnaire; STAI-6 = State-Trait Anxiety Inventory-Short Form.

The relationship between worry and driving performance was then investigated through correlational analyses. The correlation between the total score on the DCQ and total ADA errors was $r = .36$ ($p < .001$) for the full sample, indicating that as worry increases, so too do errors (i.e., performance decreases). Alternatively, higher errors are associated with a higher frequency of worry, or negative driving-related thoughts. For the fearful group, the correlation remained statistically significant ($r = .24, p = .05$), but not for the control group ($r = .09, p = .27$).

Table 10.14 shows the correlations of overall worry with both the overall skill areas and the specific errors. As with driving anxiety, worry is associated with all four overall skill errors, but this relationship becomes more specific when particular errors are analysed. Using Bonferroni correction (.05/14 = .004), worry correlated significantly with *reacts in time to situations*, *correct action taken*, *uses correct position*, and *communication and signalling*. These results suggest that there are particular areas in which worry cognitions interfere more with driving performance.

Table 10.14. *Correlations (r [p]; one-tailed) between measures of worry and driving performance (n = 100).*

Error variable	DCQ Total
Search (S)	.21 (.02)
Hazard Identification (HI)	.33 (.001)
Manipulating Controls (C)	.18 (.04)
Observes Traffic Regulations (OTR)	.33 (.001)
Search techniques (S)	.20 (.02)
Applies 12 second rule (S)	.04 (.36)
Applies 4 second rule (HI)	.04 (.36)
Reacts in time to situation (HI)	.31 (.001)
Correct action taken (HI)	.29 (.002)
Power and velocity (C)	.14 (.08)
Steering and guiding (C)	.00 (.49)
Slowing and stopping (C)	.25 (.007)
Uses correct lanes (OTR)	.24 (.008)
Uses correct position (OTR)	.33 (.001)
Communication and signalling (OTR)	.27 (.004)
Obeys signs (OTR)	-.13 (.11)
Applies priority rules (OTR)	.01 (.47)
Obeys speed limits (OTR)	-.04 (.35)

Examination of the correlations of types of worries with performance revealed a similar pattern as that found with the driving anxiety measures, where *others' negative reactions* and *injury to others* have the highest correlations with errors. Using Bonferroni correction for each sample (.05/5 = .01), all results remained statistically significant except for *physical symptoms*, as Table 10.15 shows.

Table 10.15. *Correlations (r [p]; one-tailed) between DCQ factors and total driving errors.*

DCQ factors	Sample		
	Full sample	Fearful group	Control group
Physical symptoms	.17 (.05)	.09 (.28)	-.03 (.43)
Injury to self	.28 (.002)	.24 (.05)	.06 (.34)
Others' negative reactions	.33 (.001)	.12 (.20)	.23 (.05)
Stranded	.26 (.005)	.18 (.11)	.22 (.07)
Injury to others	.32 (.001)	.18 (.11)	.13 (.19)

Note. DCQ = Driving Cognitions Questionnaire.

Finally, Table 10.16 shows the pattern of correlations of types of worries with overall driving skill areas. Using Bonferroni correction (.05/20 = .003), the only statistically significant correlations are between *injury to self* and *observes traffic regulations*, and *injury to others* and *hazard identification.*

Table 10.16. *Correlations (r [p]; two-tailed) between DCQ factors and riving skill areas.*

Skill area	Physical symptoms	Injury to self	Others' negative reactions	Stranded	Injury to others
Search	.15 (.13)	.19 (.06)	.18 (.08)	.20 (.04)	.14 (.17)
Hazard Identification	.05 (.64)	.25 (.01)	.28 (.005)	.26 (.01)	.34 (.001)
Manipulating Controls	.03 (.76)	.05 (.66)	.26 (.009)	.08 (.41)	.25 (.01)
Observes Traffic Regulations	.21 (.04)	.36 (.001)	.24 (.02)	.23 (.02)	.22 (.03)

Note. DCQ = Driving Cognitions Questionnaire.

Overall, caution should be exercised in relating the above results to the various theories previously discussed relating driving anxiety to driving performance, because the analyses in Study Two were exploratory and did not aim to directly test these theories. Nevertheless, relationships were identified between driving anxiety, driving-related cognitions, and driving performance. The question of whether cognitions moderate the relationship between driving anxiety and driving performance was analysed using a two-way between groups ANOVA. Participants were divided into two groups according to levels of driving anxiety (using the average STAI-6 score; *low* and *high*) and two groups of levels of cognitions (using the total DCQ score; *low* and *high*). Total driving errors was used as the dependent variable. The assumption of homogeneity of variance was supported (Levene's statistic: $F = 1.20, p = .32$).

The pattern of means is shown in Table 10.17 (see also Figure 10.6). There was a statistically significant main effect for cognitions ($F[1, 96] = 10.09, p = .002$; partial eta squared = .10, observed power = .88), but not for driving anxiety ($F[1, 96] = 1.17, p = .28$; partial eta squared = .01, observed power = .19). There was no interaction effect, $F(1, 96) = 0.94, p = .34$ (partial eta squared = .01, observed power = .16). Therefore, while the two driving anxiety groups did not differ in terms of errors, participants in the high cognitions group had higher error scores than those in the low cognitions group. The effect size for the cognitions variable indicated a moderate to large effect (partial eta squared = .10, observed power = .88), suggesting that the actual differences in mean cognitions scores are of practical significance (Cohen, 1988, 1992). However, there was no statistically significant difference in the effect of driving anxiety on errors for the two cognitions groups.

Table 10.17. *Total driving error means (and SDs) for the effect of cognitions and driving anxiety (using average STAI-6 score) on driving performance.*

DCQ total score	Average STAI-6 score	Mean (*SD*)	*n*
low	low	28.49 (12.02)	35
	high	28.81 (10.48)	16
	Total	28.59 (11.45)	51
high	low	34.87 (16.42)	15
	high	40.79 (14.38)	34
	Total	38.98 (15.11)	49
Total	low	30.40 (13.64)	50
	high	36.96 (14.31)	50
	Total	33.68 (14.29)	100

Note. DCQ = Driving Cognitions Questionnaire. STAI-6 = State-Trait Anxiety Inventory-Short Form.

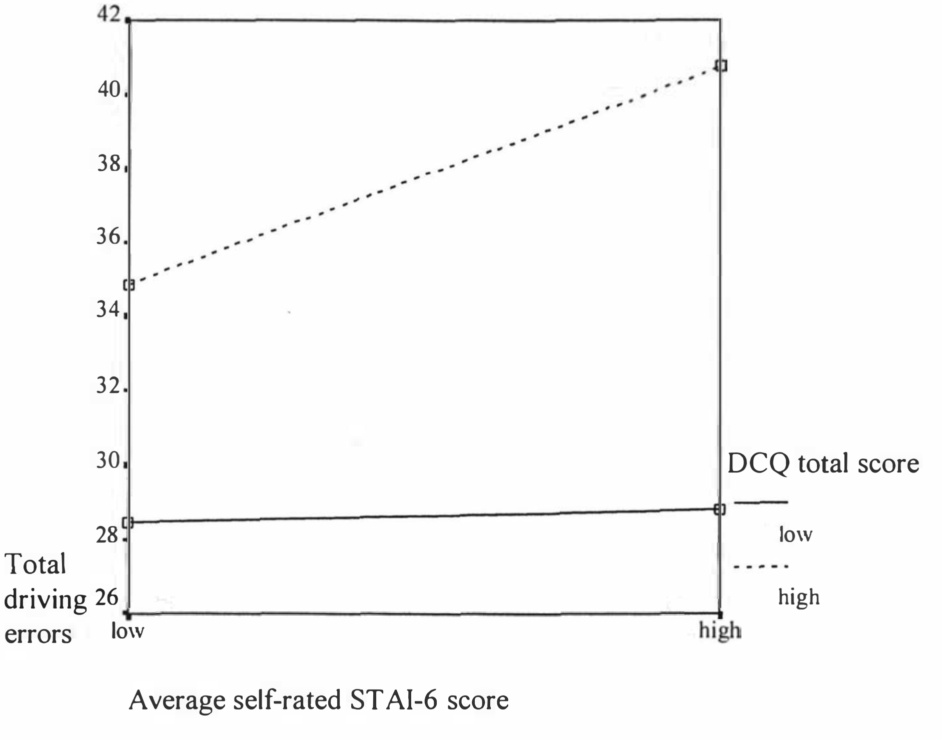

Figure 10.6. *Profile plot for the effect of cognitions and driving anxiety (average self-rated STAI-6 score) on driving performance (total driving errors).*

The instructor-rated STAI-6 score was then used as the measure of driving anxiety in another two-way between groups ANOVA. The assumption of homogeneity of variance was supported (Levene's statistic: $F = 1.90, p = .13$). The pattern of means is shown in Table 10.18 (also see Figure 10.7). As with the previous analysis, there was a statistically significant main effect for cognitions ($F[1, 96] = 7.63, p = .007$; partial eta squared = .07, observed power = .78), but not for driving anxiety ($F[1, 96] = 2.59, p = .11$; partial eta squared = .03, observed power = .36). There was no interaction effect, $F(1, 96) = 0.27, p = .604$ (partial eta squared = .003, observed power = .08). Therefore, while the two driving anxiety groups did not differ in terms of errors, participants in the high cognitions group again had higher error scores than those in the low cognitions group. The effect size for the cognitions variable indicated a moderate effect (partial eta squared = .07, observed power = .78), suggesting that the actual differences in mean cognitions scores are of practical significance (Cohen, 1988, 1992). However, there was no statistically significant difference in the effect of driving anxiety on errors for the two cognitions groups.

Table 10.18. *Total driving error means (and SDs) for the effect of cognitions and driving anxiety (using instructor-rated STAI-6 score) on driving performance.*

DCQ total score	**Instructor-rated STAI-6 score**	**Mean (*SD*)**	***n***
low	low	26.97 (11.35)	38
	high	33.31 (10.80)	13
	Total	28.59 (11.45)	51
high	low	36.73 (16.11)	15
	high	39.97 (14.79)	34
	Total	38.98 (15.11)	49
Total	low	29.74 (13.47)	53
	high	38.13 (14.01)	47
	Total	33.68 (14.29)	100

Note. DCQ = Driving Cognitions Questionnaire. STAI-6 = State-Trait Anxiety Inventory-Short Form.

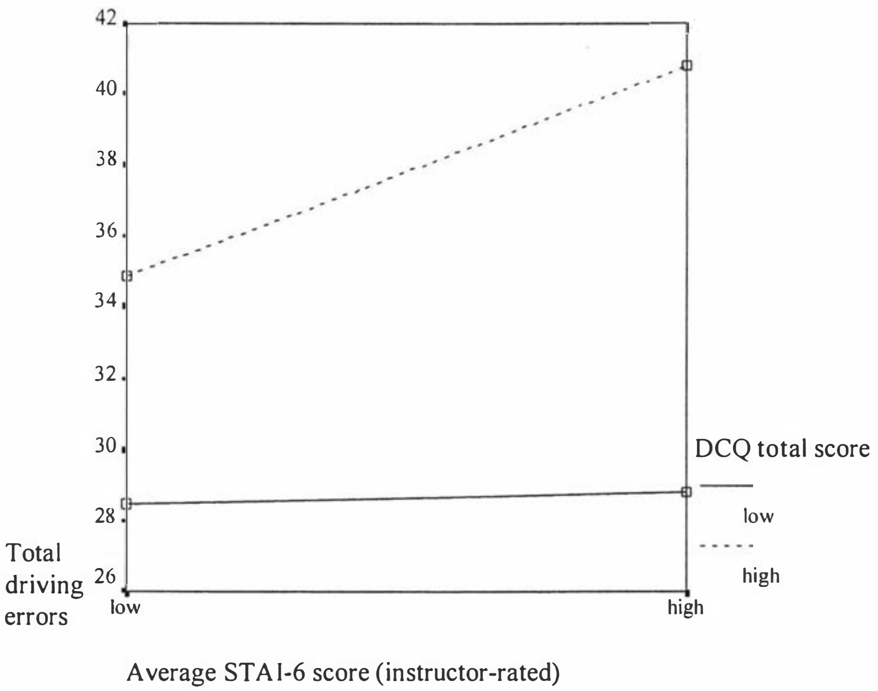

Figure 10.7. *Profile plot for the effect of cognitions and driving anxiety (instructor-rated STAI-6 score) on driving performance (total driving errors).*

Overall, the results were consistent for both measures of driving anxiety, indicating no interaction between driving anxiety and cognitions in driving performance, and did not indicate that either cognitions or anxiety had a moderating effect. However, higher levels of *cognitions*, rather than *driving anxiety*, resulted in reduced performance as indicated by higher levels of driving errors.

Summary

The relationship between driving anxiety and driving performance was investigated in a number of ways. While driving anxiety was mildly correlated with driving performance (r = .29), the relationship appeared modest. Further exploratory analyses found that, while higher levels of driving anxiety were correlated with more errors in reacting in time to situations, taking the correct action, power and velocity, and using the correct lanes, there were no statistically significant correlations between driving anxiety and errors in obeying speed limits, applying the four second rule, steering and guiding, obeying signs, and applying priority rules. The finding that driving anxiety was associated with a lower incidence of speeding convictions but a higher proportion of driving errors was consistent with results by Matthews (2001). However, further comparisons of the present results with those of Matthews were not possible due to the impact of the different methods used to assess driving (i.e., on-road compared with simulator-based assessment). Future research is required to replicate Matthews' results regarding driving anxiety causing an interference effect in single task driving situations, using on-road driving assessments.

Driving-related cognitions that focused on other's negative reactions and injury to others continued to be an important factor associated with both driving anxiety and driving performance. The relationship of driving anxiety to higher concerns about injury to self and others' negative reactions was consistent with cluster 3 identified through the cluster analysis discussed earlier in this Chapter. Higher driving errors were associated with a higher frequency of worry or negative driving-related thoughts, and these worry cognitions interfered more with driving performance in the areas of reacting in time to situations, taking the correct action, using the correct position, and communicating and signalling. In terms of specific types of worry cognitions, concerns about others' negative reactions and injury to others had the highest correlations with driving errors.

Although the analyses did not support worry cognitions as a moderating variable in the relationship between driving anxiety and driving performance, worry cognitions appeared to have a stronger relationship with driving performance than driving anxiety itself. More specifically, those with higher levels of worry cognitions made more errors on practical driving assessment, while there was no difference in errors for different levels of driving anxiety. Given that the present analysis is exploratory, further research is needed to determine the relationships between driving anxiety, driving-related worry cognitions, and driving performance.

Chapter Eleven

SUMMARY AND CONCLUSIONS

This Chapter summarises the results of Study One and Study Two in terms of the aims and objectives proposed in Chapters Two and Five. The findings are set within the context of previous research. Methodological considerations and limitations are highlighted before the overall theoretical and practical implications of the results are discussed. Finally, recommendations are made for avenues for future research.

The central research aim of the present study was to conduct a comprehensive assessment of the clinical characteristics of those who report DRF to obtain a better understanding of the nature of DRF, and to inform approaches to assessment and treatment. The first section of this Chapter summarises the results of Study One and Study Two in terms of their respective aims and objectives.

STUDY ONE: AIMS AND OBJECTIVES

Detailed Description of the Clinical Characteristics of DRF

The first objective of Study One followed the recommendation of Taylor and Deane (2000) to provide a detailed description of DRF in light of the often confusing clinical picture described in previous research.

The sample for Study One was primarily female with an average age of 50 years. Concerns while driving focused on the external themes of accident, injury, and control, as well as concerns about internal expectancies, such as very intense and unpleasant anxiety. Driving-fearfuls were more concerned about events related to danger expectancy than anxiety expectancy. They had high expectations of negative events while driving, such as experiencing an accident, panic attack, traffic jam, and being unable to drive because of anxiety symptoms. Driving-fearfuls expected to experience an accident or panic attack more often than a traffic jam or car breakdown, suggesting that the sample had higher danger and anxiety expectancies than expectancies of what could be assumed to be more likely driving events.

Driving-fearfuls reported high levels of fear of anxiety symptoms as well as experiencing panic attacks and avoidance of driving alone. On the comparative driver ratings, driving-fearfuls perceived that they were more predictable, reliable, considerate, safe, and responsible than *an average driver*, but less relaxed in comparison with *an average driver*. They also rated themselves lower on all dimensions in comparison with *a very good driver*.

Comparison of MVA and Non-MVA Driving-Fearfuls

The second objective of Study One was to further compare fear severity between MVA and non-MVA driving-fearfuls, following the finding by Taylor and Deane (2000) that the two groups did not differ on measures of severity of DRF.

The pattern of concerns while driving was very similar for the MVA and non-MVA groups and both groups rated the same highest concerns, suggesting that the focus of fear is not necessarily different on the basis of MVA involvement (as opposed to the content of driving-related thoughts). Those who have not experienced an MVA also expressed high danger expectancies. There were no differences between MVA and non-MVA participants regarding expectations of negative events. The two groups also did not differ in terms of severity of fear of anxiety symptoms or avoidance behaviour. However, analyses suggested that the lack of group differences for driving concerns and expectations of negative events could have also been due to insufficient statistical power, indicating the need for further research using larger sample sizes (Cohen, 1988, 1992).

Exploration of Potential Subtypes of DRF

The third objective of Study One was to conduct a preliminary investigation of subtypes of DRF.

The factor and cluster analyses supported two potential subtypes of DRF. The first subtype was characterised by danger expectancies (i.e., concerns about accidents, injury, lack of control over the driving situation, and dangerous road conditions), although the inclusion of the variable *very intense and unpleasant anxiety* somewhat confused the picture. The second subtype was characterised by anxiety expectancies (i.e., concerns about anxiety symptoms and their effects on driving) and unpleasant driving situations.

Despite previous findings of high anxiety and avoidance associated with driving with someone who criticises one's driving (Taylor & Deane, 2000), no separate subtype was identified on the basis of the *other people will be critical* driving concern variable. Instead, the variable clustered with the second subtype, characterised by anxiety expectancies and unpleasant driving situations.

STUDY TWO: AIMS AND OBJECTIVES

Description and Comparison of Fearful and Control Groups

The first objective of Study Two served a descriptive purpose to locate the fearful and control groups within the broader context of demographic, driving, and fear severity characteristics. This objective was important given the media-recruited nature of the sample. The groups were matched for gender, average age, and average number of years of driving experience.

Demographic Variables. Fearfuls had a mean age of 44 years and controls 41 years. More fearfuls than controls were taking medication, although this was mostly for conditions other than anxiety.

Driving-Related Variables. Fearfuls and controls were similar for years of driving experience; fearfuls had an average of 20 years while controls had an average of 23 years of driving experience. There was only a one-year difference in the number of years licensed for the two groups. However, fearful participants started to learn to drive at a later age than controls (an average of four years later), a finding similar to that of Ehlers et al. (1994). More than twice as many controls as fearfuls had completed a Defensive Driving Course. However, more controls had had at least one minor driving incident involving damage to the vehicle or personal property recently, as well as being charged with more traffic offences. There were no group differences in terms of number of recent accidents as the driver or number of MVA-related injuries.

Current driving patterns revealed greater group differences. Fearfuls tended to drive less frequently and to restrict their driving to less dense traffic than controls. There were no large group differences in terms of main driving and driving locality, although nine (18%) fearfuls (and no controls) limited their driving to within suburban areas only.

Driving-Related Fear Variables. As expected, fearfuls reported greater levels of severity of DRF and associated symptoms than controls. The main types of most-feared situations reported were fear of an MVA or injury to self or others; specific driving situations, conditions, or manoeuvres; having a panic attack or anxiety symptoms; and social concerns.

On average, fearfuls rated a 36% likelihood of being involved in an MVA, similar to the 42% likelihood reported in Study One. Despite frequent interference of DRF in daily life, only 16-20% of the fearful group had spoken to a mental health or medical professional about their DRF, and few had sought professional psychological help or received professional driving instruction.

Diagnostic Assessment. The lack of helpseeking behaviour was of particular concern given that, using the Composite International Diagnostic Interview-Auto 2.1, 46% (*n* = 23) of fearfuls met DSM-IV criteria for at least one anxiety disorder. However, those meeting diagnostic criteria perceived a higher need for and likelihood to seek professional psychological help than those who did not meet any diagnostic criteria. There were no differences between those with and without a diagnosis in terms of years of driving experience or perceived need for professional driving instruction.

Psychological Assessment. Fearfuls obtained higher scores than controls on all self-report measures except for the blood-injury phobia subscale of the Fear Questionnaire. On the Driving Cognitions Questionnaire, fearfuls reported having the most frequent cognitions while driving as worrying about not reacting fast enough, other people thinking they are a bad driver, and holding up other traffic and making people angry. Social concerns were also evident on the Fear Questionnaire, as the social phobia subscale had the highest total of the Fear Questionnaire subscales.

Driving Assessment. On the practical driving assessment using the Advanced Driver Assessment, fearfuls overall made a greater number of errors than controls. While errors were made in a range of skill areas and driving situations, most errors were made in search techniques, primarily at intersections. While fearfuls made more errors than controls, the pattern of errors was identical for both groups. Therefore, fear and anxiety seemed to affect the *number* rather than the *type* of errors made.

Consistent with the results of the practical driving assessment, controls were rated as having better overall driving skills by both themselves and the driving instructors. These results, coupled with the findings of similar self- and instructor-rated anxiety, support the concurrent validity of such measures.

Comparison of Driver-Fearfuls and Passenger-Fearfuls

The second objective for Study Two aimed to explore the gap in the literature for comparing symptom severity amongst those who are most afraid of being a driver versus being a passenger.

Descriptive comparisons were largely unremarkable, other than the higher perceived likelihood of an MVA among those who feared being a driver. As driver-passenger comparisons were unable to be formally tested due to small sample sizes, this is an area requiring future research.

Subtypes of DRF

The third objective for Study Two, based on the findings of Study One, was to further investigate potential subtypes of DRF.

The exploratory PRINCALS analysis identified four subtypes of DRF, based on the structure of relationships among variables across the fearful group. However, the cluster analysis was more representative of the structure of relationships among fearfuls, and identified three clusters in the fearful sample. Cluster 1 participants had low scores on all variables, and was dominated by participants who did not meet any diagnostic criteria for an anxiety disorder. Members of cluster 2 had moderate DRF scores but high levels of concern about physical symptoms and being stranded, as well as broader phobic complaints. Cluster 2 also showed a predominance of single and multiple anxiety disorder diagnoses. Participants in cluster 3 had high levels of DRF, as well as high levels of concern about injury to others, others' negative reactions, and moderate concern about injury to self. Cluster 3 was dominated by mixed diagnoses. Although cluster 3 also had the highest score for driving errors in the sample, driving errors and concerns about injury to self did not differentiate well across the clusters.

The Relationship Between DRF and Driving Skills

The final objective for Study Two was to explore the relationship between DRF and driving skills.

The relationship between driving anxiety and driving performance appeared relatively modest. In more qualitative terms (since the analysis was exploratory), higher levels of driving anxiety were significantly correlated with more errors in reacting in time to situations, taking the correct action, power and velocity, and using the correct lanes. However, driving anxiety was not correlated with errors in obeying speed limits.

Driving-related cognitions that focused on others' negative reactions and injury to others continued to be an important factor associated with both driving anxiety and driving performance in Study Two. The relationship of driving anxiety to higher concerns about injury to self and others' negative reactions was consistent with the cluster analysis. Higher driving errors were associated with a higher frequency of worry or negative driving-related thoughts, and these worry cognitions were most strongly related to driving performance in the areas of reacting in time to situations, taking the correct action, using the correct position, and communicating and signalling. In terms of specific types of worry cognitions, concerns about others' negative reactions and injury to others had the highest correlations with driving errors.

Although the analyses did not support worry cognitions as a moderating variable in the relationship between driving anxiety and driving performance, those with higher levels of worry cognitions made more errors on practical driving assessment, while there was no difference in errors for different levels of driving anxiety.

METHODOLOGICAL CONSIDERATIONS

Before discussing the theoretical and practical implications of the present study, it is pertinent to temper such discussion with a consideration of the inherent limitations of the research in terms of both internal and external validity.

Internal Validity

Research Design. Study One could be considered primarily cross-sectional in design given its focus on describing the characteristics of a driving-fearful group only. While the absence of a control group necessarily limits the conclusions of Study One, its purpose was exploratory and descriptive and aimed at determining the important variables in need of further study. In contrast, Study Two represented a quasi-experimental design with separate fearful and control groups. Participants were selected for their particular characteristics rather than obtained through random assignment, as this was the most practical recruitment option. Such a design is not experimental and is open to the effects of unknown and uncontrolled variables (Coolican, 1994). However, the design was identical to that of other studies of DRF that have compared fearful and control groups (e.g., Ehlers et al., 1994).

Several experimental controls were built in to the design of Study Two. For example, gender was controlled across groups as an unintentional product of recruiting the fearful sample. Control drivers were selected for similarity to the fearful drivers in both age and years of driving experience. Data collection was undertaken with the same group of examiners under similar conditions that were controlled to the extent that was possible, and within an efficient timeframe, to ensure internal validity. All of these factors were considered to represent as high a degree of internal validity as possible.

Measurement. An important consideration within the measurement procedure was that the order of the various assessment components for Part Two of Study Two was not counterbalanced. All participants first completed the diagnostic interview, followed by the practical driving assessment, and the remaining questionnaires. The main reason for this was that assessment sessions were relatively lengthy (approximately two hours) and information was collected in order of priority in the event that participants dropped out for whatever reason (although this did not occur). Also a consideration was the potential for increased demand characteristics and other forms of expectation associated with completion of the driving assessment early on the data collection. While this may have introduced the potential for variables such as fatigue to affect later assessment components more than those occurring earlier on in the session, this was the same for both groups.

Assessor bias was considered another potential measurement limitation, in that there was the risk of the driving instructors being aware of group membership. While the measurement procedures for the practical driving assessment were standardised and instructors were impartial to the outcome of the study as well as blind to group membership, behavioural cues given at times by participants could have confounded such attempts at measurement control. Some fearful drivers expressed their anxiety about driving or related some of their driving experiences despite being told by the researcher to refrain from anything that might reveal their group membership.

Response biases of participants were also identified as a possible measurement limitation of the present study. For example, motivation to perform well or fear of being embarrassed or negatively evaluated for errors in driving performance may have been extraneous variables affecting the participant groups. A number of steps were taken to minimise the effect of response biases. Confidentiality was assured at every step of data collection. Assurances were also given that the assessment results would have no bearing on participants' driver's licence status.

Potential effects of using the terms *fear* and *anxiety* interchangeably (as in previous research) was another measurement consideration. Of particular interest was whether participants distinguished these two terms or rated them in a similar manner. Results of Study Two found no difference in ratings of overall driving-related *fear* or overall driving-related *anxiety* within participants, suggesting that participants do not distinguish these terms in their ratings.

The use of a practical, on-road driving assessment could be considered a measurement issue because of the problems with reliability from one assessment to the next. However, the importance of the external validity of the driving assessments was thought to outweigh the issue of unreliability given the phenomenon of interest. It was thought that an invalid assessment of fearful participants' driving skills would be obtained from a simulator-based assessment, where levels of anxiety may be reduced in an artificial situation.

Statistical Procedures. The use of multivariate data analysis techniques such as cluster analysis and PRINCALS was considered exploratory in Study Two due to the sample sizes available. While caution was exercised in using these analytical techniques in terms of checking assumptions, future research is needed to replicate the findings in terms of subtypes of DRF, using larger sample sizes.

External Validity

Limitations related to external validity were also considered in the present study, particularly for Study Two. Participants were characterised by a number of features, such as being female and of a similar age range. All participants resided in the lower North Island, predominantly in the two centres of Palmerston North and Wellington. While the fearful sample was similar to other samples of driving-fearfuls (e.g., Ehlers et al., 1994), it is unknown to what extent those with very severe DRF and avoidance were captured within the sample. Nevertheless, these restrictions were necessary because of the detailed and lengthy data collection procedures.

Anecdotally, recruitment was often characterised by participants' commenting on the stigma associated with acknowledging their driving-related fears and anxieties. Many participants expressed a sense of relief that they were not alone in their experience, along with an inability to talk to family, friends, and others in general about their symptoms. Therefore, the recruitment procedures in the present study likely attracted willing volunteers, while those with more severe and incapacitating symptoms may not have volunteered their participation. This may have reduced the overall effects found. However, as noted above, the fearful sample recruited in the present study commented about the stigma of their symptoms, which may not be expected with a less fearful sample. Furthermore, advertisements for the study did not refer to the types of data being collected (e.g., driving assessment; see Appendix D-1).

The predominance of females in the present study is consistent with other studies of DRF (e.g., Ehlers et al., 1994; Mathew et al., 1982; Munjack, 1984) and may reflect the fact that women are generally overrepresented in clinical phobic samples (e.g., Antony et al., 1997; Himle et al., 1991). The reasons for this have largely been unclear. Although unavailable at the time of writing, a recently published book by Craske (2002) has provided the first comprehensive investigation of this issue.

THEORETICAL CONSIDERATIONS

The present study did not intend and was not designed to develop a detailed theoretical position on the relationship between DRF and driving performance. However, attempts were made to locate and integrate the results from Study Two with various driving theories and specifically the empirical work of Matthews and colleagues (see Matthews, 2001).

As reviewed in Chapter Five, most theories of driving from the general driving literature do not deal with the role of anxiety in any detail. Theories of the relationship between anxiety and performance (as a general concept) do consider the role of anxiety in detail, although do not specifically relate this to the dynamic nature of driving. In contrast, the conceptualisation forwarded by Matthews and colleagues (see Matthews, 2001) appears to be the sole link in the existing literature between theories of the anxiety-performance relationship and those specific to the driving situation. It is particularly relevant to the present study that the concept of anxiety used in the research by Matthews was that of *Dislike of Driving*, representing driving-related anxiety, including driving phobia at the extreme.

In sum, Matthews found that the anxiety-related impairment in driving performance was *stronger* when the driving task was relatively undemanding. In explaining this result, Matthews seems to have drawn on processing efficiency theory (Eysenck & Calvo, 1992), suggesting that drivers may well adapt to demanding dual-task situations through increased effort, which then suppresses the effects of any cognitive interference from worry. In contrast, the driver may consider single-task situations less demanding of effort and fail to sustain sufficient effort to maintain performance, instead diverting attention to processing associated with worry. This explanation is represented in Figure 11.1.

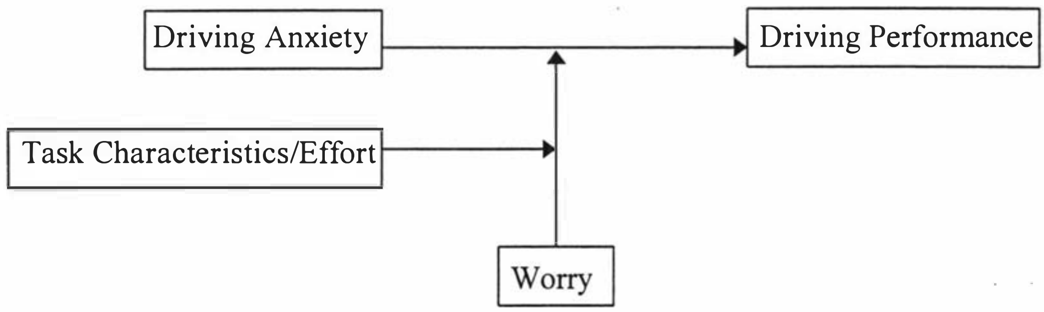

Figure 11.1. *Visual representation of Matthews' (2001) conceptualisation of the relationship between driving anxiety and driving performance.*

While Study Two was not directly comparable with Matthews' (2001) research due to important methodological differences, some of the results of Study Two were consistent with those reported by Matthews. For example, higher frequencies of worry or negative driving-related thoughts were associated with higher driving errors. The lack of support for worry cognitions as a moderating variable in Study Two may have been affected by the lack of manipulation of task characteristics in the research design. Given that the conceptualisation of Matthews draws on well-developed anxiety-performance theory and appears to provide the first link to driving and driving-related anxiety specifically, a promising avenue for future research would be to replicate and extend these ideas. A theory based on the ideas and research of Matthews would not only help to explain the relationship between DRF and driving performance, but could also have potential implications for clinical practice. For example, the moderating role of the characteristics of the driving task may be relevant in planning exposure therapy, where those situations associated with greater cognitive interference and performance impairment may be addressed later in a graded hierarchy. Furthermore, whether specific types of worry are associated with greater performance impairment given certain task characteristics would also be of clinical relevance. In Study Two, negative driving-related thoughts about the negative reactions of other drivers and causing injury to other drivers were those most associated with driving errors.

PRACTICAL IMPLICATIONS AND FUTURE RESEARCH

The results of the present study have other implications for practice in addition to those that flow from the theoretical considerations outlined above.

Prevalence

The sample size in the present study and the lack of differences between MVA and non-MVA participants suggest a broader population of driving-fearfuls than has been represented by the previous literature. While in many instances those with DRF may present a confusing diagnostic picture, such symptoms can still interfere significantly with daily functioning and cause distress. As noted by Cotton (1998),

> Accordingly, it is important to distinguish three types of psychological health issues for which consumers may consult psychologists: (a) clinically diagnosable *psychological disorders*, (b) *psychological problems*, that is, emotional difficulties that significantly disrupt personal, social, and/or vocational functioning but may be, in formal terms, subclinical and not warrant a formal diagnosis; and (c) *personal-development issues*, that is, self-exploration and life enhancement concerns in which personal growth rather than the amelioration of pathology is the focus...The second group is more variable in expression and more elusive in yielding to a comparable degree of formalisation. (pp. 32-33)

While almost half of the fearful sample in Study Two met DSM-IV criteria for a psychological disorder and were therefore represented by the first group identified by Cotton (1998), the rest of the driving-fearfuls likely fell into the second, more subclinical, group. The present study supported the presence of a broader DRF population than has been previously identified in prior research, which has focused on MVA-related driving fears and phobias. The focus on MVA groups has been determined in part by medico-legal implications, insurance issues, and the potential for post-traumatic stress disorder following MVA trauma (see Blanchard & Hickling, 1997). Identification of a broader DRF group is particularly important in the context of a lack of difference in symptom severity between MVA and non-MVA driving-fearfuls. Further research is needed to replicate these findings.

There may also be implications for identifying those in need of treatment. Fearfuls whose DRF is MVA-related may be more likely to be involved with insurance companies as they receive treatment for post-MVA problems, such as physical injuries or psychological distress that has been caused by the MVA. Non-MVA driving-fearfuls, on the other hand, may be more difficult to identify and, coupled with the stigma associated with not driving that was reported anecdotally in the present study, may be less likely to seek psychological help.

Study Two explored differences between fearfuls who were most afraid of being a driver versus being a passenger, although further research would benefit from manipulating this variable and examining any differences using an experimental design. If differences between these groups can be identified, there may be implications for assessment and treatment. For example, a greater fear of being a passenger may mean that exposure sessions need to consider another person as the driver, such as the therapist initially, after which a friend or family member may take over as treatment progresses. Ascertaining the degree of fear as a driver and as a passenger is therefore an important assessment component that could help to develop efficient and effective treatment sessions.

Problem Severity

The pattern of problem severity as defined by cognitive, behavioural, and emotional functioning, set driving-fearfuls apart from their control counterparts in Study Two. Levels of avoidance behaviour and emotional functioning gleaned from psychometric assessment indicated relatively high problem severity among the fearful sample as a whole. Assessment of cognitions provided further insights into the types of thought processes experienced by those with DRF. In both studies, fearfuls rated a very high (36-42%) likelihood of having an MVA (compared to the control group's rating of 7.8%) that was out of proportion to actual risk. Such cognitive errors are likely to increase feelings of vulnerability and maintain anxiety and fear reactions. The types of negative driving-related thoughts rated highly by fearfuls also reflected a high frequency of worry about MVAs, although worries about the negative reactions of other drivers and injuring other people were also predominant. Although previous studies (e.g., Ehlers et al., 1994) have not borne out the suggestion of the potential relevance of social concerns in DRF, the present study indicates that such concerns are an important feature of the broader DRF population and are worthy of further study. These types of cognitive processes have implications for the use of cognitive therapy as well as behavioural experiments in the treatment of DRF.

Driving Assessment

The various driving-related variables highlighted some potentially important differences between fearfuls and controls that are worth investigating further. In particular, the finding that fearfuls started to learn to drive later than controls may signify early vulnerability to fearfulness, or could simply reflect less driving experience. Additional exploration of the reasons for learning to drive later in life may be helpful, particularly since the lack of group differences for recent accidents or injuries sustained in MVAs suggests that factors other than MVAs may be important in the onset and maintenance of DRF. Early driving-related learning experiences (either direct or vicarious) may hold promise for better understanding the etiology of DRF and the potential for early intervention or prevention.

The present investigation appears to be the first to assess driving skills in those with DRF. Fearfuls and controls tended to make the *same kinds* of driving errors, but fearfuls made *more* such errors than controls. It might be expected that increased driving errors would lead to greater accident involvement, but this was not found in the present study. Factors such as increased behavioural caution may account for this result. Additional research is needed to explore the driving skills of those with DRF compared with controls so that clear recommendations for assessment and treatment can be made. In particular, future research could examine Matthews' (2001) predictions about anxiety and driving performance by examining errors across driving situations with different levels of difficulty. For example, relatively global errors in search techniques (as found in Study Two) may differ according to task severity. Matthews would propose that fewer errors in search techniques would be made in difficult driving situations, as opposed to more such errors in relatively simple driving tasks. Such research would also assist in targeting treatment interventions more specifically, if certain errors under certain task characteristics can be identified as typically problematic for those with DRF.

Assessment and Treatment

In addition to the practical implications for assessment and treatment discussed above, a number of further recommendations can be made based on the results of the present study. In particular, the Driving Cognitions Questionnaire showed promise as an assessment instrument and was helpful in ascertaining the types of driving-related worries typically experienced by those with DRF. Further analysis of the psychometric properties of the Driving Cognitions Questionnaire would be useful, as would an independent comparison of the shortened 25-item version identified through the factor analysis in Study Two with the full 49-item form. Certainly, the internal consistency reliabilities ranging from r = .94-.96 (present study) to r = .98 (Ehlers et al., 1994) for the 49-item version suggest that all items may not be necessary. In addition, the similarity between self-ratings and instructor ratings of anxiety and driving skill after completion of the practical driving assessment in Study Two support such measures as useful adjuncts.

The present study explored a possible typology of DRF that could have implications for treatment. As noted in Chapter Ten, the primary concerns of fearfuls in cluster 2 were related to physical symptoms and being stranded. This finding may be indicative of an internal focus of fear or anxiety expectancy, and is also very consistent with an agoraphobic presentation. In contrast, the concerns of cluster 3 fearfuls seemed more consistent with an external focus of fear or danger expectancy, given the high levels of concern about injury to others and others' negative reactions. As suggested by Wilhelm and Roth (1997), differences such as this may have implications for the kinds of exposure tasks that are effective in treatment. For example, exposure to external stimuli may be ineffective for those in cluster 2 whose primary concern is about experiencing physical symptoms of anxiety. Conversely, exposure to internal stimuli may be equally ineffective for members of cluster 3 whose main concerns are injuring others and other people's negative reactions to their driving. More research is needed to replicate these findings and further investigate whether a typology of DRF can help to make treatment interventions better targeted to symptom dimensions and thus more efficient and effective.

Errors on the practical driving assessment did not differentiate well across the clusters and therefore suggest that no one subtype requires professional driving instruction more than another. However, these results require replication and further study and, since fearfuls made a higher number of driving errors overall compared with controls, a driving assessment may be of use as part of a general assessment process. Whilst the present study does not fully explain the relationships between driving skill and DRF, it strongly suggests the need for further research, given that: (a) fearfuls made a higher number of errors than controls, (b) in the full sample, self-reported driving anxiety ratings were correlated significantly but modestly with performance (r = .29), (c) in the full sample, instructor ratings of driver anxiety were correlated significantly but moderately with performance ($r = .37$), (d) relationships between self-ratings and instructor ratings of anxiety and some specific types of driving errors were more substantial (e.g., $r = .51$ for *power and velocity*), and (e) in general, the shape of the relationship in the sample was adequately explained as a linear function.

Together, these findings suggest the need to consider driving skill in the assessment and treatment of DRF. The present study did not establish what causal relationships (if any) may be present between DRF and driving skill. It is unclear what role driving performance may play in the development and maintenance of DRF. Certainly, the role of cognitions or worry as a component of the fear response is likely to play a strong role and future research should include this as a potential explanatory variable in the DRF and driving performance relationship. Until such time as these issues have been clarified, clinicians would be wise to consider a driving skill assessment as part of a comprehensive assessment process for DRF.

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APPENDIX A-1

Taylor, J.E., Deane, F.P., & Podd, J.V. (in press). Driving-related fears: A review. *Clinical Psychology Review.*

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Driving-related fear: A review

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Abstract

This article reviews the research on driving-related fear (DRF). Until recently, research has concentrated almost exclusively on the effect of motor vehicle accidents (MVAs) on subsequent levels of DRF. However, recent findings have suggested that MVAs are not solely responsible for this fear reaction, and that non-MVA d iving fear can be just as strong. Studies of the broader driving-fearful population have encountered difficulty with diagnostic conceptualisation of DRF, although some have investigated a possible typology of DRF. Driving skill has been a neglected issue in the DRF research, and may prove to be a useful part of assessment and remediation of this potentially debilitating problem. Issues of definitional inconsistency are highlighted, and suggestions are made for several di ections that future research might profitably take. © 2001 Elsevier Science Inc. All rights reserved.

Keywords: driving-related fear; review

1. Introduction

Driving is considered to be a fundamental part of living in modern society. It is a skill which frequently facilitates the maintenance of independence and mobility, and enables contact with a wide variety of important activities. Fears related to driving have the potential to severely restrict these freedoms. A significant proportion of the existing research on driving-related fear (DRF) has come from an interest in the psychological consequences of motor vehicle accidents (MVAs). This research has documented posttraumatic stress disorder (PTSD) and DRFs as relatively common in the constellation of symptoms that can manifest as

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a result of MVAs. With increasing recognition of the typical symptomatology arising from MVAs, researchers have begun to identify a broader sample of people who report DRFs. Although there have been reviews of the clinical and research literature on MVA-related driving fears (Blanchard & Hickling, 1997; Hickling & Blanchard, 2000; Taylor & Koch, 1995), there is no such review pertaining to those who identify themselves as having a fear of driving which is not necessarily related to an MVA. However, sufficient research has now been conducted with this group to warrant a review, especially to enable comparisons to be made between MVA and non-MVA driving-fearfuls.

The present article begins with a brief overview of the research on fear reactions to MVAs. Then, studies of the broader (non-MVA) driving-fearful population are summarised and compared to the MVA driving-fearful population. The MVA and non-MVA studies have typically been characterised by inconsistency in defining DRF. Some studies have referred to the phenomenon as a *phobia*, while others have used varying *anxiety* terms. Furthermore, some research has found that DRF often presents as part of a broader symptom picture, making a clear definition even more difficult. The present review highlights these definitional problems, and uses the term *DRF* to refer to the phenomenon of interest. The need for improved definitional clarity is stressed, as this may assist in conceptual and theoretical development as well as aiding in comparing results across studies. Finally, promising avenues for future research are discussed, with a particular focus on the assessment of driving skills. driving-related fear

2. Fear reactions to MVAs

A number of investigators have explored the psychological sequelae of MVAs (for a review, see Blanchard & Hickling, 1997; Blaszczynski ~~et al.~~, 1998; Hickling & Blanchard, 2000; Koch & Taylor, 1995; Mitchell, 1997; Taylor & Koch, 1995). Perhaps the most widely researched psychological disorder following MVAs is PTSD (for a review, see Blanchard & Hickling, 1997; Hickling & Blanchard, 2000; Kuch, Cox, & Evans, 1996). Gordon, Silove, Sloane, Hillman, & Panasetis

Other fear reactions to MVAs have also been documented, and the relevant studies are summarised in Table 1. These studies include medical, legal/medical, and clinical studies of survivors of MVAs. They include samples referred for medical complaints, medico-legal opinion, assessment of somatic symptoms, and treatment after an MVA. Further studies examined people who had sought medical attention after an MVA, or who were referred to private psychological practices for assessment or treatment following an MVA.

2.1. Driving phobia

As Table 1 shows, studies of MVA survivors have defined *driving phobia* in quite different ways, one consequence of which has been to increase variation regarding incidence. One key difference among the definitions is whether complete avoidance of driving is required. Blanchard and Hickling (1997) define driving phobia as "either complete elimination of all driving or severe restriction of all driving" (p. 87). These stringent criteria have likely led to the lower rates of driving phobia (2–6%) among their samples of MVA survivors compared to those found in some other studies. For example, using similar samples but less restrictive criteria (i.e., complete avoidance not required), Hickling and Blanchard (1992) and Kuch, Swinson, and Kirby (1985) found higher rates of driving phobia, ranging from 42% to 77%. Blanchard and Hickling have a separate definition for *driving reluctance*, which includes lesser degrees of avoidance, such as "avoidance of all discretionary (driving for pleasure) driving or riding, and avoidance limited to the accident site or certain classes of driving situations (high-speed highways, rainy or snowy weather, etc.)" (p. 500). They consider that their definition of driving reluctance more closely approximates Kuch, Cox, Evans, and Shulman's (1994) criteria for *accident phobia*.

2.2. Accident phobia

Accident phobia has been defined as meeting DSM-III-R criteria for simple phobia of driving, as well as requiring that the fear onset, content, symptoms, and behaviour be related to an MVA (Kuch, Evans, Watson, Bubela, & Cox, 1991). Kuch et al. (1994) diagnosed accident phobia as "an intensification of symptoms associated with exposure to driving, a fear-related substantial reduction of miles normally travelled, when driving was restricted to certain roads, weather conditions, drivers, and seats in the car, and when there was excessive cautioning of the driver by the patient" (p. 183). In their more recent study, Kuch, Cox, and Direnfeld (1995) also include various criteria for PTSD in their diagnosis of accident phobia. Incidence rates reported from these studies range from 26% to 49%, even with relatively similar definitions of accident phobia.

2.3. Other definitions

The remaining research on MVA survivors has used a variety of other terms (which are frequently undefined) to refer to DRF, most frequently *phobic travel anxiety*.

2.4. Summary

The existing literature on DRF among MVA survivors is characterised by definitional inconsistency, and reports of incidence rates have been affected by this (Blaszczynski et al., 1998). Future research must utilise consistent definitions, otherwise comparisons of incidence rates across studies are meaningless. Furthermore, conceptual and theoretical development is difficult in the face of such a wide range of "operational" definitions of DRF. Definitions of driving phobia have differed mainly according to the extent of avoidance required. However, avoidance is only one aspect of *phobia* in its strictest sense according to the current (fourth edition) Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994). Use of the term *phobia* should be restricted to these guidelines, as they provide a standard definition which facilitates ease of discussion and permits comparison across studies. Accident phobia as a term is also confusing, because it does not clearly relate the phobia to driving, and could perhaps be called "MVA phobia."

Table 1
Summary of studies on DRF in MVA survivors

Study	Description of sample	Term used	Definition	Incidence (%)
Kuch et al., 1985, Canada	30, 73% F *M* age NR	Driving phobia	Avoidance of, or reduction in, driving, or endurance of necessary driving with marked discomfort	77
Kuch, 1989, Canada	80, 66% F *M* age NR	Specific posttraumatic phobia	NR	71
Kuch et al., 1991, Canada	33, 52% F *M* age 43.1	Accident phobia	DSM-III-R phobic disorder Onset and fear content related to an MVA Symptoms and behaviour focus on potential repetition of MVA	49
Kuch et al., 1994, Canada	55, 66% F *M* age 38	Accident phobia	DSM-III-R simple phobia with onset after MVA and fear of MVA	38
Kuch et al., 1995, Canada	54, 56% F *M* age 41.1	Accident phobia	DSM-III-R simple phobia and PTSD criteria B (distress) and C (avoidance)	26
Hickling & Blanchard, 1992, USA	20, 85% F *M* age 34.6	Driving phobia	Kuch et al.'s (1985) criteria	60
Blanchard, Hickling, Taylor, Loos, & Gerardi, 1994, USA	50, 64% F *M* age 33.7	Driving phobia Driving reluctance	Complete avoidance of driving for psychological reasons Avoidance of certain aspects of driving	2 [100]
Blanchard, Hickling, Taylor, & Loos, 1995; Blanchard et al., 1996, USA	158, 68% F *M* age 35.4	Driving phobia Driving reluctance	Avoidance of all driving or endures necessary driving with subjective discomfort	6
			Avoids MVA site	[21]
			Avoids certain driving aspects	14
			Avoids driving/riding for pleasure	21
Mayou, Bryant, & Duthie, 1993, UK	188, 21% F *M* age 30	Phobic travel anxiety	Present State Examination criteria	14
Dalal & Harrison, 1993, UK	56, gender and age NR	Phobic travel anxiety Anxiety disorder	NR [redacted]	11 18
~~deP.~~ Horne, 1993, Australia	7, 71% F *M* age 31.3	Phobic anxiety	DSM-III-R PTSD subcriteria (various)	57
Hobbs, Mayou, Harrison, & Worlock, 1996, UK	54, 43% F *M* age NR	Phobic travel anxiety	NR	20

move [redacted] term used and incidence down to be level with the definition

(continued on next page)

Table 1 (*continued*)

Study	Description of sample	Term used	Definition	Incidence (%)
Vingilis, Larkin, Stoduto, Parkinson-Heyes, & McLellan, 1996, Canada	149, 38% F *M* age NR	Fear of driving	Self-report during interview	38
		Fear of cars	[redacted]	25

Studies are ordered by research groups. Description of sample refers to *N*, percentage of female participants, and mean age. NR = not reported. Incidence refers to the percentage of cases meeting criteria according to the term used. Horne's (1993) cases all met the requirements for diagnostic Category A (serious MVA) for PTSD, none met requirements for Category B (reexperiencing), and a mixture endorsed symptoms in Categories C (avoidance) and D (arousal) without meeting full requirements.

However, it is unclear whether or how accident phobia is distinct from PTSD or specific phobia, and further definitional clarity should be provided in future studies.

3. Non-MVA research on DRF

The MVA research has greatly enhanced our understanding of the psychological consequences of MVAs, but the focus on accident-related phenomena has led to a relative neglect of the broader driving-fearful population. Relatively few studies have examined DRF in general community samples of people who identify themselves as having some degree of DRF, not necessarily related to an MVA. These studies are summarised in Table 2. It is worth noting that all of the studies recruited participants by advertising in newspapers or on television for people who were afraid of driving.

Mathew, Weinman, Semchuk, and Levin (1982) recruited 48 people who were considered "driving phobic" because they had some degree of anxiety while driving under normal city conditions, identified their fear as inappropriate and excessive, and felt that their fear

Table 2
Summary of studies on self-identified DRF in general community samples

Study	Description of sample	Term used	Definition	Incidence (%)
Mathew et al., 1982, USA	48, 81% F *M* age 42.1	Driving phobia	Interview data (anxiety inappropriate, excessive, interfered with lifestyle)	100
Munjack, 1984, USA	30, 83% F *M* age NR	Driving phobia	NR	100
Ehlers et al., 1994, USA	56, 82% F *M* age 48.4	Driving phobia	DSM-III-R simple phobia (driving)	70
Taylor & Deane, 1999, 2000, NZ	190, 92% F *M* age 46.5	DRF	Some degree of DRF	100

Studies are ordered by date. Description of sample refers to *N*, percentage of female participants, and mean age. NR = not reported. Incidence refers to the percentage of cases meeting criteria according to the term used.

seriously interfered with their lifestyle. The authors introduced a problem of definition by failing to report whether or not any specific diagnostic criteria were used. Compared with an age- and sex-matched control group, "driving phobics" reported higher levels of anxiety while driving in both normal and difficult situations, and 48% avoided driving on motorways, in congested traffic, and in fast-moving traffic. Mathew et al. (1982) found that about half of their "driving phobics" could explain their DRF in terms of another fear, such as heights (avoiding overpasses) and claustrophobia (avoiding tunnels), and they therefore suggested that the term *driving phobia* should only be used for those whose fear relates specifically to driving. This suggestion is consistent with the present call for a stricter use of terms in the DRF literature.

In an investigation of the onset of driving phobias, Munjack (1984) found that 70% of participants reported a specific conditioning experience in the onset of their "driving phobia" (undefined), such as "a collision, an upsetting occurrence directly associated with driving or an endogenous or spontaneous panic attack" (p. 306). This study supports the view that factors other than MVAs can contribute to the onset of DRFs. As with previous studies, however, Munjack does not provide details of how driving phobia was diagnosed.

Ehlers, Hofmann, Herda, and Roth (1994), Hofmann (1992), and Sartory, Roth, and Kopell (1992) compared 56 "driving phobics" and 31 controls using a behavioural avoidance test, structured interviews, and a number of self-report questionnaires. Ehlers et al. (1994) diagnosed driving phobia according to the DSM-III-R (American Psychiatric Association, 1987) criteria for simple phobia using the Structured Clinical Interview for DSM-III-R and scores on the Mobility Inventory, a measure of agoraphobic avoidance. Of the phobics, 70% ($n = 39$) met criteria for simple phobia of driving, while 14% ($n = 8$) were diagnosed with panic disorder (with or without agoraphobia), and 11% ($n = 6$) with agoraphobia without history of panic disorder. The remaining three phobics did not meet full criteria, with one or both of the immediate anxiety response and avoidance aspects unsatisfied. Ehlers et al. incorrectly refer to their sample as "driving phobics," even though 30% did not meet the diagnostic criteria used. Furthermore, none of the controls met the criteria for an anxiety disorder. Ehlers et al. found that their driving phobics were particularly anxious when driving on freeways, rated significantly more anxiety and discomfort than controls in all driving situations on a self-report questionnaire, and had higher scores than controls on various measures of fear severity. The main reason for the phobia was reported as an MVA by 15% of the sample and panic attacks by 53%.

Taylor (1996), Taylor and Deane (1999), and Taylor, Deane, and Podd (1999) have conducted more recent studies on DRF. Taylor and Deane recruited 190 driving-fearfuls from media coverage of the study. Although no diagnostic criteria were used, it was considered important to initially provide more understanding of the clinical characteristics of people with DRF given the problems in the literature with diagnostically conceptualising DRF. Participants completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin of DRFs, their strength, and anxiety response patterns. MVAs were reported as the cause of the DRF by 27% of participants, while 15% reported onset events which involved distressing symptoms of anxiety, 9% described vicarious (i.e., seeing others become hurt or fearful in a driving situation) and informational (i.e., being given information related to driving, such as stories or warnings) conditioning events, 8% reported mixed conditioning events, 25% said that they had always been fearful, and 10% reported no memories of how their DRF originated.

Taylor and Deane (2000) also compared those who had experienced at least one MVA (MVA participants, $n = 140$) with those who had not experienced an MVA in their lifetime (non-MVA participants, $n = 50$) on measures of fear severity, interference of fear in daily functioning, and help-seeking behaviour. There were no differences between the two participant groups on self-report measures of the physiological and cognitive components of fear or measures of anxiety. Patterns of concerns while driving were very similar for MVA and non-MVA participants. There were also no differences in terms of how much their fear interfered with daily functioning, avoidance of obtaining a driver's license, expectations of negative events while driving, or help-seeking behaviour. When those who attributed their fear to an MVA ($n = 78$) were compared with those who did not ($n = 112$), again no differences were found on the measures noted above.

These findings suggest that non-MVA participants exhibit symptoms of a similar severity to those who have experienced an MVA. However, non-MVA participants have not received the attention in prior studies that has been afforded MVA survivors. The driving-fearful population is much broader than has been previously realised, and Taylor and Deane (2000) suggest that "further studies are needed to investigate the clinical characteristics of this increasingly diverse population" (p. 16).

3.1. *Heterogeneity of DRF and phobia*

3.1.1. *Diagnostic issues*

The non-MVA research on DRF is plagued by definitional inconsistency. Such difficulties with diagnostically conceptualising DRF may be related to the difficulty of obtaining a clear diagnosis in such samples. In the only published study of the non-MVA driving-fearful population, which has included DSM-based diagnoses, Ehlers et al. (1994) note that their sample was "not easy to diagnose" (p. 335). These researchers described both the heterogeneity of media-recruited "driving phobics" and the difficulty in relating clinical presentations to single DSM-III-R diagnostic categories (Ehlers et al., 1994; Herda, Ehlers, & Roth, 1993; Hofmann, 1992; Sartory et al., 1992). Instead, driving phobics tended to meet criteria for multiple diagnoses and manifested features of simple phobia and panic disorder with agoraphobia without meeting the full criteria for either disorder. For example, 44 (81.5%) participants reported panic attacks, but only 8 of them (14.3%) met the full criteria for panic disorder (with or without agoraphobia). Furthermore, panic attacks were often not specific to the driving situation; 19 (35.2%) participants had panic attacks only in driving situations, 7 (13.0%) in situations other than driving, and 18 (33.3%) in both driving and other situations. Ehlers et al.'s diagnoses also differed according to how Criterion A for simple phobia was interpreted. Criterion A states that simple phobia is a persistent fear of a circumscribed stimulus (object or situation) other than fear of having a panic attack (as in panic disorder) (American Psychiatric Association, 1987). Since 37 (68.5%) participants who reported panic attacks were afraid of having such attacks in the driving situation, Ehlers et al.

could either exclude all participants with a fear of panic attacks in driving situations, or only exclude those who met panic disorder criteria. Taking the former scenario, 10 (17.9%) met criteria for simple phobia, while 30 (53.6%) were classified into the category "anxiety disorder not otherwise specified."

The advent of DSM-IV (American Psychiatric Association, 1994) may have provided a solution to this problem. One major change in the diagnosis of specific phobia in DSM-IV from simple phobia in DSM-III-R was the specification of specific phobia type into *animal* type, *natural environment* type (e.g., heights, storms, water), *blood–injection–injury* type, *situational* type (e.g., planes, lifts, enclosed places, driving), and *other* type. These categories were included on the basis of research suggesting that subtypes of specific phobia differ on various dimensions, such as etiology, age of onset, gender ratio, and anxiety response patterns (e.g., Antony, Brown, & Barlow, 1997; Craske & Sipsas, 1992; Curtis, Hill, & Lewis, 1990; Curtis, Himle, Lewis, & Lee, 1989; Himle, McPhee, Cameron, & Curtis, 1989; Hugdahl & Öst, 1985). This is very different from earlier conceptualisations of simple phobia as a homogeneous entity. Criteria for specific phobia now allow for the possibility that exposure to the feared stimulus results in a panic attack, although the panic attack is situationally specific, rather than apparent in a variety of situations as in panic disorder (Kaplan, Sadock, & Grebb, 1994). Despite this clarification in DSM-IV, driving phobia contains multiple foci of fear which are difficult to separate. Hofmann (1992) notes that:

> In driving phobics, anxiety usually begins to rise in anticipation of entering a driving situation and rises further thereafter. . .This means that driving phobics are afraid of both aversive increases in anxiety and the driving situation, since the two usually occur together. Driving phobics often describe this increase of anxiety in the fearful situation as 'panic attacks' (p. 134).

In addition,

> Categorizing phobias by the nature of fear cognitions seems also insufficient. In performance and other situational phobias, the anxiety itself is aversive, the deterioration of performance is dangerous or embarrassing, and the situation usually becomes an object of avoidance. Quantitative variations in the specific balance between categories of fear cognitions are probably unsuitable for assigning phobics to the presumably qualitatively different diagnoses of Panic Disorder (fear of anxiety and its symptoms), Simple Phobia (fear of external situations), Social Phobia (fear of embarrassment), or Generalized Anxiety Disorder (worry about "life circumstances" such as "academic, athletic, and social performance") (p. 135).

Typically, driving-fearfuls have a mixture of all of these kinds of thoughts (Ehlers et al., 1994). Despite attempts to create distinct categories of specific phobia types, it has been suggested that the boundary between particular specific phobias and other anxiety disorders is unclear, particularly in the case of situational-specific phobias (Curtis et al., 1989). Some researchers (e.g., Curtis et al., 1989; Himle, Crystal, Curtis, & Fluent, 1991) have indicated that situational-specific phobias share more features of the dimensions of panic disorder and agoraphobia than other specific phobia types. In a recent overview of the evidence for this relationship, Antony et al. (1997) noted that similarities between situational-specific phobia and agoraphobia have been found in terms of age of onset (mean onset age in the

20s), etiology (occurrence of unexpected panic attacks), and focus of apprehension (on physical symptoms).

These issues mean that the differential diagnostic distinctions for anxiety disorders appear rather arbitrary for specific performance phobias (Ehlers et al., 1994). Chapman (1997) notes the difficulty in differentiating specific phobias from agoraphobia with the illustration that some studies have combined fears of "tunnels or bridges," "crowds," and "public transport" into an "agoraphobia" category only (e.g., Eaton, Dryman, & Weissman, 1991). However, such fears may also be indicative of specific phobia rather than agoraphobia (Fyer & Klein, 1992), and the procedure has misclassified specific phobics as "agoraphobics without panic" (Horwath, Lish, Johnson, Hornig, & Weissman, 1993; McNally, 1997). Some investigators conclude that situational phobias (such as phobias of driving and flying) are not a variant of agoraphobia (e.g., Antony et al., 1997). Other authors have found that it is difficult to distinguish phobic from panic anxiety (Craske, 1991; Himle et al., 1989, 1991). A complicating factor involves the common presentation of DRFs as a component of agoraphobic anxiety and avoidance (Kuch & Shulman, 1989). Indeed, some authors consider that DRF may occur either as a set of apparently isolated symptoms or more usually as part of panic disorder and agoraphobia (Himle et al., 1989, 1991).

cited in Chapman, 19..

Problems with the diagnosis of specific phobia for driving using DSM-IV have also been outlined by Blanchard and Hickling (1997). They noted that this diagnosis is problematic because (a) the anxiety may be better accounted for by another mental disorder (e.g., PTSD after an MVA), (b) the anxiety may not invariably provoke an immediate anxiety response, (c) there may be times when driving does not evoke the particular triggers required for a phobic response, and (d) the response may not be regarded as a fear as much as a situation that elicits anxiety and uncomfortable affect (Blanchard & Hickling, 1997). Future research needs to use current diagnostic classifications to begin to resolve this issue. Although DSM-IV allows for situationally specific panic attacks in specific phobia (thereby resolving the previous confusion between diagnoses of panic disorder and simple phobia), the multiple foci of fear that appear to be inherent in DRF continue to present a diagnostic challenge, as they are often used for differential diagnosis. Additional research with current diagnostic criteria may be a starting point to clarify this issue.

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3.1.2. Typology and DRF

The apparent heterogeneity of DRF has led to attempts to discern different subgroups of DRF to gain a better understanding of the factors which might differentiate among potential subgroups, and therefore assist with assessment and treatment procedures. Similar research has been conducted with flying phobia, which has also been found to be diagnostically complex (e.g., Borrill & Foreman, 1996; Ekeberg, 1991; Foreman & Borrill, 1993, 1994; Greco, 1989; McNally, 1997). Subgroups of flying phobia based on focus of fear have been identified (McNally & Louro, 1992; Van Gerwen, Spinhoven, Diekstra, & Van Dyck, 1997). Subgroups of flying fear may have implications for treatment (Van Gerwen et al., 1997). For example, in terms of exposure as a therapy component, Wilhelm and Roth (1997) suggest that both panic disorder with agoraphobia and specific phobia groups need to be exposed to external stimuli, while exposure to bodily sensations is only required for those with panic disorder with agoraphobia.

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Similar research has been conducted with DRF by Ehlers et al. (1994), who identified subgroups of driving phobics on the basis of the subjective reason for the phobia, or the onset circumstances. Phobics were grouped according to the primary reason they gave for their phobia: "traumatic experiences" (Trauma group), "panic attack" (Panic Attack group), and "generally anxious person" or "generally afraid of high speed/enclosed spaces" (Other Anxieties group). The groups did not differ in terms of gender, employment, previous treatment for anxiety problems, use of medication, or medical history. There were differences between the groups in terms of age and years of education. Severity of phobia was also similar across the three groups based on anxiety ratings in various driving situations and avoidance scores on the Mobility Inventory. In terms of concerns while driving, the Panic Attack group were more concerned about anxiety symptoms and their consequences while driving than the Other Anxieties group, and the Trauma group was less concerned about losing control than either of the other two groups. Contrary to Ehlers et al.'s expectations, the Trauma group was no more concerned about car accidents and dangerous traffic situations than was the rest of the sample.

In a preliminary study, Taylor, Deane, and Podd (2000) used factor analysis and cluster analysis to identify potential subgroups of DRF. Using the 14-item Concerns While Driving Scale (Ehlers et al., 1994), four factors were identified. Factor 1 seemed to be consistent with the dimension of danger expectancy, while Factor 2 was made up of variables consistent with anxiety expectancy. Factors 3 and 4 consisted of unpleasant and dangerous driving situations, respectively. Cluster analysis was then used to further investigate a possible typology of concerns while driving, or focus of fear. Using Ward's method, the hierarchical cluster analysis suggested two clusters. The first cluster grouped the following concerns together: accident, injury, lose control over the car, very intense and unpleasant anxiety, dangerous road conditions, and no control over other people's driving. The remaining eight concern variables formed the second cluster. Although the results of both analyses supported the notion of two main subtypes of DRF based on danger and anxiety expectancies, the results must be interpreted cautiously. The clusters found could not be further validated, and no diagnostic evaluation was used. While subgroups of DRF seem to focus on danger and anxiety expectancies, further research is needed to confirm these subgroups. This would be best accomplished in conjunction with formal diagnostic evaluation.

3.2. *The role of driving skills*

Fear that is related to the task of driving is somewhat different from other types of fear (such as fear of flying) in that driving has a large performance component. Driving is an activity which is dependent upon the acquisition of a complex set of skills (Groeger, 1988). Drivers must be competent at operating their own vehicle and be proficient at dealing with the environment in which they are driving. For someone lacking in these skills, it is plausible that they may develop some anxiety, or even fear, towards the driving task.

It is surprising that there is no existing research which has explicitly investigated whether driving skills play a role in DRF. This gap in the literature is of particular concern because the level of driving skill may have important implications for the assessment and remediation of

DRF. For example, if the focus of fear for some driving-fearfuls is on their actual driving skills deficits, then the use of a skill assessment and/or driving instruction may be beneficial and enhance treatment efficacy and efficiency. Similar utility may be gained where the individual has low self-confidence in their driving ability. They may perceive their driving ability to be worse than actual skills assessment reveals.

The only aspect of existing DRF research, which has approximated the investigation of remove comma
driving skill~~s is~~ the few studies which have used behavioural avoidance tests in the are
assessment of their driving-fearful samples. Ehlers et al. (1994) describe in detail the use of a behavioural avoidance driving test as part of their assessment procedure. Although they report that this test took about two hours, the purpose of the testing was not to assess driving skill but to gather physiological data. Kuch (1989, 1997) mentions behavioural tests as useful assessment measures, although again there is no discussion of the assessment of driving skills, even though it is suggested that a defensive driving course may be a useful part of the intervention. Some authors (e.g., Flynn, Taylor, & Pollard, 1992; Kuch, 1988; Levine & Wolpe, 1980; Williams, Dooseman, & Kleifield, 1984; Williams & Rappoport, 1983; Wolpe, 1982) have noted their use of road tests as part of an assessment and/or exposure programme with driving phobics in both research and case studies, but there have been no studies of the role of driving skills in DRF or the patterns of driving skills that may be predominant amongst those with DRF.

Why no prior research has specifically investigated the driving skills of those with DRF is unclear, although there are potential practical difficulties which may have discouraged investigation. For example, recruitment of participants may be difficult given that those who are driving-fearful will likely be reluctant to do the very thing they fear. It is also possible that the sample may not include more severely anxious individuals because they are not prepared to put themselves in a situation which is so unpleasant for them (a point acknowledged by Ehlers et al., 1994). The complexity of the traffic situation may also be a deterrent to research in the area, particularly because its inherent nature means that two driving situations are never identical. Nevertheless, since driving is a performance-related task, it would seem sensible to attempt to overcome these difficulties and to ascertain whether driving skills play a role in DRF. There are clear implications of driving skills for both the assessment and treatment of DRF, and we suggest this is a very important area for future research.

4. Conclusions

Most of the research on DRF has originated from studies of MVA survivors and the psychological sequelae of MVAs as traumatic events. While this research has been important in the development of assessment and treatment programmes for MVA survivors, the focus on MVAs has resulted in a neglect of the broader non-MVA driving-fearful population, who appear to have similar levels of fear severity and symptom distress. The few studies which have examined the broader driving-fearful population have reported considerable difficulty with conceptualising their samples in diagnostic terms. In particular, the occurrence of panic attacks has presented problems for studies conducted prior to DSM-IV, and the multiple foci of fear that appear to be an inherent part of DRF continue to present diagnostic problems (Hofmann, 1992). It is essential for researchers to define their DRF groups more consistently and, at a minimum, do so in reference to the definitions in prior studies. Despite some limitations, we strongly recommend the use of DSM-IV criteria to define driving "phobia" when this is the focus of the study.

Preliminary attempts to develop a typology of DRF have yielded promising results, suggesting a division between danger and anxiety expectancies (Taylor & Deane, 2000; lc Taylor et al., 2000). As with fear of flying research (e.g., Van Gerwen et al., 1997), the identification of different typologies offers the potential for differential assessment and more efficient and effective interventions for those with DRFs.

The present review also highlighted driving skills as another neglected issue in the existing research on DRF. The role of driving skills in DRF needs clarification, particularly for assisting clinicians to determine when a client may benefit from assessment and remediation of any deficits in their driving skills. Thus, we recommend increased focus on non-MVA samples, the use of consistent definitions, exploration of typologies, and assessment of the role of driving skills as important for forwarding our understanding and treatment of driving-related fears.

5. Uncited reference

Öst & Hugdahl, 1981

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APPENDIX A-2

Taylor, J.E., & Deane, F.P. (1999). Acquisition and severity of driving-related fears. *Behaviour Research and Therapy, 37,* 435-449.

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BEHAVIOUR RESEARCH AND THERAPY

Acquisition and severity of driving-related fears

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Abstract

Rachman's theory of fear acquisition proposes that directly-conditioned fears will differ from indirectly-conditioned fears in magnitude and anxiety response patterns, however the theory has received inconsistent empirical support. The aim of the present study was to describe the fear acquisition pathways for a community sample who reported driving-related fears, and to test Rachman's theory of fear acquisition. One hundred and ninety participants completed a questionnaire which assessed a variety of driving-related situations, reactions to motor vehicle accidents (MVAs), and anxiety response patterns. Professional psychological helpseeking and perceived need for treatment for driving-related fears were also assessed. Results failed to support Rachman's predictions. However, it was confirmed that respondents who had been involved in an MVA were more likely to ascribe their fears to a directly-conditioned pathway. The theoretical and methodological implications of the findings are discussed, along with suggestions for assessment of those with driving-related fears. © 1999 Elsevier Science Ltd. All rights reserved.

1. Introduction

The three-pathways theory of fear acquisition proposed by Rachman (1976, 1977) developed out of the recognition that classical conditioning theories provide an incomplete account of human fear acquisition and ignore less direct pathways to fear (Withers & Deane, 1995). Rachman (1984, 1991) noted that fears can be acquired through conditioning as well as other processes, such as vicarious and verbal transmissions, and proposed that there were *three* major associative pathways to the acquisition of fear: (1) classical conditioning experiences, (2) observational experiences, and (3) instructional or informational experiences. In addition to this three-pathway proposition, Rachman postulated that direct fear-conditioning would lead

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to severe fears, while indirect fear-conditioning (i.e. vicarious or instructional pathways) would lead to mild to moderate fears. Rachman also predicted that directly-conditioned fears would be characterised by more elevated physiological and behavioural symptoms than cognitive symptoms, while indirectly-conditioned fears would be characterised by more elevated cognitive symptoms than physiological and behavioural symptoms. Rachman referred to this prediction as the 'differential-anxiety-response' hypothesis.

It is evident from existing research that the fear acquisition literature which tests Rachman's predictions has produced inconsistent and variable findings, and it has been suggested that the acquisition of nonclinical fears has not been adequately addressed (Öst, 1991). In particular, past research has been criticised for the lack of control over retrospective judgements made as respondents construct reasons for their fears, and null results have been explained in terms of potential uncontrolled memory distortions (Merckelbach, de Jong, Muris & van den Hout, 1996). A recent study which investigated the potentially confounding role of memory in fear acquisition research with 191 university students failed to support Rachman's predictions (Withers & Deane, 1995). However, direct conditioning ascriptions were endorsed with greater certainty, indicating that direct conditioning events may be more memorable than indirect conditioning events, and that memories of onset events may be important (Withers & Deane, 1995). The present study attempted to address this problem by selecting driving-related fears as the phenomenon of interest, as it could reasonably be assumed that motor vehicle accidents (MVAs) may account for at least some proportion of these fears and are likely to be memorable events.

Despite the potential advantages of investigating driving-related fears for testing Rachman's theory, only three studies could be located in this area and all three recruited relatively small nonclinical samples of community volunteers through media advertisements in newspapers or on television. Munjack (1984) interviewed thirty respondents and found that a variety of onset circumstances characterised his sample. Panic attacks were most frequently attributed to the onset of driving-related fears (40%), followed by a collision on the freeway (20%), and other upsetting events directly associated with driving (10%). Therefore, 70% of the sample reported a history of direct conditioning experiences, although indirect pathways to fear such as observation and instruction were not investigated.

Sartory, Roth & Kopell (1992) examined fear onset among sixteen respondents and found that 75% had panic attacks while driving, 31% described one of their parents as being fearful of freeway driving (although two of these also reported panic attacks), and one reported becoming fearful as a result of information regarding fatal accidents on motorways. For most respondents in the study, the cause of their panic attacks was a sudden, unexpected rise in anxiety while driving, and the attack was triggered endogenously by worries of having a panic attack while driving, rather than by an MVA. Subsequently, driving was avoided. One subject met DSM-III-R criteria for panic disorder. Finding a high rate of panic attacks as the reported onset event is consistent with the study by Munjack (1984). However, other research has reported that problems after an MVA (such as phobic reactions) were clearly caused by classical conditioning and were a direct result of the accident (Mayou, Simkin & Threlfall, 1991).

Ehlers, Hofmann, Herda & Roth (1994) used interviews and questionnaire information to investigate driving phobia in fifty-five respondents. Respondents were asked to rate the three most important reasons for their driving phobia from a list of fourteen on a questionnaire. Panic attacks were rated as one of the most important reasons for driving anxiety by 65% of subjects. A traumatic experience such as an accident, dangerous traffic situations, or being assaulted while driving was reported by 36%, while 5% rated seeing someone else experience a traumatic event when driving as an onset event. Other reasons which were rated highly were being a generally anxious person (53%) and being generally afraid of high speed (47%). Pathways of fear acquisition were further investigated through an interview, with questions which asked about traumatic accidents, vicarious onset, and informational acquisition. Compared with control subjects, phobics were not more likely to have been involved in an accident, not more likely to have had anxious models, and not more likely to have been given information regarding the dangers of driving (Ehlers et al., 1994). However, phobics were more anxious about their worst accident as well as reading or hearing about particular dangers associated with driving than control subjects, and 15% reported an MVA as the primary reason for their phobia.

These studies have reported a range of pathways consistent with Rachman's theory, although they have not investigated his hypotheses regarding strength of fear and anxiety response patterns (Munjack, 1984; Mayou et al., 1991; Sartory et al., 1992; Ehlers et al., 1994). Furthermore, no research was located which compared people who are fearful because of an MVA with those who are fearful for some other reason. The present study was aimed at addressing both of these issues.

Prior studies have tended to omit investigations of nonassociative pathways through which fears can be acquired in the absence of any previous associative learning experience. The present study aimed to investigate a range of pathways through the use of the Origins Questionnaire (OQ; Menzies & Clarke, 1993), a relatively new instrument developed in an effort to address methodological problems in the assessment of fear acquisition. In particular, the OQ addresses the inconsistent definitions of conditioning events used by different researchers, and considers pathways to fear other than conditioning experiences.

From Rachman's predictions, three hypotheses were formulated: (1) respondents will ascribe strong fears to the direct pathway and moderate fears to the indirect (i.e. observational or instructional) pathways, (2) respondents will report *higher* levels of physiological than cognitive responses for fears ascribed to the direct pathway, but for fears ascribed to either of the indirect pathways, they will report *lower* levels of physiological than cognitive responses; and (3) respondents who report having experienced an MVA will be more likely to ascribe to the direct pathway than those who do not report having experienced an MVA.

2. Method

2.1. Sample and procedure

Of the 190 volunteers who participated in this study, 175 were female (92%) and 15 male. Initial contact with participants was gained through media interest in and coverage of the present study. Two local and two national newspapers published articles about the study and requested interested volunteers to telephone the researcher. Radio coverage about the study was also obtained through national radio stations. This coverage consisted of brief (5–10 min) interviews with the first author who conveyed the purpose of the study and provided information about how interested listeners could participate. The content of the interviews was consistent with the newspaper articles, in which common examples of driving-related fears were provided and it was emphasised that the researcher was interested in people with any type or severity of driving-related fear, from mild worry to severe distress and avoidance. A toll-free telephone line was established in order for a wide range of callers to have the opportunity to participate. Upon calling, volunteers were able to have any questions answered and were then sent a copy of the questionnaire with a freepost, return-addressed envelope. From a total pool of 249 phone calls, 190 (76%) completed questionnaires were returned and 59 (24%) withdrew by failing to return the questionnaire. An information sheet attached to the front of the questionnaire outlined the consent procedures. Just under two-thirds (66%) of the sample were aged between 30 and 59 years. Almost two-thirds (62%) of the participants were married or in a de facto relationship. Most participants (91%) identified themselves as of European descent, with 1% identifying themselves as Maori.

Participants volunteered by self-report of a driving-related fear, as opposed to having been involved in an MVA. This sample was assumed to be characterised by a range of driving-related fears and severity levels, rather than being restricted to MVA survivors. Previous studies which have utilised samples recruited by advertising have not always clearly described their samples (e.g. Mathew, Weinman, Semchuk & Levin, 1982; Munjack, 1984; Sartory et al., 1992). As a result, the ability to make judgements about the generalisability of the results to other samples was compromised. In an effort to partially address this issue, we endeavoured to provide a detailed description of the sample along dimensions which we thought would relate to the fear severity and clinical characteristics of the sample. This was accomplished by asking about prior and anticipated professional psychological helpseeking and the scores of those who had been involved in MVAs on the extensively used Impact of Event Scale, enabling comparisons with other research samples.

Initial descriptive data indicated a range of severity of driving-related fears within the sample. In terms of how much their fear interfered with daily functioning (on a scale from 0 'not at all' to 10 'extremely'), the sample reported a mean of 4.43 (S.D. = 3.00, range 0–10, $n = 188$). One item asked participants to indicate those people they had spoken to about their driving-related fear (participants could check none or all of six options). Between 64 and 69% of the sample had spoken to friends or family members about their driving-related fear, while 19% had spoken to a mental health professional and 17% to a medical professional. Prior help from a mental health professional for any personal or emotional problems had been sought by 39% ($n = 74$) of participants.

Two items used in studies of professional helpseeking (Deane & Chamberlain, 1994; Deane & Todd, 1996) were included as an alternative method of assessing how problematic the fears may be for the participants. Although the sample as a whole rated a low to moderate perceived need for and likelihood to seek professional psychological help for their driving-related fear, only 32% indicated 'no need' for such help. Approximately 23% ($n = 43$) indicated some perceived need for professional psychological help for their driving-related fear. In addition, 18% ($n = 33$) indicated some likelihood they would seek professional psychological help, and 9% thought it was 'extremely likely' they would seek such help.

Table 1
Summary of studies using the IES with MVA survivors, compared with the findings from the present study

Study	N	Time since MVA	Total IES mean (S.D.)	Intrusion subscale mean (S.D.)	Avoidance subscale mean (S.D.)
Fear reactions					
Kuch, Cox & Direnfeld (1995)	14	mean = 3.6 yr	40.78 (10.56)	19.42 (5.14)	21.51 (5.93)
Malt (1988)	103	1 week		5.48 (6.03)	9.26 (8.53)
	107	6–9 months		3.84 (5.40)	7.51 (8.45)
PTSD reactions					
Blanchard et al. (1995)	62	1–4 months	35.40 (17.70)	18.30 (9.00)	17.10 (9.00)
Green, McFarlane, Hunter & Griggs (1993)	24	18 months	40.57 (14.94)	21.43 (8.14)	19.14 (11.02)
Kuch et al. (1995)	12	mean = 3.6 yr	44.80 (8.42)	22.68 (4.39)	22.07 (5.20)
Undiagnosed					
Brom, Kleber & Hofman (1993)	68	1 month	21.90 (15.90)	12.10 (8.10)	8.50 (8.40)
		6 months	9.30 (11.00)	5.30 (6.20)	3.30 (5.70)
Malt et al. (1993)	107	acute		11.30 (7.10)	8.80 (6.30)
		1 month		7.50 (6.80)	6.70 (6.00)
		1 year		6.30 (6.50)	6.40 (6.20)
Present study	40*	mean = 9.68 yrs	22.92 (16.77)	11.50 (8.79)	11.90 (9.73)

*n = 38 for the total IES score as missing data reduced overall n.

Extensive research exists which has used the Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979) and a series of studies have used the IES with MVA victims. The means and standard deviations on the IES for the present study as well as previous research with MVA samples can be seen in Tables 1 and 2.

Compared with other studies which have used the IES with MVA survivors, the means from the present study are relatively similar to studies of fearful and undiagnosed individuals, suggesting that the MVA sample employed in the present study had comparable IES scores to those utilised in previous research. Table 2 provides a breakdown of IES scores according to severity thresholds, which have been used in prior research to determine those fears which are

Table 2
IES scores as a function of level of distress

	% with level of distress		
Subscale	Low (0–8)	Medium (9–19)	High (20–35)
Intrusion	40.0	42.5	17.5
Avoidance	42.5	37.5	20.0
Total score	29.0	10.5	60.5

of clinical importance. A previous study by Malt et al. (1993) used a sample of 107 train drivers studied one year after train accidents. Malt et al. (1993) mostly reported scores in the low severity range for both the intrusion and avoidance subscales (76 and 69%, respectively). Only 8% endorsed scores within the high severity threshold for the intrusion subscale and 3% for the avoidance subscale. In comparison, 17.5% of the present sample endorsed a high level of distress on the intrusion subscale and 20% on the avoidance subscale, after an average of *at least nine years*. In addition, a larger percentage of the present sample had medium levels of distress on both the intrusion (42.5%) and the avoidance (37.5%) subscales, compared with the 16 and 28% found in the train drivers (Malt et al., 1993).

Although a range of severity of driving-related fears were reported by the present sample, the majority had spoken to another person about their fear, 23% indicated some perceived need for professional psychological help for their driving-related fear, and almost 40% had sought prior help from a mental health professional. For those who had had MVAs, the impact of their accidents seemed to be quite high, despite the average time since the accident being nine years.

2.2. Measures

Participants completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin of driving-related fears, their strength, and anxiety response patterns. The questionnaire started by asking participants to describe their driving-related fear in their own words.

2.2.1. The Bodily Reactions and the Negative Thoughts scales

These two scales from Öst and Hugdahl's (Öst & Hugdahl, 1981) Phobic Origins Questionnaire (POQ) were used to measure the physiological and cognitive components of fear. The 11-item Bodily Reactions scale assesses the intensity of physiological reactions. The 10-item Negative Thoughts scale measures the degree to which patients think negatively when they are facing their phobia. On both scales, items are rated from 'never' (0) to 'always' (4). The scales have been employed in prior research on fear acquisition (although not in studies of driving-related fears), which enabled fear ratings in the present study to be compared with those obtained in other research (e.g. Öst & Hugdahl, 1981, 1985; Öst, 1991). This was particularly important given the unknown nature of the driving fear sample. The original use of the Bodily Reactions and the Negative Thoughts scales was for patients to rate the reactions they *actually experienced* when exposed to their phobia. In comparison, the present study asked participants to rate the reactions they experienced while *imagining having to face* their most-feared driving-related situation. This change in wording was more appropriate for the present study, particularly in cases where the participant may not have had a personal encounter with their feared situation.

2.2.2. The State-Trait Anxiety Inventory (STAI)

The 6-item short form of the State-Trait Anxiety Inventory (STAI, Form Y; Spielberger et al., 1983) was developed by Marteau and Bekker (1992) in an attempt to locate the least number of state scale items which produced the highest correlation with the original 20-item state scale. Respondents were asked to rate the feelings experienced while imagining having to face their most-feared driving situation and each item was rated on a 4-point Likert-type scale ranging from 'not at all' (1) to 'very much' (4). Internal consistency reliability for the STAI-Y was $r = 0.82$ (Marteau & Bekker, 1992).

2.2.3. The Origins Questionnaire (OQ)

This questionnaire was included as a more comprehensive approach to assessing pathways to fear. The OQ was initially used in a study of height-fearful subjects (Menzies & Clarke, 1993) and was developed in an effort to address methodological problems in the assessment of fear acquisition. In particular, Menzies and Clarke (1993) noted that inconsistencies in past research have arisen from the vast discrepancies in the definition of categories used by different researchers, especially with respect to classical conditioning. These authors noted that previous research, particularly that by Öst and colleagues (e.g. Öst & Hugdahl, 1981, 1983, 1985; Öst, 1991) had classified *any* traumatic event as classical conditioning and had not ascertained that the conditioned stimulus was affectively neutral prior to the conditioning episodes. Furthermore, such studies have not required an independent unconditioned stimulus to be identified in the initial conditioning event (Menzies & Clarke, 1993). As a consequence of this, it has been suggested that such methodology may have led to a significant overestimation of the incidence of conditioned fears.

The original OQ is a 16-page questionnaire which provides a comprehensive picture of the history of the individual with respect to the feared situation before the onset of the fear (Menzies & Clarke, 1993). It does not require causal attributions as the POQ does, but rather asks people to indicate and describe any conditioning or other pertinent events that occurred before the onset of their concerns. The OQ makes the distinction between those who report having always been fearful and those who remember an earlier period in their lives in which they were not fearful, even if they cannot recall the actual onset of their fear (Menzies & Clarke, 1993). Furthermore, questions on the OQ provide participants with opportunities to describe onset events, which allows for making distinctions between classical conditioning events and traumatic events in which no clearly identifiable unconditioned stimulus is evident (Menzies & Clarke, 1993). The OQ also asks whether episodes of stress or depression were associated with learning events.

The OQ was modified slightly for use in the present study for three reasons. Firstly, the existing questionnaire was too lengthy for the purposes of the present study. Secondly, some items on the OQ were able to be omitted without influencing the criteria for pathway assignment, such as items concerning the symptoms experienced during the first fearful incident and periods of stress or depression around learning events. Thirdly, the term 'excessively fearful' was part of the criteria for OQ pathway classification. However, some subjects clearly had fears of only mild severity which they did *not* consider excessive. In addition, the original request was for people who were fearful of driving, thus there were likely to be some mild fears among the sample. Therefore, rather than having to indicate being '*excessively* fearful of the feared stimulus ever since the initial event', this criteria was not required for pathway classification. The resulting modified version of the OQ for the present study was seven pages in length. Responses on the OQ can be classified into the following seven categories: (1) classical conditioning, (2) vicarious conditioning, (3) information/instruction, (4) non-conditioning traumatic event, (5) always been this way, (6) cannot remember and (7) cannot classify.

2.2.4. Impact of Event Scale (IES)

The IES is a 15-item measure of current subjective distress related to a specific event and was used in the present study as a standardised measure to obtain descriptive information regarding severity of fear. Participants were asked to respond to each item in terms of how frequently the item was true for them during the past week. Items were rated on a scale from 'not at all' (1) to 'often' (4). The 7-item intrusion subscale score ranges from 0–35, the 8-item avoidance subscale ranges from 0–40, and the total IES score ranges from 0–75. Severity threshold scores between 0–8 reflected low level distress with minor reactions, scores between 9–19 indicated medium level distress with moderate reactions, and scores of 20 or more reflected high level distress with reactions of clinical importance (Horowitz et al., 1979; Malt et al., 1993). Horowitz et al. (1979) demonstrated satisfactory psychometric properties for the IES.

3. Results

Based on responses on the OQ, respondents were classified into one of the seven fear-onset categories. For the purposes of hypothesis-testing and consistent with prior research (e.g. Öst, 1991; Withers & Deane, 1995), respondents were divided into 'direct' (classical) and 'indirect' (vicarious and informational) conditioning pathways. To test the prediction relating ascribed pathway to fear severity levels, one-tailed independent t-tests were carried out on the mean pathway-related severity levels (the Bodily Reactions, the Negative Thoughts and the STAI-Y scales) of direct and indirect groups. To examine the differential-anxiety-response hypothesis, a repeated-measures multivariate analysis of variance (MANOVA) was conducted on direct and indirect fear-onset groups' mean item scores on the Bodily Reactions and the Negative Thoughts scales. To test the prediction relating ascribed pathway to MVA involvement, chi square analyses on the proportions choosing the respective pathways were carried out. There was some variation in sample sizes between analyses due to missing data. For the Bodily Reactions, Negative Thoughts, and STAI-Y scales, when only one item was missing scores were prorated (e.g. Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983), otherwise the case was deleted from the analysis using listwise deletion.

The correlation between the Bodily Reactions and the Negative Thoughts scales was moderately strong, $r(124) = 0.58$, $p < 0.001$, but both scales had lower correlations with the STAI-Y, r's$(124) = 0.32$ and 0.21, respectively, p's < 0.01. The mean scores for the whole sample ($n = 124$) on the Bodily Reactions scale was $M = 1.96$ (S.D. = 0.82), Negative Thoughts scale, $M = 1.89$ (S.D. = 0.81), and STAI-Y scale, $M = 3.19$ (S.D. = 0.57).

Table 3 shows the classification of the sample into fear onset categories. Independent t-tests revealed no significant differences between direct and indirect pathways regarding fear severity. The data did not support the first hypothesis which predicted that strong fears would be ascribed to the direct pathway while moderate fears would be ascribed to the indirect pathway.

Table 3
Classification of the sample into fear onset categories based on responses to the Origins Questionnaire

Pathway	n	%
Classical conditioning	52	27.4
Vicarious conditioning	4	2.1
Informational conditioning	13	6.8
Non-conditioning traumatic event	28	14.7
Always been this way	48	25.3
Cannot remember	19	10.0
Mixed classical and vicarious	5	2.6
Mixed classical and informational	8	4.2
Mixed vicarious and informational	1	0.5
Mixed (all three pathways)	2	1.1
Uncodable	8	4.2
Missing	2	1.1
Direct conditioning pathway	52	27.4
Indirect conditioning pathway	17	8.9

Note: Percentages rounded to one decimal place.

In addition to those participants who ascribed their driving-related fear to the direct and indirect conditioning pathways, 58.4% were classified into other pathways of onset, such as a non-conditioning traumatic event, always been this way, cannot remember, and mixed pathways. Because such large proportions of the sample fell into these categories, anxiety response mode scores of these participants were examined in more detail (see Table 4). Post-hoc one-way analyses of variance (ANOVA) were conducted to see whether the means for each of the three anxiety response mode scales differed according to ascribed pathway. The data did not support any significant differences between these pathways in terms of fear severity: Bodily Reactions scale, $F(5, 136) = 1.99$, $p > 0.05$, Negative Thoughts scale, $F(5, 132) = 1.09$, $p > 0.05$, and STAI-Y scale, $F(5, 128) = 0.73$, $p > 0.05$.

Table 4
Mean item ratings and S.D.'s for the fear severity scales according to ascribed pathway

	Bodily Reactions		Negative Thoughts		STAI-Y	
Pathway	mean (S.D.)	n	mean (S.D.)	n	mean (S.D.)	n
Non-conditioning traumatic event	2.50 (0.87)	20	2.26 (0.83)	19	3.16 (0.65)	18
Always been this way	1.83 (0.77)	36	1.85 (0.75)	38	3.19 (0.55)	35
Cannot remember	1.83 (1.13)	16	1.91 (1.02)	14	2.98 (0.65)	14
Mixed[a]	1.79 (0.84)	13	1.68 (0.79)	13	2.99 (0.68)	14
Direct	1.99 (0.73)	40	1.80 (0.82)	40		
Indirect	2.19 (0.88)	12	1.95 (0.87)	12		

[a] Combines all mixed pathway groups (i.e. mixed classical and vicarious; mixed classical and informational; mixed vicarious and informational; and mixed classical, vicarious and informational). All $p > 0.05$.

Direct and indirect respondents' mean ratings on the Bodily Reactions and the Negative Thoughts scales are shown in the lower section of Table 4. The data did not support the second hypothesis which predicted that respondents would have higher levels of physiological than cognitive anxiety correlates for directly-conditioned fears. No significant interaction between pathway and anxiety response mode was obtained, $F(1, 50) = 0.05$, $p = 0.82$. No significant main effects were obtained for pathway, $F(1, 50) = 0.58$, $p = 0.45$, or anxiety response mode, $F(1, 50) = 2.75$, $p = 0.10$.

Forty-three of the 46 respondents (93.5%) who reported experiencing at least one MVA ascribed their fear to the direct pathway. In comparison, only 39% (9 of 23) of those who had *not* experienced an MVA ascribed their fear to the direct pathway. Consistent with the third hypothesis, significantly higher proportions of respondents who had been involved in an MVA ascribed their fear to the direct pathway compared to those who had not been involved in an MVA, χ^2 (1, $N = 69$) = 24.39, $p < 0.000$.

3.1. Post-hoc analyses comparing MVA and non-MVA respondents

Post-hoc analyses were conducted to examine the differences between participants who reported having experienced an MVA and those who did not. This analysis was undertaken in order to expand the ability of the study to test the hypotheses, particularly since most (93.5%) participants who reported having experienced an MVA (henceforth, 'MVA respondents') ascribed their fear to the direct pathway, while 61% of those who had not been involved in an MVA (henceforth, 'non-MVA respondents') endorsed the indirect pathway.

The post-hoc hypothesis that MVA respondents would report strong fears (direct pathway) and non-MVA respondents would report moderate fears (indirect pathway) was not supported. There was no difference between MVA and non-MVA respondents on the STAI-Y, $t(1, 139) = 0.66$, $p = 0.25$. These relationships were also tested using MANOVA for the Bodily Reactions and the Negative Thoughts scales when the relationship of MVA experiences to anxiety responses was explored. Table 5 provides the mean ratings for the Bodily Reactions and the Negative Thoughts scales according to MVA experiences. The data did not support this hypothesis. No significant main effects were found for MVA experiences, $F(1, 134) = 0.18$, $p = 0.68$, or anxiety response mode, $F(1, 134) = 2.08$, $p = 0.15$. Although the interaction effect was not significant, $F(1, 134) = 3.22$, $p = 0.075$, the pattern of means resembled that hypothesised (see Fig. 1).

4. Discussion

In the present study, no support was found for the predictions derived from Rachman's theory. The low proportion of direct respondents in the present study is inconsistent with the findings of previous nonclinical research on the acquisition of driving-related fears. As previously mentioned, percentages of between 70 and 100% for direct pathway ascriptions have been reported (Munjack, 1984; Sartory et al., 1992; Ehlers et al., 1994). In comparison, only 27% of the present sample attributed their driving-related fear to the direct conditioning pathway. Furthermore, indirect respondents only accounted for 9% of pathway ascriptions,

Table 5
Mean item ratings and S.D.'s for the Bodily Reactions and the Negative Thoughts scales according to MVA experiences

	Bodily Reactions			Negative Thoughts		
MVA experiences	mean	S.D.	*n*	mean	S.D.	*n*
MVA	2.055	0.812	56	1.845	0.830	56
non-MVA	1.883	0.879	80	1.906	0.818	80

while previous studies have reported percentages of 25% (Sartory et al., 1992) and 28% (Ehlers et al., 1994).

The discrepancy in pathway ascriptions between the present study and previous research may be due to the method with which the onset of driving-related fears was investigated. Prior studies have employed a relatively short series of questions which have investigated direct and indirect conditioning pathways, although only the study by Munjack (1984) allowed respondents to report having always been fearful. In the study by Ehlers et al. (1994), pathways other than conditioning were investigated (e.g. non-conditioning traumatic events, such as panic attacks), although some seemed unrelated to theory, had not been used in previous research and were very study-specific (e.g. generally afraid of high speed, generally anxious person, heredity, and generally afraid of heights). However, the ascriptions in the present study were based on a broader range of pathways derived from the Origins Questionnaire (OQ) which included both associative and nonassociative events. The present finding that a substantial proportion (55%) of the sample could not be classified according to the associative-learning account suggests the potential importance of nonassociative pathways in the onset of driving-related fears. In particular, the 'always been this way' pathway accounted for 25% of respondents, almost as much as that for classical conditioning.

Respondents who report having always been fearful may have experienced a direct or indirect conditioning event that they cannot remember. Another possibility is the neoconditioning process of UCS inflation, in which a series of relatively small, mild UCS's slowly inflate a weak conditioned fear response. In this situation, the individual may never

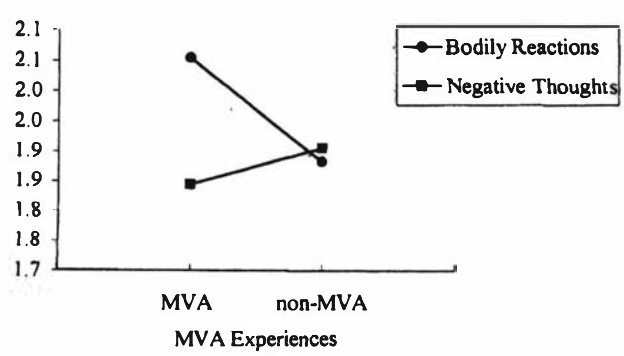

Fig. 1. The relationship of MVA experiences to anxiety response patterns.

connect such small events with the original conditioning pathway, hence reporting *no memories* of any associative-learning events. This has important implications for dealing with memory difficulties in future research, in that such a process may be impossible to detect retrospectively in cases where unmemorable events have inflated an initial directly-conditioned fear response. Longitudinal research may be better able to assess the influence of UCS inflation by tracking the development of mild UCS's longitudinally and their contribution to fear acquisition.

The results bring into question the ability of traditional associative theories of fear acquisition to adequately account for the onset of driving-related fears. In terms of nonassociative pathways to fear, the present findings support those of Menzies and Clarke (1993), who used a nonclinical sample of fifty height-fearful university students. Using the same measure of fear-onset (Origins Questionnaire), Menzies and Clarke (1993) found a broader range of pathways to fear. They characterised associative pathways as a combination of direct and indirect modes to fear and nonassociative pathways as non-conditioning traumatic events and the 'always been this way' pathway. Consistent with their finding that 42% (21 of 50) of participants reported nonassociative pathways to fear, 40% (76 of 190) of the present sample described nonassociative fear-onset pathways. In addition, 46% (23 of 50) of Menzies and Clarke's (1993) sample indicated associative pathways, while almost 45% (85 of 190) of participants in the present study reported associative pathways to fear. These percentages are surprisingly similar despite quite different sample sizes and types of fear. This data suggests the need to include investigations of nonassociative pathways in further research on fear onset, rather than maintaining an exclusive focus on conditioning pathways.

Both the present study and Menzies and Clarke's (1993) research found that relatively few subjects were classified into the classical conditioning pathway compared to other studies. For example, Öst and colleagues' series of studies reported that up to 81.3% of subjects ascribed their fears to the direct pathway (Öst & Hugdahl, 1981, 1983, 1985; Öst, 1991). It has been argued that the use of Öst and Hugdahl's (1981) Phobic Origins Questionnaire may lead to a significant overestimate of classically conditioned cases (Menzies & Clarke, 1993; Withers & Deane, 1995). The results of the present study are consistent with such a view. However, the studies by Öst and colleagues used clinical samples and it is unclear to what extent the difference in pathway ascriptions are due to the nature of the fears investigated.

While the anxiety and avoidance behaviour responses of the media recruited sample in the present study suggested some were very distressed and experienced symptoms consistent with phobic-level problems, the sample was not as symptomatic as phobic groups. Generalisations from the present study to clinical samples are difficult to make, and replication of the present study with phobic subjects who are seeking treatment is necessary.

It is notable that the highest mean Bodily Reactions and Negative Thoughts ratings were made by respondents who made non-conditioning traumatic event ascriptions. This may be explained by the fact that most respondents in this category described the sudden, unexpected onset of panic attacks as the pathway to their fear. Such panic attacks are typically accompanied by quite severe physical symptoms and distressing negative cognitions (Kaplan, Sadock & Grebb, 1994). However, it was surprising that direct respondents did not have similar or higher mean Bodily Reactions scores, particularly for those who experienced MVAs and sustained physical injuries as a result.

The lack of support for the proposition that pathway of ascription leads to different anxiety response patterns is the first such finding in the area of driving-related fears and is consistent with previous nonclinical research. Three nonclinical studies have reported no relationship between ascribed pathway and anxiety response patterns (DiNardo, Guzy & Bak, 1988; Menzies & Clarke, 1993, Withers & Deane, 1995). The tendency for higher Bodily Reactions anxiety responses for both direct and indirect respondents is also consistent with other studies (e.g. Withers & Deane, 1995; Merckelbach et al., 1996). It has been suggested that it may be less socially desirable to admit to intense cognitive reactions, and future research might include an assessment of social desirability to clarify this issue further (Withers & Deane, 1995). Alternatively, it may be that respondents are more aware of physiological reactions than cognitive responses to their driving-related fear. The minimal psychometric data available on the Bodily Reactions and the Negative Thoughts scales also suggests some caution.

The results supported the hypothesis that respondents who had been involved in an MVA would be more likely to ascribe their fear to the direct pathway than those who had not been involved in an MVA. A likely influence is the greater memorability of MVAs as onset events.

Despite the lack of support for Rachman's theory, the findings of the present study have important clinical implications, especially for the investigation of fear acquisition in both research and clinical practice. The results highlight both the utility of the Origins Questionnaire and the importance of considering nonassociative pathways to fear. The results also suggest the need to avoid insisting upon searching for traumatic events consistent with the conditioning model, and that such an insistence on associative-learning events in fear acquisition may be detrimental to theory, research, and practice (Menzies & Clarke, 1995; Merckelbach et al., 1996). However, the results also raise questions about the possible role of UCS inflation in the acquisition of driving-related fears.

There is a need to more fully investigate the role of cognitions associated with driving-related fears. Particularly relevant to this issue are the reasons why 35 respondents reported being involved in an MVA, yet did not mention the MVA anywhere in the section on the origins of fear, and did not ascribe to the direct conditioning pathway. Some subjects reported an MVA but did not attribute their driving-related fear to that MVA. Future studies need to investigate the attributions that MVA victims make regarding their MVA and subsequent fear onset. Some researchers have also suggested that cognitive facets of driving phobia may involve the tendency to overestimate the amount of fear that will be endured in a subjectively threatening situation (Rachman & Bichard, 1988). In turn, this overprediction of fear may encourage avoidance behaviour, particularly in individuals with intense anxiety sensitivity, or fear of anxiety (Koch & Taylor, 1995). This phenomenon has yet to be evaluated with driving phobia. As noted by Taylor and Koch (1995), driving phobics tend to overestimate the likelihood of future MVAs and underestimate their own skills and abilities and those of other drivers. As a result of such firm beliefs, people with driving phobia experience increased anticipatory anxiety before attempting to drive as well as avoidance behaviour (Koch & Taylor, 1995).

In order to address the difficulties with retrospective accounts, longitudinal studies with MVA victims beginning soon after their accidents could provide valuable information about the influence of direct conditioning events as they occur. This type of research would reduce the potential for memory distortions which might affect fear acquisition reporting. It may also enable the identification of mild UCS's which may contribute to UCS inflation. Longitudinal studies are difficult and expensive, although even a relatively short-term follow-up would provide information about changes in symptomatology and the stability of driving-fear acquisition pathways.

Much of prior driving-related fear research has commented on the overlap between driving-related fears, phobias, and panic attacks and found that subjects with driving phobia rarely fit neatly into DSM-IV diagnostic categories (Himle, Crystal, Curtis & Fluent, 1991; Herda, Ehlers & Roth, 1993; Ehlers et al., 1994). The complex characteristics of those who view themselves as having a fear of driving was also reflected in the present sample. By improving the assessment of how these fears are acquired and how this interacts with different symptom constellations, we may be better able to develop efficient, specific, and effective interventions for different driving-fear presentations.

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APPENDIX A-3

Taylor, J.E., Deane, F.P., & Podd, J.V. (1999). Stability of driving fear acquisition pathways over one year. *Behaviour Research and Therapy, 37,* 927-939.

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Stability of driving fear acquisition pathways over one year

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Abstract

The present study was conducted in response to increasing concerns about the potential unreliability of retrospective accounts in assessing the origins of fears and phobias. Some investigators [e.g. Menzies, R.G., & Clarke, J.C. (1993). The etiology of fear of heights and its relationship to severity and individual response patterns. *Behaviour Research and Therapy*, *31*, 355–365; Kirkby, K.C., Menzies, R.G., Daniels, B.A., & Smith, K.L. (1995). Aetiology of spider phobia: Classificatory differences between two origins instruments. *Behaviour Research and Therapy*, *33*, 955–958; King, N.J., Gullone, E., & Ollendick, T.H. (1998). Etiology of childhood phobias: current status of Rachman's three pathways theory. *Behaviour Research and Therapy*, *36*, 297–309.] have questioned the reliability of retrospective reports at a single assessment point, although the test–retest reliability of such accounts has yet to be examined. The aim of the present study was to conduct a one-year follow-up of the subclinical driving-fearful sample studied by Taylor and Deane [Taylor, J. E., & Deane, F. P. (1999). Acquisition and severity of driving-related fears. *Behaviour Research and Therapy*, *37*, 435–449.] to primarily investigate the stability of fear onset ascriptions and fear severity over time. 85 respondents completed a questionnaire which assessed fear origins, anxiety response patterns, and additional fear-relevant events occurring over the year. The results suggest that retrospective accounts of fear onset may be quite unstable over time, although this instability does not clearly appear to be related to intervening events, and limitations of the study make these results inconclusive. Fear-relevant negative thinking worsened over time, while physiological reactions and general anxiety remained relatively stable. The theoretical, methodological and clinical implications of the findings are discussed, along with suggestions for future research.

1. Introduction

Research which has investigated the origins of fears and phobias has relied heavily on retrospective accounts. This methodology has been criticised on two main grounds. Firstly,

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concerns have been raised about the way in which information based on retrospective recall is gathered and utilised. Recent findings tend to support the view that the bias in prior research in favour of traditional conditioning etiologies of fear may have been influenced to a large extent by the methodology employed, in particular the use of the Phobic Origins Questionnaire (POQ: Öst & Hugdahl, 1981; Menzies & Clarke, 1994; Kirkby, Menzies, Daniels & Smith, 1995; Menzies, 1996).

Secondly, the issue of memory distortions as a source of bias when people construct reasons for their fears has been raised (Menzies & Clarke, 1994; Kirkby et al., 1995; Withers & Deane, 1995; Merckelbach, de Jong, Muris & van den Hout, 1996; King, Eleonora & Ollendick, 1998). The latter issue is the focus of the present study. It is unclear whether people can know and accurately recall the development of their phobia (Kirkby et al., 1995). For example, Withers and Deane (1995) found that direct or classical conditioning experiences may be more memorable than indirect (i.e. vicarious or informational) conditioning events. In addition, the increased interest in the phenomenon of UCS inflation suggests that phobias can develop in the absence of pertinent UCS trauma (Davey, 1989; Merckelbach et al., 1996). In such cases, the individual may not recall the specific instances of UCS inflation and may instead attribute their fear to some other pathway. In their discussion of the etiology of fear of dogs, Doogan and Thomas (1992) caution against the assumption that respondents have accurately identified the onset of their fear. They suggest that it is possible for respondents to incorrectly ascribe their fear to a conditioning event, particularly because such an event seems to be a salient and plausible explanation for their fear, while the true onset circumstances may be neglected due to being less obvious or less memorable (Doogan & Thomas, 1992). The possibility of wrong attributions or mood-congruent recall biases have also been suggested by other investigators (e.g. Merckelbach, Arntz, Arrindell & de Jong, 1992).

Conversely, evidence suggests that general concerns about the unreliability of retrospective accounts are overstated (Merckelbach et al., 1996). In their review of retrospective reports of childhood experiences, Brewin, Andrews and Gotlib (1993) summarised evidence from numerous studies which have assessed test–retest reliability of these reports and compared retrospective recall with the recall of other individuals and with data from independent records. Brewin et al. (1993) concluded that claims about the unreliability of retrospective reports were exaggerated. Usher and Neisser (1993) found that some memories are available from earlier points in time than often suggested and that some events are more memorable than others. In a study concerning phobia origins, Kheriaty, Kleinknecht and Hyman (in press) verified the retrospective accounts of phobia onset provided by a phobic sample with parental accounts. Their results provide some support for the validity of phobics' retrospective recall, although the authors suggest that a structured interview format may increase the reliability of onset reports over the use of questionnaires such as the POQ.

Despite these equivocal findings, the reliance on retrospective reports for establishing fear and phobia onset continues to be of interest in fear acquisition research. It would seem that a possible solution to this problem is to investigate fear acquisition prospectively. This type of research would reduce the potential for memory distortions which might affect fear acquisition reporting. It may also enable the identification of mild UCS's which contribute to UCS inflation. However, longitudinal studies are complex and expensive and an interim approach may be to gather more evidence to support the need for such research. If concerns exist over the unreliability of retrospective reports at a single point in time, how do we know that respondents' recollections of the onset of their fear are stable *over time*? Of particular concern in the present study is whether or not retrospective accounts of fear onset over time are reliable. It might be expected that fear-onset ascriptions *will* remain stable over time. This assumption is implied by the extensive use of retrospective reports in previous research. Brewin et al. (1993) summarised evidence suggesting that adults' recollections of salient features of a childhood event are generally accurate and relatively stable over time.

In their study on the heterogeneity among specific phobia subtypes, Antony, Brown, and Barlow (1997) did not consider events that occurred after the fear began to be etiologically relevant, even if they led to an increase in fear. Similarly, Menzies and Clarke's (1993) examination of height-fearfuls excluded traumatic events that occurred after the initial onset of fear. Menzies and Clarke (1993, p. 360) noted that "While such events may be involved in maintenance of fear responses, they obviously cannot be related to their origin". However, no studies could be located which either directly investigated the stability of fear-onset ascriptions, or whether subsequent fear-relevant events affect attributions of fear onset.

If retrospective accounts of fear onset are found to be unreliable over time, what implications would this have for fear acquisition research? Would it mean that prior studies have only captured a 'snapshot' of the fear after which pathway ascriptions may have changed? Clearly, there is a need to establish the stability of retrospective fear-onset attributions. Although validity cannot necessarily be assumed from high reliability, it would be hard to establish the validity of memories without evidence of their reliability (Brewin et al., 1993). This would also assist in clarifying how best to deal with fear-relevant events which occur after the initial onset of fear. King et al. (1998) have suggested that a useful starting point for future research investigating the reliability and validity of retrospective accounts would be to examine test–retest reliability. The present study aimed to examine the stability of fear-onset ascriptions over one year in the subclinical driving-fearful sample studied by Taylor and Deane (1999). A one-year follow-up would provide preliminary information about shorter-term changes in symptomatology and the stability of driving-fear acquisition pathways.

Any changes in driving-fear pathways between times 1 and 2 may be due to the occurrence of some driving-related fear event during this time, such as a motor vehicle accident (MVA), near-miss, panic attack while driving, or experience consistent with the vicarious or instructional pathways to fear (e.g. witnessing an MVA, hearing information about MVAs). Where no such driving-related fear event occurs between times 1 and 2, any changes in the fear acquisition pathway may be due to memory biases or measurement errors. To confirm such a hypothesis, it would be important to gather information comparing age of onset and onset circumstances.

For those who have had an additional driving-related fear event occur between measurement points, it can be predicted that there would also be elevations in fear levels, particularly in relation to those who do not experience a reactivating event. It appears that the stability of symptomatology and fear severity over time has not been examined.

Therefore, the main question in the present study was whether ascriptions of pathways to fear and levels of driving-related anxiety remain stable over time. In addition, it was hypothesised that: (1) there would be a higher proportion of new driving-related fear events among those whose pathway ascriptions changed compared with those whose ascriptions remained the same and (2) levels of anxiety would increase for those who had another driving-related fear event occur.

2. Method

2.1. Sample and procedure

The original sample of 190 volunteers were recruited through media advertisements which asked for participants who had a fear of driving (see Taylor & Deane, 1999). The original sample were asked whether they would be willing to participate in future research and 86.4% ($n = 115$) expressed an interest in participating in the follow-up study. 85 of this 115 returned the follow-up questionnaire in the postage paid envelope producing a response rate of 74%.

Of the original sample of 190, 85 (45%) participated in the follow-up study. To find out whether respondent attrition had caused bias in the follow-up sample, the 85 follow-up respondents were compared with the 105 who dropped out of the study. The only significant difference found was for age, with the follow-up group having a slightly higher mean age ($M = 50.09$, S.D. = 15.17) than the dropout group ($M = 43.56$, S.D. = 13.89), $t(1, 187) = 3.09$, $p < 0.005$. No significant differences were found for 11 other demographic, driving status or helpseeking-related variables. In addition, the two groups did not differ significantly on time 1 measures of fear severity, including the Bodily Reactions and the Negative Thoughts scales from Öst and Hugdahl's (1981) Phobic Origins Questionnaire (POQ), as well as the six-item short form of the State-Trait Anxiety Inventory (STAI, Form Y; Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983; Marteau & Bekker, 1992). As with the original sample, most respondents in the follow-up group were female ($n = 81$, 95%) with only 4 males. This sample was characterised by a range of driving-related fears and severity levels, rather than being restricted to MVA survivors.

2.2. Measures

Respondents completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin of driving-related fears, their strength and anxiety response patterns. The questionnaire started by asking respondents to describe their most-feared driving-related situation in their own words. Respondents were asked to report additional MVAs, additional events which had influenced the driving-related fear in any way, change in fear severity, and total number of MVAs experienced.

2.2.1. The Bodily Reactions and the Negative Thoughts scales

These two scales from the Öst and Hugdahl (1981) Phobic Origins Questionnaire (POQ) were used to measure the physiological and cognitive components of fear. The 11-item Bodily Reactions scale assesses the intensity of physiological reactions. The 10-item Negative Thoughts scale measures the degree to which patients think negatively when they are facing their phobia. On both scales, items are rated from 'never' (0) to 'always' (4). These scales are described in detail by Taylor and Deane (1999) and were used in the same way in the present study.

2.2.2. The State-Trait Anxiety Inventory (STAI)

The 6-item short form of the State-Trait Anxiety Inventory (STAI, Form Y; Spielberger et al., 1983) was developed by Marteau and Bekker (1992). Respondents were asked to rate the feelings experienced while imagining having to face their most-feared driving situation and each item was rated on a 4-point Likert-type scale ranging from 'not at all' (1) to 'very much' (4). The STAI-Y is described in detail by Taylor and Deane (1999) and was used in the same way in the present study.

2.2.3. The Origins Questionnaire (OQ)

In the original questionnaire use by Taylor and Deane (1999), a modified version of Menzies and Clarke's (1993) OQ was used. For the present study, the measure was reduced further because we were concerned that compliance would be reduced if respondents had to complete the seven-page version. Therefore, the components of each pathway were summarised using the criteria in the OQ. A brief description of each pathway was provided and each pathway item was worded so as to retain the essential features of the original classifications as specified by Menzies and Clarke (1993). For example, for the conditioning pathways, there was a requirement that the person had been fearful of their particular driving-related situation or unable to confront it ever since the event and was not fearful to this extent before the event. Respondents were asked to read through all seven descriptions before selecting the one which best described how their driving-related fear first started, and then ticking the box next to this pathway description. For example, the item for an MVA as the onset event read: "I had a motor vehicle accident. Ever since the accident, I have been fearful of my most-feared driving-related situation OR have been unable to confront it. I was not fearful of this situation to this extent before the accident". The seven pathway categories were: 'classical conditioning', 'vicarious conditioning', 'information/instruction', 'non-conditioning traumatic event', 'always been this way', 'cannot remember' and 'mixed conditioning onset'.

3. Results

There was some variation in sample sizes between analyses due to missing data. For the bodily reactions, Negative Thoughts, and STAI-Y scales, when only one item was missing scores were prorated (e.g. Spielberger et al., 1983); otherwise the case was deleted from the analysis using listwise deletion.

3.1. Stability of pathway ascriptions

Based on responses on the one-page OQ, respondents were classified into one of the seven fear-onset categories. Table 1 shows the numbers of respondents who ascribed to the same pathway at both points in time. Only 54% of pathway classifications remained the same, while almost half (46%) of the respondents made different pathway ascriptions after one year. The highest proportion of change occurred within the 'cannot remember' category, where only 18% of original classifications remained stable and 9 respondents ascribed their fear onset to another pathway at time 2. A relatively high frequency of pathway change was also apparent

Table 1
Numbers of respondents who ascribed to the same fear-onset pathway at test and retest

Pathway	Pathway classification (n = 85)				% of original classifications which stayed the same
	Time 1		Time 2		
	n	%	n	%	
Classical conditioning	18	21.2	11	12.9	61.1
Vicarious conditioning	2	2.3	1	1.2	50.0
Informational conditioning	5	5.9	2	2.3	40.0
Non-conditioning traumatic event	13	15.3	9	10.6	69.2
Always been this way	23	27.1	17	20.0	73.9
Cannot remember	11	12.9	2	2.4	18.2
Mixed conditioning	10	11.8	4	4.7	40.0
Cannot classify	3	3.5	0	0	0.0
Total	85	100.0	46	54.1	

Percentages rounded to one decimal place. Frequencies at time 2 reflect the number of cases who ascribed to the same pathway at time 2 as they did at time 1. Percentages are calculated from the total sample (n = 85).

for the 'classical conditioning', 'always been this way', and 'mixed conditioning' categories. Of the 25 respondents who were originally classified into associative-learning categories (i.e. classical, vicarious, or informational conditioning), only 56% ($n = 14$) remained in this category one year later. The corresponding results for nonassociative categories (i.e. non-conditioning traumatic event and always been this way) was 72% ($n = 26$) of the original 36 remaining in the same pathway.

Since almost half of the original pathway ascriptions changed over time, we were interested in obtaining more information about the types of pathways respondents ascribed to at time 2. This information is presented in Table 2. Of the nine respondents who originally reported that they could not remember the onset of their fear, six subsequently ascribed their fear to some type of traumatic event (conditioning or non-conditioning) one year later, while three stated that they had always been fearful. Some respondents who originally ascribed their fear to a conditioning event subsequently made very different onset ascriptions after one year which did not feature the conditioning event recalled earlier. When we looked back at respondents' original narrative descriptions of the onset of their fear using the longer version of the OQ, it was evident in some cases that clear pathway changes had occurred. For example, four respondents initially described a conditioning event as the onset of their fear, noting that they had been fearful ever since the event and not excessively fearful before the event occurred. However, a year later all four reported that they had always been fearful. Similarly, four respondents who initially stated that they had always been fearful subsequently attributed their fear to a conditioning or non-conditioning traumatic event. The two respondents who originally ascribed their fear to a traumatic event both indicated that they were not fearful before these events occurred, yet one year later they could not remember the onset of their fear.

Table 2
Pathway classifications of respondents whose fear onset ascriptions changed after one year

Original classification	Classification after one year				Total
	1[a]	2	3	4	
(1) Conditioning	2[b]	4	4	1	11
(2) Non-conditioning traumatic event	2		1	1	4
(3) Always been this way	3	1		2	6
(4) Cannot remember	4	2	3		9
(5) Mixed conditioning	5		1		6
(6) Cannot classify	2	1			3
Total	18	8	9	4	39

[a] Includes classical, vicarious, informational, and mixed conditioning.
[b] Refers to types of conditioning that the respondent ascribed to at retest which were different from their original conditioning ascription.

It appeared that the 'cannot remember' category had proportionately more change than other pathways (if 'cannot classify' with $n = 3$ is ignored). The 'cannot remember' category most often became some kind of traumatic event pathway (conditioning or non-conditioning). The conditioning pathway (whether classical, vicarious, informational, or mixed) appeared to convert equally to 'always been this way' or to a 'non-conditioning traumatic event'. Furthermore, mixed conditioning appeared to convert to the general conditioning pathway (4 became classical conditioning, while 1 converted to vicarious conditioning). In general, when pathways changed, they tended to move toward a conditioning event ($n = 18$), 'always been this way' ($n = 9$) or a non-conditioning traumatic event ($n = 8$).

3.2. Stability of fear severity

Three separate paired samples t-tests were conducted to assess the stability of fear severity over time on the Bodily Reactions, Negative Thoughts and STAI-Y scales. There were no significant differences over time in mean score on the bodily reactions scale (time 1: $M = 1.83$, S.D. = 0.87; time 2: $M = 1.98$, S.D. = 0.89), $t(1, 57) = 1.79$, $p > 0.05$, or the STAI-Y scale (time 1: $M = 3.19$, S.D. = 0.61; time 2: $M = 3.02$, S.D. = 0.67), $t(1, 50) = 1.65$, $p > 0.10$. There was a significant difference over time in mean score on the Negative Thoughts scale (time 1: $M = 1.79$, S.D. = 0.89; time 2: $M = 2.02$, S.D. = 0.85), $t(1, 56) = 2.79$, $p < 0.01$.

3.3. Intervening driving-related events

To test the influence of intervening driving-related events on pathway changes and fear severity, respondents were asked whether or not they had an MVA in the last year and to describe any other event occurring in the interim which may have influenced their fear. Only four respondents (4.7%) indicated having an MVA between test and retest. When asked to describe other events which had influenced their driving fear during this time, seven respondents described a driving-related event (e.g. car breakdown, seeing driving campaign advertisements on television), while 34 described an event which was not directly related to driving (e.g. reduced physical or psychological confidence, general life stressors). Therefore, 41 (48%) respondents described a new event while 44 denied any additional event influencing their fear.

Although only seven respondents described an additional event which was driving-related, we were still interested in whether or not pathway changes were related to intervening driving-related events. There were no significant differences in the proportions of people who did or did not report new driving events for the same or different pathway ascriptions, χ^2 (1, $N = 85$) = 1.93, $p = 0.23$. However, the pattern of results resembled that hypothesised, since 71% (5 out of 7) of respondents who reported a new driving event changed pathways, while only 43% (19 of 44) of respondents who reported no new driving event changed pathways at time 2. Caution is needed in interpreting these results since there were few respondents who reported driving events (only 2 in one cell) and this suggests the need for further research.

Low statistical power precluded the use of the small group who described new driving events to formally test the hypothesis relating increases in fear severity to intervening driving events. But we were still interested in the influence of additional events on ratings of fear severity, particularly because of the increasing consideration of UCS inflation in the etiology of fear. At a descriptive level, we compared fear severity among those who had a driving-related fear event occur ('driving event' group) with those who described some other event which influenced their fear ('other event' group) and those who reported no additional event ('no event' group). It might be expected that increases in fear severity would be highest for the driving event group, followed by the other event and no event groups, respectively. In terms of general levels of anxiety as measured by the STAI-Y, the driving event group was the only group to show an increase in mean score over time (of 0.22 on a 1–4 scale). On the STAI-Y, the other event and no event groups showed decreases in mean severity at retest. When we looked at cognitive anxiety response patterns on the Negative Thoughts scale, the expected pattern was borne out. The driving event group showed the largest increase (0.52 on a 1–4 scale), while the other event and no event groups showed smaller increases (0.23 and 0.03, respectively). In terms of physiological response patterns measured by the Bodily Reactions scale, the no event group showed the largest increase (0.15 on a 1–4 scale), while the other event group increased slightly and the driving event group showed a decrease in mean severity score. Therefore, the hypothesised pattern appeared to hold for the STAI-Y and Negative Thoughts scales, but not for the Bodily Reactions scale. Although these findings are based on very few responses, they would seem to indicate that the effects of additional driving-related events on fear severity is worthy of further investigation.

4. Discussion

The present finding that almost half (46%) of our sample of driving-fearful respondents ascribed the onset of their fear to different pathways after one year suggests that retrospective accounts of fear onset may be quite unstable over time. This point is most clearly illustrated where there have been changes in pathway from a conditioning event to 'cannot remember' or 'always been this way', and vice versa. In these instances, it would seem that respondents have either 'forgotten' a previously-recalled trauma or 'remembered' a traumatic event which they hold responsible for the etiology of their driving-related fear. These two processes appear evident when we compare respondents' original descriptions with their fear-onset ascriptions at retest. The following narratives are some examples of the original descriptions provided in cases where respondents had seemingly 'forgotten' a conditioning event to which they ascribed their fear one year earlier. In all cases, respondents stated that they had been fearful ever since the event and were not excessively fearful before it happened, which partly qualified them for a conditioning classification (words in parentheses have been added for ease of reading):

"When learning to drive and, soon after, overtook a car and clipped it on my left through misjudgement" (classical conditioning).

"(My) father and mother were drunk and arguing. (My) father ran the car into a lamp post. I was knocked out and had (a) dislocated jaw" (classical conditioning).

"My mother would drive over the (Auckland Harbour) Bridge... but she would become very anxious. She didn't like going over it with my father, especially when the toll plazas were removed and the lanes merged at the bottom of the Bridge" (vicarious conditioning).

"(Warnings from mother:) Don't drive too fast! Don't take risks! You will have an accident!" (informational conditioning).

Although these respondents stated at time 1 that they could clearly remember a time before their fear developed when they were not even mildly distressed by their feared situation, they reported that they had always been fearful at retest.

Similarly, the following two examples illustrate cases where respondents could not remember the onset of their fear at retest, despite describing a traumatic event to which they attributed the etiology of their fear at time 1. One respondent initially stated being able to clearly remember a time before the fear developed when he was not distressed in the feared situation. As with the other examples above, this respondent stated that they had been fearful of the situation and unable to confront it ever since receiving warnings about driving from their father and that they were not fearful before being given these warnings: "(Warnings from father:) If you (drive) wrongly, you could hurt others and/or yourself" (informational conditioning).

Another respondent who had apparently 'forgotten' a traumatic event at time 2 described the following event in their initial description: "My boyfriend was driving on the motorway. Traffic was all around and I was suddenly absolutely terrified, traffic 3 lanes, going fast, cars all around, overhead bridge ahead. I was terrified. I couldn't get out (and) had nowhere to go" (non-conditioning traumatic event).

This respondent not only recalled this event at time 1 but also stated that they could clearly remember this event as the first occasion where they were excessively fearful in the presence of their feared driving situation. Despite an apparently clear recall of this event, the same respondent indicated being unable to remember the onset of their fear at retest. Other instances where people have failed to recall MVAs one year after their occurrence have been reported. For example, Bryant (1996) described the case of an MVA survivor who had no direct memory of the accident in which he was involved ten months earlier.

Conversely, some respondents in the present study had 'remembered' events that they previously had no apparent memory for. No descriptions of 'remembered' events were available for these respondents as they were not required to provide them at follow-up, only to check the box next to the best description of their pathway to fear. Nevertheless, it seems striking that these respondents originally could not remember their fear onset or stated that they had always been fearful, and subsequently recalled an onset event at retest without noting any *new* intervening traumatic event. Rather than ascribing failures of recall to memory distortions, some investigators have suggested that recall problems can be influenced by the way in which questions are phrased (e.g. Pope, Hudson, Bodkin & Oliva, 1998). This latter point is particularly relevant to the present study since there were changes in the way that fear acquisition pathways were elicited between time 1 and time 2. Unfortunately, the extent of this influence cannot be determined. However, it seems unlikely that such dramatic inconsistencies across time could be wholly due to methodological differences.

When we examine the proportions of pathway change in Table 1, a pattern emerges which appears to indicate that some pathways are more likely to stay stable than others. Although there does not appear to be any theory to support this idea, it would seem logical to assume that pathways which are specific and memorable are more likely to stay stable than pathways which are less specific and memorable. Based on the characteristics of specificity and memorability, it might be predicted that classical conditioning would be the most stable pathway (e.g. MVA, near-miss), followed by a non-conditioning traumatic event (e.g. panic symptoms while driving), which would both be expected to be relatively specific events. Less specific may be vicarious, informational and mixed conditioning events. Pathways which might be expected to be the least stable would be the 'always been this way' and 'cannot remember' pathways. While this general pattern appears to be borne out, one needs to be cautious in drawing such conclusions because of the exceptions of 'always been this way', which was the most stable pathway and 'non-conditioning traumatic event', which was more stable than classical conditioning.

Consistent with this contention, Withers and Deane (1995) found that classical (direct) conditioning ascriptions were endorsed with greater certainty than vicarious and informational (indirect) conditioning ascriptions, suggesting that direct-conditioning events may be more memorable than indirect-conditioning experiences. That four respondents initially classified into the mixed conditioning pathway changed to classical conditioning and one changed to vicarious conditioning at retest supports the bias towards classical conditioning suggested in previous fear acquisition research.

However, the present study showed that the 'always been fearful' pathway was relatively stable compared to pathways such as classical conditioning. Nevertheless, the results suggest that certain pathways may be more stable than others, although it is unclear whether this stability is based on specificity and memorability or on some other factor/s. The finding that some pathways to fear are more stable over time than others has implications for the use of the questionnaire methodology in fear acquisition research (Withers & Deane, 1995). More extensive investigation of the levels of memorability associated with different pathway ascriptions would be useful. In particular, the classification of the 'always been fearful' pathway as a nonassociative event may be problematic. Forsyth and Chorpita (1997, pp. 299–300) suggest that "...the following dimensions of the OQ, 'no recall', 'nonconditioning traumatic event', 'always been this way', and 'cannot classify' might be more conservatively taken as indicative of poor recall... The OQ, therefore, may best highlight the problems with retrospective self-report of etiology, rather than supporting actual instances of nonassociative etiology". So, this pathway may not accurately assess whether or not the person has always been afraid of the particular situation, and could instead reflect an inability to recall etiological events. Again, this issue highlights the problems with the reliability and veracity of self-reported accounts of the etiology of fear (Forsyth & Chorpita, 1997).

Although the results of the present study indicate that retrospective accounts of pathways to fear may be quite unstable over time, this instability does not clearly appear to be related to intervening events between test and retest. The results did not support the hypothesis that there would be a higher proportion of additional events among those whose onset ascriptions had changed compared with those whose ascriptions had stayed the same. This result negates the role of UCS inflation in cases where fear-onset ascriptions have changed over time. This conclusion may be premature, however, because of the very few cases who reported more salient conditioning events (e.g. MVA, near-miss) as occurring in the interim. Better conclusions about the role of additional events and UCS inflation in changing etiologies of fear may be made through employing longer test–retest intervals, during which time it is more likely that some driving-related event has occurred.

Even though it does not appear that the present finding of pathway instability is related to intervening events, we cannot confidently state that our findings are due to some real change in attributional or memory processes because of the change in methodology used to assess origins at retest. The main reason for shortening the OQ to one page at follow-up was to enhance compliance. However, this led to a major methodological limitation in that we cannot be sure of the extent to which changes in fear acquisition pathways are due to method changes or other factors. The comparison of original narrative descriptions of fears with OQ-derived pathways suggests these changes are more than just a function of method variance, but further research is needed to confirm these impressions.

In addition, the present study did not assess the role of panic attacks in the etiology of driving fears, which have been found to be reported by driving-fearfuls (e.g. Munjack, 1984; Ehlers, Hofmann, Herda & Roth, 1994). Instead, people reported being in the feared situation and suddenly having panicky feelings, although nothing actually happened to themselves or others. There was no information that would have enabled classification of the event as a full-blown panic attack. Subsequently, the event was considered to be a non-conditioning traumatic event, which was the method used by Menzies and Clarke (1993, p. 362). However, this method may have inadvertently reduced the ability of the study to identify cases where a panic attack accounted for the etiology of the fear, particularly in light of the recent suggestion that such aversive bodily events can be considered to be traumatic or direct conditioning events (Forsyth & Eifert, 1996; Forsyth & Chorpita, 1997). Therefore, inadequate assessment of panic attacks in addition to the change in methodology may have contributed to the results obtained.

The present findings on the instability of retrospective ascriptions have major implications for both theory and research. Theoretically, the findings implicate the relevance of memory and attributional processes when people construct reasons for their driving-related fears, and suggest that this process may be more complicated than has been previously thought. Although the present study found no apparent relationship between pathway changes and intervening events, a more systematic investigation of this relationship may help to assess the possible role of UCS inflation in retrospective accounts of fear onset. In turn, this has implications for fear acquisition research, particularly if future studies find that retrospective accounts of the onset of other types of fears are unstable over time. This would suggest that previous research using the retrospective methodology may have only captured a 'snapshot' of the fear after which pathway ascriptions may have changed. Furthermore, the negation of the etiological relevance of events occurring after the fear began, which has been noted by some researchers (e.g. Menzies & Clarke, 1993; Antony et al., 1997), may be inappropriate if such events are found to be etiologically relevant, as in the case of UCS inflation or pathway change for some other reason. On the other hand, pathway stability may vary for different types of fears. The present finding of pathway instability may be due to the inherent characteristics of driving-related fears. For example, the frequency with which most people are exposed to driving or riding may increase the likelihood of additional conditioning or traumatic events, potentially making onset ascriptions more unstable over time. The reduced exposure generally inherent in other types of fears in New Zealand, such as fears of spiders and snakes, may mean that pathways to these fears are more stable over time. Pathway instability of driving fears could also be increased by the effects of head injury following MVAs, as subsequent memory problems could affect fear-onset ascriptions. Therefore, factors inherent in driving fears, such as head injury and frequency of exposure, may predict stability estimates of pathway acquisition. Further research is needed to establish the stability of pathways to other fears before the role of inherent factors can be examined more closely.

The other result which has important clinical implications is that fear-relevant negative thinking (as measured by the Negative Thoughts scale) appears to have worsened over time. In contrast, measures of the physiological component of fear (the Bodily Reactions scale) and general anxiety (STAI-Y) remained stable. This indicates that, if not offered any intervention to address their fears, some people may experience an increase in the severity of their driving-related fear. Clearly, this suggests that we cannot simply ignore this particular fearful group, and some level of intervention may be warranted.

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APPENDIX A-4

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Comparison and Characteristics of Motor Vehicle Accident (MVA) and Non-MVA Driving Fears

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Abstract—Prior research has revealed the diagnostic complexity among people who report driving fears. However, the focus on survivors of motor vehicle accidents (MVAs) and diagnostic samples may have inadvertently led to a relative neglect of the broader driving-fearful population. No studies could be located that compared MVA survivors with those who had not experienced an MVA. The aim of the present study was to address these deficits by comparing the characteristics of MVA and non-MVA driving-fearfuls and also exploring a range of characteristics associated with driving fears. One hundred and ninety media-recruited driving-fearfuls completed a questionnaire that assessed severity of anxiety and avoidance associated with a variety of driving situations. It was found that fear levels were similar to samples of driving phobics and MVA victims. There were no significant differences between MVA and non-MVA respondents on various measures of fear severity. In addition, the sample rated a high level of anxiety when driving with someone who criticizes their driving. Implications of the findings are discussed, along with suggestions for assessment and treatment of those with driving-related fears. © 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Driving-related fear; Motor vehicle accidents; Clinical characteristics; Media-recruits

Diagnosis has traditionally been used to inform decisions regarding the most appropriate treatment options (Kaplan & Sadock, 1994). However, the more diagnostically complex (or confusing) a particular presentation is, the more difficult it is to make direct recommendations regarding treatment. Individuals with driving-related fears certainly appear to represent a diagnostic challenge. The majority of research points to posttraumatic stress disorder (PTSD), specific

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(simple) phobia, panic disorder, and agoraphobia as the most frequent diagnostic categories within this group.

PTSD seems to be the most salient diagnosis in studies of driving-fearful samples (e.g., Blanchard & Hickling, 1997; Brom, Kleber, & Hofman, 1993; Epstein, 1993; Green, McFarlane, Hunter, & Griggs, 1993; Horne, 1993; Koch & Taylor, 1995; Kuch, Cox, & Evans, 1996; Kuch, Cox, Evans, & Shulman, 1994; Kuch, Evans, Watson, Bubela, & Cox, 1991; Kuch, Swinson, & Kirby, 1985; Taylor & Koch, 1995). However, this appears to be partly due to the focus in such studies on survivors of motor vehicle accidents (MVAs; e.g., Blanchard & Hickling, 1997). While PTSD-focused research has greatly increased our understanding of the consequences of MVAs, this may have inadvertently led to a relative neglect of the broader driving-fearful population.

In previous analyses using a media-recruited driving-fearful sample, those who attributed their fear to an MVA (MVA-onset respondents) were compared with those who were fearful for some other reason (non-MVA-onset respondents; Taylor & Deane, 1999). There were no significant differences between the two groups in the severity of physiological or cognitive components of fear as measured by Öst and Hugdahl's (1981) Bodily Reactions and Negative Thoughts subscales from their Phobic Origins Questionnaire. Furthermore, the MVA-onset respondents had similar scores on the Impact of Event Scale (Horowitz, Wilner, & Alvarez, 1979) as the subsyndromal PTSD group studied by Blanchard, Hickling, Taylor, and Loos (1995). This suggests that many non-MVA-onset driving-fearfuls have fears of similar severity as their MVA-onset driving-fearful counterparts. Despite this, non-MVA driving-fearfuls remain a relatively underresearched group, and we could find no research that compared the characteristics of driving fears among MVA survivors with people who were fearful but had not had any MVAs.

Another frequent diagnosis among driving-fearful samples is specific (simple) phobia, and the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*; American Psychiatric Association, 1994) specifies driving in the situational category (p. 406). The heterogeneity of media-recruited driving phobic samples has been described previously, as has the difficulty in relating clinical presentations to single diagnoses (e.g., Ehlers, Hofman, Herda, & Roth, 1994; Herda, Ehlers, & Roth, 1993; Sartory, Roth, & Kopell, 1992). In particular, symptoms of panic disorder and agoraphobia have tended to confuse the diagnostic picture. For example, Herda et al. (1993) found that initial diagnostic attempts revealed that most individuals were not able to be classified into single *DSM-III-R* (American Psychiatric Association, 1987) categories. Consistent with research suggesting that the symptom profiles of phobic and panic anxiety cannot be reliably distinguished (Craske, 1991), driving phobics can manifest features of simple phobia and panic disorder with agoraphobia without meeting full criteria for either disorder (Ehlers et al., 1994). A complicating factor involves the common presentation of driving fears as a component of agoraphobic anxiety and avoidance (Kuch & Shulman, 1989).

Problems with the diagnosis of a specific phobia for driving using *DSM-IV* have recently been outlined by Blanchard and Hickling (1997). They note that this diagnosis is problematic because (a) the anxiety may be better accounted for by another mental disorder (e.g., PTSD after an MVA), (b) the anxiety may not invariably provoke an immediate anxiety response, (c) there may be times when driving does not evoke the particular triggers required for a phobic response, and (d) the response may not be regarded as a fear as much as a situation that elicits anxiety and uncomfortable affect (Blanchard & Hickling, 1997). In addition, Ehlers et al. (1994) note that:

> . . . categorization by the nature of fear cognitions is unsatisfactory for assigning driving phobics to panic disorder (fear of anxiety and its symptoms), simple phobia (fear of external situations), or social phobia (fear of embarrassment), since driving phobics typically have a mixture of all three kinds of thoughts. They are afraid both of aversive increases in anxiety and of the driving situation, since the two usually occur together. Furthermore, they typically fear losing control of the car, having an accident, harming themselves or others, and incurring the wrath of other drivers. (p. 336)

Ehlers and colleagues are one of the few groups to implicate social phobia as contributing to the overall driving fear constellation (Ehlers et al., 1994; Herda et al., 1993). However, while 10 out of 56 driving phobics met *DSM-III-R* criteria for social phobia, these involved anxiety about public speaking or other nondriving situations (Ehlers et al., 1994). Herda et al. (1993) reported a case involving fear of having a panic attack while driving and being ridiculed by others. Thus, there is anecdotal evidence for the influence of social factors, such as humiliation or embarrassment, as a consequence of perceived negative performance evaluation by others. The role of social phobia or social scrutiny in driving fears may be underestimated and has certainly received very little research attention.

To summarize, many studies have outlined the difficulty in diagnostically characterizing driving-related fears. The focus of most research interest has been on MVA survivors and PTSD as a diagnostic consequence. This emphasis may have narrowed the breadth of assessment for this potentially diverse problem group. The confusing diagnostic picture of driving-fearful individuals would seem to suggest that research needs to temporarily move away from its diagnostic emphasis and step back to focus instead on describing the characteristics of these people in more detail. For example, few studies have reported the types of situations feared and the degree of anxiety and avoidance associated with those situations (Ehlers et al., 1994; Kuch, Cox, & Direnfeld, 1995). This may be particularly important if further research demonstrates that driving-fearful groups are more diverse than has been anticipated.

The aims of the present study were to: (a) describe specific driving fear characteristics and situations, (b) compare the fear severity of a media-recruited sample with MVA and clinical samples, and (c) compare the characteristics and severity of driving fears in MVA and non-MVA samples.

METHOD

Sample and Procedure

Of the 190 volunteers who participated in this study, 175 were female (92%) and 15 male. Initial contact with respondents was gained through media interest in and coverage of the present study. Two local and two national newspapers published articles about the study and requested interested volunteers to telephone the researcher. Radio coverage about the study was also obtained through national radio stations. This coverage consisted of brief (5–10 minutes) interviews with the first author who conveyed the purpose of the study and provided information about how interested listeners could participate. The content of the interviews was consistent with the newspaper articles, in which common examples of driving-related fears were provided, and it was emphasized that the researcher was interested in people with any type or severity of driving-related fear, from mild worry to severe distress and avoidance. A toll-free telephone line was established in order for a wide range of callers to have the opportunity to participate. Upon calling, volunteers were able to have any questions answered and were then sent a copy of the questionnaire with a postage-paid, return-addressed envelope. From a total pool of 249 phone calls, 190 (76%) completed questionnaires were returned and 59 (24%) withdrew by failing to return the questionnaire. An information sheet attached to the front of the questionnaire outlined the consent procedures. Just under two thirds (66%) of the sample was aged between 30 and 59 years. Almost two thirds (62%) were married or in a de facto relationship. Most (91%) identified themselves as of European descent, with 1% identifying themselves as Maori.

Respondents had been driving for a mean of 21 years (SD = 14.5; range, 0–64 years; n = 187), and a current driver's licence was held by 90% (n = 170) of them. Most (73%) of the sample reported experiencing two or less MVAs, and the mean number of accidents was 1.68 (SD = 1.53; n = 182). Of those who reported having had at least one MVA, the length of time since the most recent accident was somewhat varied, from 0–5 years (31%), 6–10 years (11%), 11–15 years (8%), to more than 15 years (14%). Most traffic offenses reported were either speeding (21%) or parking (8%) offenses.

Measures

Respondents completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin of driving-related fears, their strength, and anxiety response patterns. Results gained from the sections on fear acquisition pathways and physiological and cognitive components of fear have been reported elsewhere (Taylor & Deane, 1999; Taylor, Deane, & Podd, 1999).

Self-reported fear. The first item asked respondents to describe their driving-related fear or fears in their own words. If the respondent had more than one fear, they were asked to list all of them in order from the most-feared to the least-feared situation. Often, respondents reported a combination of specific characteristics in one feared situation, such as "driving on the motorway at night in the rain." In cases where it was not clear what the primary fearful characteristic of the situation was, the first characteristic noted was the main criteria, thus for the above example, "driving on the motorway" was the category in which the fear was placed.

Driving Situations Questionnaire. Ehlers et al. (1994) constructed the Driving Situations Questionnaire (DSQ), which measures the extent of anxiety and avoidance in a number of driving situations. The five-page DSQ asks respondents to rate their amount of anxiety and avoidance in response to a range of driving situations, which are all rated with respect to the person driving alone, driving accompanied, and with another person driving. In short, anxiety and avoidance are both rated three times for each situation. Ratings on the anxiety scale range from 0 ("No discomfort or anxiety") to 4 ("Extreme discomfort or anxiety"), and from 0 ("Never avoid") to 4 ("Always avoid") on the avoidance scale.

The DSQ was used in the present study in an attempt to compare the ratings obtained by the present sample with the clinical sample in the Ehlers et al. (1994) study. It also allowed descriptive information on the types of feared driving situations in addition to narrative self-report. It is important to note, however, that no psychometric data on the DSQ could be located. The DSQ was modified for use in the present study mainly because of its length and was rearranged to make the presentation clearer and completion of the scale more efficient. The modified DSQ was divided into two parts, one each for ratings of anxiety and avoidance. Driving situations were then listed with ratings to be made for "driving alone," "driving accompanied," and "other person driving." Number of specific driving situations listed was also shortened to those which were rated highly in the study by Ehlers et al. (1994). Ten items were removed because of redundancy or inapplicability. Slight wording changes were made so as to make the modified DSQ more appropriate for a New Zealand sample. In the present study, "freeways" was changed to "motorways," and "residential" to "suburban." The final DSQ contained 15 driving situations, one of which was an "other" category for participants to rate their anxiety and avoidance in a situation which they specified.

Other fears. One item asked respondents to list any other fears they had besides their driving-related fear. This was included in an attempt to get an indication of coexisting fears, particularly those related to panic and agoraphobia, which have been difficult to separate from driving-related fears in prior research.

Accident Fear Questionnaire. The Accident Fear Questionnaire (AFQ; Kuch et al., 1995) is a 20-item screening scale for accident phobia after an MVA, and was modeled after the Fear Questionnaire developed by Marks and Mathews (1979; Kuch et al., 1995). The AFQ is a measure of MVA-related avoidance, and asks the respondent about their MVA and their reactions to it. It was used in the present study to compare the ratings obtained by the present sample with the accident phobics in the Kuch et al. (1995) study as well as to provide descriptive information on the accident-related avoidance and anxiety of MVA respondents. The first 10 items on the AFQ explore the experience of the MVA and related anxiety and require a "yes" or "no" answer. The second part of the AFQ consists of 10 items that measure fear and avoidance in certain driving situations, and are rated on a scale from 0 ("Would not avoid it") to 8 ("Always avoid it"). This yields a total AFQ score ranging from 0 to 80. The AFQ seems to be a specific and sensitive measure for MVA-related fears, and the reliability coefficient for internal consistency of items 11–20 was r = 0.89 (Kuch et al., 1995). The AFQ was unaltered for use in the present study, although the wording of item 20 was changed from "Riding a bus or streetcar" to "Riding a bus" for application to a New Zealand sample. The AFQ was only appropriate for respondents who had experienced an MVA, and only those participants who had been involved in an MVA completed this section.

The Bodily Reactions and the Negative Thoughts subscales. These two subscales from Öst and Hugdahl's (1981) Phobic Origins Questionnaire (POQ) were used to measure the physiological and cognitive components of fear. The 11-item Bodily Reactions subscale assesses the intensity of physiological reactions. The 10-item Negative Thoughts subscale measures the degree to which patients think negatively when they are facing their phobia. On both scales, items are rated from "Never" (0) to "Always" (4). The scales have been employed in prior research on fear acquisition and are described in more detail by Taylor and Deane (1999).

The State-Trait Anxiety Inventory. The 6-item short form of the State-Trait Anxiety Inventory (STAI, Form Y; Marteau & Bekker, 1992; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) asks respondents to rate the feelings experienced while imagining having to face their most-feared driving situation on a 4-point Likert-type scale ranging from "Not at All" (1) to "Very Much" (4).

TABLE 1
THE MOST-FEARED DRIVING SITUATIONS REPORTED IN THE PRESENT STUDY

Self-Reported Fear	*n*	%
1 Motor vehicle accident	45	23.7
2 Driving in certain road conditions (i.e., types of roads, such as open, country, gravel, wet, icy, winding, steep, and narrow roads, including bridges, overpasses, and tunnels)	25	13.2
3 Losing control of the car or not being in control of the driving situation	9	4.7
4 Driving in a traffic jam or congested, heavy traffic	8	4.2
5 Being a passenger	7	3.7
6 Driving in general	7	3.7
7 Not being able to react or make decisions fast enough, or making errors in judgement while driving	7	3.7
8 Driving in certain weather conditions	6	3.2
9 Driving on a motorway	6	3.2
10 Power of a vehicle and being in control of it	6	3.2
11 Driving fast or in fast-moving traffic	5	2.6
12 Having a panic attack while driving	5	2.6
13 People on the road (e.g., being criticized while driving, other drivers)	5	2.6
14 Fainting or dizziness while driving (physical collapse)	5	2.6

Note. Percent of respondents who included the fear item as their highest-ranked fear, rounded to one decimal place. Items with the same percentage have been listed in alphabetical order. Items reported are only those fears described by at least five respondents.

Fear intensity and help-seeking behavior. One question asked respondents to rate the extent to which their driving-related fear interfered with their daily functioning on a scale from "Not at All" (0) to "Extremely" (10). This item was included as a single-item severity measure, and was of interest because no prior research has reported obtaining self-reports of the degree of interference of the fear with the individual's daily life. Another item asked whether the respondent had ever received psychological help from a mental health professional for any personal or emotional problems (rated "Yes" or "No") and was included as an alternative method of assessing how problematic the fears were for the sample.

RESULTS

Feared Driving Situations

Types of feared driving situations were of interest in the present study because of the limited description of such situations in previous research. From the initial self-report item, the most-feared driving situations (i.e., first-ranked) reported by the sample are presented in Table 1. The top 10 situations accounted for more than three quarters (77%) of the self-reported driving fears in the sample, while the top two situations (MVA and certain road conditions) accounted for nearly 37% of the fears reported. It is clear from Table 1 that a diverse range of situations were reported.

A somewhat different picture emerged from the situations endorsed on the DSQ. Table 2 shows the mean anxiety ratings found in the present study compared with those reported by Ehlers et al. (1994) for their driving phobics. Avoidance ratings are also provided, although the comparisons were constrained by the data and categories reported by Ehlers et al. (1994).

As Table 2 shows, the six highest-ranked situations were very similar between the two studies, which both employed media-recruited samples. Although they had slightly different ranked positions, the two studies shared the same top six situations reported. For the top four situations reported by Ehlers et al. (1994), the means for the present sample were slightly less than the means for their phobic sample. For all of the remaining situations in Table 2, the mean anxiety ratings obtained in the present study were higher than those reported for the phobic sample by Ehlers et al. (1994). The mean anxiety ratings for the control group in the Ehlers et al. (1994) study ranged from .08 to .96, considerably lower than the means for their phobics and our sample. Overall, the present avoidance ratings in Table 2 seem to be slightly lower than the anxiety scores. In some cases, our avoidance ratings are higher than the anxiety scores for phobics (e.g., for driving alone or accompanied in the city and in a suburban area), although these comparisons must be made with caution as Ehlers et al. (1994) did not report their avoidance ratings.

Additional analyses were conducted to describe the characteristics of our sample in more detail. First, we were interested in which of the three driving categories—"driving alone," "driving accompanied," and "other person driving"—produced the highest anxiety and avoidance ratings. This was calculated as the mean for each driver category pooled across all 14 situations. The "other" situation was not included as it was specified by the participants and tended to be a situation of high relevance to their fear, yielding the highest mean anxiety rating of 3.18 (SD = 1.17). This would have effectively skewed the results. Interestingly, the types of situations reported by the 40 respondents who rated this item included driving in an unfamiliar area, drunk drivers, driving on country roads or open roads, traffic lights, driving where children are playing on the side of the road, and driving when in a hurry. At a descriptive level, "driving alone" was found to have the highest mean anxiety (M = 2.58, SD = .96, n = 83) and avoidance (M = 2.10, SD = 1.22, n = 93) ratings, while "driving accompanied" had slightly lower ratings (M = 2.40, SD = .95, n = 100; M = 1.94, SD = 1.18, n = 96, respectively). The lowest rated was with some "other person driving" (anxiety: M = 1.58, SD = 1.20, n = 78; avoidance: M = .68, SD = .91, n = 86). From these results, it seems that being a passenger (other person driving) does not cause as much anxiety and may therefore not be as important as driving alone and accompanied.

TABLE 2

MEAN ANXIETY AND AVOIDANCE RATINGS (AND SDs) IN DIFFERENT DRIVING SITUATIONS FOUND IN THE PRESENT STUDY COMPARED WITH PHOBICS' ANXIETY RATINGS REPORTED BY EHLERS ET AL. (1994)

	Ehlers et al. (1994)		Present Study			
	Anxiety		Anxiety		Avoidance	
Driving Situation	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
Driving alone on a motorway	3.00	(1.11)	2.69	(1.22)	2.34	(1.54)
Driving accompanied on a motorway	2.73	(1.07)	2.51	(1.26)	2.19	(1.57)
Driving alone in other situations	2.67	(0.90)	2.20	(1.31)	1.77	(1.57)
Driving accompanied in other situations	2.55	(0.97)	2.11	(1.31)	1.66	(1.55)
Driving alone under special circumstances	2.32	(1.03)	2.77	(0.95)	2.26	(1.23)
Driving accompanied under special circumstances	2.16	(1.02)	2.57	(0.95)	2.15	(1.19)
Other person driving (suburban area, motorway, bridges, city, tunnels)	1.36	(1.06)	1.37	(1.26)	0.50	(0.87)
Driving alone in city	1.35	(1.22)	2.11	(1.40)	1.86	(1.55)
Other person driving under special circumstances	1.34	(1.02)	1.75	(1.24)	0.78	(0.99)
Driving accompanied in city	1.30	(1.19)	2.00	(1.32)	1.66	(1.48)
Driving alone in suburban area	0.90	(0.98)	1.35	(1.25)	1.08	(1.34)
Driving accompanied in suburban area	0.81	(0.81)	1.37	(1.14)	1.03	(1.29)

Note. 0–4 scale. Ehlers et al.'s (1994) phobics ranged from $n=38$ to 40. Number of respondents in the present study who endorsed each driving situation varied from 82 to 161, since items were not always endorsed by all respondents. "Other situations" included winding road, mountain road, road next to a cliff, bridge, overpass, tunnel, driving uphill on a hilly road, and steep road (uphill and downhill) in the study by Ehlers et al. (1994). In the present study, "other situations" consisted of bridges and tunnels. "Special circumstances" included heavy traffic, driving at night, driving in an unfamiliar car, driving in fog or rain, driving when tired or stressed for other reasons than driving, driving with somebody who criticizes your driving, and driving with children in the car.

We were then interested in which situations had the highest mean ratings within the driving alone and accompanied categories. When driving alone, driving in fog was rated highest for anxiety (M = 2.90, SD = 1.24, n = 152), while the highest avoidance rating while driving alone was when driving in an unfamiliar car (M = 2.57, SD = 1.49, n = 141). In terms of the driving accompanied category, driving with somebody who criticizes one's driving was rated the highest for levels of anxiety (M = 3.05, SD = 1.15, n = 141) and avoidance (M = 2.42, SD = 1.55, n = 123). This finding was particularly surprising, given that, when asked to report their driving fears in narrative form, only 2.6% (n = 5) of the sample reported this particular situation as their most-feared driving-related situation. Yet more than half (51.1%) of the sample reported moderate to extreme discomfort or anxiety in this situation, and most (43.2%) of these indicated "much" or "extreme" anxiety when driving with someone who criticizes their driving in response to the DSQ items. Half of the sample reported that they avoid this situation to some degree, while 21% (n = 40) indicated that they always avoid driving with someone who criticizes their driving. In addition, it is notable that a relatively large number of respondents endorsed this item (n = 141) and this was the single highest anxiety severity rating across all situations whether driving alone or accompanied.

Other fears reported by the sample included heights (16.8%), enclosed spaces (11.6%), flying (6.8%), deep water (5.3%), fire and home being burgled (both 4.2%), death or dying and spiders (both 3.7%), and crowds, earthquakes, obsessive-compulsive concerns, and speaking in public (all 3.2%).

Severity of Fear

The severity of anxiety symptoms reported by the sample as a whole was evident in the results for the DSQ. Other results obtained in the present study support the suggestion that the present sample as a whole experienced considerable levels of distress. For example, 37 (19%) respondents indicated that they had avoided obtaining their driver's licence because of their driving fear. Furthermore, 56% of the sample rated a moderate to extreme level of interference of their fear with daily functioning (inclusive of extreme ratings).

Also of interest was the severity of fear in those who attributed their driving-related fear to an MVA. These participants were asked to complete the AFQ (Kuch et al., 1995) and Impact of Event Scale (IES; Horowitz et al., 1979) as related to their MVA. Results from the IES have been reported elsewhere (see Taylor & Deane, 1999). Results from the first 10 items on the AFQ are shown in Table 3. These results can be compared with the results obtained by Kuch et al. (1995), although such comparisons need to be made with caution since Kuch et al. (1995) used a small sample. The largest differences between the percentages obtained in the present study and those reported in the Kuch et al. (1995) study were on items 3 ("During the accident, did you lose

TABLE 3
PERCENTAGE OF PARTICIPANTS REPORTING "YES" ON THE ACCIDENT FEAR QUESTIONNAIRE

Items	*n*	% Reporting Positive: Present Study	% Reporting Positive: Kuch et al. (1995)[a]
1. During the accident, did you fear for your life?	51	52.9	71.4
2. During the accident, did you see anyone injured or killed?	51	25.5	21.4
3. During the accident, did you lose consciousness?	50	14.0	42.9
4. Do you have nightmares about the accident?	51	41.2	78.6
5. Are you nervous before trips?	51	76.5	78.6
6. Do you easily get upset in the car?	51	62.8	85.7
7. Do you tell the driver what to do?	49	71.4	71.4
8. Do you drive less than you used to?	50	58.0	92.3
9. Do you expect another accident soon?	48	31.3	42.9
10. Would most people feel after an accident the way you do?	39	69.2	100.0
Average overall percentage endorsement		50.3	68.5

[a]Kuch et al.'s (1995) study used 14 accident phobics.

consciousness?"), 4 ("Do you have nightmares about the accident?"), 8 ("Do you drive less than you used to?"), and 10 ("Would most people feel after an accident the way you do?"). Items 3, 4, and 8 seem to reflect the severity of the accident and posttraumatic reactions to the accident. Therefore, these differences would be expected given the nature of the present sample compared with the accident phobics in the study by Kuch et al. (1995). An average overall percentage endorsement is also reported for both studies, and was calculated by summing the item percentages and dividing by the number of items. This also reflects differences in the nature of the sample utilized in both studies.

Table 4 shows the differences between means on AFQ items 11 to 20, again reflecting a difference in severity that may be inherent in the nature of the different samples employed.

The difference between studies in total scores on the AFQ was analyzed using a two-tailed *t*-test, which revealed a significant difference, $t\ (1, 29) = 3.24$, $p < .001$. The reliability coefficient for internal consistency (Cronbach's alpha) of items on the AFQ was $r = 0.65$, compared with an alpha of $r = 0.89$ in the study by Kuch et al. (1995). It is possible that the more diverse sample in the present study was responsible for a reduced internal reliability coefficient. Therefore, the MVA-onset respondents in the present study had lower levels of distress and avoidance than another small sample of accident phobics (Kuch et al., 1995).

TABLE 4
MEAN AVOIDANCE SCORES ON ACCIDENT FEAR QUESTIONNAIRE (AFQ) ITEMS COMPARED WITH KUCH ET AL.'S (1995) 14 ACCIDENT PHOBICS

		Present Study		Kuch et al. (1995)	
Items	*n*	*M*	(*SD*)	*M*	(*SD*)
Since your accident, do you avoid:					
11. Riding as a passenger?	47	2.15	(2.46)	2.93	(1.50)
12. Driving yourself?	47	3.43	(3.40)	4.07	(2.56)
13. Riding in a particular seat?	48	1.31	(2.31)	2.21	(2.29)
14. Driving on certain roads?	49	3.53	(3.00)	4.36	(2.50)
15. Riding with certain drivers?	48	3.19	(2.86)	4.43	(2.38)
16. Driving in certain weather conditions?	49	3.02	(2.74)	5.43	(2.62)
17. Hearing news of accidents?	48	1.73	(2.44)	2.79	(2.49)
18. Seeing wounds and injuries?	49	2.24	(2.93)	3.50	(3.18)
19. Crossing streets alone?	49	0.53	(1.32)	1.64	(2.31)
20. Riding a bus (or streetcar)?	47	1.13	(2.33)	2.64	(3.10)
Total AFQ score	47	21.13	(12.52)	34.00	(14.77)

Note. 0–8 scale.

MVA Compared With Non-MVA Respondents

An aim of the present study was to compare those who had experienced at least one MVA (henceforth, "MVA respondents," $n = 140$) with those who had not experienced an MVA in their lifetime (henceforth, "non-MVA respondents," $n = 50$). There were no significant differences between MVA and non-MVA respondents on the Bodily Reactions subscale, $t\,(1, 147) = 1.17$, $p = .25$, the Negative Thoughts subscale, $t\,(1, 142) = -.25$, $p = .80$, or the six-item STAI, $t\,(1, 139) = .05$, $p = .96$. There were also no significant differences in terms of how much their fear interfered with daily functioning (on a scale ranging from 0 "Not at all" to 10 "Extremely"), $t\,(1, 181) = .84$, $p = .40$. MVA respondents (41%) were not more likely to have sought prior help from a mental health professional for any personal or emotional problems than non-MVA respondents (36%), $\chi^2(1) = .32$, $p = .57$. There were also no differences between MVA (21%) and non-MVA respondents (23%) in terms of avoidance in obtaining a driver's licence, $\chi^2(1) = .06$, $p = .81$. In addition, of the 140 participants who had been in MVAs, only 78 (55.7%) attributed their fear to an MVA. The remaining 62 (44.3%) who did not ascribe the onset of their driving fear to an MVA made other fear-onset attributions, suggesting that an MVA does not necessarily lead to fear onset. When those who attributed their fear to an MVA ($n = 78$) were compared with those who did not ($n = 112$), again no differences were found on all of the measures noted above.

DISCUSSION

The present study sought to address deficits in prior research on driving fears, particularly in terms of comparing MVA and non-MVA driving-fearful participants as well as describing some of the characteristics associated with driving fears. The first aim of the study was to explore the types of feared situations reported by the sample. A wide range of feared situations were reported, and the open-ended self-report narratives and item-endorsement questionnaire (DSQ) produced quite different kinds of feared situations. Given the opportunity to rate their anxiety in a variety of driving situations as prompted by specific items on a questionnaire (DSQ), participants indicated fears for a greater range of situations and endorsed relatively high levels of anxiety associated with these situations. This information would not have been obtained with the use of open-ended self-report methods alone, and suggests that a comprehensive assessment of those who report driving fears needs to incorporate elements of both forms of assessment.

The open-ended question asked people about their most-feared driving situation and it is not surprising that the largest number (23.7%) of respondents reported an MVA. It could be assumed that being involved in an MVA is the ultimate driving situation to be feared, and that such a fear is realistic when one considers the common occurrence of MVAs. However, translating the components of fear of an MVA into a treatment plan is not so straightforward. Because an MVA is something toward which you would expect people to have some realistic fear, it is of questionable value to desensitize a person to an MVA as a general situation. It would be more useful in developing goals for desensitization to access the specific driving conditions or situations which the person associates with an MVA or other driving-related fear. For example, the focus of fear may be of having an accident in stormy weather conditions due to reduced visibility, changes in the nature of the road surface, and handling of the vehicle. In this case, the exposure components of therapy would be more helpful when aimed at reducing anxiety in such specific conditions and increasing safety through a defensive driving course. Such specific driving conditions may lead to the ultimate fear of being in an MVA, but are more useful in terms of reducing anxiety responsiveness to specific anxiety-provoking stimuli. The implication for assessment is to ask the person what it is about an MVA that they fear. Are they afraid of death or injury? Or are their fears related to more probable situations, such as having to deal with the hassles arising from a minor "fender bender" MVA (i.e., insurance problems, police involvement, or public scorn)? Dependent on the specifics of the fear, treatment might focus on developing more accurate expectations of such an event, or planning how to cope successfully if faced with the situation rather than some form of desensitization.

Other themes that emerged from participant fear descriptions (Table 1) were related to issues of control (losing control of the car, not being in control of the driving situation, being in control of a powerful vehicle) and the skill requirements of driving (reaction time, judgement errors, weather conditions, road conditions). These aspects of driving fear also have treatment implications. In cases where the issue of control serves as a primary focus of fear, methods for increasing perceived control may be appropriate. For example, skills training and opportunities to practice how to react to potential loss-of-control situations may be a component of an intervention package. Skills training may also be useful where the focus of fear is on the latter issue of skill requirements for driving. For example, treatment might involve training in skid control procedures, driving in icy or wet conditions, or maximizing the use of visual cues for making judgements and improving reaction time.

Therefore, it is important in assessment to clearly ascertain the focus of the driving fear, as this has pertinent implications for treatment. An analogy can be drawn with test or examination anxiety where it is sometimes unclear whether the fear is of examinations or of failure. Similarly, with those who report driving fears, there may be some confusion over whether the fear is of driving itself or of ultimately being injured or killed in an MVA. Many driving-fearful subjects may not have very specific feared situations in mind until they are prompted to consider their anxiety in various situations, as on the DSQ. The results from the DSQ indicate that respondents rated relatively high levels of anxiety in response to a range of situations, thereby prompting them to consider situations that they may not have necessarily thought of spontaneously. This would seem particularly relevant with the high anxiety rating for "driving with somebody who criticizes your driving."

Results of the DSQ indicated that driving-fearfuls were most anxious about and avoidant of driving alone. This would appear to make intuitive sense, as less anxiety was associated with driving accompanied, and presumably some sense of increased safety in the event of "something happening" operates for driving-fearfuls when they are accompanied by a passenger. The category of "other person driving" was not rated as highly as the other two categories, and it could be concluded from this that being a passenger does not cause as much anxiety and avoidance as driving either alone or accompanied. These results seem to have implications for treatment and treatment planning, particularly in relation to developing a hierarchy of feared situations for exposure-based procedures. The results suggest that graded in vivo exposure hierarchies should incorporate situations where another person is driving at a lower point in the hierarchy than when the client is driving accompanied by someone else, and that situations involving driving alone should appear further up in the hierarchy. However, these conclusions can be seen as guidelines only and need to be interpreted cautiously given the rather idiosyncratic presentations among driving-fearfuls. For example, it has been noted that the nature of an

MVA can determine the types of situations subsequently feared. Koch and Taylor (1995) described cases where patients reported that they were more afraid of traveling as a passenger than of driving themselves. They typically reported an enhanced perception of control and safety when behind the wheel, and therefore in vivo exposure for such patients requires much more passenger travel than for someone who is more fearful of driving alone (Koch & Taylor, 1995). Clearly, these results may be useful in developing exposure hierarchies, but not at the expense of differing individual presentations.

Driving with someone who criticizes one's driving was rated with the highest anxiety and avoidance when driving accompanied. In fact, this situation was rated as the most anxiety-provoking in the present study (when the "other" situation was disregarded because of its high ratings as explained previously). It is unclear from the item whether the respondent is rating a perceived or real criticism. Further research may be needed to clarify to whom respondents are referring when they rate this item. If they are referring to perceived criticism from other drivers, this may introduce quite a different cognitive process or error that requires therapy.

Other targets of cognitive restructuring that have already been identified include the overprediction of fear, underprediction of safety, and selective attention to threat information (Rachman & Bichard, 1988; Taylor & Rachman, 1994). Nevertheless, this finding has important implications for the assessment and treatment of those who report driving-related fears. Issues of performance anxiety need to be included in a comprehensive assessment of this group, and the focus of treatment may be quite different if fears of being humiliated or criticized are maintaining anxiety and avoidance behavior.

A course in defensive driving may help in treating those whose driving skills are sound but whose self-efficacy has been reduced through driving-related criticism (Koch & Taylor, 1995). This finding may also indicate that, for some people, an element of fear of negative evaluation is associated with their driving-related fear, and may fit diagnostically as a feature of social phobia. This result highlights the relative neglect of performance evaluation concerns in the assessment of those who report driving fears. Further research needs to investigate other issues that may be related to performance evaluation or deficits in skills to cope with such situations, such as assertion, fear of negative evaluation, and self-perceptions of driving skills. In addition, as with many performance-related anxiety disorders, attention that is directed to self-monitoring and "dealing with the implied criticism of others" is not being directed toward driving. In this case, there is likely to be excessive self-monitoring and insufficient resources directed to the task at hand, that is, driving safely. This may decrease reaction times and attention and increase the risk of near-misses or accidents, further undermining the driver's confidence and potentially increasing the risk of further accidents in a vicious cycle.

The second aim of the present study was to describe the severity of a media-recruited driving-fearful sample. The fear symptoms reported by the sample were relatively severe. The finding that the present media-recruited sample reported similar or higher mean anxiety ratings to that of Ehlers et al.'s (1994) media-recruited clinical sample suggests that those who report general driving fears also manifest significant levels of distress. Overall, the sample was characterized by relatively high levels of anxiety and avoidance behavior. Comparisons on the AFQ with the small number of accident phobics described by Kuch et al. (1995) suggested a slightly different picture with those in the present study generally showing lower levels of distress and avoidance on the AFQ to this "accident phobic" group. This may be explained in part by the fact that Kuch et al.'s (1995) accident phobics were recruited through referral for assessment of chronic pain and other somatic symptoms after an MVA.

The third aim of the present study was to describe the characteristics and severity of MVA and non-MVA samples. It could have been expected that MVA respondents would report greater levels of distress and anxiety than non-MVA respondents due to the traumatic nature of motor vehicle accidents and their consequences. However, this was not found in the present study. In fact, no significant differences were found between the two groups on measures of physiological and cognitive symptoms, state anxiety, degree of interference in daily functioning, prior help from a mental health professional, and avoidance of obtaining a driver's licence. This would indicate that, although non-MVA respondents exhibit symptoms of a similar severity to those who have experienced an MVA, they certainly have not received the attention in prior studies that has been afforded MVA survivors. The driving-fearful population appears to be much broader than has been previously realized.

Although the present study is limited by the lack of comparison control and clinical groups, the aims were primarily descriptive. However, now that the results indicate a broader driving-fearful population, further studies are needed to investigate the clinical characteristics of this increasingly diverse population. In particular, further research needs to assess the implications that fear of criticism, negative evaluation, and other cognitive processes may have on anxiety and subsequent driving behavior. More detailed assessment of variables related to panic disorder and agoraphobia would also help to provide more information about the relationship between driving fears and these other anxiety disorders. Future research should continue the process of developing comprehensive assessment procedures that inform the treatment process. While diagnostic formulations may be a part of this process, clear descriptions of contextual components of driving fears will be essential for the design of efficient, specific, and effective interventions.

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APPENDIX A-5

Case 4 from Herda et al. (1993).

Ms. D., a divorced 63-year-old volunteer charity worker, had never had driving difficulties for the first 20 years after receiving her license at age 16. At age 36, after moving to Los Angeles, Ms. D. felt slightly apprehensive one day when she started out driving. On a freeway on which she had never driven before, she experienced a panic attack with palpitations, sweating, dizziness, flushes, shaking, and the fear of doing something uncontrolled. She had her last panic attack 14 years before our evaluation, at age 49. At the time of evaluation, fear of having anxiety attacks, losing control, and of being hit by other cars were her major concerns when driving on freeways. For a two-year period beginning eight years before, Ms. D was able to drive a certain freeway route to visit a friend, but after her friend died, her anxiety worsened again. She had not driven on a freeway at all for two years.

Ms. D. never had experienced difficulty driving on streets other than freeways until a few weeks ago. She thinks that this is related to the fact that in the past four months she had three near accidents on a major thoroughfare; in each instance another car tried to merge from the left. During these incidents Ms. D. felt angry at the other drivers, not panicky, but she subsequently had become afraid of driving on that particular street. Oddly, in the BAT [Behavioural Avoidance Test], Ms. D. reported no anxiety driving on the very thoroughfare where the accidents had occurred. Furthermore, she completed the freeway BAT task, giving herself an anxiety rating of only 3 [out of 10]. She gave herself 3 on two other tasks, and 0 on the rest.

Ms. D. had panic attacks only on freeways and was only afraid of having them there. Therefore, ...the diagnosis *anxiety disorder not otherwise specified* [italics added] had to be given. Additionally, Ms. D. met criteria for simple phobia (heights) and major depression, recurrent, in full remission. (p. 13)

APPENDIX A-6

Taylor, J.E., Deane, F.P., & Podd, J.V. (2000). Determining the focus of driving fears. *Journal of Anxiety Disorders, 14,* 453-470.

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Determining the Focus of Driving Fears

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Abstract—Fear of driving has been recognized as a complex diagnostic entity. Studies on flying phobia have drawn similar conclusions, although increasing clarity has been gained through research that indicates that there may be subtypes of flying phobia based on the focus of fear. However, it is unclear if similar subtypes exist for fear of driving. The aim of the present study was to conduct a preliminary investigation of driving fear subtypes and to clarify further whether there were differences between driving-fearful respondents who had been in a motor vehicle accident (MVA) and those who had not. Eighty-five driving-fearful, media-recruited respondents completed a questionnaire that assessed anxiety, avoidance, and concerns related to their driving fears. The sample had high expectations of negative events while driving. There were no significant differences between those who had experienced an MVA and those who had not on various measures of fear severity. Cluster analysis revealed two main foci of fear, one characterized by danger expectancies and the other based on anxiety expectancies and unpleasant driving situations. This emphasizes the importance of assessing both internal and external foci of fear. Although this finding is consistent with the results obtained for flying phobia, more research is required to replicate and extend these results and to develop and evaluate differential treatment programs. © 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Driving-related fear; Motor vehicle accidents; Subtypes; Media-recruits

According to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*), fear of driving can be conceptualized as a specific phobia (American Psychiatric Association, 1994, p. 406) as well as a type

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of travel fear that forms part of the syndrome of agoraphobia (American Psychiatric Association, 1994, p. 396). Fears of driving have been described as a component of wider agoraphobic avoidance (Curtis, Himle, Lewis, & Lee, 1989; Himle, McPhee, Cameron, & Curtis, 1989; Himle, Crystal, Curtis, & Fluent, 1991; Kuch & Swinson, 1989), although other researchers have not always found support for this hypothesis (e.g., Antony, Brown, & Barlow, 1997). As noted by McNally and Louro (1992), the distinction between specific phobia and agoraphobia is blurred further by studies showing that the situational panic attacks experienced by those with specific phobia are very similar to those with agoraphobia (Craske, 1991). Furthermore, driving phobias can develop after the person experiences an unexpected panic attack in the feared situation (Ehlers, Hofmann, Herda, & Roth, 1994; Munjack, 1984; Taylor & Deane, 1999).

Despite the apparent similarities between specific phobias and agoraphobia (Curtis, Himle, Lewis, & Lee, 1989), some research has shown that the two groups are distinguishable in terms of focus of apprehension. For example, fear of flying has proved difficult to fit into traditional phobia categories (McNally, 1997). McNally and Louro (1992) studied a treatment-seeking sample of 17 persons with agoraphobia and 17 persons with specific phobia who feared flying in an attempt to distinguish the two groups. They found that behavioral avoidance and most demographic and clinical features did not differentiate the two groups, although persons with agoraphobia and persons with specific phobia who feared flying were distinguishable in terms of their focus of apprehension, or motivation for flight avoidance. Persons with agoraphobia avoided flying because they feared panic and its consequences (anxiety expectancy), whereas persons with specific phobia avoided flying because they feared crashes (danger expectancy). In contrast, Wilhelm and Roth (1997) found that both groups of media-recruited persons with phobia were equally concerned about external dangers, such as an accident or crash. Only the two groups diagnosed with panic disorder (current or past) were more concerned than control participants about internal dangers, such as unpleasant bodily symptoms and panic attacks, partially confirming McNally and Louro's findings. Interestingly, the panic disorder groups were also more concerned than the control group about social dangers, such as other people being critical and subsequent humiliation.

Van Gerwen, Spinhoven, Diekstra, and Van Dyck (1997) explored the association of flight anxiety with different types of phobia among 419 people who sought help for fear of flying. They identified four specific subtypes of flying phobia that differed in terms of flight anxiety level, age, sex, and focus of fear. The foci of fear that differentiated the four subtypes were: (1) fear of an aircraft accident and the need to be in control of the situation; (2) fear of loss of self-control or social anxiety; (3) fear of water or claustrophobia, agoraphobia, or both (with panic attacks); and (4) acrophobia. Because the Van Gerwen et al. study did not include a diagnostic evaluation, it is difficult to compare it with related studies. Overall, however, research findings suggest that there are subgroups of flying fear based on focus of fear. It has been suggested that differences between studies are in part the result of varying recruitment procedures, which in turn lead to distinct types of samples and fear severities (Wilhelm & Roth, 1997). Nevertheless, the identification of subtypes of flying fear may have implications for treatment (Van Gerwen, Spinhoven, Diekstra, & Van Dyck, 1997). Wilhelm and Roth (1997) suggested that both panic disorder with agoraphobia and specific phobia groups must be exposed to external stimuli, whereas exposure to bodily sensations is only required for those with panic disorder with agoraphobia. Howard, Murphy, and Clarke (1983) also noted that treatment outcomes may be improved if specific flying fear patterns can be isolated. This would help to determine the best treatment approach for that particular fear, rather than using a comprehensive intervention that may include irrelevant material.

As with studies on fear of flying, existing research supports the hypothesis that the clinical presentation of driving fears is diagnostically complex. Those who present with a fear of driving often describe features consistent with various anxiety disorders, including panic disorder, agoraphobia, specific phobia, and social phobia. In addition, some or all of these different features can be evident in an individual case, making it difficult to relate clinical presentations to single diagnoses (Ehlers, Hofmann, Herda, & Roth, 1994; Herda, Ehlers, & Roth, 1993; Sartory, Roth, & Kopell, 1992). Although distinct subgroups have been identified among those with flight phobia, studies examining those with driving phobia have found that they typically report a mixture of cognitions associated with different anxiety disorders, such as fear of accidents (specific phobia), fear of anxiety and its symptoms (panic disorder), and fear of embarrassment (social phobia; e.g., Ehlers, Hofmann, Herda, & Roth, 1994).

It may be that, when people describe their fear, they report a chain of events perceived as fearful, thereby making it more difficult to ascertain the focus of the fear. For example, a person may describe their feared situation as driving on the highway in heavy traffic, experiencing panic-like anxiety symptoms, becoming distracted, making some error in judgment, losing control and having an accident, with others being highly critical and angry at them. There are many different possible foci for the fear in this instance. Is the fear specific to driving on the highway? Is the fear of the actual anxiety symptoms? Is it ultimately of having an accident or causing injury to self or others? Is it of being negatively evaluated and criticized by other people on the road? Or is it a combination of all of these fears (i.e., the entire chain of events)? If it is the latter, then how much weight does each of these individual fears contribute to the overall fear?

Determining the focus of driving-related fears can be a complex process that has implications for assessment and treatment. For instance, characteristics of driving fears associated with social phobia have been comparatively neglected and underassessed, despite their relevance to the performance component inherent in driving (Taylor & Deane, 2000). The possible relevance of a focus of fear consistent with social phobia was demonstrated in the study by Taylor and Deane. They found that the questionnaire item "driving with somebody who criticizes one's driving" was rated the most feared situation for levels of anxiety and avoidance among their sample of 190 driving-fearful media recruits. Furthermore, 51% of their sample reported moderate to extreme anxiety in this situation, which suggests that concerns about criticism and negative performance evaluation are important areas of assessment and treatment for those who present driving fears.

Given the often confusing clinical picture of driving-fearful individuals, Taylor and Deane (2000) suggested that research must step back temporarily from the emphasis on diagnosis and focus instead on describing in more detail the clinical characteristics of this group. This may then help in the development of more comprehensive assessment procedures and interventions that target the different foci of driving fears. The present study aimed to examine some of the specific fear characteristics of a driving-fearful sample. Also of interest was whether there were any differences in characteristics between those who had experienced a motor vehicle accident (MVA) and those who had not, particularly because Taylor and Deane (2000). found no significant differences between these groups in terms of fear severity. This result is important because it may have implications for the identification of at-risk persons as well as service provision.

METHOD

Sample and Procedure

The original sample of 190 volunteers was recruited through media advertisements that asked for respondents who had a fear of driving (see Taylor, Deane, & Podd, 1999). The original sample were asked whether they would be willing to participate in future research, and 86.4% (n = 115) expressed an interest in participating in the follow-up study. Eighty-five of these 115 persons returned the follow-up questionnaire in the postage-paid envelope, producing a response rate of 74%.

Of the original sample of 190, 85 (45%) participated in the follow-up study. To find out whether respondent attrition had caused bias in the follow-up sample, the 85 follow-up respondents were compared with the 105 who dropped out of the study. The only significant difference found was for age, with the follow-up group having a slightly higher mean age (M = 50.09, SD = 15.17) than the dropout group ($M = 43.56, SD = 13.89$), $t(1, 187) = 3.09, p < .005$. No significant differences were found for 11 other demographic, driving status, or helpseeking-related variables, as well as three measures of fear severity (see Taylor, Deane, & Podd, 1999). As with the original sample, most respondents in the follow-up group were female ($n = 81$; 95%) with only four males. The overrepresentation of women in studies of driving phobia is a reflection of the fact that women are generally overrepresented in clinical phobic samples (e.g., Himle, Crystal, Curtis, & Fluent, 1991; Sartory, Roth, & Kopell, 1992). This sample was characterized by a range of driving-related fears and severity levels, rather than being restricted to MVA survivors.

Measures

Respondents completed a self-report questionnaire composed of measures designed to elicit detailed information about the origin and strength of their driving-related fears and their anxiety response patterns. The results gained from the sections on fear acquisition pathways and physiologic and cognitive components of fear have been reported elsewhere (Taylor, Deane, & Podd, 1999).

Concerns and expectations while driving. To help characterize the types of concerns respondents had while driving (i.e., focus of fear), two sets of items used by Ehlers, Hofmann, Herda, and Roth (1994) were used in the present study. The first set of items listed 14 possible concerns that some people have while driving (e.g., accident, loss of control over the car, intense and unpleasant bodily symptoms, anxiety impairing driving, other people being critical, car breaking down, getting lost) and asked respondents to rate how concerned they were about each item using a scale from 0 ('not at all concerned') to 10 ('extremely concerned'). Ehlers et al. also conducted a factor analysis to examine patterns of phobic concerns and identified five factors: anxiety symptoms while driving, danger in driving situations, unpleasant driving situations, being criticized, and losing control.

The second set of items assessed expectations of negative events while driving and was drawn from Ehlers, Hofmann, Herda, and Roth's (1994) Driving Situations Questionnaire. Respondents were asked to rate the likelihood of six events while driving—accident (MVA), panic attack, serious bodily symptoms, traffic jam, car breakdown, and inability to drive because of anxiety—on a scale from 0% ('will not happen') to 100% ('will certainly happen'). No psychometric information was available for either of these scales.

Anxiety Sensitivity Index. The Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) is a 16-item self-report measure of the fear of anxiety. Responses to each item are made on a 0- to 4-point scale, and a total score is calculated by summing the items, resulting in a range of 0 to 64. Higher scores reflect a greater fear of bodily sensations (Apfeldorf, Shear, Leon, & Portera, 1994). The ASI has adequate test–retest reliability (r = .75; Reiss, Peterson, Gursky, & McNally, 1986), good construct validity (Taylor, Koch, & Crockett, 1991), and predictive validity (Maller & Reiss, 1992). The ASI also differentiates between patients diagnosed with panic disorder and other anxiety disorders (Apfeldorf, Shear, Leon, & Portera, 1994; Taylor, Koch, & Crockett, 1991). Taylor et al. also found that a cutoff score of 27 maximized the total proportion of correct classifications of panic disorder. The ASI was used in the present study to assess the possible role of fear of anxiety in driving-related fears.

Mobility Inventory for Agoraphobia. The Mobility Inventory for Agoraphobia (MI; Chambless, Caputo, Jasin, Gracely, & Williams, 1985) is a self-report questionnaire consisting of two sections. The first section concerns avoidance in 26 different situations. The degree of avoidance of each situation is rated on a scale from 1 ('never avoid') to 5 ('always avoid'), and all situations are rated twice, once in relation to 'when accompanied by a trusted companion' and once for 'when alone' (score range, 26–130). The second section of the MI pertains to panic attacks. A definition of a panic attack is provided, and respondents indicate the number of panic attacks they have experienced in the last 7 days and rate the severity of the attacks on a scale from 1 ('very mild') to 5 ('extremely severe'). After these ratings have been made, respondents are asked to circle the five situations with which they are most concerned.

The MI has adequate test–retest reliability (r = .62–.90) and individual item reliability (r = .50–.90; Chambless, Caputo, Jasin, Gracely, & Williams, 1985). It has good convergent and construct validity (Cox, Swinson, Kuch, & Reichman, 1993; Kwon, Evans, & Oei, 1990) and has been shown to discriminate those with agoraphobia from those with other anxiety disorders (Craske, Rachman, & Tallman, 1986). Some studies have used the MI with driving phobia samples and have found that the mobility of these persons was more limited than that of the control participants, even when the driving items were removed (Ehlers, Hofmann, Herda, & Roth, 1994; Sartory, Roth, & Kopell, 1992). The MI was used in the present study mainly to provide an initial indication of whether driving fears were part of wider agoraphobic avoidance.

Self-perception of driving ability. Because practical and temporal limitations precluded an assessment of actual driving skills, we chose to assess self-perceptions of driving ability. It could be argued that how driving-fearful persons perceive their driving skills may be as important as their actual driving abilities. For example, they may have good driving skills yet perceive themselves as a poor driver. A self-report measure of comparative driving ability previously used in New Zealand (McCormick, Walkey, & Green, 1986) was used in the present study. The following dichotomies are rated: foolish–wise, unpredictable–predictable, unreliable–reliable, inconsiderate–considerate, dangerous–safe, tense–relaxed, and irresponsible–responsible. Respondents were required to rate 'me as a driver' and the hypothetical constructs of 'an average driver' and 'a very good driver' on each of the dimensions using a 7-point scale. McCormick et al. found a self-enhancement bias, where drivers tended to rate themselves as better than an average driver on all dimensions, but worse than a very good driver. To our knowledge, this measure has not been used previously with driving-fearful samples.

Fear of Negative Evaluation Scale. The Fear of Negative Evaluation (FNE; Watson & Friend, 1969) Scale is a self-report measure of social-evaluative anxiety and consists of statements involving concern about others' evaluations, avoidance of evaluative situations, distress about negative evaluation, and expectation of being negatively evaluated. The brief 12-item form of the FNE developed by Leary (1983) was used, which correlates highly with the original form ($r = .96$) and has acceptable reliability ($r = .75$–$.90$) and validity, although there is mixed support for its discriminant validity (Heimberg, Hope, Rapee, & Bruch, 1988; Turner, McCanna, & Beidel, 1987). Each item is rated on a scale from 1 ('not at all characteristic of me') to 5 ('extremely characteristic of me'), resulting in a range of 12-60. The brief FNE scale was used to further investigate our previous finding that high anxiety and avoidance was reported in the situation 'driving with somebody who criticizes one's driving' (see Taylor, Deane, & Podd, 1999).

RESULTS

For purposes of comparisons based on MVA involvement, the sample was divided into those who reported being involved in at least one MVA (henceforth, 'MVA group'; $n = 60$) and those who had no such MVA experiences (henceforth, 'non-MVA group'; $n = 25$).

Concerns and Expectations While Driving

The first column in Table 1 shows the rank order of concerns while driving. Persons fearful of driving were most concerned about having an accident, losing control over the car, injury, very intense and unpleasant anxiety, and no control over other people's driving. They were less concerned about becoming lost, other people being critical, anxiety leading to some type of catastrophe, traffic jam, and experiencing a physical crisis. Comparisons between the present results and those obtained by Ehlers, Hofmann, Herda, and Roth (1994)

TABLE 1

Rank Order of Concerns While Driving, Compared with Those Reported by Ehlers et al. (1994) for Their 56 Patients with Driving Phobia

	Present Study		Ehlers et al. (1994)		
Concern (0–10)[a]	Mean	(*SD*)	Mean	(*SD*)	*t*
Accident	8.13	(3.03)	6.59	(3.05)	4.53***
Lose control over the car	7.96	(2.90)	7.05	(3.11)	2.99**
Injury	7.85	(3.16)	6.09	(3.33)	4.99***
Very intense and unpleasant anxiety	7.69	(2.89)	7.70	(2.77)	0.04
No control over other people's driving	7.43	(3.24)	6.18	(3.16)	3.43***
Anxiety will impair driving	6.10	(3.40)	7.66	(2.69)	4.10***
Dangerous road conditions	5.83	(3.50)	5.02	(3.19)	2.05*
Intense and unpleasant bodily symptoms	5.38	(3.38)	6.80	(3.21)	3.66***
Car might break down	4.62	(3.33)	4.06	(3.63)	1.49
Getting lost	3.73	(3.63)	5.10	(3.69)	3.32***
Other people will be critical	3.69	(3.39)	4.87	(1.41)	3.07**
Anxiety will lead to a physical or mental catastrophe	2.96	(3.40)	4.67	(3.82)	4.44***
Traffic jam	2.90	(3.35)	4.09	(3.76)	3.13**
Physical crisis	2.70	(3.37)	4.41	(3.90)	4.43***

Note. SD = standard deviation.

[a] n = 76 to 81 because of missing data on individual items.

* $p < .05$; ** $p < .01$; *** $p < .001$.

are useful because they allow preliminary description of how a media-recruited, nonclinical (not recruited from a clinical setting) sample describing themselves as fearful of driving compare with a media-recruited group diagnosed as driving phobic. The n for each item was not available for Ehlers et al.'s data. Therefore, one-sample t tests were conducted on the concern scores to evaluate whether the mean was significantly different from that obtained by Ehlers et al. The results can be seen in the remainder of Table 1. Persons fearful of driving reported a significantly higher level of concern about 5 of the 14 situations than Ehlers et al.'s group with driving phobia—accident, losing control over the car, injury, no control over other people's driving, and dangerous road conditions. In contrast, those with driving phobia were significantly more concerned about anxiety symptoms and their effects (i.e., anxiety will impair driving, intense and unpleasant bodily symptoms, anxiety will lead to a physical or mental catastrophe, physical crisis), as well as other people being critical, becoming lost, and experiencing a traffic jam.

Expectations of negative events while driving were also assessed, although comparison data with Ehlers, Hofmann, Herda, and Roth's (1994) sample are not available (they did not report individual item means). Those fearful of driving rated the likelihood of the following events out of 100% (will certainly happen): accident (M = 41.52%, SD = 27.18, n = 79); panic attack (M = 37.50%, SD = 31.88, n = 80); traffic jam (M = 35.40%, SD = 34.31, n = 76); unable to drive because of anxiety (M = 33.90%, SD = 33.18, n = 82); car breaking down (M = 32.95%, SD = 29.41, n = 78); and serious body symptoms (M = 24.05%, SD = 26.27, n = 74). Using a multivariate analysis of variance, no significant differences were found between MVA and non-MVA groups regarding expectations of any of the six negative events, $F(1, 66) = 0.35, p = 0.91$.

Associated Symptoms

A number of existing questionnaires were used to assess symptoms that may be associated with driving fears. The results from these measures are shown in Table 2. On the ASI, the difference in mean score between the MVA and non-MVA groups was not significant, $t(1, 81) = 1.16, p = .25$. Almost one third (31.76%) of the sample scored 27 or higher on the ASI (the cutoff set by Taylor, Koch, & Crockett, 1991, for panic disorder). The mean score for the total sample can be compared with ASI scores reported in other studies of those fearful of driving. Antony, Brown, and Barlow (1997) reported a mean ASI score of 20.73 (SD = 9.13) for a group of 15 persons with driving phobia. In a study of MVA survivors, Kuch, Cox, Evans, and Shulman (1994) reported ASI scores for a group of 21 persons with accident phobia that were significantly higher (M = 29.14, SD = 14.26) than for a group of 34 persons who were not phobic (M = 20.81, SD = 10.88). The difference in ASI scores across these two studies may be the result of the different criteria used to define driving fear (i.e., driving phobia compared with accident phobia).

Avoidance of driving and nondriving situations was assessed with the MI. The two driving situations on the MI are 'car' and 'motorways' (highways). Overall, those fearful of driving indicated the highest levels of avoidance when they were alone in driving situations (see Table 2). This was also found by Ehlers, Hofmann, Herda, and Roth (1994), although the mean for their sample of persons with driving phobia was 2.13 (SD = 0.83), lower than that for our sample. Avoidance behavior appears to be relatively similar between MVA and non-MVA groups, and a multivariate analysis of variance revealed no significant differences, $F(1, 64) = 1.20, p = 0.32$. The highest rated situation for the group as a whole was driving alone on highways (M = 3.20, SD = 1.52), followed by being alone in high places (M = 2.89, SD = 1.56), being alone in enclosed places (M = 2.68, SD = 1.50), being accompanied in high places (M = 2.44, SD = 1.45), being alone in a car (M = 2.40, SD = 1.27), and being alone in social situations (M = 2.38, SD = 1.23).

TABLE 2
MEANS (AND STANDARD DEVIATIONS) OF QUESTIONNAIRE SCORES

Variable	Total Sample[a]	Motor Vehicle Accident Group[b]	Non-Motor Vehicle Accident Group[c]
Anxiety Sensitivity Index[d]	21.71 (11.50)	22.67 (11.91)	19.48 (10.36)
Mobility Inventory for Agoraphobia[e]			
Alone, driving situations	2.78 (1.22)	2.66 (1.18)	3.04 (1.28)
Accompanied, driving situations	1.84 (0.94)	1.86 (0.89)	1.80 (1.06)
Alone, other than driving situations	1.75 (0.67)	1.70 (0.61)	1.88 (0.81)
Accompanied, other than driving situations	1.38 (0.49)	1.38 (0.51)	1.38 (0.44)
Fear of Negative Evaluation Scale[f]	35.37 (10.50)	35.79 (10.70)	34.40 (10.15)

Note. [a]*n* varies (74–83) because of missing data on individual items.
[b]*n* varies (52–58) because of missing data on individual items.
[c]*n* varies (20–25) because of missing data on individual items.
[d]Range, 0–64.
[e]Range, 0–5.
[f]Range, 12–60.

TABLE 3
MEANS (AND STANDARD DEVIATIONS) FOR DRIVER CONCEPTS RATED ON SEMANTIC DIFFERENTIAL SCALES

Scale[a]	"Very Good Driver"	"Average Driver"	"Me as a Driver"
Foolish–wise	6.39 (0.82)	4.27 (1.05)	4.55 (1.55)
Unpredictable–predictable	6.35 (0.92)	4.18 (1.15)	4.89 (1.47)
Unreliable–reliable	6.39 (0.88)	4.26 (1.33)	5.00 (1.51)
Inconsiderate–considerate	6.50 (0.91)	4.11 (1.44)	5.88 (1.15)
Dangerous–safe	6.41 (0.92)	4.22 (1.28)	5.25 (1.62)
Tense–relaxed	6.09 (1.06)	4.83 (1.14)	3.39 (1.75)
Irresponsible–responsible	6.59 (0.79)	4.57 (1.28)	5.84 (1.14)

Note. [a]n = 79 to 83 because of missing data on individual scales.

Panic attacks were reported by 34 (43.5%) respondents, 32 of whom had experienced between one and three panic attacks in the last week. Of those who did report panic attacks, 64.7% ($n = 21$) rated their attacks as of mild or very mild intensity, whereas 26.5% ($n = 9$) described experiencing moderately severe panic attacks.

Although no studies could be located that have used the FNE with driving-fearful samples, the mean score of the present sample was similar to that reported by Leary (1983) for a sample of 85 nonclinical undergraduate students ($M = 35.70$, $SD = 8.10$). The difference between the scores for the MVA and non-MVA groups was not significant, $t(1, 81) = 0.55, p = 0.58$.

Self-perception of Driving Abilities

Table 3 shows the mean comparative driver ratings made on the semantic differential scales. Of particular interest was the difference in ratings of 'me as a driver' with 'an average driver' and 'a very good driver.' Individual t tests were conducted for paired samples on the seven bipolar sematic differential scales. Those fearful of driving rated themselves as significantly ($p < .001$) more predictable, reliable, considerate, safe, and responsible than 'an average driver,' but rated themselves as significantly less relaxed (i.e., more tense) than 'an average driver.' This may be expected given the nature of the sample. They also perceived themselves as significantly lower on all dimensions compared with 'a very good driver.' All ratings for 'a very good driver' were significantly higher than those for 'an average driver.'

Subtypes of Driving Fear

Our primary interest was to investigate potential subtypes of driving fear. However, this part of the analysis was considered exploratory and descriptive *only*, because (1) subtypes of driving fear have not previously been examined, (2) the sample size in the present study was relatively small, and (3) we had not conducted any formal diagnostic evaluation. Our aim was simply to determine whether any coherent groupings emerged from the data and, if so, to conduct a separate and more thorough study of potential driving-fear subtypes. Therefore, we carried out a factor analysis followed by a cluster analysis (Hair, Anderson, Tatham, & Black, 1995). The 14-item 'concerns while driving' scale was used as a measure of focus of fear. Initially, the dimensional structure of the concerns data was ascertained using factor analysis. The sample size met minimum requirements (N = 70), and there were no outliers which were strong candidates for deletion (Hair, Anderson, Tatham, & Black, 1995). Principal components was chosen as the method of factor extraction, and so multicollinearity and singularity were not relevant (Coakes & Steed, 1997). Linearity was assumed from an examination of the residuals. Bartlett's test of sphericity was significant, and the Kaiser-Meyer-Olkin measure of sampling adequacy was more than 0.6. Therefore, it seemed appropriate to proceed with factor analysis.

An oblique rotation was chosen as the most appropriate rotation option because of the high correlations among factors extracted using varimax rotation. For the correlation matrix of the 14 concerns, the breaks-in-scree-plot criterion suggested that a four-dimensional structure was appropriate. Because the difference between high and low loadings was more apparent in the pattern matrix, this matrix was interpreted. According to Hair, Anderson, Tatham, and Black (1995), loadings of ±0.5 indicate practical significance and, given our relatively small sample size, we chose to adopt this cutoff point for significance. The rotated factor pattern can be seen in Table 4. The concerns are presented in the order of the factor loadings and the factor structure. Significant loadings appear in italics. In addition to the factor loadings of each variable on each factor, Table 4 shows the eigenvalues, percentage of trace (percentage of variance explained), and communalities (the amount of variance in a variable that is accounted for by the factor solution).

For factor 1, 'accident,' 'injury,' and 'lose control over the car' were significant loadings, and seemed to be consistent with the dimension of danger expectancy. Factor 2 was made up of the variables 'intense and unpleasant bodily symptoms,' 'physical crisis,' 'very intense and unpleasant anxiety,' 'anxiety will impair driving,' and 'anxiety will lead to a physical or mental catastrophe.' In contrast to factor 1, the variables that load on factor 2 appear consistent with anxiety expectancy. Factor 3 consisted of 'traffic jam' and 'getting lost,' whereas 'dangerous road conditions' and 'no control over other people's driving' loaded separately on factor 4. These last two factors could be called unpleasant and dangerous driving situations, respectively. Considering our significance criterion of ±0.5, two variables ('other people will be critical' and 'car might break down') loaded highly but not significantly on two factors. The

TABLE 4
FACTOR STRUCTURE OF CONCERNS WHILE DRIVING FOR THE SAMPLE (N = 70)

	Factors					
	1	2	3	4	Communality	Total
Accident	*.865*		−.102	.252	.87	
Lose control over car	*.820*		.136		.68	
Injury	*.812*		−.101	.322	.83	
Other people critical	.422	.273	.420	−.276	.54	
Bodily symptoms		*.871*	−.108		.74	
Physical crisis	−.309	*.759*	.130	.181	.68	
Anxiety	.378	*.684*	−.279		.68	
Anxiety impairs driving	.133	*.623*		−.263	.50	
Catastrophe		*.604*	.395		.59	
Traffic jam	−.238		*.771*		.66	
Getting lost	.123		*.766*		.59	
Dangerous road conditions		.207		*.792*	.68	
No control over other's driving	.102			*.726*	.56	
Car breakdown	.171		.426	.442	.44	
Sum of squares (eigenvalue)	3.37	2.61	1.73	1.34		9.05
Percentage of trace[a]	24.1	18.6	12.4	9.6		64.7

Note. [a]Trace = sum of eigenvalues/14.

communality for car breakdown was less than 0.5, suggesting that this variable did not have much explanatory power. 'Other people will be critical' did appear to have adequate explanatory power, but was more difficult to interpret because of its loadings on both factors 1 and 3.

Cluster analysis (SPSS, 1997) was then performed on the concerns variables to investigate further a possible typology of concerns while driving, or focus of fear. Cluster analysis is sensitive to outliers, and an examination of the data set revealed no strong outlying observations. Given that the set of 14 variables was metric, squared Euclidean distance was chosen as the similarity measure because Mahalanobis' distance (D^2) was not available. Correlational measures were not used because the derivation of segments should consider the magnitude of the concerns (i.e., high versus low) as well as the pattern. This is best accomplished with a distance measure of similarity (Hair, Anderson, Tatham, & Black, 1995). No form of standardization was used because all variables used the same scale. Multicollinearity can be a critical problem in cluster analysis, and an investigation of this issue identified no levels that should affect the analysis. The other important assumption of cluster analysis is representativeness of the sample and, because we cannot be sure that our sample is representative of those fearful of driving, the results must be treated with caution.

Using Ward's method, the hierarchical cluster analysis suggested two clusters. The first cluster grouped the following concerns together: accident, injury, lose control over the car, very intense and unpleasant anxiety, dangerous road conditions, and no control over other people's driving. The remaining eight concern variables formed the second cluster. Typically, nonhierarchical cluster analysis is used to fine tune the results from the hierarchical procedures (Hair, Anderson, Tatham, & Black, 1995), although this option was not available to us because we were interested in clustering variables rather than cases. Therefore, the results must be interpreted cautiously because we could not validate and profile the clusters found.

DISCUSSION

The present study sought to extend our prior research by describing in more detail the characteristics of a driving-fearful sample as well as investigating possible driving-fear subtypes. The driving-related concerns in the present sample focused on the external themes of accident, injury, and control, as well as concerns about internal expectancies, such as very intense and unpleasant anxiety. Although anxiety expectancy was a prominent concern, those fearful of driving were more concerned about events related to danger expectancy. Previous research with persons with flying phobias has associated these two different types of focus of fear with different anxiety disorders (i.e., specific phobia and agoraphobia, respectively; e.g., McNally & Louro, 1992). A limitation of the present study is the lack of diagnostic evaluation, which prevents further discussion about the varying foci of fear across diagnoses. Despite this, we can conclude that the pattern of concerns while driving was very similar for MVA and non-MVA groups. Although the MVA group was more concerned about accident and injury than the non-MVA group, both groups rated the same highest concerns. This would suggest that the focus of fear is not necessarily different on the basis of MVA involvement and that those who have not experienced an MVA also express danger expectancies.

Our conclusion is further supported by the finding that the sample had high expectations of negative events, which again showed no differences in terms of MVA involvement. Those fearful of driving expected to experience an accident or panic attack more often than a traffic jam or car breakdown, suggesting that the sample had higher danger and anxiety expectancies than expectancies of what could be assumed to be more likely driving events. The results highlight the importance of assessing both internal and external foci of fear in those who present driving fears.

The second goal of the study was to investigate potential subtypes of driving fear. Although caution is needed in interpreting the factor and cluster analyses for reasons stated previously, the results of both analyses support the notion of two main subtypes of driving fear. The first subtype derived from the cluster analysis contains variables loading on factors 1 and 4 in the factor analysis. This subtype is characterized by danger expectancies (concern about accident, injury, lack of control over the driving situation, and dangerous road conditions). However, confusing this picture is the inclusion of the variable 'very intense and unpleasant anxiety' into the first cluster. It would have been expected that this variable would cluster together with the other anxiety-related variables, and it is difficult to explain the separation of this variable in the cluster analysis. The second subtype derived from the cluster analysis contains variables loading on factors 2 and 3 in the factor analysis as well as the two variables that were difficult to interpret because they loaded on two factors. This subtype appears to be characterized by anxiety expectancies (concern about anxiety symptoms and their effects on driving) and unpleasant driving situations. These two subtypes are consistent with those found in previous research with persons with flying phobia (e.g., Van Gerwen, Spinhoven, Diekstra, & Van Dyck, 1997) and support the contention that different treatment interventions may be required for the two subtypes. However, this has yet to be investigated formally, and future research is needed to replicate the present results and examine the efficacy of different treatment components for varying subtypes of driving fear.

Given the prior finding that high anxiety and avoidance ratings were associated with driving with someone who criticizes one's driving (Taylor & Deane, 2000), we had expected that another subtype would be identified for the 'other people will be critical' concern variable. This would indicate a focus of fear consistent with concerns about social and negative evaluation. However, this was not found, and the 'other people will be critical' variable clustered together with the variables representing anxiety expectancy and unpleasant driving situations. This result may be related to the potentially ambiguous nature of responses. Concern that other people will be critical of one's driving could refer to actual or perceived criticism by other people in the same car or people in other cars. It is unclear to whom respondents are referring when they make ratings on this item. It could also be assumed that concern about others' criticism is more likely to cluster with concerns about anxiety and unpleasant driving situations than concerns about danger while driving. Although the present study found no support for a subtype of driving fear associated with concerns about negative evaluation and criticism, the lack of specificity with regard to critical referents suggests that a more thorough investigation of this area may be warranted.

The results from the driving ability ratings supported the self-enhancement bias reported in previous studies (e.g., McCormick, Walkey, & Green, 1986), except that the present sample rated themselves as less relaxed than the average driver. In retrospect, this measure did not provide particularly useful information for the purposes of the present study for two main reasons. First, the measure appears to assess driving attitudes rather than driving skills. Second, the measure is problematic because there is no way of knowing what the 'average driver' is when people make these relative comparisons (Walton & Bathurst, 1998; Wood, 1996). Although better self-rating measures are emerging (e.g., Walton & Bathurst, 1998), a more objective and relevant way of checking these ratings and assessing driving skills would be to use ratings made by independent driving instructors during a practical driving evaluation. This method would also enable an assessment of possible differences between *actual* skills (as rated by an instructor) and *perceived* skills (as rated by the individual). Lack of confidence in one's driving skills and abilities may contribute to fear of driving. Such a lack of confidence would be apparent in lower ratings of perceived skill compared with actual skill. In these cases, independent assessments of driving skills may serve as evidence where a component of treatment is to assist the person to make more realistic appraisals of their own skills and abilities. Alternatively, driving skill assessments could identify cases where a *real* skill deficit contributes to or maintains driving fear reactions. Subsequent therapy may then include a component aimed at providing training in the development of the particular skill required (e.g., driving on the highway, merging, parallel parking, or defensive driving). Further research is needed to explore the role of driving skills in driving fear.

Conclusions in the present study are limited by the lack of comparison control groups and diagnostic evaluation. However, the aims were to conduct a preliminary investigation of driving fear subtypes and describe in some detail the clinical characteristics of the sample. The present study further supported the contention by Taylor and Deane (2000) that persons fearful of driving who either have or have not experienced an MVA do not differ significantly in terms of fear severity. Those fearful of driving who have not experienced an MVA deserve as much research attention and assistance as their MVA counterparts have received (e.g., Blanchard & Hickling, 1997). The results also suggest that, although subtypes of driving fear seem to focus on danger and anxiety expectancies, further research is needed to confirm these subgroups. This would be best accomplished in conjunction with formal diagnostic evaluation. As soon as these subgroups have been more clearly identified and the role of driving skills in fear reactions has been clarified, appropriate and comprehensive assessment procedures along with efficient and effective differential intervention packages can be more systematically developed.

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APPENDIX B-1

Letter of notification of follow-up study (Study One).

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DEPARTMENT OF
PSYCHOLOGY

10 April 1997

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Dear Participant

Thank you for completing the questionnaire on driving-related fears earlier last year as part of the research being conducted by Joanne Taylor for her Master's thesis. Your participation was valuable to the research project and this letter is a follow-up to provide you with a summary of the results of the study. I apologise for the lack of speed with which I have sent this material to you, and I recall my earlier optimistic estimate of December 1996. Unfortunately, this is the nature of research and things do not always go according to plan. However, I have endeavoured to collate and organise the results for you as quickly as possible. Attached is a summary of the results of the study which I hope will be of use to you. I would welcome any feedback, questions, comments, or ideas that you have in relation to this.

This letter is also an opportunity to notify you of and to invite you to participate in future research that we will be conducting. Specifically, we are interested in doing a one-year follow-up study of the same group who participated in the first study. We hope that this second study will provide information about the long-term effects of driving-related fears. In addition, it will look at effective treatments for people with driving-related fears. A request to participate in this research follows the summary of results enclosed. We would appreciate it if you would read and return the form to indicate to me whether you are interested in participating in any future research. Please return the form in the freepost, self-addressed envelope provided, even if you do not wish to participate.

Thanks again for your participation and patience.

Regards

Joanne Taylor
<u>Researcher</u>

APPENDIX B-2

Information Sheet for Study One.

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FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF PSYCHOLOGY

REQUEST TO PARTICIPATE IN FUTURE RESEARCH

This information sheet briefly explains the research we intend to undertake in the near future and invites your participation in it. Please read and complete this form, *even if you do not wish to volunteer your participation in future research.*

We intend to conduct a follow-up study from the one in which you participated, and this will involve sending you an additional questionnaire (with your consent) which will be similar to but not the same as the one you completed previously. The aim of this follow-up study is to help obtain a better understanding of the stability of people's fear symptoms over time and whether any events which have occurred since the last study have influenced people's descriptions of the onset of their fear.

Please do not feel obligated to participate in any further research we are conducting. This letter is simply inviting you to participate. If you think you might like to participate in the follow-up study, we will send you a more detailed explanation. Please tick the box beside the statement below which applies to you. Please note that even if you respond 'Yes' below you are free to withdraw from the study at any time.

☐ **NO, I am not interested in participating in any further research you intend to conduct. Please do not contact me again.**

☐ **YES, I am interested in participating in the follow-up study. Please mail me a questionnaire. (Please write your name and address below)**

NAME: ______________________________

ADDRESS: ______________________________

____

____

Thank you. Please return this completed form in the envelope provided.

Joanne Taylor
<u>Researcher</u>

APPENDIX B-3

Mail-out questionnaire for Study One.

YOUR DRIVING-RELATED FEAR

People fear different things about driving. Describe your ***most-feared driving-related situation*** below.

____

____

____

____

Please respond to the rest of the questionnaire with your *most-feared driving-related situation* in mind.

YOUR BODILY REACTIONS

Imagine that you actually have to face your most-feared driving-related situation. Indicate how you usually feel physically as you imagine having to face your most-feared situation: (Circle the relevant number after each question)

	Never				Always
1. Face becoming hot	0	1	2	3	4
2. You are in a cold sweat	0	1	2	3	4
3. Perspiration in palms or armpits	0	1	2	3	4
4. Muscles becoming tense	0	1	2	3	4
5. Muscles becoming weak (e.g., knees and arms)	0	1	2	3	4
6. You become dizzy	0	1	2	3	4
7. Changes in your heartbeat	0	1	2	3	4
8. Changes in breathing	0	1	2	3	4
9. Lump in throat	0	1	2	3	4
10. Stomach becoming upset	0	1	2	3	4
11. You feel an urge to empty your bladder	0	1	2	3	4

YOUR THOUGHTS

Indicate what your thoughts usually are as you imagine having to face your most-feared driving-related situation:

	Never				Always
1. I will panic	0	1	2	3	4
2. I will lose control and do something crazy	0	1	2	3	4
3. I will faint	0	1	2	3	4
4. What will other people think of me?	0	1	2	3	4
5. I must get out of this situation	0	1	2	3	4
6. I will go crazy (insane)	0	1	2	3	4
7. I can't stand it any longer	0	1	2	3	4
8. I can't handle this situation	0	1	2	3	4
9. I will fail	0	1	2	3	4
10. I will blush and make a fool of myself	0	1	2	3	4

YOUR FEELINGS

Indicate how you feel right now, at this moment, as you imagine having to face your most-feared driving-related situation:

	Not at all	Somewhat	Moderately	Very much
1. I feel calm	1	2	3	4
2. I feel tense	1	2	3	4
3. I feel upset	1	2	3	4
4. I am relaxed	1	2	3	4
5. I feel content	1	2	3	4
6. I am worried	1	2	3	4

YOUR CONCERNS

Below is a list of concerns that some people have about their most-feared driving-related situation. Please rate how much you are concerned about your most-feared driving-related situation by using a scale from **0 (not at all concerned) to 10 (extremely concerned).**

	Not at all concerned										Extremely concerned
1. Accident	0	1	2	3	4	5	6	7	8	9	10
2. Injury	0	1	2	3	4	5	6	7	8	9	10
3. Lose control over the car	0	1	2	3	4	5	6	7	8	9	10
4. No control over other people's driving	0	1	2	3	4	5	6	7	8	9	10
5. Very intense and unpleasant anxiety	0	1	2	3	4	5	6	7	8	9	10
6. Intense and unpleasant bodily symptoms	0	1	2	3	4	5	6	7	8	9	10
7. Physical crisis (e.g., fainting)	0	1	2	3	4	5	6	7	8	9	10
8. Anxiety will impair driving	0	1	2	3	4	5	6	7	8	9	10
9. Anxiety will lead to a physical or mental catastrophe(e.g., heart attack, go crazy)	0	1	2	3	4	5	6	7	8	9	10
10. Other people will be critical (humiliation)	0	1	2	3	4	5	6	7	8	9	10
11. Dangerous road conditions (e.g., fog, bridge collapsing)	0	1	2	3	4	5	6	7	8	9	10
12. Car might break down	0	1	2	3	4	5	6	7	8	9	10
13. Traffic jam	0	1	2	3	4	5	6	7	8	9	10
14. Getting lost	0	1	2	3	4	5	6	7	8	9	10

THE ORIGIN OF YOUR DRIVING-RELATED FEAR

1. Below there are eight descriptions of how people report having first developed their driving-related fear. **PLEASE READ THROUGH ALL EIGHT DESCRIPTIONS FIRST** and then select the **ONE (1)** which **BEST** describes how your driving-related fear first started.

☐ I had a motor vehicle accident (MVA). Ever since the accident, I have been fearful of my most-feared driving-related situation **OR** have been unable to confront it. I was not fearful of this situation to this extent before the accident.

☐ I narrowly averted a MVA. Ever since the near-miss, I have been fearful of my most-feared driving-related situation **OR** I have been unable to confront it. I was not fearful of the situation to this extent before the near-miss.

☐ I saw someone become hurt, frightened, or distressed in the presence of my most-feared driving-related situation. Ever since seeing this, I have been fearful of my most-feared driving-related situation **OR** I have been unable to confront it. I was not fearful of the situation to this extent before seeing this happen.

☐ I have been given information (unpleasant stories, warnings, or instructions) about my most-feared driving-related situation. Ever since being given this information, I have been fearful of my most-feared driving-related situation **OR** I have been unable to confront it. I was not fearful of the situation to this extent before being given this information.

☐ I was in my most-feared driving-related situation and, although nothing actually happened to myself, my vehicle, or others around me, I suddenly had panicky feelings and an unexpected sense of terror. Ever since this happened, I have been fearful of my most-feared driving-related situation **OR** I have been unable to confront it. I was not fearful of the situation to this extent before this happened.

☐ I cannot remember how my driving-related fear first started because I have **always** been fearful or anxious in this situation.

☐ I cannot remember how my driving-related fear first started.

☐ My driving-related fear came about because of a mixture of events (e.g., I had a MVA in which I saw people being hurt and frightened, or I saw people in my most-feared driving-related situation in a movie and then became distressed by road safety campaigns on television).

2. Have you had a MVA in the last year?
   [ ] YES If YES, when? ______ weeks ago
   [ ] NO

3. Has anything else happened since you completed the last questionnaire which has influenced your driving-related fear in any way (e.g., become more/less severe, avoid more/less places or situations, worry about it more/less)?
   [ ] YES
   [ ] NO

   If YES, please describe this below:

   ____
   ____
   ____
   ____

4. Please indicate on the scale below the degree to which your driving-related fear has become better or worse over the last year:

0	1	2	3	4	5	6
Much worse			The same			Much better

5. How many MVAs have you had in total in your lifetime? _____

YOUR DRIVING-RELATED THOUGHTS

Please indicate how likely you think it is that you will experience the following circumstances when you are driving. Indicate your estimated probability by circling the appropriate number from 0% (will not happen) to 100% (will certainly happen).

	Will not happen %										Will certainly happen %
Accident/MVA	0%	10	20	30	40	50	60	70	80	90	100%
Panic attack	0%	10	20	30	40	50	60	70	80	90	100%
Serious body symptoms	0%	10	20	30	40	50	60	70	80	90	100%
Traffic jam	0%	10	20	30	40	50	60	70	80	90	100%
Car breaking down	0%	10	20	30	40	50	60	70	80	90	100%
Unable to drive because of anxiety	0%	10	20	30	40	50	60	70	80	90	100%

ANXIETY SENSITIVITY

Below is a list of statements. Please read each one carefully and select the number from the box below that best describes how true that statement is for you. Enter the number you have selected in the box beside each statement.

0 =	not at all
1 =	a little bit
2 =	moderately
3 =	quite a bit
4 =	extremely

1. It is important for me not to appear nervous
2. When I cannot keep my mind on a task, I worry that I might be going crazy
3. It scares me when I feel 'shaky' (trembling)
4. It scares me when I feel faint
5. It is important to me to stay in control of my emotions
6. It scares me when my heart beats rapidly
7. It embarrasses me when my stomach growls
8. It scares me when I am nauseous
9. When I notice that my heart is beating rapidly, I worry that I might have a heart attack
10. It scares me when I become short of breath
11. When my stomach is upset, I worry that I might be seriously ill
12. It scares me when I am unable to keep my mind on a task
13. Other people notice when I feel shaky
14. Unusual body sensations scare me
15. When I am nervous, I worry that I might be mentally ill
16. It scares me when I am nervous

Please indicate the degree to which you avoid the following places or situations because of discomfort or anxiety. Rate your amount of avoidance *when you are with a trusted companion* **and** *when you are alone* using the scale below. Write your score in the box for each situation or place under both conditions-when accompanied and when alone. Leave blank those situations that do not apply to you.

1	2	3	4	5
Never avoid	Rarely avoid	Avoid about half the time	Avoid most of the time	Always avoid

Places or situations	**When accompanied**	**When alone**
1. Theatre	☐	☐
2. Supermarkets	☐	☐
3. Classrooms	☐	☐
4. Department stores	☐	☐
5. Restaurants	☐	☐
6. Museums	☐	☐
7. Lifts	☐	☐
8. Auditoriums or stadiums	☐	☐
9. Garages	☐	☐
10. High places	☐	☐
11. Enclosed places (e.g., tunnels)	☐	☐
12. Outside (e.g., fields, wide streets)	☐	☐
13. Inside (e.g., large rooms, lobbies)	☐	☐
14. Travelling on buses	☐	☐
15. Travelling on trains	☐	☐
16. Travelling on subways	☐	☐
17. Travelling on airplanes	☐	☐
18. Travelling on boats	☐	☐

1	2	3	4	5
Never avoid	Rarely avoid	Avoid about half the time	Avoid most of the time	Always avoid

	When accompanied	When alone
19. Driving or travelling in a car at any time	☐	☐
20. Driving or travelling on motorways	☐	☐
21. Standing in queues	☐	☐
22. Crossing bridges	☐	☐
23. Parties or social gatherings	☐	☐
24. Walking in the street	☐	☐
25. Staying at home alone	☐	☐
26. Being far away from home	☐	☐

27. A panic attack can be defined as:
 (a) a high level of anxiety accompanied by…
 (b) strong body reactions (e.g., heart palpitations, sweating, muscle tremors, dizziness, nausea) with…
 (c) the temporary loss of the ability to plan, think, or reason, and…
 (c) the intense desire to escape or flee the situation.

Please indicate the total number of panic attacks you have had in the last 7 days ☐

On average, how severe have the panic attacks been? (please circle a number on the scale below)

1	2	3	4	5
Very mild	Mild	Moderately severe	Very severe	Extremely severe

Of the situations numbered 1 through 26 above, please circle the numbers next to the five items you are most concerned about (these are the situations or places where avoidance or anxiety most affects your life in a negative way).

DRIVING SKILLS

Please indicate how you would rate the following driver scales. Place a circle around the number which best describes -

(i) An average driver
(ii) A very good driver
(iii) Me as a driver (refers to your driving as it is now)

1. **An average driver:**

Foolish ___________________ Wise
1 2 3 4 5 6 7

A very good driver:

Foolish ___________________ Wise
1 2 3 4 5 6 7

Me as a driver:

Foolish ___________________ Wise
1 2 3 4 5 6 7

2. **An average driver:**

Unpredictable ___________________ Predictable
1 2 3 4 5 6 7

A very good driver:

Unpredictable ___________________ Predictable
1 2 3 4 5 6 7

Me as a driver:

Unpredictable ___________________ Predictable
1 2 3 4 5 6 7

3. **An average driver:**

Unreliable ___________________ Reliable
1 2 3 4 5 6 7

A very good driver:

Unreliable ___________________ Reliable
1 2 3 4 5 6 7

Me as a driver:

Unreliable ___________________ Reliable
1 2 3 4 5 6 7

4. **An average driver:**

Inconsiderate	1	2	3	4	5	6	7	Considerate

A very good driver:

Inconsiderate	1	2	3	4	5	6	7	Considerate

Me as a driver:

Inconsiderate	1	2	3	4	5	6	7	Considerate

5. **An average driver:**

Dangerous	1	2	3	4	5	6	7	Safe

A very good driver:

Dangerous	1	2	3	4	5	6	7	Safe

Me as a driver:

Dangerous	1	2	3	4	5	6	7	Safe

6. **An average driver:**

Tense	1	2	3	4	5	6	7	Relaxed

A very good driver:

Tense	1	2	3	4	5	6	7	Relaxed

Me as a driver:

Tense	1	2	3	4	5	6	7	Relaxed

7. **An average driver:**

Irresponsible	1	2	3	4	5	6	7	Responsible

A very good driver:

Irresponsible	1	2	3	4	5	6	7	Responsible

Me as a driver:

Irresponsible	1	2	3	4	5	6	7	Responsible

FEAR OF NEGATIVE EVALUATION

Read each of the following statements carefully and indicate how characteristic each statement is of you according to the following scale:

1 =	Not at all characteristic of me
2 =	Slightly characteristic of me
3 =	Moderately characteristic of me
4 =	Very characteristic of me
5 =	Extremely characteristic of me

	Not at all				Extremely
1. I worry about what other people will think of me even when I know it doesn't make any difference	1	2	3	4	5
2. I am unconcerned even if I know people are forming an unfavourable impression of me	1	2	3	4	5
3. I am frequently afraid of other people noticing my shortcomings	1	2	3	4	5
4. I rarely worry about what kind of impression I am making on someone	1	2	3	4	5
5. I am afraid that others will not approve of me	1	2	3	4	5
6. I am afraid that people will find fault with me	1	2	3	4	5
7. Other people's opinions of me do not bother me	1	2	3	4	5
8. When I am talking to someone, I worry about what they may be thinking about me	1	2	3	4	5
9. I am usually worried about what kind of impression I make	1	2	3	4	5
10. If I know someone is judging me, it has little effect on me	1	2	3	4	5
11. Sometimes I think I am too concerned with what other people think of me	1	2	3	4	5
12. I often worry that I will say or do the wrong things	1	2	3	4	5

HELPSEEKING BEHAVIOUR

1. Have you ever spoken to any of the following people about your driving-related fear? (Circle the letter(s) next to those relevant to you)

   a. Mental health professional
   b. Medical professional
   c. Partner or spouse
   d. Other family members
   e. Friends
   f. Other person (Please specify): ______________________

2. Have you ever received psychological help from a mental health professional for your driving-related fear? (Circle one)

   [ ] YES
   [ ] NO

   If YES, what did you find helpful or useful about this? (Please describe)

   ____
   ____
   ____
   ____
   ____

3. To what extent do you feel that you need professional psychological help for your driving-related fear? (Circle one)

1	2	3	4	5	6	7
No Need						Extreme Need

5. How likely is it that you would seek professional psychological help from a psychologist or counsellor for your driving-related fear? (Circle one)

1	2	3	4	5	6	7	8	9
Extremely Unlikely								Extremely Likely

If your driving-related fear developed primarily as a result of a MVA, please complete the final section of the questionnaire on the following pages.

If the onset of your driving-related fear is unrelated to a MVA, you have completed the questionnaire. Thank you for your cooperation. Please check to ensure you have not left any questions blank, and return the questionnaire in the freepost, self-addressed envelope provided. When the results are available, we will mail you a summary of the findings. If you feel you need help for your driving-related fear, then you may contact your local hospital psychological service or locate a psychologist (Registered) in the Yellow Pages of the telephone directory.

YOUR REACTIONS

The following questions are about your motor vehicle accident and your reactions to it. This set of questions only apply to you, if you remember the accident. Please tick the appropriate response to each question.

	YES	NO
1. During the accident, did you fear for your life?	____	____
2. During the accident, did you see anyone injured or killed?	____	____
3. During the accident, did you lose consciousness?	____	____
4. Do you have nightmares about the accident?	____	____
5. Are you nervous before trips?	____	____
6. Do you get easily upset in the car?	____	____
7. Do you tell the driver what to do?	____	____
8. Do you drive less than you used to?	____	____
9. Do you expect another accident soon?	____	____
10. Would most people feel after an accident the way you do?	____	____

How much do you avoid the situations listed below because of fear or distress? For each question, please choose a number from the scale below to show **how much you avoid the situation**. Then write the number on the line opposite the situation.

0	1	2	3	4	5	6	7	8
Would not avoid it		Sometimes avoid it				Often avoid it		Always avoid it

Since your accident, do you avoid:

11. Driving as a passenger ____
12. Driving yourself ____
13. Riding in a particular seat ____
14. Driving on certain roads ____
15. Riding with certain drivers ____
16. Driving in certain weather conditions ____
17. Hearing news of accidents ____
18. Seeing wounds and injuries ____
19. Crossing streets alone ____
20. Riding a bus ____

IMPACT OF EVENT

Below is a list of comments made by people after stressful life events, such as the motor vehicle accident that you were involved in. Indicate how frequently each comment was true for you **during the past week.** If they did not occur during that time, mark the "Not at All" column: (Tick the appropriate column for each comment)

	Not at All	Rarely	Some-times	Often
1. I thought about it when I didn't mean to	_____	_____	_____	_____
2. I avoided letting myself get upset when I thought about it or was reminded of it	_____	_____	_____	_____
3. I tried to remove it from memory	_____	_____	_____	_____
4. I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind	_____	_____	_____	_____
5. I had waves of strong feelings about it	_____	_____	_____	_____
6. I had dreams about it	_____	_____	_____	_____
7. I stayed away from reminders of it	_____	_____	_____	_____
8. I felt as if it hadn't happened or it wasn't real	_____	_____	_____	_____
9. I tried not to talk about it	_____	_____	_____	_____
10. Pictures about it popped into my mind	_____	_____	_____	_____
11. Other things kept making me think about it	_____	_____	_____	_____
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them	_____	_____	_____	_____
13. I tried not to think about it	_____	_____	_____	_____
14. Any reminder brought back feelings about it	_____	_____	_____	_____
15. My feelings about it were kind of numb	_____	_____	_____	_____

Thank you for your cooperation. Please check to ensure you have not left any questions blank, and return the questionnaire in the freepost, self-addressed envelope provided. When the results are available, we will mail you a summary of the findings.

APPENDIX C-1

Agglomeration schedule for the hierarchical cluster analysis in Study One.

The agglomeration schedule shows which variables are combined at each step. First, variable 1 is joined with variable 7, as the distance between this pair is smaller than that for any other pair. The distance is shown in the column labelled *Coefficients.* Variables continue to be joined in this way, until clusters start to be formed. For example, at stage 2, variable 8 joins the pairing of variables 1 and 7 which took place at stage 1.

SPSS uses the number of the first variable in a cluster to assign a number to the cluster, so the first cluster is cluster 1 and the second with 3 cases is also cluster 1 (stage 2). In reading the two columns labelled *Cluster 2* on the *Stage 2* line, *8* is listed as the *Cluster Combined* and *0* is listed as the stage where cluster 8 first appears. The *Next Stage* column indicates the next stage (6) where a variable or cluster is joined with cluster 1. The *Next Stage* column indicates that cluster 1 is not increased in size until stage 6, followed by stage 11.

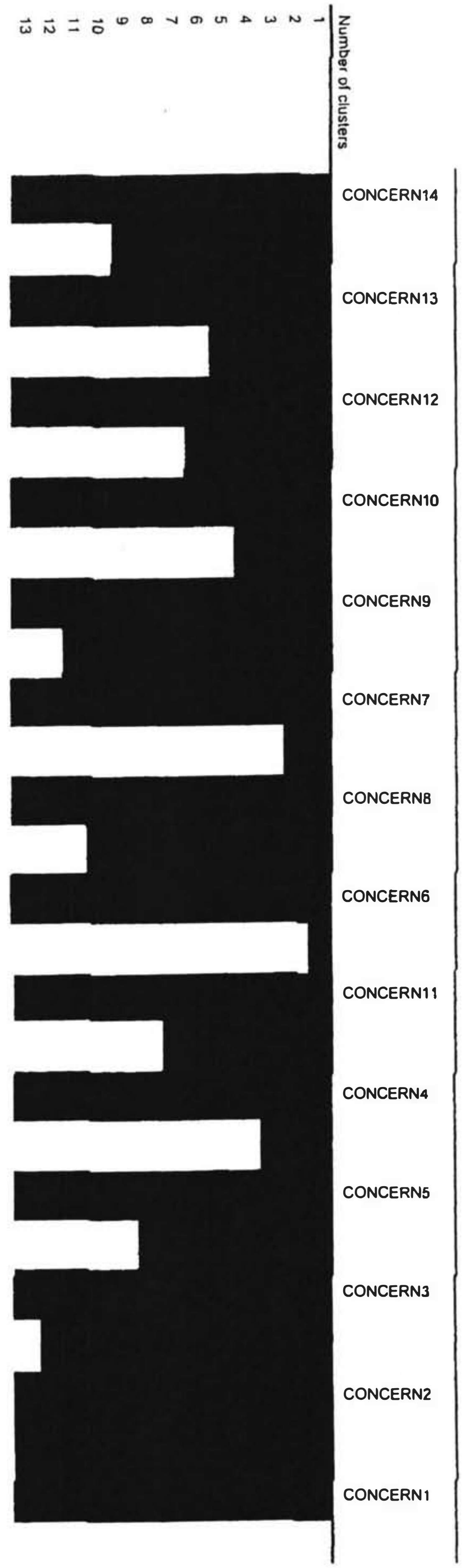
Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	1	7	55.000	0	0	2
2	1	8	388.000	1	0	6
3	12	14	778.500	0	0	10
4	11	13	1242.500	0	0	12
5	5	6	1759.000	0	0	9
6	1	10	2281.000	2	0	11
7	3	9	2819.500	0	0	11
8	2	4	3483.000	0	0	9
9	2	5	4214.000	8	5	10
10	2	12	5042.333	9	3	12
11	1	3	6078.333	6	7	13
12	2	11	7340.125	10	4	13
13	1	2	11784.429	11	12	0

APPENDIX C-2

Vertical icicle plot for the hierarchical cluster analysis in Study One.

The vertical icicle plot summarises the steps in forming clusters (Hair et al., 1998). Each black line represents a variable, which are separated by the white lines. The number of clusters is specified across the top of the plot. If a ruler is placed vertically just under each step, the variables joining into clusters can be seen, progressing from 1 variable as a cluster through to all 14 variables joined together. The 2-cluster solution can be seen by placing a ruler just under the step marked *2*.

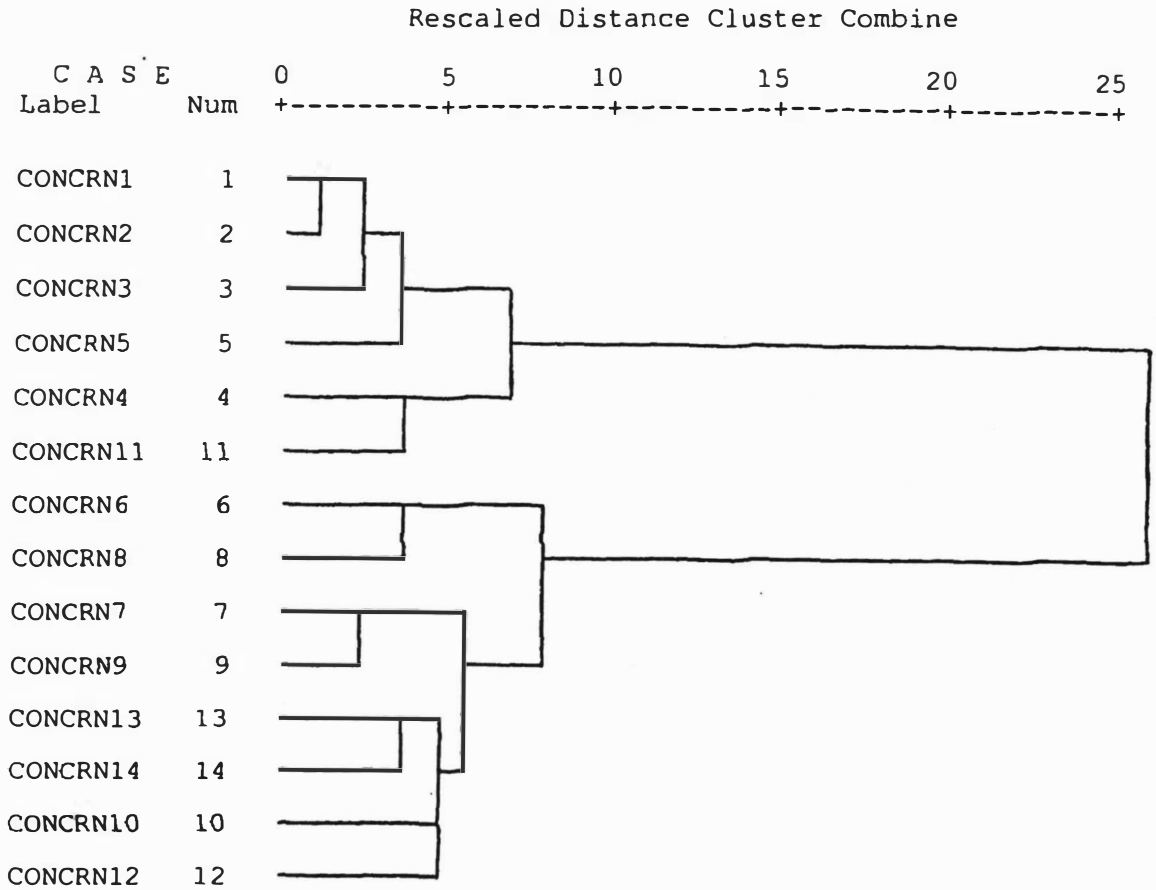


Number of clusters
1
2
3
4
5
6
7
8
9
10
11
12
13
CONCERN14
CONCERN13
CONCERN12
CONCERN10
CONCERN9
CONCERN7
CONCERN8
CONCERN6
CONCERN11
CONCERN4
CONCERN5
CONCERN3
CONCERN2
CONCERN1

APPENDIX C-3

Dendrogram for the hierarchical cluster analysis in Study One.

The dendrogram gives a good visual picture of the cluster agglomeration and the formation of clusters. However, the distances along the top of this display are scaled differently from the coefficients in the cluster agglomeration, and are instead rescaled to numbers between 0 and 25. The dendrogram indicates how the clusters are formed and provides a visual measure of the linkage distance for clustering (Hair et al., 1998). No outliers can be seen in the dendrogram. The 2-cluster solution can be seen by placing a vertical line at a distance of 10.


Rescaled Distance Cluster Combine
C A S E
Label Num
0 5 10 15 20 25
CONCRN1 1
CONCRN2 2
CONCRN3 3
CONCRN5 5
CONCRN4 4
CONCRN11 11
CONCRN6 6
CONCRN8 8
CONCRN7 7
CONCRN9 9
CONCRN13 13
CONCRN14 14
CONCRN10 10
CONCRN12 12

APPENDIX D-1

Initial newspaper advertisements for recruiting participants.

Interested In Driving?

We are researchers from Massey University studying driving fears. We are trying to find out why some people become highly anxious about driving.

We need two groups of people for our study. We would like to talk with people who have a fear of driving in some or all situations. We also need a comparison group of healthy men and women who do not have driving fears. If you decide to participate, you may be eligible for a free driving assessment.

If you are interested in volunteering for the group, or would like to know more about the study, please contact Joanne Taylor during working hours on 0800 150 276.

Joanne Taylor Dr John Podd

Massey University

Interested in driving? (1999, September 4). *The Dominion,* p. 2.

INTERESTED IN DRIVING?

We are researchers from Massey University studying driving fears. We are trying to find out why some people become highly anxious about driving.

We need two groups of people for our study. We would like to talk with people who have a fear of driving in some or all situations. We also need a comparison group of healthy men and women who do not have driving fears. If you decide to participate, you may be eligible for a free driving assessment.

If you are interested in volunteering for either group, or would like to know more about the study, please contact Joanne Taylor during working hours on 350-5834.

Joanne Taylor Dr John Podd

Massey University

Interested in driving? (1999, September 5). *The Tribune,* p. 20.

Worried drivers wanted

Massey University PhD student Joanne Taylor is looking for 100 Manawatu and Wellington people who are fearful about driving so she can formulate better assessment and treatment guidelines for psychiatrists. Miss Taylor also needs a control group of 50. She can be reached at 0800 150 276.

Worried drivers wanted. (1999, September 9). *The Evening Post,* p. 2.

APPENDIX D-2

Local and national newspaper articles about Study Two.

MASSEY University PhD student Joanne Taylor hopes to get people with driving fears back behind the wheel. She's hoping to develop assessment and treatment procedures. Photo by Graeme Brown.

Frightened drivers sought for study

by Corrie de Vries

A SIMPLE drive to the shops frightens some people and Massey University PhD student Joanne Taylor is on a mission to find out why.

She plans to research driving fears and then develop assessment and treatment procedures.

Miss Taylor said a finding of her first study, which she did for her master's, was that car accidents only accounted for a third of people's anxieties.

"This time we will look more in depth at what is the focus of their fear," she said.

"We're also looking at how the fear impacts on their driving skills."

In order to carry out her research, Miss Taylor needs two groups of people: one with any kind of anxiety about driving, and a control group of men and women who have no anxieties.

"When I did my master's, I had over 200 people involved with driving fears," she said.

She hoped to get the same number this year.

The research is being funded by Massey, the Land Transport Safety Authority and the Institute of Transport.

Land Transport Safety Authority research and statistics manager Bill Frith said the research was important for older drivers.

"Quite often, the younger husband dies and it's then up to the wife, with little experience, to drive."

Mr Frith said it also had implications for road safety.

"A panicky driver isn't likely to be as safe as one who isn't."

● Miss Taylor can be contacted on 350-5834.

de Vries, C. (1999, September 10). Frightened drivers sought for study. *The Evening Standard,* p. 5.

Wanted: 200 scared drivers

JOANNE TAYLOR is on the lookout for people who are scared of driving.

The Massey University psychologist wants about 200 people with driving anxieties to help her PhD research so she can develop assessment and treatment procedures.

The idea for the research came from television's graphic road safety advertisements.

"I wondered what happened to the people who developed anxieties after they had recovered physically from such a bad accident," Miss Taylor said.

"I found there had not been a lot of work done in this field."

Her study for her masters degree included 190 people with driving anxieties. She found that car accidents accounted for only a third of their fears.

BILL KEARNS

Joanne Taylor wants to study driving anxieties

Now Miss Taylor hopes to look in depth at what is the focus of their fear and how that affects their driving skills.

"It seems there is a wide variety of reasons for being afraid of driving."

Miss Taylor is looking for two groups of people: one with anxieties about driving and a control group who have no worries.

Wanted: 200 scared drivers (1999, September 23). *The Dominion,* p. 8.

Wanted: 100 anxious drivers

SCARED stiff or cool as a cucumber every time you get behind the wheel? Either way, Joanne Taylor wants to hear from you.

Miss Taylor is looking for two groups of volunteers — one with driving anxieties; and a control group with no worries — as part of her PhD research. About 200 volunteers are needed, with plans to use the research to develop treatment procedures for people afraid of driving. Those recruited so far include people who are "mildly anxious" about getting behind the wheel, to those "totally incapacitated" by fear.

The research follows a 1996 study which looked at how people coped with driving anxieties afteraccidents.

Barriers to stress-free motoring included fear of being unable to cope in certain situations. "One of the things we noticed anecdotally was that people from Auckland were really really afraid of driving over the harbour bridge."

"My hypothesis is that people with fears don't have any problem with driving — they just don't have any confidence in their skills."

● Joanne Taylor: 0800 150 276.

Wanted: 100 anxious drivers (1999, October 14). *Contact,* p. 12.

APPENDIX D-3

Fearful drivers focus of new study. (1999, October). *Road Safety New Zealand*, 2-3.

Fearful drivers focus of new study

Most of us have had a scary moment or two behind the wheel, usually the result of a crash or a close call.

But for some people, every minute spent on the road is nerve-racking and anxiety-provoking. Some have a chronic fear of driving, and it can turn a simple journey across town into a harrowing experience.

What causes this fear? How does it affect a person's driving performance? And how can it be treated? These are some of the questions clinical psychologist and Massey University PhD student Joanne Taylor hopes to answer in research she is undertaking as part of her doctoral studies.

She plans to research the clinical characteristics of driving fears in order to make recommendations for assessment and treatment. With funding from the Transport and Educational Trust Board, the Road Safety Trust and Massey University, Miss Taylor is recruiting two groups of subjects for her study. One group will be comprised of 100 people with various levels of driving anxiety, while the other will be a control group of 50 drivers with no anxieties.

All of the subjects will fill in a questionnaire, complete a computerised diagnostic interview and perform an advanced practical driving assessment, to be administered by a Palmerston North driving school.

Miss Taylor says the idea of studying driving-related anxiety came to her while watching TV a few years ago, after seeing one of the first of the graphic LTSA/Police road safety advertisements.

"I got to thinking about how those people would be affected (by a crash) later on, and how it would affect their driving," she said. As part of her Masters degree from Massey, she undertook her first examination of driving anxiety in 1996, one of the first studies of its kind.

She said that while there had been a lot of research done on post-traumatic stress disorder in general, very little had been done on fear and phobia and how it affects specific tasks like driving.

One of the most significant and surprising findings of Miss Taylor's first study was that only one third of fearful drivers pointed to a previous crash as the cause of their anxiety.

...only one third of fearful drivers pointed to a previous crash as the cause of their anxiety.

Many said they were afraid of having a panic attack while driving. They feared the attack itself, but also the consequences of having an attack on the road. Others cited a fear of criticism by passengers or other drivers.

The original study also found a very wide range of anxiety levels among fearful drivers. "Some people were only a little bit anxious, others were completely house-bound," Miss Taylor said.

continued from page 1

which was also attended by LTSA Auckland Regional Manager Peter Kippenberger, Phil Warren, Sir Peter Blake and transatlantic rowing hero Rob Hamill.

Efforts to make the Safe Summer 2000 brand a reality were spearheaded by Mr Kippenberger and Karen Sandoy, LTSA Auckland Regional Education Adviser. Besides coming up with the concept and original funding, the Auckland office also commissioned the Safe Summer logo, which features a series of optional icons depicting landmarks and activities with a distinctly Auckland flavour. Variations on the logo will also be used for campaigns in the Waikato, Bay of Plenty and Gisborne.

LTSA Hamilton Regional Manager Glenn Bunting said it makes good sense for the central North Island to adopt the Safe Summer 2000 concept, given that the region is a funnel for all north and south bound traffic en route to and from Auckland. He said the co-operative effort was needed to convince people to act responsibly.

"It will take the collective will of many to bring about changes in attitude and behaviour and the Safe Summer brand could well be the vehicle to start the ball rolling," he said.

Speaking at the launch, Rob Hamill asked people to slow down and use common sense in all of their activities this summer.

"There's no need to hurry. We averaged just two and a half knots rowing the Atlantic - but we got there safely."

For information on how you or your organisation can use the 'Safe Summer 2000' logo, contact Karen Sandoy, c/o Land Transport Safety Authority, Private Bag 106 602, Auckland, or e-mail kls@ltsa.govt.nz.

PhD student Joanne Taylor is studying anxious drivers in her research on the focus and origins of driving fears.

She said the current study would look more in depth at the focus and origins of driving fears, especially those where the anxiety is not caused by a previous crash or incident.

"Fear of driving has sub-groups of all sorts of other fears," she said. "For some people it may be a specific fear of driving, for others it is fear of a panic attack."

A panic attack is characterised by the sudden onset of severe anxiety, a pounding heart, shortness of breath, chest pains and other debilitating symptoms. An attack can last for several minutes. Panic disorder is a fear of having unexpected and repeated panic attacks.

Panic attacks and panic disorder can lead to a fear of driving and fears of other specific tasks or environments. Once someone has had a panic attack while driving (or riding in an elevator, for example), he or she may develop irrational fears, called phobias, about these situations and begin to avoid them.

Eventually, the pattern of avoidance and level of anxiety about another attack may reach the point where the individual with panic disorder may be unable to drive (or get into an elevator), or even step out of the house.

LTSA Research and Statistics Manager Bill Frith said Miss Taylor's research has obvious implications for road safety. "A panicky driver isn't likely to be as safe as one who isn't," he said.

The Transport and Educational Trust Board has identified reaction times, braking, hesitancy and speed management as factors which could be affected by a fear of driving.

Miss Taylor said that the possible treatments for driving anxiety would vary as widely as the different levels of anxiety people experience. Some anxious drivers may be bad drivers, while others just think they are bad drivers.

"It may be that some people lack driving skills. Others may lack self-confidence. Whether it's their skills that need to be improved or their perception of their skills will determine what kind of treatment is appropriate," she said.

Remedies could range from relaxation techniques, to education about anxiety and its causes, to building self-confidence or taking practical driving lessons.

Land transport sector prepared for Y2K

A recently commissioned public safety review of the effects of the Y2K bug on the land transport sector has concluded that the risk of systems failure is minimal, and will have little effect on the motoring public.

The LTSA and state highway manager Transit New Zealand are confident that there are no additional risks posed to public safety from potential land transport-related Y2K failures. The LTSA has had a Y2K readiness plan in place since 1996, and considers itself to be fully Y2K ready.

A few of the key areas examined in the public safety review (commissioned by the Ministry of Transport) are outlined here.

Motor vehicles

Some newer vehicles are manufactured with "date processing capable" microchips which control various functions of the vehicle, from automatic braking systems (ABS) to gear changing and fuel injection. While these microchips are capable of processing dates, very few of them are actually programmed to do so. This means that the majority of these chips are not dependent on dates and are therefore not affected by the Y2K problem. Also, all chips are designed to failsafe and allow vehicles to operate safely. It is recommended you contact your vehicle manufacturer or car dealer if you have any concerns about your particular vehicle.

continued on page 8

Newspaper advertisements for second recruitment.

Women Drivers

We are researchers from Massey University studying driving fears. We are trying to find out why some people become highly anxious about driving.

We need two groups of women for our study. We would like to talk with women who have a fear of driving in some or all situations. We also need a comparison group of women who do not have driving fears. If you decide to take part, you may be eligible for a free driving assessment.

If you are interested in volunteering for the study or would like to know more, please contact Joanne Taylor on 0800 800 677 before May 12.

Joanne Taylor **Dr John Podd**

Massey University

Te Kunenga ki Pūrehuroa

www.massey.ac.nz

Women drivers (2000, April 29). *The Dominion*, p. 20.

WOMEN DRIVERS

We are researchers from Massey University studying driving fears. We are trying to find out why some people become highly anxious about driving.

We need two groups of women for our study. We would like to talk with women who have a fear of driving in some or all situations. We also need a comparison group of women who do not have driving fears. If you decide to take part, you may be eligible for a free driving assessment.

If you are interested in volunteering for the study or would like to know more, please contact Joanne Taylor on 350-5874 before May 12.

Joanne Taylor **Dr John Podd**

Massey University

Te Kunenga ki Pureburoa

http://www.massey.ac.nz

Women drivers (2000, April 30). *The Tribune*, p. 22.

APPENDIX E-1

Mail-out questionnaire for fearfuls for Part One of Study Two.

ID#______

Fear of Driving Study Questionnaire

Please remember that all of the information you provide is strictly confidential. Most of the questions require you to respond either by circling a number or writing your response. You may circle more than one number per question if you need to for your answer. Please try to answer every question. Thank you for your help.

Background Information

Please answer this part of the questionnaire by circling the number next to your response or writing your response in the space provided.

Sex:	1	Male
	2	Female
Age:	____	years
Marital Status:	1	Single
	2	Married/De Facto
	3	Separated
	4	Divorced
	5	Widowed
Ethnicity:	1	Pakeha
	2	Maori
	3	Other (describe):
Years of education (inclusive of secondary school):	____	years
Years of driving experience:	____	years
What is your current employment status?	1	Currently in paid employment
	2	Not currently in paid employment
Do you have any cardiovascular (heart) problems?	1	Yes
	2	No
Do you have a history of brain or nervous system damage or disorder, such as epilepsy?	1	Yes
	2	No
Are you currently taking any regular medications, other than contraceptives, either prescribed or self-administered?	1	Yes
	2	No

If so, what are you taking? What is it for? ____________________

If you are female, are you pregnant?
1 Yes
2 No

Did you participate in our earlier research on driving fears?
1 Yes
2 No

Driving Information

Please answer this part of the questionnaire by writing your response in the space provided or circling the number next to your response. You may circle more than one number per question if you need to for your answer.

1. How old were you when you started to learn to drive?____ years

2. How did you learn to drive?
   1 Driving instruction in school
   2 Taught by a family member/friend
   3 Driving school
   4 Other (describe): ________________

3. How many years have you had your drivers' licence? ____ years

4. How many times have you sat the test to get your licence? ____ time(s)

5. Which of the following do you currently drive?
   1 Manual vehicle
   2 Automatic vehicle

6. How often do you currently drive?
   1 More than once a day
   2 Once a day
   3 Several times a week (not daily)
   4 Once a week
   5 Several times a month (not weekly)
   6 Once a month
   7 Other (please specify how long ago you last drove): ________________

7. What does your main driving consist of?
   1 It is part of my job
   2 Travel to and from work/study
   3 Local routes (e.g., to/from shops)

8. Where do you usually drive?
   1 Town/city
   2 Suburbs
   3 Main highways/motorways
   4 Rural roads

9. When do you usually drive?

1 In peak traffic periods
2 In busy traffic periods
3 In moderate traffic periods
4 In minimum traffic periods

10. Have you ever done a Defensive Driving Course?

1 Yes
2 No

11. In the last three years, how many times have you had any minor incidents which damaged your vehicle or personal property (e.g., scraped paint/small dents)?

1 Never
2 Once
3 A few times
4 Several times
5 Many times

12. In the last three years, how many accidents (i.e., collision with another car/person/object) have you been involved in where you have been the driver? ____ accident(s)

If you have been involved in one or more accidents as a driver, how many of these were your fault? ____ accident(s)

13. In the last three years, how many accidents (i.e., collision with another car/person/object) have you been involved in where you have been a passenger? ____ accident(s)

14. Have you sustained any injuries from motor vehicle accidents?

1 Yes
2 No

If so, what kinds of injuries? ________________________
____

15. How many times have you been charged with:

Parking offences _____ time(s)
Speeding _____ time(s)
Instant traffic fines (e.g., no registration, WOF) _____ time(s)
Minor traffic offence (e.g., failure to pay fines) _____ time(s)
Major traffic offences (e.g., drink-driving, dangerous driving causing injury) _____ time(s)

Thank you for completing this part of the questionnaire. Remember that the information you have provided is strictly confidential. Please turn the page and continue with the next part.

Driving Fear Information

Please answer this part of the questionnaire by circling a number or writing your response in the space provided.

1. Do you consider yourself to have a fear of driving?
   1 Yes
   2 No

2. How fearful are you about driving in general? (Please circle one number)

0	1	2	3	4	5	6	7	8	9	10
Not at all fearful										Extremely fearful

3. What is it about driving that you fear the most?

____

____

4. Each time you get in a vehicle to drive, how likely do you think it is that the situation or event you described in question 2 above might occur? (Please circle one number)

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Will not happen										Will certainly happen

5. When you get into a car, how likely do you think it is that you will be involved in a motor vehicle accident?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Will not happen										Will certainly happen

6. Of the following, what do you fear the most?
   1 Being a driver
   2 Being a passenger

7. To what extent does your fear of driving interfere with things you want to do?
   1 Never
   2 Sometimes
   3 Often
   4 All the time

8. Who have you spoken to about your driving fear? (Circle all those that apply to you)
   1 Mental health professional (e.g., psychologist, counsellor)
   2 Medical professional (e.g., GP)
   3 Partner or spouse
   4 Other family members
   5 Friends

9. Have you ever received psychological help from a mental health professional for your driving fear?

1 Yes
2 No

10. To what extent do you think you need professional psychological help from a psychologist or counsellor for your driving fear? (Please circle one number)

1	2	3	4	5	6	7
No need						Extreme need

11. How likely is it that you would seek professional psychological help from a psychologist or counsellor for your driving fear? (Please circle one number)

1	2	3	4	5	6	7	8	9
Extremely unlikely							Extremely likely	

12. To what extent do you think you need professional driving instruction to help you with your driving fear?

1	2	3	4	5	6	7
No need						Extreme need

13. Have you ever received professional driving instruction to help you with your driving fear?

1 Yes
2 No

14. Have you sought professional help from anyone else for your driving fear?

1 Yes
2 No

If so, what were they trained in? ____________________

15. How fearful are you about sitting tests in general? (Please circle one number)

0	1	2	3	4	5	6	7	8	9	10
Not at all fearful										Extremely fearful

Thank you for completing this part of the questionnaire. Remember that the information you have provided is strictly confidential. Please turn the page and continue with the next part.

Listed below are some thoughts or ideas that may pass through your mind when you are driving. Please indicate how often each thought occurs when you are driving. If you are not currently driving, please base your answers on the last time you drove. Please circle the appropriate number using a scale from 0 to 4 as described below.

0	1	2	3	4
The thought never occurs	The thought rarely occurs	The thought occurs during half of the times I drive	The thought usually occurs	The thought always occurs when I am driving

	Never				Always
1. A tyre will burst	0	1	2	3	4
2. I will get stuck in traffic	0	1	2	3	4
3. I will not be able to react fast enough	0	1	2	3	4
4. I am going to faint	0	1	2	3	4
5. People I care about will criticise me	0	1	2	3	4
6. I will injure someone	0	1	2	3	4
7. I will tremble and not be able to steer	0	1	2	3	4
8. If I have an accident, it will cause financial problems.	0	1	2	3	4
9. I will be injured	0	1	2	3	4
10. I will lose control of myself and act stupidly or dangerously	0	1	2	3	4
11. I will not be able to stop	0	1	2	3	4
12. If I have an accident, I will not get to the hospital fast enough	0	1	2	3	4
13. I will be trapped	0	1	2	3	4
14. Things will be confused like in a dream	0	1	2	3	4
15. A bridge or overpass will collapse	0	1	2	3	4
16. People will think I am a bad driver	0	1	2	3	4
17. I will die in an accident	0	1	2	3	4
18. The engine will break down	0	1	2	3	4
19. I will have a heart attack	0	1	2	3	4
20. I will fall asleep	0	1	2	3	4
21. I will be attacked if the car breaks down	0	1	2	3	4
22. I will be unable to catch my breath	0	1	2	3	4
23. People riding with me will be hurt	0	1	2	3	4
24. I will be too far from home	0	1	2	3	4
25. The car will catch fire	0	1	2	3	4
26. My heart will stop beating	0	1	2	3	4
27. I will be arrested for unsafe driving	0	1	2	3	4
28. I will get lost	0	1	2	3	4

	Never				Always
29. I will lose control over my limbs	0	1	2	3	4
30. The brakes will not work	0	1	2	3	4
31. The way I drive will endanger others	0	1	2	3	4
32. I will be stranded	0	1	2	3	4
33. The car will turn over	0	1	2	3	4
34. I will be crippled in an accident	0	1	2	3	4
35. The car will run out of gas	0	1	2	3	4
36. I will not be able to think clearly	0	1	2	3	4
37. I will hold up traffic and people will be angry	0	1	2	3	4
38. I will cause an accident	0	1	2	3	4
39. I will hyperventilate	0	1	2	3	4
40. People will laugh at me	0	1	2	3	4
41. My face will be disfigured in an accident	0	1	2	3	4
42. The car will be wrecked	0	1	2	3	4
43. I will not be able to move	0	1	2	3	4
44. I cannot control whether other cars will hit me	0	1	2	3	4
45. I will not find my way home	0	1	2	3	4
46. Other people will notice that I am anxious	0	1	2	3	4
47. I will drive off the road	0	1	2	3	4
48. I will have an accident and end up in a coma	0	1	2	3	4
49. I will hit an animal	0	1	2	3	4

Imagine the last time you drove your car. Please rate the items below based on the degree of anxiety you experienced in this situation. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe how you felt the last time you drove.

	Not at all	Somewhat	Moderately	Very Much
1. I feel calm	1	2	3	4
2. I am tense	1	2	3	4
3. I feel upset	1	2	3	4
4. I am relaxed	1	2	3	4
5. I feel content	1	2	3	4
6. I am worried	1	2	3	4

Listed below are different driving situations that you may find uncomfortable or frightening. Please indicate to what degree you feel anxious in the driving situation when you are driving by circling the appropriate number. If you have not driven in a particular situation, please rate how anxious you would be if you were in that situation.

Situation	No anxiety	Little anxiety	Moderate anxiety	Much anxiety	Extreme anxiety
1. Driving at intersections	0	1	2	3	4
2. Driving in the fog	0	1	2	3	4
3. Making a U-turn	0	1	2	3	4
4. Driving through road works	0	1	2	3	4
5. Being in a traffic jam	0	1	2	3	4
6. Turning right	0	1	2	3	4
7. Straight parking	0	1	2	3	4
8. Reversing	0	1	2	3	4
9. Driving in an unfamiliar car	0	1	2	3	4
10. Turning left	0	1	2	3	4
11. Driving in a residential area	0	1	2	3	4
12. Parallel parking	0	1	2	3	4
13. Driving in the rain	0	1	2	3	4
14. Driving in an unfamiliar area	0	1	2	3	4
15. Driving in a city/town	0	1	2	3	4
16. Driving on a motorway	0	1	2	3	4
17. Driving on a steep road	0	1	2	3	4
18. Driving in heavy traffic	0	1	2	3	4
19. Driving at night	0	1	2	3	4
20. Being passed	0	1	2	3	4
21. Angle parking	0	1	2	3	4
22. Driving on the open road	0	1	2	3	4
23. Driving behind a truck	0	1	2	3	4
24. Driving through a tunnel	0	1	2	3	4
25. Driving on a gravel road	0	1	2	3	4
26. Passing	0	1	2	3	4
27. Driving over a bridge	0	1	2	3	4
28. Driving during the day	0	1	2	3	4
29. Driving on a winding road	0	1	2	3	4
30. Waiting at a traffic light	0	1	2	3	4
31. Changing lanes	0	1	2	3	4
32. Driving next to roadside barriers	0	1	2	3	4
33. Driving fast	0	1	2	3	4
34. Being tailgated by another car	0	1	2	3	4
35. Driving in strong winds	0	1	2	3	4
36. Driving past a truck	0	1	2	3	4
37. Driving on a narrow road	0	1	2	3	4
38. Merging into traffic	0	1	2	3	4
39. Driving in front of a truck	0	1	2	3	4

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the number which indicates how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately	Very Much
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I am satisfied with my life	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am "calm, cool, and collected"	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that doesn't really matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Choose a number from the scale below to show how much you would avoid each of the situations listed below because of fear or other unpleasant feelings. Then write the number you choose in the space opposite each situation.

0	1	2	3	4	5	6	7	8
Would not avoid it		Slightly avoid it		Definitely avoid it		Markedly avoid it		Always avoid it

1. Driving .... _____
2. Injections or minor surgery .... _____
3. Eating or drinking with other people .... _____
4. Hospitals .... _____
5. Travelling alone by bus or coach .... _____
6. Walking alone in busy streets .... _____
7. Being watched or stared at .... _____
8. Going into crowded shops .... _____
9. Talking to people in authority .... _____
10. Sight of blood .... _____
11. Being criticised .... _____
12. Going alone far from home .... _____
13. Thought of injury or illness .... _____
14. Speaking or acting to an audience .... _____
15. Large open spaces .... _____
16. Going to the dentist .... _____

How anxious are you about driving in general? (Please circle one number)

0	1	2	3	4	5	6	7	8	9	10
Not at all anxious										Extremely anxious

Thank you for completing the questionnaire and for your help in answering all of the questions. Your contribution has been a most valuable part of the research. Remember that the information you have provided is strictly confidential. Please feel free to make any comments on the back of this page or to let us know of any questions you may have.

Would you like your name placed on the list to receive a report of the overall results at the end of the study? (Circle one) Yes No
Thank you once again for your help.

APPENDIX E-2

Mail-out questionnaire for controls for Part One of Study Two.

ID#_____

Fear of Driving Study Questionnaire

Please remember that all of the information you provide is strictly confidential. Most of the questions require you to respond either by circling a number or writing your response. You may circle more than one number per question if you need to for your answer. Please try to answer every question. Thank you for your help.

Background Information

Please answer this part of the questionnaire by circling the number next to your response or writing your response in the space provided.

Sex:	1	Male
	2	Female
Age:	____ years	
Marital Status:	1	Single
	2	Married/De Facto
	3	Separated
	4	Divorced
	5	Widowed
Ethnicity:	1	Pakeha
	2	Maori
	3	Other (describe):
Years of education (inclusive of secondary school):	____ years	
Years of driving experience:	____ years	
What is your current employment status?	1	Currently in paid employment
	2	Not currently in paid employment
Do you have any cardiovascular (heart) problems?	1	Yes
	2	No
Do you have a history of brain or nervous system damage or disorder, such as epilepsy?	1	Yes
	2	No
Are you currently taking any regular medications, other than contraceptives, either prescribed or self-administered?	1	Yes
	2	No

If so, what are you taking? What is it for? ________________

If you are female, are you pregnant?

1 Yes
2 No

Driving Information

Please answer this part of the questionnaire by writing your response in the space provided or circling the number next to your response. You may circle more than one number per question if you need to for your answer.

1. How old were you when you started to learn to drive?____ years

2. How did you learn to drive?
   1 Driving instruction in school
   2 Taught by a family member/friend
   3 Driving school
   4 Other (describe): ______________

3. How many years have you had your drivers' licence? ____ years

4. How many times have you sat the test to get your licence? ____ time(s)

5. Which of the following do you currently drive?
   1 Manual vehicle
   2 Automatic vehicle

6. How often do you currently drive?
   1 More than once a day
   2 Once a day
   3 Several times a week (not daily)
   4 Once a week
   5 Several times a month (not weekly)
   6 Once a month
   7 Other (please specify how long ago you last drove): ________________

7. What does your main driving consist of?
   1 It is part of my job
   2 Travel to and from work/study
   3 Local routes (e.g., to/from shops)

8. Where do you usually drive?
   1 Town/city
   2 Suburbs
   3 Main highways/motorways
   4 Rural roads

9. When do you usually drive?

1 In peak traffic periods
2 In busy traffic periods
3 In moderate traffic periods
4 In minimum traffic periods

10. Have you ever done a Defensive Driving Course?

1 Yes
2 No

11. In the last three years, how many times have you had any minor incidents which damaged your vehicle or personal property (e.g., scraped paint/small dents)?

1 Never
2 Once
3 A few times
4 Several times
5 Many times

12. In the last three years, how many accidents (i.e., collision with another car/person/object) have you been involved in where you have been the driver? ____ accident(s)

If you have been involved in one or more accidents as a driver, how many of these were your fault? ____ accident(s)

13. In the last three years, how many accidents (i.e., collision with another car/person/object) have you been involved in where you have been a passenger? ____ accident(s)

14. Have you sustained any injuries from motor vehicle accidents?

1 Yes
2 No

If so, what kinds of injuries? ______________________

____

15. How many times have you been charged with:

Parking offences _____ time(s)
Speeding _____ time(s)
Instant traffic fines (e.g., no registration, WOF) _____ time(s)
Minor traffic offence (e.g., failure to pay fines) _____ time(s)
Major traffic offences (e.g., drink-driving, dangerous driving causing injury) _____ time(s)

Thank you for completing this part of the questionnaire. Remember that the information you have provided is strictly confidential. Please turn the page and continue with the next part.

Driving Fear Information

Please answer this part of the questionnaire by circling a number or writing your response in the space provided.

1. Do you consider yourself to have a fear of driving?

   1 Yes
   2 No

2. How fearful are you about driving in general? (Please circle one number)

0	1	2	3	4	5	6	7	8	9	10
Not at all fearful										Extremely fearful

3. When you get into a car, how likely do you think it is that you will be involved in a motor vehicle accident?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Will not happen										Will certainly happen

4. How fearful are you about sitting tests in general? (Please circle one number)

0	1	2	3	4	5	6	7	8	9	10
Not at all fearful										Extremely fearful

Thank you for completing this part of the questionnaire. Remember that the information you have provided is strictly confidential. Please turn the page and continue with the next part.

Listed below are some thoughts or ideas that may pass through your mind when you are driving. Please indicate how often each thought occurs when you are driving. If you are not currently driving, please base your answers on the last time you drove. Please circle the appropriate number using a scale from 0 to 4 as described below.

0	1	2	3	4
The thought never occurs	The thought rarely occurs	The thought occurs during half of the times I drive	The thought usually occurs	The thought always occurs when I am driving

	Never				Always
1. A tyre will burst	0	1	2	3	4
2. I will get stuck in traffic	0	1	2	3	4
3. I will not be able to react fast enough	0	1	2	3	4
4. I am going to faint	0	1	2	3	4
5. People I care about will criticise me	0	1	2	3	4
6. I will injure someone	0	1	2	3	4
7. I will tremble and not be able to steer	0	1	2	3	4
8. If I have an accident, it will cause financial problems	0	1	2	3	4
9. I will be injured	0	1	2	3	4
10. I will lose control of myself and act stupidly or dangerously	0	1	2	3	4
11. I will not be able to stop	0	1	2	3	4
12. If I have an accident, I will not get to the hospital fast enough	0	1	2	3	4
13. I will be trapped	0	1	2	3	4
14. Things will be confused like in a dream	0	1	2	3	4
15. A bridge or overpass will collapse	0	1	2	3	4
16. People will think I am a bad driver	0	1	2	3	4
17. I will die in an accident	0	1	2	3	4
18. The engine will break down	0	1	2	3	4
19. I will have a heart attack	0	1	2	3	4
20. I will fall asleep	0	1	2	3	4
21. I will be attacked if the car breaks down	0	1	2	3	4
22. I will be unable to catch my breath	0	1	2	3	4
23. People riding with me will be hurt	0	1	2	3	4
24. I will be too far from home	0	1	2	3	4
25. The car will catch fire	0	1	2	3	4
26. My heart will stop beating	0	1	2	3	4
27. I will be arrested for unsafe driving	0	1	2	3	4
28. I will get lost	0	1	2	3	4

	Never				Always
29. I will lose control over my limbs	0	1	2	3	4
30. The brakes will not work	0	1	2	3	4
31. The way I drive will endanger others	0	1	2	3	4
32. I will be stranded	0	1	2	3	4
33. The car will turn over	0	1	2	3	4
34. I will be crippled in an accident	0	1	2	3	4
35. The car will run out of gas	0	1	2	3	4
36. I will not be able to think clearly	0	1	2	3	4
37. I will hold up traffic and people will be angry	0	1	2	3	4
38. I will cause an accident	0	1	2	3	4
39. I will hyperventilate	0	1	2	3	4
40. People will laugh at me	0	1	2	3	4
41. My face will be disfigured in an accident	0	1	2	3	4
42. The car will be wrecked	0	1	2	3	4
43. I will not be able to move	0	1	2	3	4
44. I cannot control whether other cars will hit me	0	1	2	3	4
45. I will not find my way home	0	1	2	3	4
46. Other people will notice that I am anxious	0	1	2	3	4
47. I will drive off the road	0	1	2	3	4
48. I will have an accident and end up in a coma	0	1	2	3	4
49. I will hit an animal	0	1	2	3	4

Imagine the last time you drove your car. Please rate the items below based on the degree of anxiety you experienced in this situation. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe how you felt the last time you drove.

	Not at all	Somewhat	Moderately	Very Much
1. I feel calm	1	2	3	4
2. I am tense	1	2	3	4
3. I feel upset	1	2	3	4
4. I am relaxed	1	2	3	4
5. I feel content	1	2	3	4
6. I am worried	1	2	3	4

Listed below are different driving situations that you may find uncomfortable or frightening. Please indicate to what degree you feel anxious in the driving situation <u>when you are driving</u> by circling the appropriate number. If you have not driven in a particular situation, please rate how anxious you would be if you were in that situation.

Situation	No anxiety	Little anxiety	Moderate anxiety	Much anxiety	Extreme anxiety
1. Driving at intersections	0	1	2	3	4
2. Driving in the fog	0	1	2	3	4
3. Making a U-turn	0	1	2	3	4
4. Driving through road works	0	1	2	3	4
5. Being in a traffic jam	0	1	2	3	4
6. Turning right	0	1	2	3	4
7. Straight parking	0	1	2	3	4
8. Reversing	0	1	2	3	4
9. Driving in an unfamiliar car	0	1	2	3	4
10. Turning left	0	1	2	3	4
11. Driving in a residential area	0	1	2	3	4
12. Parallel parking	0	1	2	3	4
13. Driving in the rain	0	1	2	3	4
14. Driving in an unfamiliar area	0	1	2	3	4
15. Driving in a city/town	0	1	2	3	4
16. Driving on a motorway	0	1	2	3	4
17. Driving on a steep road	0	1	2	3	4
18. Driving in heavy traffic	0	1	2	3	4
19. Driving at night	0	1	2	3	4
20. Being passed	0	1	2	3	4
21. Angle parking	0	1	2	3	4
22. Driving on the open road	0	1	2	3	4
23. Driving behind a truck	0	1	2	3	4
24. Driving through a tunnel	0	1	2	3	4
25. Driving on a gravel road	0	1	2	3	4
26. Passing	0	1	2	3	4
27. Driving over a bridge	0	1	2	3	4
28. Driving during the day	0	1	2	3	4
29. Driving on a winding road	0	1	2	3	4
30. Waiting at a traffic light	0	1	2	3	4
31. Changing lanes	0	1	2	3	4
32. Driving next to roadside barriers	0	1	2	3	4
33. Driving fast	0	1	2	3	4
34. Being tailgated by another car	0	1	2	3	4
35. Driving in strong winds	0	1	2	3	4
36. Driving past a truck	0	1	2	3	4
37. Driving on a narrow road	0	1	2	3	4
38. Merging into traffic	0	1	2	3	4
39. Driving in front of a truck	0	1	2	3	4

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the number which indicates how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately	Very Much
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I am satisfied with my life	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am "calm, cool, and collected"	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that doesn't really matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Choose a number from the scale below to show how much you would avoid each of the situations listed below because of fear or other unpleasant feelings. Then write the number you choose in the space opposite each situation.

0	1	2	3	4	5	6	7	8
Would not avoid it		Slightly avoid it		Definitely avoid it		Markedly avoid it		Always avoid it

1. Driving .... _____
2. Injections or minor surgery .... _____
3. Eating or drinking with other people .... _____
4. Hospitals .... _____
5. Travelling alone by bus or coach .... _____
6. Walking alone in busy streets .... _____
7. Being watched or stared at .... _____
8. Going into crowded shops .... _____
9. Talking to people in authority .... _____
10. Sight of blood .... _____
11. Being criticised .... _____
12. Going alone far from home .... _____
13. Thought of injury or illness .... _____
14. Speaking or acting to an audience .... _____
15. Large open spaces .... _____
16. Going to the dentist .... _____

How anxious are you about driving in general? (Please circle one number)

0	1	2	3	4	5	6	7	8	9	10
Not at all anxious										Extremely anxious

Thank you for completing the questionnaire and for your help in answering all of the questions. Your contribution has been a most valuable part of the research. Remember that the information you have provided is strictly confidential. Please feel free to make any comments on the back of this page or to let us know of any questions you may have.

Would you like your name placed on the list to receive a report of the overall results at the end of the study? (Circle one) Yes No

Thank you once again for your help.

APPENDIX E-3

Questionnaires administered during Part Two of Study Two.

Listed below are different driving situations that you may find uncomfortable or frightening. Please indicate to what degree you feel anxious in the driving situation when you are a passenger by circling the appropriate number. If you have not driven in a particular situation, please rate how anxious you would be if you were in that situation.

Situation	No anxiety	Little anxiety	Moderate anxiety	Much anxiety	Extreme anxiety
1. Driving at intersections	0	1	2	3	4
2. Driving in the fog	0	1	2	3	4
3. Making a U-turn	0	1	2	3	4
4. Driving through road works	0	1	2	3	4
5. Being in a traffic jam	0	1	2	3	4
6. Turning right	0	1	2	3	4
7. Straight parking	0	1	2	3	4
8. Reversing	0	1	2	3	4
9. Driving in an unfamiliar car	0	1	2	3	4
10. Turning left	0	1	2	3	4
11. Driving in a residential area	0	1	2	3	4
12. Parallel parking	0	1	2	3	4
13. Driving in the rain	0	1	2	3	4
14. Driving in an unfamiliar area	0	1	2	3	4
15. Driving in a city/town	0	1	2	3	4
16. Driving on a motorway	0	1	2	3	4
17. Driving on a steep road	0	1	2	3	4
18. Driving in heavy traffic	0	1	2	3	4
19. Driving at night	0	1	2	3	4
20. Being passed	0	1	2	3	4
21. Angle parking	0	1	2	3	4
22. Driving on the open road	0	1	2	3	4
23. Driving behind a truck	0	1	2	3	4
24. Driving through a tunnel	0	1	2	3	4
25. Driving on a gravel road	0	1	2	3	4
26. Passing	0	1	2	3	4
27. Driving over a bridge	0	1	2	3	4
28. Driving during the day	0	1	2	3	4
29. Driving on a winding road	0	1	2	3	4
30. Waiting at a traffic light	0	1	2	3	4
31. Changing lanes	0	1	2	3	4
32. Driving next to roadside barriers	0	1	2	3	4
33. Driving fast	0	1	2	3	4
34. Being tailgated by another car	0	1	2	3	4
35. Driving in strong winds	0	1	2	3	4
36. Driving past a truck	0	1	2	3	4
37. Driving on a narrow road	0	1	2	3	4
38. Merging into traffic	0	1	2	3	4
39. Driving in front of a truck	0	1	2	3	4

Please provide the following information:

Name______________________________ Date______________

Gender (*Please circle*): **Male Female** Score: T_____ W_____ E_____

Directions

A number of statements which people have used to describe themselves are given on the following page. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel:

1 = Almost Never, 2 = Sometimes, 3 = Often, 4 = Almost Always.

There are no wrong or right answers. Do not spend too much time on one statement but give the answer which seems to describe how you generally feel. Please answer every statement.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
1. I feel confident and relaxed while taking tests	1	2	3	4
2. While taking examinations I have an uneasy, upset feeling	1	2	3	4
3. Thinking about my grade in a course interferes with my work on tests	1	2	3	4
4. I freeze up on important exams	1	2	3	4
5. During exams I find myself thinking about whether I'll ever get through school	1	2	3	4
6. The harder I work at taking a test, the more confused I get	1	2	3	4
7. Thoughts of doing poorly interfere with my concentration on tests	1	2	3	4
8. I feel very jittery when taking an important test	1	2	3	4
9. Even when I'm well prepared for a test, I feel very nervous about it	1	2	3	4
10. I start feeling very uneasy just before getting a test paper back	1	2	3	4
11. During tests I feel very tense	1	2	3	4
12. I wish examinations did not bother me so much	1	2	3	4
13. During important tests I am so tense that my stomach gets upset	1	2	3	4
14. I seem to defeat myself while working on important tests	1	2	3	4
15. I feel very panicky when I take an important test	1	2	3	4
16. I worry a great deal before taking an important examination	1	2	3	4
17. During tests I find myself thinking about the consequences of failing	1	2	3	4
18. I feel my heart beating very fast during important tests	1	2	3	4
19. After an exam is over I try to stop worrying about it, but I can't	1	2	3	4
20. During examinations I get so nervous that I forget facts I really know	1	2	3	4

 TSANP Permissions Test Booklet

BDI-II

Date:

Name: ______ Marital Status: ______ Age: ______ Sex: ______

Occupation: ______ Education: ______

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.
1 I feel more discouraged about my future than I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0 I don't feel particularly guilty.
1 I feel guilty over many things I have done or should have done.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

______ Subtotal Page 1

Continued on Back

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11. Agitation

0 I am no more restless or wound up than usual.

1 I feel more restless or wound up than usual.

2 I am so restless or agitated that it's hard to stay still.

3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.

1 I am less interested in other people or things than before.

2 I have lost most of my interest in other people or things.

3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.

1 I find it more difficult to make decisions than usual.

2 I have much greater difficulty in making decisions than I used to.

3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.

1 I don't consider myself as worthwhile and useful as I used to.

2 I feel more worthless as compared to other people.

3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.

1 I have less energy than I used to have.

2 I don't have enough energy to do very much.

3 I don't have enough energy to do an thing.

16. Changes In Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.

1a I sleep somewhat more than usual.

1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.

2b I sleep a lot less than usual.

3a I sleep most of the day.

3b I wake up 1–2 hours early and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.

1 I am more irritable than usual.

2 I am much more irritable than usual.

3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.

1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.

2b My appetite is much greater than usual.

3a I have no appetite at all.

3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.

1 I can't concentrate as well as usual.

2 It's hard to keep my mind on anything for very long.

3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.

1 I get more tired or fatigued more easily than usual.

2 I am too tired or fatigued to do a lot of the things I used to do.

3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.

1 I am less interested in sex than I used to be.

2 I am much less interested in sex now.

3 I have lost interest in sex completely.

_____ Subtotal Page 2

_____ Subtotal Page 1

_____ Total Score

APPENDIX E-4

Original Driving Situations Questionnaire (Ehlers, 1990).

Driving Situations Questionnaire

Below we have listed different driving situations that you may find uncomfortable or frightening. Please indicate to what degree 1) you **feel uncomfortable or afraid** in the driving situation *and* 2) you **avoid** driving in this situation when you are 1) **driving alone** *and* 2) **when a trusted companion is a passenger.**

Rate your amount of discomfort and avoidance by circling the appropriate number on the scales following each situation. The numbers refer to

Discomfort or anxiety		Avoidance	
0	no discomfort	0	never avoid
1	little discomfort	1	rarely avoid
2	moderate discomfort	2	avoid about half of the time
3	much discomfort	3	avoid most of the time
4	extreme discomfort	4	always avoid

In summary, you should circle four numbers in each line below, one each for discomfort or anxiety driving alone, avoidance driving alone, discomfort or anxiety driving accompanied, and avoidance driving accompanied.

	DRIVING ALONE		DRIVING ACCOMPANIED	
Driving Situation	**Discomfort/anxiety**	**Avoidance**	**Discomfort/anxiety**	**Avoidance**
Residential areas				
driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
waiting at traffic light	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
right turn	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
left turn	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
U turn	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
changing lanes	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
stopping at four-way stop	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
stopping at two-way stop	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
seeing children or pets on the sidewalk	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
parking	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

0 - no discomfort; 1 - little discomfort; 2 - moderate scomfort; 3 - much discomfort; 4 - extreme omfort

0 - never avoid; 1 - rarely avoid; 2 - avoid about half of the time; 3 - avoid most of the time; 4 - always avoid

Driving Situation	DRIVING ALONE Discomfort/anxiety	DRIVING ALONE Avoidance	DRIVING ACCOMPANIED Discomfort/anxiety	DRIVING ACCOMPANIED Avoidance
Busy urban thoroughfares (like El Camino)				
right lane	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
middle lane	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
fast lane	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
waiting at traffic light	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
right turn	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
left turn	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
U turn	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
changing lanes	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
road side barriers (e.g., construction areas)	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
traffic jam	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
Freeways				
merging	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
right lane	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
middle lane	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
fast lane	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
freeway without shoulder for emergencies	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
changing lanes	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

0 - no discomfort; 1 - little discomfort; 2 - moderate discomfort; 3 - much discomfort; 4 - extreme discomfort

Driving Situation	DRIVING ALONE Discomfort/anxiety					Avoidance					DRIVING ACCOMPANIED Discomfort/anxiety					Avoidance				
Freeways																				
passing another car	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
being passed by another car	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
driving behind a truck	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
driving in front of a truck	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
being tailgated by another car	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
seeing a law inforcement vehicle	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
traffic jam	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Other																				
winding road	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
mountain road	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
road next to a cliff	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
bridge	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
overpass	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
tunnel	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
driving uphill on hilly street or road	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
steep street or road																				
going uphill	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
going downhill	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4

0 - no discomfort; 1 - little discomfort; 2 - moderate discomfort; 3 - much discomfort; 4 - extreme discomfort

Please indicate to what degree
1) you feel uncomfortable or afraid *and* 2) you avoid driving in this situation when another person is driving.

Driving Situation	OTHER PERSON DRIVING Discomfort/anxiety	Avoidance
Residential areas	0 1 2 3 4	0 1 2 3 4
Busy urban thoroughfares (like El Camino)	0 1 2 3 4	0 1 2 3 4
Freeways	0 1 2 3 4	0 1 2 3 4
Bridges	0 1 2 3 4	0 1 2 3 4
Tunnels	0 1 2 3 4	0 1 2 3 4
Other: ________________	0 1 2 3 4	0 1 2 3 4

In the following, we have listed a number of special circumstances that can enhance discomfort or anxiety in some people. Please circle how uncomfortable you feel when you have to drive under these circumstances. Note that in this list you indicate only discomfort or anxiety, not avoidance.

CIRCUMSTANCE	DRIVING ALONE	DRIVING ACCOMPANIED	OTHER PERSON DRIVING
heavy traffic	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
driving at night	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
driving in an unfamiliar car	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
fog	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
rain	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
snow	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

0 - no discomfort; 1 - little discomfort; 2 - moderate discomfort; 3 - much discomfort; 4 - extreme discomfort

0 - never avoid; 1 - rarely avoid; 2 - r id about half of the time; 3 - avoid most of th me; 4 - always avoid

CIRCUMSTANCE	DRIVING ALONE	DRIVING ACCOMPANIED	OTHER PERSON DRIVING
driving when tired	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
driving when stressed for other reasons than driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
driving with somebody who criticizes your driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
driving with children in the car	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
being looked at	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
Other:			
____________________	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
____________________	0 i 2 3 4	0 1 2 3 4	0 1 2 3 4

0 - no discomfort; 1 - little discomfort; 2 - moderate discomfort; 3 - much discomfort; 4 - extreme discomfort

0 - never avoid; 1 - rarely avoid; 2 - ɾ ˈd about half of the time; 3 - avoid most of thɾ ˈme; 4 - always avoid

APPENDIX F-1

ADA: Operational definition of skills areas assessed (Advanced Driver Assessment Manual, 1998, pp. 8-9).

Search

- The driver will need to demonstrate a scanning pattern which includes all segments of the scene, both front and rear. This scanning will usually be accomplished by moving the eyes at least every two seconds;
- A safe lead time by way of the 12 second rule.

Hazard Identification: Drivers will:

- React in time to situations;
- Predict a plausible path of travel for vehicles and pedestrians in the scene based on environmental, vehicle, and driver conditions;
- Maintain a safe following distance by way of the 2 second rule;
- Maintain a safe following distance by way of the 4 second rule;
- Select a reasonable course of action and make the appropriate decisions.

Controls

- Power and Velocity: Considers the influence of acceleration and braking when moving forward and reversing.
- Steering and Guiding: Manipulating the steering wheel for guidance of the vehicle.
- Slowing and Stopping: Manipulating the controls for slowing and stopping.

Observes Traffic Regulations

- Uses Correct Lanes: Selects the correct lane for the intended path of travel.
- Uses Correct Position: Selects the correct position when turning.
- Communicates and Uses Correct Signals: Manipulating controls and other actions for communicating and signalling.
- Observes Signs and Give way Rules: Observes all signs and signals relevant to maintaining safety and direction.
- Observes Speed Limits: Observes all speed limits applicable to the vehicle.

APPENDIX F-2

ADA: Operational definition of terms (Advanced Driver Assessment Manual, 1998, pp. 7-8).

Moving into traffic	**Entering the traffic flow.** This may occur when changing from one lane to another. The task also has to be mastered when entering from the edge of a roadway. This may also occur when using a motorway on ramp or entering from a side road.
Moving on the road	**Holding on the road.** Keeping the vehicle safely on the right road in the proper place. This includes when cornering, when handling different road surfaces, and when handling emergencies.
Moving with the traffic flow	**Maintaining position in traffic streams.** Controlling the vehicle so that it safely and smoothly maintains its correct position with all the other traffic. This includes when following other vehicles, when travelling in front of others, and when travelling abreast of other traffic.
Moving through traffic	**Going through intersections.** Moving the vehicle through situations when other traffic may cross your path. This includes all intersections, controls, signs, pedestrian crossings, railway crossings, officers directing traffic, etc.
Moving past other traffic	**Going past.** Having vehicles travelling in the same direction at different speeds going past each other in safety. This includes passing or being passed.
Moving back in traffic	**Turning back.** Driving the vehicle back along the direction it has just come from and includes reversing into parking spaces and making 'U' turns.
Moving out of the traffic	**Exiting from the traffic flow.** Disengaging from the line of cars and stopping or parking. This includes getting off motorways, pulling into parking spaces, moving off the road, and leaving the road by making left or right turns.

APPENDIX F-3

ADA rating form.

Driver Assessment Marking Sheet

Name: ____________________ Licence No: ____________________

Address: ____________________ Issue Date: / /

Town/City ____________________ Expiry Date: / /

VEHICLE YEAR __________ MAKE __________ Classes Held: ____________________

MODEL ____________________ Conditions: ____________________

AUTOMATIC ☐ MANUAL ☐ P/STEERING ☐ Other ____________________

TRAFFIC FLOW LIGHT ☐ MEDIUM ☐ HEAVY ☐

DATE: / / START TIME: FINISH TIME: WEATHER:

ROUTE TAKEN :
(Location / Suburbs)

	Search		Hazard Identification				Controls			Observes Traffic Regulations						
Moving	Search Techniques	Applies 12 second Rule	Applies 2 second Rule	Applies 4 second Rule	Reacts in Time to Situation	Correct Action Taken	Power & Velocity	Steering & Guiding	Slowing & Stopping	Uses Correct Lanes	Uses Correct Position	Communication & Signalling	Obeys Signs	Applies Priority Rules	Obeys Speed Limits	
IN																IN
ON																ON
WITH																WITH
THRU																THRU
PAST																PAST
BACK																BACK
OUT																OUT

Blind Spot Check
Clutch Coasting
Wrong Gear

Buffer Zone
Neutral Coasting
Speed for Condition

APPENDIX F-4

Hypothetical driving assessments used for assessing inter-rater reliability in Study Two.

ASSESSMENT EXAMPLE 1

You are assessing Driver A, a 40-year old woman who wants to brush up on her driving skills. It is 11:30am on a cloudy, overcast day. Below are the errors she makes during the driving assessment you are conducting.

1. When reversing out of her driveway, Driver A pulls out too far into the roadway and gets tooted at by a passing motorist who has to pull over into the right hand lane to avoid Driver A's car. There is no oncoming traffic.

2. Driver A then moves off down the road but cannot find second gear, saying she feels nervous. After some calming and reassuring words from you, Driver A settles into the assessment.

3. While driving through a suburban area in light traffic, Driver A signals correctly on entering a roundabout but fails to signal her exit route.

4. Still in light traffic, Driver A is travelling at 40km/hr in a 50km/hr area.

5. Now entering the city in peak traffic, Driver A follows the car in front so closely that you cannot see the lead car's number plate.

6. She then fails to give way to her right at a roundabout and nearly causes an accident.

7. Approaching an intersection in moderate traffic, Driver A slows but fails to stop completely, saying to herself that there is no oncoming traffic.

8. She then swerves abruptly to avoid running over a piece of wood on the road that was clearly visible 50m ahead.

9. On the return trip, Driver A fails to signal left when turning into the street she lives in.

10. When pulling into her driveway, Driver A enters too tightly and her rear left tyre runs over the kerb.

ASSESSMENT EXAMPLE 2

The parents of Driver B have asked you to assess their 19-year old son's driving because they are worried that he drives dangerously and would like someone to help him drive more safely. He is cooperative because his parents are paying for the assessment. You meet him at his place of work in town at 9am. The weather is generally fine with some intermittent showers. Below are the errors he makes during the driving assessment you are conducting.

1. As he pulls out from the kerb, Driver B fails to signal.

2. In moderately busy traffic, he accelerates on approaching an orange traffic light, even though there was plenty of time to stop safely, he was travelling within the speed limit, and no cars were in front of him.

3. Moving out onto the motorway, Driver B quickly brings his speed up to 120km/hr.

4. He weaves across lanes without signalling at all to pass other cars. Traffic flow is moderate.

5. Driver B pulls in behind a car in the far right lane when all other lanes are blocked with steadily-moving traffic, and has to brake abruptly to bring his speed down to 110km/hr in line with the car in front.

6. On the return trip back to the city, Driver B is travelling in light traffic at 60km/hr in a 50km/hr area. Approaching an intersection, the traffic light turns red 20m away and Driver B brakes heavily to stop in time but does not stop completely until his car is blocking the pedestrian crossing.

7. Driver B is tailgating the car in front around the central city, continually braking abruptly to avoid rear-ending the lead car.

8. He then fails to signal left when moving out from a side street into a main street. There is no oncoming traffic.

9. There is a 5-minute downpour of rain but Driver B continues to drive at 60km/hr in 50km/hr areas around town.

10. When pulling back into his parking space, Driver B again fails to signal his intentions and instead brakes abruptly to pull in, almost causing an accident in the line of traffic behind him.

APPENDIX G-1

Pre-driving assessment questionnaire.

FEAR OF DRIVING STUDY

Pre- Driving Assessment Questionnaire

Here are some questions we need to ask you before the practical driving assessment. Please remember that all the information you provide is strictly confidential. Thank you for your help.

1. Are you currently taking any regular medications, other than contraceptives, either prescribed or self-administered?

1 Yes
2 No

If so, what are you taking? What is it for? ______________________________
____

2. Please rate your <u>current</u> level of anxiety on the following scale (Please circle one number):

0	1	2	3	4	5	6	7	8	9	10
Not at all anxious										Extremely anxious

3. Please read the statements below and indicate how you feel right now, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately	Very Much
I feel calm	1	2	3	4
I am tense	1	2	3	4
I feel upset..	1	2	3	4
I am relaxed..	1	2	3	4
I feel content	1	2	3	4
I am worried..	1	2	3	4

APPENDIX G-2

Post-driving assessment questionnaire: Participant form.

FEAR OF DRIVING STUDY

Post- Driving Assessment Questionnaire
Participant Form

Now that you have completed the practical driving assessment, please answer the following questions. Please remember that all the information you provide is strictly confidential. Thank you for your help.

1. Please rate your current level of anxiety on the following scale (Please circle one number):

0	1	2	3	4	5	6	7	8	9	10
Not at all anxious										Extremely anxious

2. Please read the statements below and indicate how you feel right now, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately	Very Much
I feel calm	1	2	3	4
I am tense	1	2	3	4
I feel upset	1	2	3	4
I am relaxed	1	2	3	4
I feel content	1	2	3	4
I am worried	1	2	3	4

3. From the driving assessment you have just completed, how would you rate your driving skills overall? (Please circle one number)

1	2	3	4	5	6	7
Excellent						Very poor

4. Was your driving performance typical of your usual driving performance?

1	2	3	4	5	6	7
Much better	Better	Slightly better	About the same	Slightly worse	Worse	Much worse

5. Do you think that your anxiety affected your driving performance? 1 Yes
2 No

If yes, in what way do you think anxiety affected your driving performance?

____

____

APPENDIX G-3

Post-driving assessment questionnaire: Driving instructor form.

FEAR OF DRIVING STUDY

Post- Driving Assessment Questionnaire
Driving Instructor Form

Now that you have completed the practical driving assessment, please answer the following questions. Please remember that all the information you provide is strictly confidential. Thank you for your help.

1. From the driving assessment you have just completed, how would you rate the driver's driving skills overall? (Please circle one number)

1	2	3	4	5	6	7
Excellent						Very poor

2. How would you rate their overall level of anxiety during the assessment? (Please circle one number):

0	1	2	3	4	5	6	7	8	9	10
Not at all anxious										Extremely anxious

3. The following are a list of feelings. Please rate how the driver appeared to you DURING the driving assessment. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe how they appeared to you.

	Not at all	Somewhat	Moderately	Very Much
I feel calm	1	2	3	4
I am tense	1	2	3	4
I feel upset	1	2	3	4
I am relaxed	1	2	3	4
I feel content	1	2	3	4
I am worried	1	2	3	4

4. Do you think that anxiety affected their driving performance?

1 Yes
2 No

If yes, in what way do you think anxiety affected their driving performance?

____

____

____

APPENDIX G-4

Follow-up driving questionnaire for pre- and post-anxiety ratings.

FEAR OF DRIVING STUDY

Within a month after your driving assessment, we would like you to complete the same route you took for the assessment using the map provided. Please try and do this at the same time of day as you did the driving assessment, and preferably by yourself. We would like you to again rate how you feel both prior to and after the drive using the scales below. Please remember that all the information you provide is strictly confidential. Thank you for your help.

Rate the following items *5 minutes* before your drive:

Please read the statements below and indicate how you feel right now, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately	Very Much
I feel calm	1	2	3	4
I am tense	1	2	3	4
I feel upset	1	2	3	4
I am relaxed	1	2	3	4
I feel content	1	2	3	4
I am worried	1	2	3	4

Rate the following items *immediately after* your drive:

Please read the statements below and indicate how you feel right now, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately	Very Much
I feel calm	1	2	3	4
I am tense	1	2	3	4
I feel upset	1	2	3	4
I am relaxed	1	2	3	4
I feel content	1	2	3	4
I am worried	1	2	3	4

APPENDIX H-1

Letter to participants for Part One of Study Two.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

School of Psychology
Massey University

April/May 2000

Dear Participant

Thank you for your interest in our study on driving fears. We appreciate you volunteering your time to help us with the study, and recognise that your contribution is valuable.

Following our recent telephone contact, we have enclosed an Information Sheet for you to read and keep for your own records. Also included is the questionnaire, should you decide to take part. Whether or not you decide to take part, we would appreciate it if you could return the questionnaire in the freepost, return-addressed envelope enclosed.

Thank you once again for your interest in the study.

Yours sincerely

J Podd.

Joanne Taylor Dr John Podd

APPENDIX H-2

Information Sheet for Part One of Study Two.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

Fear of Driving Study

Information Sheet

This research is being conducted by Joanne Taylor as part of her doctoral work at Massey University under the supervision of Dr John Podd. If you would like to talk to Joanne Taylor or John Podd, they can both be contacted through the School of Psychology, Massey University on (06) 356-9099.

This study is about the thoughts and feelings people have in relation to their driving fear. Our aim is to find out more about driving fears so that we can make recommendations for assessment and treatment. There are two parts to this study. Taking part in this study today involves filling out a questionnaire that asks about driving fear, associated thoughts and feelings, and aspects of driving in general. This is a very valuable part of the study, and we estimate that it will take you about half an hour to complete.

Once you return your completed questionnaire, you may be contacted in the future and invited to take part in the second part of this study. This will involve meeting with Joanne to go through an interview. This interview is a little different from usual, however, because the questions will be asked by a computer programme. If you are not familiar with computers, don't worry because Joanne will explain everything and set up the computer for you. The computer will take you through a short practice session so you can familiarise yourself with how to use it. It will then ask you a series of questions. You can type in your answer to a question on the keyboard at your own pace. Joanne will be available to answer any questions or fix any technical problems that might arise.

This part of the study also involves a practical driving check with a senior driving instructor. It is very important to remember that <u>none</u> of the information we obtain from you (including the driving check) will be used to affect your driving licence. The driving instructor will also have signed a confidentiality agreement, which means that the information collected during the driving check will be treated with the strictest confidence, and the instructor agrees not to discuss this information with anyone outside of the research team.

Taking part in the research today does not mean that you are under any obligation to take part in future research. The questionnaire that you complete today will be collected by the researcher and coded in such a way that other people will not be able to tell who was assessed. All questionnaires will be stored securely or destroyed at the end of the project.

If you do take part in the research, you have the right to stop at any time and you do not have to answer any questions that you do not want to. Also you can ask the researcher any questions about the study. If you would like a summary of the results of the research, these can be sent to you at the end of the study. The research findings will be presented at conferences and published in professional journals so that other psychologists can learn from our findings. Again, the results will be presented as a summary and no information that could identify any individual will be presented.

Thank you for your interest in the study.

Joanne Taylor John Podd (PhD)

APPENDIX H-3

Letter to participants for Part Two of Study Two.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

School of Psychology
Massey University

September/October 1999

Dear Participant

Thank you for your interest in our study on driving fears and for completing and returning the questionnaire. We appreciate you volunteering your time to help us with the study, and recognise that your contribution is valuable.

You have been selected to participate in the second and final part of the study. We would like to invite you to take part, although you are under no obligation to do so. We have enclosed an Information Sheet for you to read and keep for your own records. There is also a Consent Form which you should use to indicate whether or not you wish to take part. Once you have done this, please return the consent form in the freepost, return-addressed envelope enclosed.

If you decide to take part, we will contact you as soon as possible to make the appropriate arrangements. If you decide not to take part, thank you for completing the questionnaire. We will send you a summary of the results if you have requested one.

Thank you once again for your interest in the study.

Yours sincerely

Joanne Taylor　　　　Dr John Podd

APPENDIX H-4

Information Sheet for Part Two of Study Two.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

Fear of Driving Study

Information Sheet

This research is being conducted by Joanne Taylor as part of her doctoral work at Massey University, under the supervision of Dr John Podd. If you would like to talk to Joanne Taylor or John Podd, they can both be contacted through the School of Psychology, Massey University on (06) 356-9099.

This study is about the thoughts and feelings people have in relation to their driving fear. It is the second part of the study that you participated in recently. The purpose of this study is to find out more about driving fears so that we can make recommendations for assessment and treatment. This part of the study involves an interview and a practical driving assessment.

The interview is a little different from usual, however, because the questions will be asked by a computer programme. Joanne will set up the computer for you and then the computer will ask you a series of questions. You can type in your answer to a question on the keyboard at your own pace. Joanne will be available to answer any questions or fix any technical problems that might arise.

This part of the study also involves a practical driving check with a senior driving instructor. It is very important to remember that <u>none</u> of the information we obtain from you (including the driving check) will be used to affect your driving licence. It is for research purposes only. The driving instructor will be experienced, professional, and licenced. You can also choose to stop the driving check at any time. The driving instructor will have signed a confidentiality agreement, which means that the information collected during the driving check will be treated with the strictest confidence, and the instructor agrees not to discuss this information with anyone outside of the research team. In total, this part of the study is estimated to take two hours. All records will be stored securely or destroyed at the end of the project.

The fact that you completed the first part of the research involving just the questionnaire does not mean that you have to participate again. If you do take part in the research, you have the right to stop at any time and you do not have to answer any questions that you do not want to. Also you can ask the researcher any questions about the study at any time.

The research findings will be presented at conferences and published in professional journals so that other psychologists can learn from our findings. Again, the results will be presented as a summary and no information that could identify any individual will be presented.

Please read and respond to the attached Consent Form.

Thank you for your interest in the study.

Joanne Taylor John Podd (PhD)

APPENDIX H-5

Consent Form for Study Two.

Fear of Driving Study

Consent Form

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand I have the right to withdraw from the study at any time and to decline to answer any particular questions.

I agree to provide information to the researcher on the understanding that my name will not be used without my permission.
(The information will be used only for this research and publications arising from this research project.)

I understand that complete confidentiality is assured.

I understand that none of the information collected can be used to affect my driving licence, and I understand that the material will only be used for the purposes of this research and statistical analyses. I give my consent on the understanding that the information I provide will remain confidential to the researcher, and that I may withdraw the consent at any time and have the material destroyed.

I agree/do not agree to participate in the interview. (Please circle one response)

I agree/do not agree to participate in the driving check. (Please circle one response)

(If you have agreed to participate in the driving check:)
I do/do not have access to an insured automobile for the driving check. (Please circle one response)

Signed: ....

Name: ....

Date: ....

Contact address: ....

....

....

Contact telephone number: ....

Witness: ....

APPENDIX H-6

Letter of confirmation of appointment for Part Two of Study Two.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

School of Psychology
Massey University
Phone: (06) 350 5799 extension 2080

April/May 2000

Dear Participant

Thank you for volunteering for the second part of our study on driving fears. As we discussed in our recent telephone contact, your appointment for the second part of the study is on:

____

A map is enclosed showing you where to park when you arrive for your appointment, but please contact me on the above phone number if this is not clear. I will meet you at the carpark and give you a parking pass for during your appointment time.

I look forward to meeting you.

Yours sincerely

Joanne Taylor
Researcher

APPENDIX I-1

Letter of authorisation for the researcher to administer the CIDI-Auto 2.1.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

November - December 1999

TO THE PARTICIPANT

Site Licensee : Associate Professor Kevin Ronan

Licence Number : C21 AUS 0122

The site licensee gives **Joanne Taylor** the authorisation to administer the **CIDI-Auto 2.1 Interview.**

Signed: Kevin Ronan

Date: 8-11-99

APPENDIX I-2

Confidentiality agreements with the driving instructors.

Confidentiality Agreement

Driving Phobia: Typology and the Role of Driving Skills

Principal Investigators: Joanne Taylor, John Podd, and Frank Deane

Maintaining confidentiality and privacy for people taking part in this study is a high priority. Participants have been assured that everything they discuss or disclose will be treated with the strictest confidence. It is vital that you do not discuss this confidential information with anyone outside of the research team.

To aid confidentiality, all participants will be assigned a code number and all written material such as questionnaires or reports relating to that participant will be marked with a code number rather than the person's name. The list of participants' names will be kept safely by the principal investigators.

It is important for you to store all written information securely before handing this over to the principal investigators.

I have read the Confidentiality Form and have had an opportunity to have my questions regarding this policy answered by either Joanne Taylor or John Podd. I agree to maintain the confidentiality of people taking part in this study.

Signed: W D Young

Name: Wayne young

Witness: J Podd

Date: 31/10/99

Confidentiality Agreement

Driving Phobia: Typology and the Role of Driving Skills

Principal Investigators: Joanne Taylor, John Podd, and Frank Deane

Maintaining confidentiality and privacy for people taking part in this study is a high priority. Participants have been assured that everything they discuss or disclose will be treated with the strictest confidence. It is vital that you do not discuss this confidential information with anyone outside of the research team.

To aid confidentiality, all participants will be assigned a code number and all written material such as questionnaires or reports relating to that participant will be marked with a code number rather than the person's name. The list of participants' names will be kept safely by the principal investigators.

It is important for you to store all written information securely before handing this over to the principal investigators.

I have read the Confidentiality Form and have had an opportunity to have my questions regarding this policy answered by either Joanne Taylor or John Podd. I agree to maintain the confidentiality of people taking part in this study.

Signed: ....

Name: MICHAEL R YOUNG

Witness: ....

Date: 31/10/99

APPENDIX I-3

Driving assessment feedback sheet.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

DRIVING ASSESSMENT FEEDBACK SHEET

Date: ______________________

Instructor: ______________________

Thank you for participating in the second part of the study. This sheet contains some brief feedback about your driving assessment and is intended for your information only.

Things I did well: ______________________

Things I had difficulty with: ______________________

We appreciate the time and effort you have taken to be a part of the study, and hope that it has been useful for you. We will send you a summary of the results if you have requested one, when they become available.

Guidelines for coding self-reported DRF responses.

CODING SELF-REPORTED DRIVING-RELATED FEAR

Participants were asked to describe in their own words what it is about driving that they fear the most. This was an open-ended question.

1. Most participants provided a single response. This meant that the response to be coded was clear. Refer to the categories for coding on the following page.

2. The remaining participants described or listed two or more fears, which necessitated the establishment of some decision criteria regarding which response was to be coded. These decision criteria are as follows:

a. If the participant mentioned "panic" in any context, code into the Panic Attack/ Anxiety Symptoms category.

b. If the participant mentioned "motor vehicle accident", "accident", "crash", "collision", or "injury" in any context, code into the MVA/Injury category. Also include in this category any responses that mention harming or killing oneself or others, other drivers causing accidents or injury, or potential fatality.

c. If the participant provided a list of fears but somewhere in that list clearly pinpointed the most-feared situation, code the most-feared situation.

d. If there is nothing else in the response that differentiates emphasis, code the first response provided. This assumes that participants generally provide the most-feared situation first.

e. Participants may have described a specific feared situation, followed by their understanding of the underlying reason for that fear (e.g., making a right hand turn at a particular intersection because of having a previous accident there, feeling anxious on the open road because of feeling pressured by other traffic). In these cases, the underlying reason explains the feared situation, and should be coded, rather than the specific situation itself.

f. Participants may have also described a set of feared events or circumstances which could lead to a motor vehicle accident, such as losing control of the vehicle or not being able to control the vehicle. These cases should be coded under the MVA/Injury category.

Categories for coding:

Category	**Definition**
1. Panic Attack/Anxiety Symptoms	Fear related to having a panic attack or intense anxiety symptoms while driving. Participants must make specific reference to "panic" in some context, and the panic may be in relation to any driving situation. Code into this category any response where "panic" is mentioned.
2. MVA/Injury	Fear related to ultimately having a motor vehicle accident (MVA). Participants may describe concern about causing injury to self or others or being in an accident caused by other people. Participants may also describe a set of events or situations that could lead to an accident, such as losing control of the vehicle. Code into this category any response where "MVA", "accident", "crash", "collision", or "injury" is mentioned.
3. Social Concerns	Fear related to worries about the reactions of other drivers. This includes concern about the negative reactions of others to one's driving (i.e., fear of negative evaluation and criticism), as well as feeling under pressure from or impeding other drivers. Participants may also describe a sense of performance anxiety or lack of self-confidence related to driving. Any responses related to other drivers should be coded here.
4. Specific Driving Situations/ Conditions/Manoeuvres	Fear related to specific situations, conditions, or manoeuvres, such as driving at speed, at night, in unfamiliar areas, over bridges, through tunnels, on steep roads, on open roads, merging, and changing lanes.
5. Other	Feared situations that cannot be coded into the above categories.

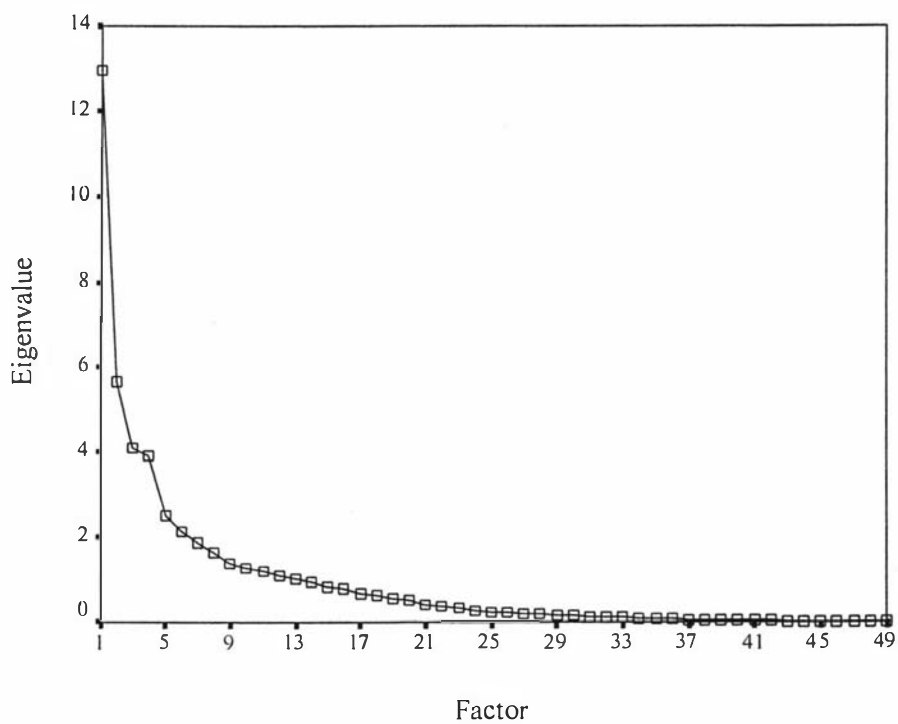
APPENDIX J-2

Results for the factor analysis of the DCQ.

Results for the extraction of component factors.

Factor	Eigenvalue	Percent of variance	Cumulative percent of variance
1	12.973	26.5	26.5
2	5.677	11.6	38.1
3	4.101	8.4	46.4
4	3.904	8.0	54.4
5	2.493	5.1	59.5
6	2.141	4.4	63.9
7	1.858	3.8	67.7
8	1.629	3.3	71.0
9	1.378	2.8	73.8
10	1.260	2.6	76.4
11	1.204	2.5	78.8
12	1.077	2.2	81.0
13	1.023	2.1	83.1

Scree test for factor analysis.



APPENDIX J-3

Illustration of the importance of the standardisation of variable values in cluster analysis.

Based on an example provided in SPSS (1999):

Variables with large values contribute more to the calculations of distance measures in cluster analysis than those with small values, as the following example shows. This problem can be avoided by re-expressing all variables on the same scale by standardisation.

For example, consider the following data extracted from the raw data file for two participants, on the variables 0-10 *DRF rating* and total *ADA errors*:

	Original Units		**Standardised Units**	
Case #	**DRF rating**	**ADA errors**	**DRF rating**	**ADA errors**
#20	8	44	1.09	0.62
#36	6	38	0.54	0.18

The squared Euclidean distance between these two participants in original units is

$$2^2 + 6^2 = 4 + 36 = 40$$

and, in standardised units, is

$$0.55^2 + 0.44^2 = 0.30 + 0.19 = 0.49$$

In the original units, *ADA errors*, with its larger values, comprises 90% (36/40) of the distance measure; while in standardised units, it accounts for 38.78% (0.19/0.49).

APPENDIX J-4

Agglomeration schedule for the hierarchical cluster analysis in Study Two.

The agglomeration schedule shows which cases or clusters are combined at each step. First, case 8 is joined with case 13, as the distance between this pair is smaller than that for any other pair. The distance is shown in the column labelled *Coefficients*. Cases continue to be joined in this way, until clusters start to be joined. For example, at stage 6, case 29 joins the pairing of cases 31 and 35 which took place at stage 5.

SPSS uses the number of the first case in a cluster to assign a number to the cluster, so the first cluster is cluster 8 and the second with 3 cases is cluster 29 (stage 6). In reading the two columns labelled *Cluster 2* on the *Stage 6* line, *31* is listed as the *Cluster Combined* and *5* is listed as the stage where cluster 31 first appears. The *Next Stage* column indicates the next stage (16) where are case or cluster is joined with what is now cluster 29. The *Next Stage* column indicates that cluster 29 is not increased in size until stage 16, followed by stage 31.

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	8	13	.000	0	0	15
2	23	46	.282	0	0	14
3	18	44	.712	0	0	8
4	21	36	1.263	0	0	11
5	31	35	1.844	0	0	6
6	29	31	2.657	0	5	16
7	38	45	3.570	0	0	23
8	18	27	4.484	3	0	31
9	34	40	5.401	0	0	16
10	17	20	6.388	0	0	23
11	21	22	7.745	4	0	27
12	47	49	9.171	0	0	17
13	11	48	10.870	0	0	28
14	23	50	12.602	2	0	19
15	5	8	14.513	0	1	22
16	29	34	16.651	6	9	31
17	6	47	18.832	0	12	47
18	1	37	21.124	0	0	32
19	10	23	23.445	0	14	34
20	24	33	25.789	0	0	30
21	32	39	28.170	0	0	27
22	5	19	30.652	15	0	45
23	17	38	33.523	10	7	25
24	14	25	36.605	0	0	38
25	17	28	39.828	23	0	40
26	3	15	43.081	0	0	35
27	21	32	46.437	11	21	37
28	11	42	50.510	13	0	38
29	9	26	54.738	0	0	42
30	16	24	59.143	0	20	36
31	18	29	63.558	8	16	43
32	1	30	68.010	18	0	44
33	4	12	72.870	0	0	39
34	7	10	78.019	0	19	40
35	3	41	83.980	26	0	37
36	16	43	90.323	30	0	44
37	3	21	97.518	35	27	41
38	11	14	106.277	28	24	45
39	2	4	115.627	0	33	42
40	7	17	125.408	34	25	41
41	3	7	138.121	37	40	43
42	2	9	151.461	39	29	46
43	3	18	165.468	41	31	49
44	1	16	180.755	32	36	46
45	5	11	196.188	22	38	47
46	1	2	221.056	44	42	48
47	5	6	249.561	45	17	48
48	1	5	297.826	46	47	49
49	1	3	392.000	48	43	0

APPENDIX J-5

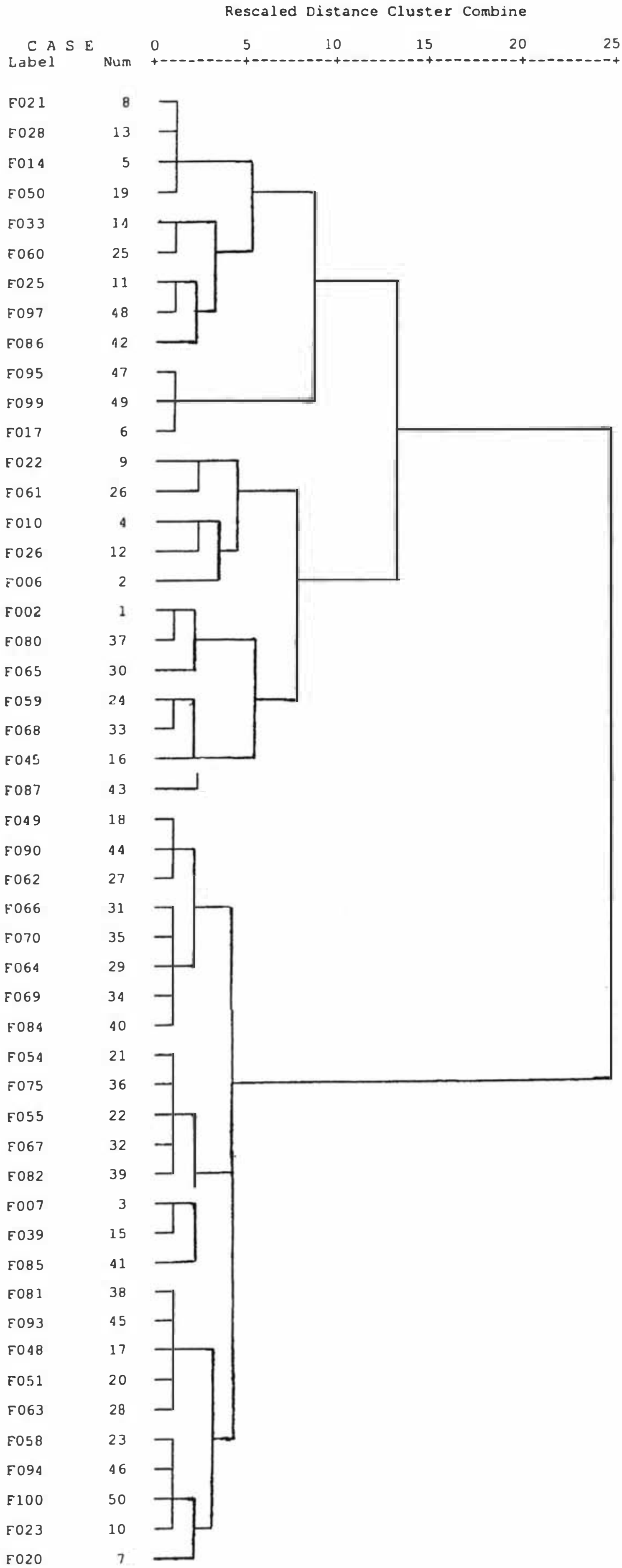
Vertical icicle plot for the hierarchical cluster analysis in Study Two.

The vertical icicle plot summarises the steps in forming clusters (Hair et al., 1998). Each black line represents a case, which are separated by the white lines. The number of clusters is specified across the top of the plot. If a ruler is placed vertically just under each step, the cases joining into clusters can be seen, progressing from 1 case as a cluster through to all 50 cases joined together. The 3-cluster solution can be seen by placing a ruler just under the step marked *3*.

APPENDIX J-6

Dendrogram for the hierarchical cluster analysis In Study Two.

The dendrogram gives a good visual picture of the cluster agglomeration and the formation of clusters. However, the distances along the top of this display are scaled differently from the coefficients in the cluster agglomeration, and are rescaled to numbers between 0 and 25. The dendrogram indicates how the clusters are formed and provides a visual measure of the linkage distance for clustering (Hair et al., 1998). No outliers can be seen in the dendrogram. The 3-cluster solution can be seen by placing a vertical line at a distance of 10.


Rescaled Distance Cluster Combine
C A S E
Label Num
0 5 10 15 20 25
F021 8
F028 13
F014 5
F050 19
F033 14
F060 25
F025 11
F097 48
F086 42
F095 47
F099 49
F017 6
F022 9
F061 26
F010 4
F026 12
F006 2
F002 1
F080 37
F065 30
F059 24
F068 33
F045 16
F087 43
F049 18
F090 44
F062 27
F066 31
F070 35
F064 29
F069 34
F084 40
F054 21
F075 36
F055 22
F067 32
F082 39
F007 3
F039 15
F085 41
F081 38
F093 45
F048 17
F051 20
F063 28
F058 23
F094 46
F100 50
F023 10
F020 7