THE ACQUISITION AND SEVERITY OF DRIVING-RELATED FEARS

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ABSTRACT

Rachman's theory of fear acquisition proposed that directly-conditioned fears would differ from indirectly-conditioned fears in magnitude and anxiety response patterns, however this theory has received inconsistent empirical support. The aim of the present study was to examine pathways of fear acquisition for a general community sample who reported driving-related fears. One hundred and ninety subjects completed a questionnaire which comprised three anxiety scales, a comprehensive set of fear onset items, a driving situations scale, and two scales related to experiences of and reactions to motor vehicle accidents, all used in prior research. Additional questionnaire items addressed self-reported driving-related fears, helpseeking behaviour, treatment needs of respondents not already in therapy, and driving history. Subjects completed the questionnaire for their most-feared driving-related situation. Results failed to support Rachman's predictions. However, results supported the prediction that respondents who had been involved in a motor vehicle accident (MVA) would be more likely to ascribe to the direct pathway than those who had not been involved in a motor vehicle accident. Post-hoc analyses comparing respondents who had and had not been involved in MVAs were conducted as a means of expanding the ability of the study to test the hypotheses. These analyses also failed to support the predictions derived from Rachman's theory. The theoretical and methodological implications of the findings are discussed, as are the implications of the results for professional psychological helpseeking following motor vehicle accidents and assessment of those with driving-related fears.

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"We shall not cease from exploration
and the end of all our exploring will be
to arrive where we started
and know the place for the first time."
(T.S. Eliot)

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INTRODUCTION

This introductory chapter aims to provide the relevant background to the development of the present study in two main parts. Firstly, an overview of the concept of fear and theories of its etiology are provided, followed by an explication of the particular theory under study in the present thesis and literature relevant to this theory. Secondly, a rationale for the study of driving-related fears is provided and research in this area is critically reviewed.

HISTORICAL CONCEPTUALISATIONS OF FEAR AND ANXIETY

Fear and anxiety as concepts in psychology have stimulated an immense amount of thought and research which continues today. Clinicians, theorists, and researchers from diverse frameworks and orientations have remained interested in the notions of fear and anxiety. It is clear from the literature, however, that definitional inconsistencies have surrounded these two concepts, and that considerable ambiguity and debate continues to characterise their use in both theory and research (Bamber, 1979; Barlow, 1988).

The Concept of Anxiety

The term *anxiety* originates from the Latin word *anxius*, meaning a condition of agitation and distress, and has been used since the 1500s (Beck, Emery, & Greenberg, 1985; Bourne, 1990). Anxiety is an emotional state which may be unpleasant and tends to be future-oriented (Lewis, 1980). Anxiety may be normal or pathological, mild or severe, episodic or chronic, and detrimental or beneficial to action and thought (Lewis, 1980). Anxiety affects individuals in a number of ways, and involves physiological, behavioural, and cognitive components (Bourne, 1990; Levitt, 1980). Distinctions within the concept of anxiety have also been made, and researchers have delineated and investigated state and trait anxiety, or anxiety as a relatively permanent, ephemeral characteristic and as a momentary condition, respectively (Levitt, 1980; Spielberger, 1985; Spielberger & Krasner, 1988; Weissman, 1985). Originally proposed by Cattell and Scheier (1961), this typology of anxiety brought about a fundamental change in the orientation towards and investigation of anxiety. The distinction between state and trait anxiety is now accepted as a basic empirical consideration (Levitt, 1980).

The Concept of Fear

The word *fear* comes from the Old English word *faer*, meaning "sudden calamity or danger," and tends to be seen currently as a normal response to an entirely realistic threat or danger (Rheingold, 1974; Rowan & Eayrs, 1987). The distinctions between anxiety and fear have been espoused by numerous authors, although definitions are diverse from writer to writer (Lewis, 1980). Nevertheless, the two concepts may be distinguished in a variety of ways. Anxiety can be differentiated from fear in that the latter tends to be directed towards some concrete, external situation or object where the feared event is possible, while the former is usually a more internally-focused response to a vague, distant, or unacknowledged danger (Bourne, 1990; May, 1950; Wolman, 1994). Attempts to discern the concepts of fear and anxiety 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 behaviours associated with fear and anxiety differ from each other cognitively, physiologically, or behaviourally (Costello, 1982; Nietzel, Bernstein, & Russell, 1988). Therefore, conceptual distinctions between anxiety and fear are ambiguous, and the two terms are used interchangeably in the literature (Edelmann, 1992; Rowan & Eayrs, 1987; Wolman & Stricker, 1994). This latter usage is the one employed in the present study.

The Concept of Phobias

While fear may cause anxiety and result in some minor limitation in the course of everyday life, a phobia is distinct in that it involves marked interference with daily activity (Agras, 1985; Bourne, 1990). In essence, the difference between fears and phobias is one of degree (Emmelkamp, 1982). A phobia can be defined as a specific kind of fear which 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).

AN OVERVIEW OF THE ANXIETY DISORDERS

Anxiety is an unavoidable aspect of human life and there are many situations that arise in everyday activity in which some degree of anxiety is an appropriate and rational reaction. Indeed, a *lack* of anxiety in response to daily problems and challenges involving failure or loss may be suggestive of other difficulties (Bourne, 1990). With this in mind, then, anxiety disorders can be differentiated from normal anxiety in that disorders consist of anxiety which is more intense, lasts longer, or leads to problems which interfere with everyday life (Bourne, 1990). In order to make this more explicit, the American Psychiatric Association (APA, 1987, 1994) have established specific criteria for diagnosing anxiety disorders, and these form part of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV). The literature on driving-related fears and phobias is replete with diagnostic difficulties and issues of overlap with other anxiety disorders. For this reason, a brief overview of the anxiety disorders will be presented.

Panic Disorder and Agoraphobia

The central feature of *panic disorder* is the spontaneous, unexpected occurrence of panic attacks (Eaton, Dryman, & Weissman, 1991; Taylor & Arnow, 1988). Panic attacks tend to be short-lived episodes of intense apprehension, fear, or terror in which the individual experiences somatic symptoms such as palpitations, sweating, trembling, nausea, and chest pain. Other criteria which may be involved in diagnosis are derealisation, fear of losing control or going crazy, fear of dying, and paresthesias. Initially, panic attacks are spontaneous, although they may become associated with specific situations, people, or places over time (Taylor & Arnow, 1988). The disorder is diagnosed as *panic disorder with agoraphobia* if it meets panic disorder criteria and also involves a fear of being in places or situations from which escape may be difficult or embarrassing, or in which assistance might be unavailable in the event of a panic attack (Kaplan et al., 1994). As a result of this fear, functioning outside of the home may be significantly interfered with. In addition, *panic disorder without agoraphobia* and *agoraphobia without history of panic disorder* may be diagnosed.

Obsessive-Compulsive Disorder

Obsessive-compulsive disorder (OCD) is characterised by recurrent obsessions or compulsions of sufficient severity to cause marked distress, to be time-consuming, or to interfere with daily functioning (Kaplan et al., 1994). Obsessions are recurrent and persistent thoughts, impulses, or images, while compulsions are repetitive behaviours or mental acts (Kaplan et al., 1994). Such obsessions and compulsions are recognised as excessive and unreasonable, although the disorder can be diagnosed *with poor insight*, if such an awareness is not evident. Common obsessions concern the fear of contamination, doubting, death, physical violence, socially unacceptable behaviour, religion, sex, and orderliness (Salkovskis & Kirk, 1989). Frequently-reported compulsions include checking and cleaning.

Post-Traumatic Stress Disorder

The essential feature of *post-traumatic stress disorder* (PTSD) is the development of certain symptoms following a psychologically distressing traumatic event which is outside the range of typical human experience (Taylor & Arnow, 1988). The symptoms of concern are reexperiencing the traumatic event, through recurrent and intrusive distressing recollections, dreams, or feelings related to the event; persistent avoidance of stimuli associated with the traumatic event and numbing of responsiveness as a result of the trauma; and persistent autonomic, dysphoric, or cognitive symptoms (Kaplan et al., 1994; Taylor & Arnow, 1988). The most common traumatic stressors include serious threat to one's life, physical well-being, significant others, or property.

Generalised Anxiety Disorder

Generalised anxiety disorder (GAD) is characterised by generalised and persistent anxiety and worry about a number of life circumstances. Such anxiety and worry is associated with muscle tension, restlessness, vigilance, autonomic hyperactivity, and apprehensive expectation, and causes significant distress or impairment in important areas of functioning (Kaplan et al., 1994).

Social Phobia

The notable characteristic of *social phobia* is a persistent, irrational fear of, and a compelling desire to, avoid one or more social or performance situations in which the individual is exposed to scrutiny by others (Kaplan et al., 1994; Taylor & Arnow, 1988). The individual's fears focus on the idea that they may behave in a humiliating or embarrassing manner. Significant anticipatory anxiety is evident if the individual is faced with the necessity of entering into such a situation, and therefore the feared situations are avoided or endured with marked anxiety or distress (Kaplan et al., 1994; Taylor & Arnow, 1988). The individual recognises the fear as excessive or unreasonable, and examples of social phobias include fears of public speaking, using public lavatories, and writing in the presence of others.

Specific Phobia

Previously called *simple phobia*, the essential feature of *specific phobia* is a persistent, irrational fear of and a compelling desire to avoid an object or situation other than fears consistent with panic disorder, agoraphobia, and social phobia (Eaton et al., 1991; Judd & Burrows, 1988; Taylor & Arnow, 1988). The individual often experiences an immediate anxiety response when exposed to the feared stimulus, and this reaction may resemble a situationally predisposed panic attack (Kaplan et al., 1994). The fear is recognised as unreasonable and excessive, and diagnostically may be specified as *animal*, *natural environment*, *blood/injection/injury*, *situational*, or *other type*. Examples of specific phobias include fears of enclosed spaces, storms, animals, heights, illness, death, and driving (Taylor & Arnow, 1988).

THEORIES OF THE ETIOLOGY OF FEAR

The origin of fears and phobias is a topic of considerable interest to researchers and theorists who have endeavoured to understand the etiology of fear from a variety of perspectives. Research has examined biological factors such as high arousal levels, genetic factors, neurotransmitter systems, and physiological variables (Emmelkamp,

Bouman, & Scholing, 1992; Judd & Burrows, 1988; Lindemann, 1994; Taylor & Arnow, 1988). Psychodynamic theories of the origin of fear have been revised and reformulated in past years, and view phobias as symbolic or symptomatic of unconscious conflict, thereby involving the defense mechanisms of *suppression* and *displacement* (Emmelkamp et al., 1992; Lindemann, 1994). Cognitive models of the origin of fears focus on understanding the catastrophic cognitions and irrational beliefs manifested with phobias (Emmelkamp et al., 1992; Lindemann, 1994). Some researchers have concluded that the etiology of fears and phobias (and anxiety in general) is multifactorially influenced (Cloninger, 1988). Other writers have founded their ideas on experimental psychology and the individual's learning history, and behavioural theories of the etiology of fears have received considerable attention.

BEHAVIOURAL THEORIES OF THE CAUSATION OF FEAR

The Classical Conditioning Account

Classical conditioning accounts of fear have been particularly influential in the theoretical and research literature on fear acquisition. Watson (1924) differentiated between innate and conditioned stimuli as two main sources of fear. Innate, or natural, stimuli included sudden pain or loud noises which automatically elicited a human fear-response. Conditioned stimuli, then, included all other fear-producing stimuli, and fear was conceptualised as a result of either classical or operant conditioning processes. Classical conditioning occurred when a neutral stimulus was paired with another (aversive) stimulus, thereby requiring the individual to learn a relationship between two stimuli (Catania, 1984; Merckelbach, de Jong, Muris, & van den Hout, 1996). Operant conditioning, on the other hand, depended on the individual learning a relationship between a response and a consequence. Therefore, conditioning theories approached the etiology of fear as an acquired, conditioned response (CR) which was elicited by a conditioned stimulus (CS) and led to consequential avoidance or escape behaviour.

However, it was not until Mowrer's (1939) 'two-stage' theory that respondent conditioning was recognised as an important factor in the genesis and maintenance of

fears and phobias (Menzies & Clarke, 1995). Essentially, this theory attempted to account for the persistent avoidance behaviour of phobic individuals and proposed that fear acquisition was achieved through two events. Firstly, a fear response is learned (or classically-conditioned) to an initially neutral stimulus. Secondly, the individual learns that such fear responses can be reduced or eliminated by avoiding the feared stimulus (Emmelkamp & Scholing, 1994; May, 1950; Merckelbach et al., 1996; Morris & Kratochwill, 1983; Rowan & Eayrs, 1987). According to Rachman (1991), evidence for the classical conditioning account comes from research on the induction of fear in animals, the development of anxiety states in combat soldiers, experiments on fear induction in a small number of children, clinical observations, findings from the use of aversion therapy, and some experiments on the effects of traumatic stimulation.

Nevertheless, it has been argued that the theory does not adequately account for fear acquisition in all its observed forms, and numerous lines of argument have been formulated against the theory. Firstly, the conditioning approach fails to explain the reasons for the non-random distribution of specific fears (Judd & Burrows, 1988; Merckelbach et al., 1996). It is clear from clinical findings that certain fears are extremely common while others are exceedingly rare, despite the proposition in theory that situations and objects should be equally likely to provoke fear (Menzies & Clarke, 1995; Rachman, 1991). In addition, individuals fail to acquire fears in situations which are regarded as theoretically fear-evoking, such as air-raids (Rachman, 1977; 1985; 1991). Secondly, individuals who have had aversive experiences do not always develop fears as a result of such encounters (Merckelbach et al., 1996). Thirdly, fearful individuals are not always able to trace the origin of their fears to direct conditioning experiences, either because they do not attribute the onset of their fear to this pathway or they may not remember the onset of their fear (McNally & Steketee, 1985; Rachman, 1991). Fourthly, avoidance behaviour may not be a manifestation of fearful behaviour, and clinical findings have reported that some individuals do not escape or avoid feared stimuli despite being fearful (Öst, 1991). Other attacks on the conditioning model include the apparently inextinguishable nature of phobic reactions under conventional procedures which reliably extinguish classically conditioned fear in the laboratory (Menzies & Clarke, 1995; Rachman, 1991; Wolpe, 1981).

The Preparedness Account

The preparedness hypothesis posits that phobic fear is produced by the interaction of aversive conditioning and evolutionary processes (Merckelbach et al., 1996). The theory attempts to explain why fears and phobias are overrepresented with certain stimuli (e.g., snakes and spiders) than others, and laboratory studies have found evidence to support the preparedness hypothesis (Davey, 1995; Mineka, 1985). However, the theory has also received criticism based on difficulties in ascertaining the evolutionary relevance of certain stimuli and failures to replicate supportive research (Emmelkamp & Scholing, 1994; Kanfer, 1985; Menzies & Clarke, 1995).

The Neoconditioning Perspective

The neoconditioning account is another more cognitively-oriented revision of the classical conditioning model, and posits that fear conditioning is often a cognitive process whereby an individual learns that a CS predicts an aversive unconditioned stimulus (UCS), or S-S learning (Rachman, 1991). This notion deals with many of the objections to the classical conditioning model, such as conditioned responses due to stimuli separated in time, inability to trace fear onset to certain conditioning events, and failures to acquire fear despite contiguous associations (Merckelbach et al., 1996). The neoconditioning account emphasises the phenomenon of 'latent inhibition', in which prior nonaversive experiences with the CS inhibit fear conditioning. It has been suggested that this concept explains why traumatic experiences may fail to produce phobic reactions (Merckelbach et al., 1996). Another potentially useful concept in reformulating the conditioning model is UCS inflation, which refers to the situation where a weak conditioned fear response results from pairings of a low-intensity UCS and a CS. Subsequently, the fear response grows in strength if the individual learns that the UCS is more aversive than suggested by prior experience- hence, UCS inflation (Merckelbach et al., 1996). The following case example from White and Davey (1989) shows how UCS inflation can explain situations where conditioned fear is acquired without a significant traumatic episode:

> An individual may witness an unknown person die of a heart attack on a bus or a train. On future occasions, riding on public transport may evoke memories of this incident but no anxiety...Subsequently, however, that individual may be present when a close friend or relative dies of a heart attack, thus inflating the aversive properties of heart attacks. This may then give rise to acute anxiety when riding on public transport. In this particular scenario, public transport has never been directly associated with anxiety-eliciting trauma, but the public transport phobia results from a prior learned association between public transport and heart attacks, and subsequent independent inflation of heart attacks as aversive events (p. 165).

In addition, new information about fear, such as the summation of fear and the overprediction of fear, is consistent with this perspective (Taylor, 1994; 1995; Taylor & Rachman, 1994a; 1994b). Despite the arguments for neoconditioning concepts and their ability to deal with some omissions of the traditional conditioning model, the neoconditioning perspective remains in need of further research attention (Merckelbach et al., 1996).

The Nonassociative Perspective

More recently, there has been a resurgence of interest in the nonassociative view that certain fears can be acquired in the absence of any previous associative learning experience (Gray, 1991; Menzies & Clarke, 1995). Frequently cited examples of human fears that may be acquired nonassociatively are infants' separation anxiety and fear of strangers, the embracing reflex, and fear of heights. In these situations, even one-trial learning may be one trial too many (Bowlby, 1975). It is clear that the nonassociative model can account for many situations in which the traditional conditioning account is inadequate, although not all fears can be explained by this model (Menzies & Clarke, 1995). Nevertheless, the nonassociative perspective has important clinical implications for the notions that searching for traumatic events consistent with the conditioning model may be unnecessary, and that an insistence on associative-learning events in fear acquisition may be detrimental to theory, research, and clinical practice (Merckelbach et al., 1996).

The Three-Pathways Theory

Another theory which has received considerable research attention has been Stanley Rachman's (1976, 1977) three-pathways account. This theory developed as a result of the recognition that classical conditioning theories provided an incomplete account of human fear acquisition (Rachman, 1976). This approach also ignored less direct pathways to fear by emphasising direct contact experiences that cause fears (Withers & Deane, 1995). Rachman noted that fears can be acquired through conditioning as well as other processes, such as vicarious and verbal transmissions (Rachman, 1991). In essence, then, Rachman proposed that there were *three* major associative pathways to the acquisition of fear: (1), classical conditioning, or direct, experiences; (2), observational, or vicarious, experiences in which the individual observes others' fearful behaviour, and (3), instructional, or informational, experiences in which the individual is told that certain stimuli are dangerous and to be feared (Rachman, 1984, 1991). In addition to this three-pathways proposition, Rachman postulated that the pathway to fear is related to both the strength and symptomatology of that fear. In terms of the strength of fear, Rachman predicted that direct fear-conditioning would lead to severe fears, while indirect fear-conditioning (i.e., vicarious or instructional pathways) would lead to mild to moderate fears. Regarding the symptomatology of fear, Rachman (1976) predicted that the pathway of fear acquisition determined the relative intensities of the cognitive, behavioural, and physiological correlates of fear. Specifically, Rachman proposed that directly-conditioned fears would be characterised by more elevated physiological and behavioural symptoms than cognitive symptoms. Conversely, 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.

An Evaluation of the Three-Pathways Theory

The justification for Rachman's inclusion of indirect pathways to fear was based on research in which individuals attributed the onset of their fears and phobias to indirect experiences (Rachman, 1977). Supportive evidence for the vicarious or observational pathway to fear comes from both clinical reports and experimental studies. Studies have

demonstrated that children often share the fears of their parents, although this may also be due to the operation of other processes, such as informational transmission, genetic factors, or similar traumatic events (Emmelkamp & Scholing, 1994; Thyer, 1987). Mineka and colleagues have also provided evidence for the observational conditioning of fears (Cook & Mineka, 1989). Although the instructional pathway remains to be empirically validated, it seems to be a plausible pathway to fear. For example, it seems reasonable that verbal information regarding particular stimuli from significant others (such as parents) may result in fear of the stimuli (Rachman, 1991). A similar assumption operates in prevention programmes (Merckelbach et al., 1996). In addition, social psychological research indicates that individuals award more value to negative than to positive information (Merckelbach et al., 1996). Although Rachman's three-pathways theory accounts for a number of inadequacies in the traditional conditioning account of fear acquisition, the theory does not address the findings in the literature that people do not always develop fears as a result of direct experiences with frightening stimuli, and that fear intensity differs among individuals (Norris & Kaniasty, 1992; Rachman, 1976).

A REVIEW OF THE FEAR ACQUISITION LITERATURE

Many studies have examined fear onset experiences that are based on associative conditioning events, and much recent research has approached the study of fear acquisition in terms of testing Rachman's three-pathways theory. Such research has been conducted utilising clinical subjects (who have been either involved in or about to be involved in treatment for severe fears) and nonclinical subjects (who have not sought any intervention for their fears). A recent review conducted by Withers and Deane (1995) provides a comprehensive review of this research.

Clinical Research

A number of studies have been conducted using clinical samples (e.g., Hallam & Hafner, 1978; Himle, Crystal, Curtis, & Fluent, 1991; McNally & Steketee, 1985; Öst, 1985; Öst & Hugdahl, 1981, 1983; Torgersen, 1979). According to Withers and Deane

(1995), the direct pathway was endorsed in all fifteen clinical studies, the observational pathway in nine studies, and the instructional pathway in six studies. Furthermore, the direct pathway was ascribed by the highest percentage of subjects in eleven of the clinical studies. Some research supports the hypothesis that direct-conditioning leads to severe fears, although four clinical studies reported by Withers and Deane (1995) fail to support this proposition. In terms of the differential-anxiety-response hypothesis, clinical studies have provided meagre support (Withers and Deane, 1995).

Nonclinical Research

According to Withers and Deane (1995), the existing nonclinical studies provide very little support for the hypotheses that direct conditioning leads to severe fears, and indirect conditioning leads to mild to moderate fears (e.g., DiNardo, Guzy, & Bak, 1988; Ollendick & King, 1991; Rimm, Janda, Lancaster, Nahl, & Dittmar, 1977). In addition, the studies reviewed exhibited no clear pattern of pathway ascriptions. In the study by Withers and Deane (1995), an attempt was made to test Rachman's hypotheses using a nonclinical sample of 191 university students. The researchers used a questionnaire comprising three anxiety scales and three fear-onset questions used in previous research, a specifically-developed 36-item fear list, and two validity-check items. Subjects initially selected and rank-ordered ten fears from the fear list, and then responded to questionnaire items for the first- and tenth-ranked fear. Results failed to support three of Rachman's predictions: Differential-anxiety-response patterns were not evident for different intensities of fear, and significantly more subjects ascribed highly-feared and moderately-feared situations to the direct conditioning pathway. However, the hypothesis that direct conditioning ascriptions would be endorsed with greater certainty was supported, indicating that direct conditioning events may be more memorable than indirect conditioning events (Withers & Deane, 1995). Therefore, this study suggests that memories of onset events may be important. Furthermore, it may be that current methods of investigation in fear acquisition research are inadequate, and this is suggested by studies which have found that fearful individuals often report nonassociative pathways or more than one pathway to fear (Menzies & Clarke, 1993). Indeed, some research has also reported that individuals ascribing mixed pathways to fear, such as conditioning and vicarious experiences, have higher fear levels (Merckelbach et al., 1996).

Summary

It is evident from existing research that the fear acquisition literature which tests Rachman's predictions has produced inconsistent and variable findings. It has been suggested that the acquisition of nonclinical fears has not been adequately addressed, and that research needs to focus on more than one strength of fear to conduct a comprehensive examination of Rachman's predictions (Öst, 1991). Furthermore, researchers have suggested that future studies investigate fears which may be assumed to have particularly memorable onset events, such as trauma involved in motor vehicle accidents.

The present study attempts to address these recommendations by examining people who report a specific type of fear- that is, driving-related fears. It is evident from other research that motor vehicle accidents are a potential onset event for such fears. Therefore, a pertinent reason for the present study's focus on driving-related fears is the memorability of motor vehicle accidents as onset events and the benefits of this in addressing problems with memory in prior fear acquisition research. This chapter will now move to an analytical review of the literature on driving-related fears.

PSYCHOLOGICAL CONSEQUENCES FOLLOWING MOTOR VEHICLE ACCIDENTS

This section provides an overview of the research on psychological reactions to motor vehicle accidents, with a focus on posttraumatic reactions and fear reactions in particular. Initially, the contribution of traumatic events to psychological problems is outlined, followed by an overview of psychological reactions to motor vehicle accidents. A critical analytical review of the research on driving-related fears is then presented.

Research on Traumatic Events

A growing body of literature has documented the psychological effects of disasters and accidents, particularly when such trauma is associated with some degree of physical damage (Blumenfield & Malt, 1996; Malt, 1988, 1994; McDonald & Davey, 1996). Research on accidental injury has utilised terms such as *cryptotrauma* (Pilowsky, 1985), *accident neurosis* (Allodi, 1974; Parker, 1977; Tarsh & Royston, 1985), and *whiplash neurosis* (Hodge, 1971) to conceptualise these traumatic reactions. Different psychological problems may be manifested depending on the phase of traumatic injury, and may include amnesia, somatisation, pain, substance abuse, anxiety, depression, or posttraumatic dreams or flashbacks (Blumenfield & Malt, 1996; Breslau, Davis, Andreski, & Peterson, 1991; Figley, 1985; Malt, 1994; Malt & Olafsen, 1992; Malt, Myhrer, Blikra, & Hϕivik, 1987; Modlin, 1967; Vrana & Lauterbach, 1994). An understanding of the prevalence and psychological impact of such events ultimately contributes to our knowledge regarding etiology and aids in intervention with survivors (Lundin, 1995). In addition, a variety of accidental situations or traumatic events have been studied, such as industrial accidents (Braverman, 1980; Culpan & Taylor, 1973; Jones & Riley, 1987), accidents at home, outdoors, in leisure or sporting activities, and in relation to violence (Malt, 1988), railway accidents (Hagström, 1995; Karlehagen, Malt, Hoff, Tibell, Herrstromer, Hildingson, & Leymann, 1993; Malt, Karlehagen, Hoff, Herrstromer, Hildingson, Tibell, & Leymann, 1993; Theorell, Leymann, Jodko, Konarski, Norbeck, & Eneroth, 1992), and sea and flight accidents (Lundin, 1995).

Psychological Reactions to Motor Vehicle Accidents

Research on the psychological consequences of motor vehicle accidents (MVAs) may provide advantages in testing Rachman's theory, since a MVA could be assumed to be a particularly *memorable* onset event, thereby reducing the variability of memory which may affect the results of a study. Nevertheless, the attention awarded to the study of MVAs (particularly those not resulting in death or major injury) is relatively scant, even though such accidents are frequent in occurrence (de L. Horne, 1993; Green, McFarlane, Hunter, & Griggs, 1993; Kuch, Swinson, & Kirby, 1985; Mayou, 1992; Tsuang, Boor, & Fleming, 1985; Walker, 1981). It has been suggested that the endemic nature of MVAs may account for this (Goldberg & Gara, 1990).

In 1996, 509 people were killed on New Zealand roads (Traffic Research and Statistics Section, Land Transport Safety Authority, 1996), and car accidents were the major cause of injury in 1995, with 22,667 new and ongoing motor vehicle account entitlement claims costing $180 million (Accident Rehabilitation and Compensation Insurance Corporation, 1995). The nature and sheer frequency of MVAs suggests that at least some people are likely to suffer psychological repercussions. Indeed, research has demonstrated that people who have been involved in MVAs and other common accidents may manifest chronic psychological dysfunction, even when physical injury is minimal and good recovery has been evidenced (de L. Horne, 1993; Pilowsky, 1985).

The psychosocial sequelae of MVAs was investigated in a three-year follow-up study of individuals aged between 15 and 69 years. Of those who had been injured in MVAs, 7.4% (14 of 183) experienced a worsened family or spouse relationship, 15.1% (28 of 185) reported reduced social contact, 21.6% (40 of 185) described decreased pleasure from leisure activities, and 21.3% (40 of 187) reported decreased work capacity (Malt, Hϕivik, & Blikra, 1993). Therefore, it is important that such people be identified and assisted, rather than their disturbances remaining undetected and untreated (de L. Horne, 1993; Medetsky & Parnes, 1993).

Research on the psychiatric consequences of MVAs has documented widespread implications in terms of psychological functioning. Interestingly, some of the most detailed accounts of the range of psychological morbidity following MVAs have come from studies conducted in Australia and New Zealand (Culpan & Taylor, 1973; Jones &

Riley, 1987). Both studies investigated the nature of psychological disorders evident after road traffic and industrial accidents in 71 (Culpan & Taylor, 1973) and 327 (Jones & Riley, 1987) subjects referred by solicitors for psychiatric evaluation. They discovered a wide range of morbidity, with some individuals presenting with depressive, anxious, and phobic symptomatology, and others manifesting multiple disturbances. The weakness of these two studies, however, was that they combined MVA victims with victims from a range of industrial and work-related accidents (Goldberg & Gara, 1990), thus making it difficult to clearly determine psychiatric morbidity after MVAs. Of Culpan and Taylor's (1973) sample, 58% of the accidents were associated with road traffic, while motor vehicle accident victims comprised 56% of the sample studied by Jones and Riley (1987).

Post-MVA research has ranged from examining depersonalisation responses (Noyes, Hoenk, Kuperman, & Slymen, 1977) and the notion of self-protection after MVAs to enhance perceptions of motor vehicle control (Kidd, 1993), to comprehensive studies of MVA-induced psychopathology. The most common psychological sequelae of MVAs include driving-related fears and avoidance, post-traumatic stress disorder (PTSD), depression, and pain-related syndromes (Blanchard, Hickling, Taylor, Loos, & Gerardi, 1994; Goldberg & Gara, 1990; Koch & Taylor, 1995; Kuch, Cox, Evans, & Shulman, 1994; Malt, 1988; Mayou, 1992; Mayou, Bryant, & Duthie, 1993). In victims with multiple injuries, depression and anxiety are particularly common (Mayou et al., 1993). Furthermore, approximately 40% of MVA victims suffer comorbid conditions, such as major depression, panic disorder, simple phobia, eating disorder, substance abuse, and personality disorder (Blanchard et al., 1994).

Posttraumatic Stress Reactions to Motor Vehicle Accidents

Perhaps the most researched of psychological sequelae to MVAs is post-traumatic stress disorder (PTSD). A body of research exists which indicates the frequent occurrence of PTSD in victims of MVAs, and it has been suggested that PTSD thoroughly captures the psychological consequences of MVAs (Burstein, 1989b; Davis & Breslau, 1994; Hickling, Blanchard, Silverman, & Schwarz, 1992b; Kuch et al., 1985; Platt & Husband, 1987). Studies have investigated the treatment of posttraumatic

responses after MVAs (Blanchard, Hickling, Taylor, Loos, Forneris, & Jaccard, 1996; Brom, Kleber, & Hofman, 1993; Fairbank, DeGood, & Jenkins, 1981; Green et al., 1993; McCaffrey & Fairbank, 1985; Walker, 1981), as well as the complicating nature of PTSD in posttraumatic headache (PT-HA) (Davis & Breslau, 1994; Hickling, Blanchard, Schwarz, & Silverman, 1992a; Hickling et al., 1992b) and the nature of psychophysiological responding in MVA-related PTSD (Blanchard, Hickling, & Taylor, 1991). However, it has been noted that avoidant symptoms may obscure the identification of PTSD reactions in MVA victims, and PTSD may go unrecognised for some time after the accident (Burstein, 1989a, 1989b; Epstein, 1993).

Investigations have differentiated between PTSD among respondents involved in 'serious' MVAs, involving some degree of physical injury requiring hospitalisation, and 'non-serious' MVAs, or those not resulting in death or bodily injury or involving the subjective experience of psychological injury. However, because victims of both serious and non-serious MVAs have been found to experience PTSD, these distinctions may have little utility.

Table 1 demonstrates this phenomenon, whereby research using seriously injured victims has found a range of rates of PTSD (from 1% to 100%), as have studies which have utilised victims sustaining relatively minor injuries (14.5% to 50%). While there appears to be a larger range for serious MVAs, the overlap in incidence rates is substantial and may be due to definitional differences (e.g., different criteria for severity of injury, diagnosis, and time since the MVA), and methodological differences (e.g., whether the sample was seeking treatment or not).

In terms of MVA-related PTSD in children, three studies have reported cases with onset as young as 2½ years old (Jaworowski, 1992; Jones & Peterson, 1993; Thompson & McArdle, 1993). Symptomatology in such cases has included reliving the MVA through nightmares, conduct difficulties, separation anxiety, enuresis, fear of the dark, trauma-specific fears, sleep disturbance, violent play, reluctance to cross roads or travel by car, and a preoccupation with road safety (Jones & Peterson, 1993; Taylor & Koch, 1995; Thompson & McArdle, 1993).

Summary

It is evident from the research that both children and adults may experience PTSD following MVAs. Despite definitional differences regarding the severity of injury in the MVA, research indicates the importance for clinicians to consider PTSD as a psychological consequence of MVAs.

Table 1. Summary of the research on PTSD following MVAs, and their incidence and course.

Study	*N*	*Criteria used for severity of injury*	*% diagnosed with PTSD*	*Time since MVA*
'Serious' injury				
Kuch et al. (1985)	30	Medical attention sought	100 (DSMIII)	not given
Hickling et al. (1992b)	20	Posttraumatic headache	75 (DSMIIIR)	not given
Blanchard et al. (1994)	50	Medical attention in 1 wk, 1-4 mths post-MVA	46	1-4 mths
Epstein (1993)	15	Serious injury	40 (DSMIIIR)	not given
Blanchard et al. (1996)	158	Medical attention in 1 wk, 1-4 mths post-MVA	39 (DSMIIIR) 35 (DSMIV)	1-4 mths
Feinstein & Dolan (1991)	48	Accidentally injured	25 15	6 wks 6 mths
Green et al. (1993)	24	Severe injury	25 (DSMIIIR)	18 mths
Mayou et al. (1993)	188	Multiple injury or whiplash neck injury	7-9 5-11	3 mths 1 yr
Malt (1988)	107	Hospitalised within 1 wk	1	6 mths
'Non-serious' injury				
Kuch et al. (1994)	21	Minimal injury and chronic pain	38 (DSMIIIR)	not given
Goldberg & Gara (1990)	55	Not resulting in death or major bodily injury	15	mean=15 mths
Injury criteria not given				
Hickling & Blanchard (1992)	20	not given	50 (DSMIIIR)	not given
de L. Horne (1993)	7	not given	43 (DSMIII)	mean=2 yrs
Dalal & Harrison (1993)	86	not given	32	mean=2.7 yrs
Kuch et al. (1995)	54	not given	22	mean=3.62 yrs

FEAR REACTIONS TO MOTOR VEHICLE ACCIDENTS

This section provides a detailed analysis of the theory and research on fear reactions to MVAs. Firstly, definitional issues are discussed and research using different definitions is summarised. It is argued that definitional confusion in past research has influenced the wide range of incidence rates reported in the research. This section also discusses sampling criteria, measures used to assess post-MVA fear reactions, and specific situations involved in driving-related fears that have been found in the research.

In addition to postttraumatic reactions, research has also demonstrated that fear reactions to MVAs are common and can be extremely debilitating (Herda, Ehlers, & Roth, 1993; Kuch, Evans, & Mueller-Busch, 1993). Research on fear reactions has focused on avoidance of, or reduction in driving, endurance of driving with marked discomfort, and interference of the fear with a person's lifestyle. This research has differed from studies of posttraumatic reactions in that the latter studies have examined symptoms meeting DSM criteria for PTSD, such as reexperiencing and numbing of responsiveness, as well as avoidance behaviour.

Studies of the risk of fears and phobias in association with MVAs are of significant public health importance because fear reactions are common and produce significant effects on daily activity. In addition, recent research on fears reported that being hit by a car or truck was ranked as the second most-feared situation by a cross-cultural study of children and adolescents (Ollendick, Yang, King, Dong, & Akande, 1996). Furthermore, a study by Withers and Deane (1995) found that 58% (110 of 190) of university students reported a fear of automobile accidents. Both the psychophysiological assessment of driving phobia (Sartory, Roth, & Kopell, 1992) and the treatment of driving phobia have been examined (Kuch, 1988; Levine & Wolpe, 1980). There has been a confusing array of labels associated with driving-related fears, such as amaxophobia, ochophobia, and motorphobia (all meaning 'fears of vehicles') (Doctor & Kahn, 1989). In addition, researchers have utilised varying definitions of MVA-related fears and phobias, and these inconsistencies have produced different findings, particularly with respect to incidence rates. These issues will now be outlined and discussed.

Definitional Issues

Table 2 presents a summary of the studies on driving-related fears. The term *driving-related fears* is utilised in the present study for two reasons. Firstly, as will soon be discussed, the research is replete with inconsistent definitions of the phenomenon and varying levels of fear. Secondly, research has shown that these fears are not restricted to people driving motor vehicles, and may also affect passengers, cyclists, pedestrians, and others who are in some way involved in MVAs (Mayou et al., 1991, 1993; Taylor & Koch, 1995). Therefore, the term *driving-related fears* is appropriate to the present study because it incorporates these issues.

It is evident from Table 2 that MVA-related fears and phobias have been described as *driving phobia*, *accident phobia, travel phobia*, and *phobic travel anxiety*, although these terms have also been utilised to describe phobias that are secondary to panic disorder (Beck et al., 1985; Ehlers, Hofmann, Herda, & Roth, 1994; Mathew, Weinman, Semchuk, & Levin, 1982; Munjack, 1984; Taylor & Arnow, 1988; Taylor & Koch, 1995). The studies in Table 2 are grouped by the nature of the sample utilised. Subjects who were referred for medical complaints, assessment of pain and other somatic symptoms after a MVA, or who sought medical attention or treatment after a MVA are included in the *Medical Research* group. The *Legal/Medical Research* group consists of studies in which subjects were referred for a medico-legal opinion or were involved in civil accident litigation. The *Clinical Research* category includes studies where victims were referred by physicians to private psychological practices for treatment or evaluation following a MVA. The latter three types of research employed MVA victims as subjects. *Nonclinical Research* comprises those studies in which participants were recruited through their responses to advertisements in newspapers or news telecasts on television. These people were not necessarily victims of MVAs, rather they were recruited because they reported driving-related fears.

Table 2 also summarises the definitions utilised within the studies to capture driving-related fears. It is clear that these definitions differ among studies, and the following sections examine this in more detail.

Table 2. Summary of the research on driving-related fears, definitions used, and their incidence and course.

Study	*N*	*Criteria used*	*Definition of criteria*	*% meeting criteria (n)*
Medical Research				
Blanchard et al. (1994)	50	Driving phobia	Complete avoidance of driving for psychological reasons	2 (1)
		Driving reluctance	Avoidance of certain aspects of driving	100 (50)
Hickling et al. (1992a)	12	Driving phobia	Not given	41.7 (5)
Kuch et al. (1991)	33	Accident phobia	Meet DSMIIIR criteria for phobic disorder Onset and fear content related to an MVA Symptoms and behaviour focus on potential repetition of MVA	48.4 (16)
Kuch et al. (1994)	55	Accident phobia	Simple Phobia with onset after MVA and fear of MVA (DSMIIIR)	38.2 (21)
Kuch et al. (1995)	54	Accident phobia	DSMIIIR criteria for Simple Phobia and PTSD criteria B (psychological distress) and C (avoidance) Included passengers in cars	25.9 (14)
Malt (1988)	52	Fears of MVA-related stimuli	Fear associated with exposure to situations like traumatic event	29 (31)
Mayou et al. (1993)	174 171	Travel anxiety	Not given	18.4 (32) 15.2 (26)
Legal/Medical Research				
Dalal & Harrison (1993)	56	Phobic travel anxiety	Not given	10.7 (6)
Jones & Riley (1987)	327	Phobic motor accident	Based on complaints	21.5 (70)
Kuch et al. (1985)	30	Driving phobia	Avoidance of, or reduction in driving, or endurance of necessary driving with marked discomfort	77 (23)
Parker (1977)	750	Phobia	Not given	35 (296)

Study	*N*	*Criteria used*	*Definition of criteria*	*% meeting criteria (n)*
Clinical Research				
Blanchard et al. (1995)	59	Driving phobia	Avoidance of all driving or endures necessary driving with great subjective discomfort	15.3 (9)
	179	Driving reluctance	Lesser degrees of avoidance	33.7 (60)
de L. Horne (1993)	7	Phobic reaction group	PTSD subcriteria	100 (7)
Hickling et al. (1992; 1992b)	20	Driving phobia	Avoidance of, or reduction in driving, or endurance of necessary driving with marked subjective discomfort	60 (12)
Nonclinical Research				
Ehlers et al. (1994)	56	Driving phobia	DSMIIIR (Simple Driving Phobia)	70 (39)
Mathew et al. (1982)	48	Driving phobia	Information elicited suggested DP (anxiety inappropriate and excessive and interfered with lifestyle)	100 (48)
Munjack (1984)	178	Driving phobia	Not given	16.9 (30)
Sartory et al. (1992)	16	Driving phobia	DSMIIIR Simple Phobia	100 (16)

Driving Phobia

Table 3 provides details of studies examining driving phobia as the phenomenon of interest (extracted from Table 2 for ease of examination). In studies of driving phobia, the use of different definitions seems to have led to a range of results. For example, the studies by Blanchard et al. (1994) and Kuch et al. (1985) both used driving phobia as the criteria but their different definitions of this appeared to markedly affect the reported results.

Table 3. Summary of studies investigating driving phobia.

Study	*N*	*Criteria used*	*Definition of criteria*	*% meeting criteria (n)*
Blanchard et al. (1994)	50	Driving phobia	Complete avoidance of driving for psychological reasons	2 (1)
		Driving reluctance	Avoidance of certain aspects of driving	100 (50)
Blanchard et al. (1995)	59	Driving phobia	Avoidance of all driving or endures necessary driving with great subjective discomfort	15.3 (9)
	179	Driving reluctance	Lesser degrees of avoidance	33.7 (60)
Ehlers et al. (1994)	56	Driving phobia	DSMIIIR (Simple Driving Phobia)	70 (39)
Hickling et al. (1992a)	12	Driving phobia	Not given	41.7 (5)
Hickling et al. (1992; 1992b)	20	Driving phobia	Avoidance of, or reduction in driving, or endurance of necessary driving with marked subjective discomfort	60 (12)
Kuch et al. (1985)	30	Driving phobia	Avoidance of, or reduction in driving, or endurance of necessary driving with marked discomfort	77 (23)
Mathew et al. (1982)	48	Driving phobia	Information elicited suggested DP (anxiety inappropriate and excessive and interfered with lifestyle)	100 (48)
Munjack (1984)	178	Driving phobia	Not given	16.9 (30)
Sartory et al. (1992)	16	Driving phobia	DSMIIIR Simple Phobia	100 (16)

Blanchard et al. (1994) defined driving phobia as complete avoidance of driving and reported that one subject met this criteria, while Kuch et al.'s (1985) criteria did not require complete avoidance for diagnosis, and their rate of 77% reflects this broader definition. In addition, both studies utilised similar injury levels (medical attention sought) and driving restriction criteria, suggesting that the reported differences were not due to these factors.

Two studies using identical definitions of driving phobia reported that 60% (Hickling et al., 1992b) and 70% (Kuch et al., 1985) of subjects met the criteria for driving phobia. In addition, both studies had a similar number of subjects (twenty and thirty, respectively). On occasion, inconsistencies are apparent even within the same research teams. For example, Blanchard and colleagues (1994, 1995) have used different definitions of driving phobia in both of their studies, and report different diagnostic rates as a result of this. Furthermore, rates of driving reluctance reported in the same two studies vary markedly, despite seemingly similar definitions. Both of the studies utilised identical criteria for injury severity (medical attention sought in one week) and time since the MVA (one to four months).

Definitional issues have also been raised in research using nonclinical samples and DSMIIIR criteria for Simple (Driving) Phobia. Studies by Ehlers et al. (1994) (using fearful subjects recruited through advertising) and Sartory et al. (1992) (who selected phobics for the study) both utilised this definition, although their diagnostic rates are quite different (70% and 100%, respectively). This may be due to the nature of the samples utilised. A final example of definitional issues with respect to research investigating driving phobia is that some studies do not define driving phobia at all (e.g., Hickling et al., 1992a; Munjack, 1984).

In studies using the criteria of driving phobia, a number of definitional issues have been raised. Different definitions of driving phobia have affected the results found in terms of incidence rates with similar sample groups, and it seems that definitions which are not restricted to complete avoidance of driving produce a higher incidence rate. Reported rates of driving phobia have varied considerably even with identical definitions, and some researchers have utilised different definitions altogether. Other studies have failed to define driving phobia at all.

Accident Phobia

Table 4 provides summary information (from Table 2) of studies investigating accident phobia. While some authors have defined driving phobia as meeting DSMIIIR criteria for Simple Phobia, others have used the same definition for accident phobia. Kuch and colleagues (1991, 1994, 1995) have defined accident phobia as Simple Phobia with onset after a MVA, and subsequent fear of a MVA. Diagnostic rates reported from

these studies (using samples referred for chronic post-MVA pain) are quite high, although range from 26% to 48%, even with identical definitions of accident phobia.

Table 4. Summary of studies investigating accident phobia.

Study	*N*	*Criteria used*	*Definition of criteria*	*% meeting criteria (n)*
Kuch et al. (1991)	60	Accident phobia	Meet DSMIIIR criteria for phobia Onset and fear content related to MVA Symptoms and behaviour focus on potential repetition of MVA	48.4 (33)
Kuch et al. (1994)	55	Accident phobia	Simple Phobia with onset after MVA and fear of MVA (DSMIIIR)	38.2 (21)
Kuch et al. (1995)	54	Accident phobia	DSMIIIR criteria for Simple Phobia and PTSD criteria B (psychological distress) and C (avoidance)	25.9 (14)

Another important distinction that researchers have made between driving phobia and accident phobia is that accident phobia is not restricted to people driving motor vehicles, and may also affect passengers, pedestrians, cyclists, motorcyclists, and others involved in MVAs in some way. Driving phobia has tended to refer to fears of the driving experience and of being a driver, and criteria focus on driving itself and disregard phobias which feature other stimuli. Given the application of the accident phobia definition to a potentially broader sample of people, one would expect incidence rates for accident phobia to be higher than those for driving phobia. Despite this, studies of accident phobia using DSM definitions report lower incidence rates (see Table 3) than studies of driving phobia using DSM criteria (70% and 100%). However, these studies utilised small samples, and this needs to be taken into consideration when issues of definition are raised.

In summary, although studies using accident phobia as the criteria have broadened the sample to include MVA victims who were not drivers in the MVA, reported incidence rates do not seem to reflect this. Consistent with the findings for driving phobia, a range of diagnostic rates have been reported for accident phobia, despite similar definitions. However, the range of rates for accident phobia appears to be

narrower (22.5%) than that for driving phobia (98%), which may be explained by the stringency of diagnostic criteria.

Other Definitions

The remaining research in the field of driving-related fears has used different definitions, as Table 5 shows. However, these different concepts have tended to be less specifically defined than driving phobia and accident phobia, and in some cases have not been defined at all. In addition, these studies have reported a slightly lower range of incidence rates, from 10% to 35%.

Table 5. Summary of studies utilising other definitions for driving-related fears.

Study	*N*	*Criteria used*	*Definition of criteria*	*% meeting criteria (n)*
Dalal & Harrison (1993)	56	Phobic travel anxiety	Not given	10.7 (6)
Jones & Riley (1987)	327	Phobic motor accident	Based on complaints	21.5 (70)
Malt (1988)	52	Fears of MVA-related stimuli	Fear associated with exposure to situations like traumatic event	29 (31)
Mayou et al. (1993)	174	Travel anxiety	Not given	18.4 (32)
Parker (1977)	750	Phobia	Not given	35 (296)

Summary

The previous discussion has shown that definitional inconsistencies are inherent in the research on driving-related fears. Studies of driving phobia have employed a range of definitions which have influenced reported diagnostic rates. In particular, studies which have used broader criteria in which complete avoidance is unnecessary have reported higher rates than those which have specified total avoidance for diagnosis. Research on accident phobia has utilised a broader sample rather than drivers alone,

although incidence rates from these studies have not tended to reflect the expected increase that this would bring. Despite definitional differences, it seems that studies on driving-related fears have investigated similar phenomena.

These findings have implications for the definition of driving-related fears in the present study. For the purposes of the present study, the definition of ***driving-related fears*** includes all severity levels and does not restrict the potential sample to drivers of vehicles alone. In addition, this definition includes people who are fearful but have not been involved in a MVA, as well as those who report being fearful because of a MVA. This allows a separate analysis of those who have been in MVAs and those who have not.

Sampling Issues

This section outlines sampling issues inherent in the research on driving-related fears, and provides a rationale for the sampling methodology employed in the present study.

As Table 2 illustrated, research on driving-related fears has utilised a variety of samples, and most studies have tended to use MVA victims or survivors. Such samples have been employed in medical research, in which MVA survivors have sought or been referred for post-MVA medical attention; legal/medical research, using MVA victims involved in litigation or referred for a medico-legal opinion; and clinical research, in which people were referred by medical professionals to psychological practices for assessment and treatment following a MVA. Research on MVA victims has described the psychological effects of MVAs, although most studies do not report whether their sample included passengers, pedestrians, and others involved in MVAs as well as drivers. Only research by Mayou et al. (1993) specifically reported the effects of MVAs on car drivers, car passengers, motorcycle riders, and pillion passengers. Furthermore, most studies have failed to recognise that MVAs may not be the only onset event for driving-related fears. Only four of the nineteen studies reviewed in Table 2 utilised a nonclinical sample (i.e., were recruited from the community because of their driving-related fears) rather than MVA victims alone. These are presented in Table 6.

Table 6. Summary of the studies using nonclinical samples (driving phobia).

Study	*N*	*Recruitment procedure*	*Response required*	*Nature of participation*	*% meeting criteria (n)*
Ehlers et al. (1994)	56	Advertisements in local newspapers	Telephone call for further information	Participate at hospital	70 (39)
Mathew et al. (1982)	48	Article in newspaper on driving phobia and study	Telephone call	Telephone interview	100 (48)
Munjack (1984)	178	30-minute news telecast with telephone number of Phobia Clinic	Telephone call	Telephone interview	16.9 (30)
Sartory et al. (1992)	16	Advertisements in local newspapers	Telephone call for further information	Participate at institution	100 (16)

As can be seen from Table 6, participants were recruited through their responses to advertisements or articles in newspapers or news telecasts on television. Only the study by Mathew et al. (1982) did not explicitly state whether the sample included those who were fearful as a result of a MVA. It is notable that no studies were found in which fearful MVA victims were compared with individuals with driving-related fears prompted by *non-MVA* onset events, such as informational or instructional experiences. This type of research could provide comparisons of the significance of MVAs and other events as onset events, persistence, course, and symptomatology of driving-related fears.

Summary

Few studies have utilised nonclinical volunteers from community samples to examine driving-related fears in individuals who do not present as a result of a MVA. Of those which have, participants have been recruited through media advertising. No attempts have been made to compare participants involved in MVAs with those who have not been MVA victims. The present study aims to address some of these issues by employing a nonclinical sample recruited through advertising in order to include non-MVA participants, and enabling the comparison of fearful MVA victims with fearful non-MVA participants.

Driving Situations

From the nineteen studies reviewed in Table 2, six have examined the specific driving situations for which people report fear. These studies are outlined in Table 7. It is evident from this research that a range of situations are feared by people with driving-related fears. However, this area of the research on driving-related fears is problematic. Few studies have been conducted, and, of those that do exist, sample sizes are either relatively small, or studies with larger samples do not provide information regarding the number of participants who endorsed feared driving situations (e.g., Ehlers et al., 1994; Mathew et al., 1982).

Table 7. Feared driving situations reported in studies of driving-related fears.

Study	*N*	*Criteria*	*Feared situations endorsed*
Blanchard et al. (1994)	10	Driving phobia	Riding for pleasure Driving for pleasure Accident scene Driving in certain road conditions (weather, time of day)
Blanchard et al. (1995)	45	Driving reluctance	MVA site Driving on highways Driving or riding for pleasure
Ehlers et al. (1994)	56	Driving phobia	Driving alone on a freeway Driving accompanied on a freeway Driving alone in other situations (e.g., bridge, tunnel, steep street, winding road) Driving accompanied in other situations Driving alone under special circumstances (e.g., at night, heavy traffic, rain, unfamiliar car) Driving accompanied under special circumstances
Kuch et al. (1995)	14	Accident phobia	Driving in certain weather conditions Riding with certain drivers Driving on certain roads Driving yourself
Mathew et al. (1982)	48	Driving phobia	Driving on freeways Driving in congested traffic Driving in fast-moving traffic
Sartory et al. (1992)	16	Driving phobia	Hurting others Panic

Of the studies with small sample sizes, relatively high endorsement rates were reported by the authors, although few participants were required to rate each situation in order to produce such high rates (participants could endorse more than one category; hence cumulative percentages exceeded 100). For example, Blanchard et al. (1994) reported that 60% (n=6) endorsed riding for pleasure, 20% (2) endorsed both driving for pleasure and driving in certain road conditions, while only one person (10%) feared an accident scene.

In the study by Kuch et al. (1995), all 14 subjects (100%) endorsed each driving situation specified in Table 7. Similarly, high percentages were reported by Sartory et al. (1992) for hurting others (75%) and panic (62.5%). One study with a reasonable sample size which reported the percentage of subjects who endorsed feared situations was that by Blanchard et al. (1995). However, ratings reported were relatively low, with 20% (n=9) endorsing fear of a MVA site, and driving on highways and driving or riding for pleasure both rated by 13% of subjects. In short, of the few studies which have examined feared driving situations, most have either used small sample sizes or failed to report endorsement rates of specific situations. Using measures from previous research, the present study aims to describe the driving-related situations for which people report fears.

Summary

This section has examined the literature on fear reactions following MVAs in terms of definitional issues, sampling issues, measurement issues, and research on driving situations relevant to the present study. An important issue is that of definitional inconsistency in the existing literature, which seems to have contributed to differences in incidence rates obtained. Varying definitions of and criteria for driving-related fears have meant that a clear picture of symptomatology, incidence, and avoidance behaviour have been difficult to obtain. This has been complicated by a range of (typically small) samples and a lack of psychometrically sound assessment tools which have demonstrated utility. In addition, there has been a lack of research using nonclinical samples, particularly those who are fearful but have not had a MVA, and people other than drivers who have driving-related fears.

ACQUISITION OF DRIVING-RELATED FEARS

Of particular relevance to the present study is the research on the onset of driving-related fears. Again, there are few studies in this area, as Table 8 shows. The rest of this section will examine this research in more detail, paying particular attention to the pathways to which people attribute their driving-related fears and those aspects of past research which the present study aims to improve upon.

Table 8. Summary of studies on the acquisition of driving-related fears: Percentages of subjects assigned to the various categories.

Study	*N*	*Criteria*	*Type of Onset*				
			Direct	*Observation*	*Instruction*	*Always*	*Other*
Ehlers et al. (1994) *	55	Driving phobia	100	12	16	—	100
Munjack (1984)	30	Driving phobia	70	—	—	7	23
Sartory et al. (1992)	16	Driving phobia	75	19	6	—	—

* Subjects could endorse more than one category; hence cumulative percentages exceed 100.

In the study by Munjack (1984), a variety of onset circumstances characterised the sample. A panic attack was attributed as the onset of driving-related fears in 40% of the sample, 20% to a collision on the freeway, and 10% to some other upsetting event directly associated with driving (such as feeling "woozy" due to medication, experiencing dizziness from alcohol intoxication, and having the car lights fail on a twisting mountain road with no retaining wall). Significant family stress, such as the death of a parent, a divorce, the birth of a child, or an upsetting confrontation with a partner, was reported as an onset event in 13.3% of cases. Gradual fear development without any precipitating event was described by 3.3% of subjects, and 6.7% reported having "always" been fearful or afraid of driving, and that they had rarely driven despite having held licences for some time. Two subjects (6.7%) reported some other onset event, such as moving from Las Vegas to Los Angeles, while the other described being aware of her fear at age 68 after the death of her husband, and having to learn to drive as a result of this.

In terms of the etiology of driving-related fears, 70% of the subjects in Munjack's (1984) study reported a history of direct conditioning experiences, although indirect pathways to fear, such as observation and instruction, were not investigated. The degree of onset through panic attacks was relatively high, and it has been suggested that perhaps the heightened need to be in control while driving is conducive to panic attacks (Kuch et al., 1994; Munjack, 1984). Indeed, a number of individuals who attribute the onset of their driving phobia to a panic attack are less fearful when they are accompanied in a car by another adult, which suggests that they believe the person will take control should they experience discomfort (Munjack, 1984). In comparison with this, individuals who ascribe the onset of their driving phobia to a collision tend to fear collisions, and their anxiety is not alleviated by another person in the vehicle (Munjack, 1984). Other researchers have suggested that, although driving phobia may be due to accidents, it may also be symptomatic of panic disorder and agoraphobia (Kuch et al., 1994).

Panic anxiety as an etiological factor in driving phobia is suggested by the finding that numerous phobic MVA victims report a history of anxiety disorder that is unrelated to MVAs (Kuch, 1989, cited in Kuch et al., 1994). These findings have implications for the etiology of driving phobia, and are also important in terms of intervention, since presentation of the feared stimulus is needed for exposure treatment (Kuch et al., 1994). Research by Kuch and colleagues (1994) indicated that accident phobia is distinct from agoraphobia and panic disorder, as people with these disorders fear different driving situations. For example, it seems that people with agoraphobia are more likely to avoid driving a car altogether, due to their fear of losing control of the car if they become incapacitated by a panic attack. In comparison, people with accident phobia seem to be more comfortable with the control of being in the driver's seat (Kuch et al., 1994).

Sartory et al. (1992) found that 75% of respondents 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 a 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 research by Munjack (1984). However, other research has reported that problems after a MVA (such as phobic reactions) were clearly caused by classical conditioning and were a direct result of the accident (Mayou et al., 1991).

A study by Himle, Crystal, Curtis, and Fluent (1991) also reported results similar to those by Munjack (1984). This study is not summarised in Table 8 as it included subjects other than those with driving-related fears, and thus will be reviewed separately here. Subjects in this study were patients diagnosed solely with Simple Phobia in an anxiety disorders clinic. Subjects were classified into one of five Simple Phobia subgroups: Animal / insect (n = 23), situational (n = 41), blood / injury (n = 10), and choking / vomit (n = 10). Of particular interest is the situational group, which included fears of driving as well as fears of crowded places, aeroplanes, heights, and bridges. Subjects were asked upon initial evaluation to briefly describe the onset of their phobia, and these descriptions could be characterised as 'realistic threat', 'vicarious learning', 'spontaneous', 'lifelong', and 'gradual'. The 'realistic threat' category included phobias due to immediate, specific threat such as being involved in an automobile accident. The 'vicarious learning' group included phobias resulting from observational and instructional experiences. The 'spontaneous' category involved phobias induced by a sudden, unexpected onset that was not cued by any traumatic or vicarious event. For example, upon entering the potentially phobic situation without anxiety, the subject experiences sudden, unexplained, intense anxiety (panic attack) and consequently avoids similar situations or endures them with distress. The 'lifelong' category included phobias that were described as "having it as far back as I can remember". The 'gradual' category included phobias in which onset was unclear or ambiguous, and which developed slowly over time. Himle et al. (1991) found significant mode of onset differences across groups. The situational group (n = 37) was mainly characterised by subjects reporting spontaneous (48.6%) and realistic (35%) mode of onset. These results are consistent with those reported by Munjack (1984), in which onset was described by most subjects as a sudden, unexplained increase of anxiety in the situation.

Ehlers and colleagues (1994) collected information consistent with Rachman's theory. Respondents were asked to rank 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, and the mean ranking for panic attacks was 1.2. A traumatic experience such as an accident, dangerous traffic situations, or being assaulted while driving was reported by 36%, with a mean ranking of 1.9. Only 5% ranked seeing someone else experience a traumatic event when driving with a mean of 1.3. Other reasons which were ranked highly were being a generally anxious person (53%), and being generally afraid of high speed (47%). Also rated among the top three reasons for driving phobia were being generally afraid of heights (16%), information about the dangers of driving (16%), a poor sense of direction (15%), heredity (9%), bad experiences with the car breaking down (9%), observing others who are fearful of driving (7%), being generally afraid of enclosed spaces (5%), being criticised for poor driving performance (5%), and not having enough training (2%) (Ehlers et al., 1994). The causal event of panic attacks for many phobics was a rise in anxiety that was either triggered internally or was an overreaction to a minor external event. This is consistent with research described above by Munjack (1984) and Himle et al. (1991), and such a reaction led to fears of having further similar episodes that may impair driving safety as well as increase anticipatory anxiety and avoidance.

Pathways of fear acquisition were further investigated through an interview, with questions which asked about traumatic accidents (involving vehicles, objects, animals, or people), 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). Phobics were more anxious about their worst accident as well as reading or hearing about particular dangers associated with driving than control subjects.

In order to delineate more clearly the role of panic attacks and other anxiety problems in driving phobia, the researchers divided the phobic subjects in terms of the top ranked reason for their phobia, which generated one group who chose 'traumatic experience' ('trauma' group, n = 8), one group who selected 'panic attack' ('panic' group, n = 29), and another group who chose 'generally anxious person', 'generally afraid of high speed', or 'generally afraid of heights' ('other anxieties' group, n = 11) (Ehlers et al., 1994). It was evident that those who reported panic attacks as the central reason for their driving phobia were more concerned about symptoms of anxiety while

driving, compared with phobics who provided reasons for their phobia which were unrelated to accidents (Ehlers et al., 1994). Diagnostically, five of the 'panic' group, two of the 'other anxieties' group, and none of the 'trauma' group met DSM-III-R criteria for panic disorder. The authors concluded that driving phobia is often diagnostically problematic, since it involves aspects of simple phobia and panic disorder with agoraphobia, yet does not meet the criteria for either disorder (Ehlers et al., 1994). Furthermore, the diagnostic notion of different fear cognitions for simple phobia (fear of external situations), social phobia (fear of embarrassment), and panic disorder (fear of anxiety) is inadequate for driving phobia because such individuals tend to be characterised by all three types of cognitions (Ehlers et al., 1994).

Summary

The attention given to the origins of driving phobia has been scant, despite the implications of a comprehensive understanding of the development of driving-related fears for subsequent assessment procedures and intervention programmes. The research which exists is inconsistent. Some studies support the conditioning model of fear acquisition (Mayou et al., 1991; Munjack, 1984; Sartory et al., 1992), while others have not found evidence to support Rachman's three-pathways account (Ehlers et al., 1994). Furthermore, no research was located which compared people who are fearful because of a MVA with those who are fearful for some other reason.

In terms of methodology, studies have used either structured or open-ended interviews or brief rating checklists when assessing fear onset. Only Ehlers et al. (1994) obtained comprehensive information regarding fear onset using the Driving History Interview, which assessed fear onset through traumatic experiences, vicarious acquisition, and informational acquisition. Only two studies have examined Rachman's predictions using a nonclinical sample of people with driving-related fears. Also evident from Table 8 is that most research has not investigated pathways other than conditioning, such as reports of always having had the fear, no memories of onset events, and multiple pathways being endorsed. As well as investigating Rachman's hypotheses in the present study, nonassociative pathways are also assessed.

THE PRESENT STUDY

Rationale and Goals for the Present Study

The present study aims to contribute to the research on driving-related fears in a number of ways. Firstly, the present study attempts to improve upon the methods used to test Rachman's predictions. Previous research on fear acquisition has been unable to provide consistent support for Rachman's theory. It has been suggested that potential uncontrolled memory distortions may be one explanation for these findings, although few studies have attempted to address this issue. The present study seeks to deal with this problem by selecting driving-related fears as the phenomenon of interest, as it could be assumed that MVAs may account for at least some proportion of these fears and are typically memorable events.

Prior studies have tended to focus on the classical conditioning pathway, ignoring less direct pathways to fear, such as vicarious and instructional experiences. In addition, even fewer investigations have examined nonassociative pathways through which fears can be acquired in the absence of any previous associative learning experience. The present study aims to investigate a range of pathways through the use of the Origins Questionnaire (OQ; Menzies & Clarke, 1993). The OQ was 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 also considers pathways to fear other than conditioning experiences. The OQ allows for the endorsement of mixed or multiple pathways, and provides opportunities for the subject to describe their self-reported fear and to report any other factors which they believe to have contributed to the onset of their fear.

It has been suggested that the acquisition of nonclinical fears has not been adequately addressed, and the present study tests Rachman's theory using a sample of community volunteers.

Secondly, few studies exist which investigate specific feared driving situations. The present study intends to describe those driving-related situations which elicit high fear and avoidance ratings, with a view to identifying potential interventions for use with different types of feared situations.

Thirdly, the literature on driving-related fears is replete with inconsistent definitions, contributing to ambiguity in the interpretation of differences in the results between studies. Because few studies have examined driving-related fears in New Zealand, the present study was an attempt to provide initial descriptive information about the frequency and severity of driving-related fears. Therefore, a relatively broad definition was sought, and included MVA victims as well as people not involved in MVAs, and also included passengers, pedestrians, and others involved in MVAs as well as drivers. This definition was also not restricted to complete avoidance, but rather included any level of anxiety from mild anxiety to severe anxiety and avoidance.

Fourthly, the present study provided an opportunity to employ some relatively new measures used in previous research, in order to compare the results of the present sample on these measures with samples from prior studies.

THE HYPOTHESES

From Rachman's predictions, the following hypotheses have been formulated:

(1) Consistent with Rachman's three-pathways theory of fear acquisition, 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.

(3) Respondents who report having experienced a MVA will be more likely to ascribe to the direct pathway than those who do not report having experienced a MVA.

METHOD

SAMPLE AND PROCEDURE

One hundred and ninety volunteers participated in the present study. There were 175 females (92%) and 15 males.

Initial contact with participants was gained through media interest in and coverage of the present study. Initially, two local newspapers in Palmerston North were approached regarding the possibility of printing a small article on the present study and subsequently requesting volunteers to telephone the researcher for further information. These two articles can be seen in Appendix A. Subsequent to these articles, the Massey University newsletter, Mμ, and the Sunday Star Times published articles about the study and requested volunteers to call the researcher. These can also be seen in Appendix A. From the print media coverage, 124 phone calls were received and, of these, 98 (79%) participants returned completed questionnaires. In the articles, common examples of driving-related fears were provided, and it was emphasised that the researcher was interested in people with any type of driving-related fear of any severity, from mild worry to severe distress and avoidance. Upon calling, interested volunteers were able to have any questions answered and were then sent a copy of the questionnaire with a freepost, self-addressed envelope for ease of return of the questionnaire. The Information Sheet outlining the consent procedures can be seen in Appendix B. Consent was implied if volunteers completed the questionnaire, as the first statement of page two of the research questionnaire indicates (see Appendix B).

Brief radio coverage about the study was also obtained through stations in Wellington, Auckland, Palmerston North, Bay of Plenty, and Wanganui. This coverage consisted of brief (5-10 minutes) interviews with the researcher 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. An 0800 telephone line was established in order for a wide range of callers to have the opportunity to participate. Radio coverage generated 125 calls and, of these, 92 (74%) returned completed

questionnaires. From a total pool of 249 phone calls, 190 (76%) completed questionnaires were returned and 59 (24%) withdrew by failing to return the questionnaire. All participants volunteered by stating that they had a driving-related fear, rather than by being involved in a MVA. In addition, this sample was assumed to be characterised by a range of driving-related fears and severity levels.

Table 9 provides demographic characteristics of the sample. The mean age for the whole sample was 46.50 years (SD = 14.80, range 5-86). There was a significant difference in mean age for type of media volunteer (article volunteers, mean = 42.51 years, SD = 14.16, range 5-77; radio volunteers, mean = 50.71 years, SD = 14.36, range 21-86; t (187) = -3.95, $p<.001$). There was also a significant difference in mean age for gender (females, mean = 45.85 years, SD = 14.64, range 5-86; males, mean = 54.64 years, SD = 14.93, range 34-77; t (187) = -2.16, $p<.05$). Chi-square tests revealed no significant differences in the proportions of radio to article volunteers in terms of sex, marital status, and ethnicity (see Table 9). 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.

It should be noted that attempts were made to gain access to a sample of volunteers who were seeking psychological treatment for their driving-related fears, for comparison purposes. Questionnaires were distributed by clinicians in the agency to preserve confidentiality. However, only 3 (6.7% of 45) of these questionnaires were returned. Given such a low response rate, the data from the three clinical volunteers was excluded from the analysis.

Table 9. Sample characteristics of article and radio volunteers with the sample as a whole.

	Whole sample (N = 190)		*Article volunteers (n = 98)*		*Radio volunteers (n = 92)*	
	n	***%***	***n***	***%***	***n***	***%***
Age (years)						
19 or less	2	1	2	2	0	0
20-29	24	13	18	18	6	6
30-39	42	22	24	24	18	20
40-49	45	24	24	24	21	23
50-59	38	20	17	17	21	23
60-69	21	11	7	7	14	15
70+	17	9	5	5	12	13
Sex						
Female	175	92	88	90	87	95
Male	15	8	10	10	5	5
Marital Status						
Single	25	13	15	15	10	11
Married/De facto	117	61	58	59	59	64
Divorced/separated	28	15	14	14	14	15
Widowed	18	9	9	9	9	10
Ethnicity						
European	172	91	86	88	86	94
Maori/Polynesian/Asian /Other	16	8	10	9	6	6

Percentages rounded to the nearest whole number.

INSTRUMENT

Participants completed a self-administered questionnaire entitled 'Fear of Driving' (which follows the Consent Form in Appendix B) that had been designed to elicit detailed information about the origin of driving-related fears, their strength, and anxiety response patterns. The questionnaire also provided an opportunity to examine some previously used measures at a descriptive level, in order to determine the potential utility of these measures with people with driving-related fears. Because of the unknown nature of the sample, a standardised measure was included in the questionnaire in order to be able to compare the sample with those used in previous research. The following sections step consecutively through each measure on the questionnaire (see Appendix B), providing a rationale for their inclusion and a description of how each was used.

Self-Reported Fear

The front page of the questionnaire included a section entitled 'Your Fear' which asked participants to describe their driving-related fear or fears in their own words. If the participant had more than one fear, they were asked to list them in order from the most-feared to the least-feared situation. This item was included because no research could be located which reported obtaining and listing people's self-reported driving-related fears. From a small pilot study of the questionnaire (given to four participants), the maximum number of self-reported fears described was six. Therefore, a maximum of six self-reported fears (from the most-feared to the least-feared) was used in the present study. Since self-reported fear had not been used in any previous studies, the researcher constructed a list of categories by which the narratives could be coded. These categories were based on existing research which reported commonly-feared driving-related situations, along with other potentially fearful situations. The coding categories for the narratives can be seen in Appendix C. Often, participants reported a combination of specific characteristics in a 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, such as that in the above example, 'driving on the motorway' was the category in which the fear was placed.

Physiological and Cognitive Components of Fear

The Bodily Reactions and Negative Thoughts scales from Öst and Hugdahl's (1981) Phobic Origins Questionnaire (POQ) were used to measure the physiological and cognitive components of fear. These are presented in the sections of the questionnaire entitled 'Your Bodily Reactions' and 'Your Thoughts'. The POQ is a self-report questionnaire designed to assess patients' memories regarding the onset experiences of and anxiety responses to their phobias. The 11-item Bodily Reactions (BR) scale assesses the intensity of the physiological reactions patients experience when facing their phobia (such as 'face becoming hot', 'changes in your heartbeat', 'changes in breathing', and 'stomach becoming upset'). The 10-item Negative Thoughts (NT) scale measures the degree to which patients think negatively when they are facing their phobia (such as 'I will panic', 'I can't stand it any longer', 'I will fail', and 'I can't handle this situation'). On both scales, items are rated from 'Never' (0) to 'Always' (4). Despite having been used in clinical research for more than ten years (Öst, 1991), there is scant psychometric data available for the BR and the NT scales (Menzies & Clarke, 1993; Withers & Deane, 1995).

The BR and the NT scales were used in the present study for four main reasons. Firstly, the two scales are not explicitly oriented towards phobias of clinical severity, and they have been used previously with nonclinical samples (Withers & Deane, 1995). Secondly, both scales do seem to measure different components of fear. Thirdly, both scales are relatively brief and were useful in this sense for hypothesis-testing. Fourthly, 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, 1991; Öst & Hugdahl, 1981, 1985). This was particularly important given the unknown nature of the sample.

The original use of the BR and the NT 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.

State Anxiety

The six-item short form of the State-Trait Anxiety Inventory (STAI, Form Y; Marteau & Bekker, 1992; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was used in addition to the BR and the NT scales to assess participants' anxiety responses to their most-feared driving-related situations. The STAI is a self-administered anxiety scale which has been used widely in research on anxiety and in clinical practice. The scale consists of a 20-item state scale which measures how the person feels 'right now', and a 20-item trait scale which assesses how the person 'generally' feels. Marteau and Bekker (1992) developed the short-form state scale in an attempt to locate the least number of state scale items which produced the highest correlation with the original 20-item state scale. From a study with two hundred participants, the six highest-ranking items were selected, and their reliability and validity subsequently evaluated. Internal consistency reliability was $r = 0.82$.

The six-item short-form STAI scale (STAI-Y) measures how the person feels 'right now' when they are thinking about facing their fear or phobia (such as 'I feel calm', 'I feel tense', 'I am worried', and 'I am relaxed'). Items are rated from 'Not at All' (1) to 'Very Much' (4). The STAI-Y was included in the present study for the purposes of comparing the overall levels of fear severity with other groups, since the instrument has been used widely in research and clinical practice. It seems to be a valid, reliable scale which is highly correlated with the longer version of the scale. Consistent with the STAI-Y, the situation of interest was specified in the directions and the wording of the scale requested subjects to rate the feelings experienced while *imagining having to face* the most-feared driving-related situation.

Fear Intensity and Helpseeking Behaviour

Five items measuring fear intensity and helpseeking behaviour were included in the present study. These can be seen in the section entitled 'The Intensity of Your Fear'. One question asked participants 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.

The remaining questions in this section tapped into helpseeking behaviour and were also included as an alternative method of assessing how problematic the fears may be with regard to the need to seek professional help. The helpseeking questions covered the following content areas: (1), whether the participant had spoken to a mental health professional, a medical professional, a partner or spouse, other family members, friends, or some other person about their fear (rated 'Yes' or 'No'); (2), whether the participant had ever received psychological help from a mental health professional for any personal or emotional problems (rated 'Yes' or 'No'); (3), the extent to which the participant felt they needed professional psychological help for their fear [rated on a seven-point scale from 'No Need' (1) to 'Extreme Need' (7)]; and (4), the likelihood of the participant seeking professional psychological help for their fear [rated on a nine-point scale from 'Extremely Unlikely' (1) to 'Extremely Likely' (9)]. These items have been used in other studies of helpseeking behaviour (Deane & Chamberlain, 1994; Deane & Todd, 1996).

Pathway To Fear

Prior research on the origins of driving-related fears has been scant, and has provided inconsistent findings where Rachman's theory has been tested. Furthermore, most studies have failed to consider nonassociative pathways and pathways other than conditioning experiences. For these reasons, a comprehensive approach to assessing pathways to driving-related fears was adopted in the present study. The Origins Questionnaire (OQ), developed

by Menzies and Clarke (1993), was used to measure fear onset. This is a relatively new instrument and was originally used in a study of height-fearful subjects (Menzies and Clarke, 1993).

The OQ 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 1991; Öst & Hugdahl, 1981, 1983, 1985) has classified *any* traumatic event as classical conditioning, and has 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. Other methodological problems identified by Menzies and Clarke (1993) included the failure of researchers to consider nonassociative theories of the etiology of fears and phobias, ascertaining fear onset based on single-item questions, the use of nonstructured telephone or screening interviews, and the lack of demonstrations of questionnaire validity.

The original OQ is a sixteen-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 (Öst & Hugdahl, 1981) does, but rather asks people to indicate and describe any direct, vicarious, or informational 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 subjects 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 two reasons. Firstly, the existing questionnaire was too lengthy for the purposes of the present study. Secondly, a number of items in the OQ were able to be omitted without influencing the criteria for pathway assignment given in Appendix D. Excluded from the original OQ for the present study were items concerning the symptoms experienced during the first fearful incident and periods of stress or depression around learning events. In addition, items asking about vicarious or informational experiences in relation to different family members (asked separately in the original OQ for mother and father) were collapsed together in the present study as 'family' in order to use questionnaire space efficiently and decrease question repetition. The resulting modified version of the OQ for the present study was seven pages in length, as Appendix B shows (see the section entitled 'The Origin of Your Fear').

Responses on the OQ can be classified into seven categories, as Appendix D shows. (The numbers of the items in Appendix D are slightly different from those used with the original OQ because of the modifications described above. However, the classification rules were identical.) Those categories are: (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. Classification for the classical conditioning pathway allows participants to either report clear memories of the first fearful event, or report no memories of that event, despite having an awareness of a time prior to this when there was no such fear. In either case, the participant must describe an event, including an independent unconditioned stimulus (UCS) that caused the fear and the presence of the conditioned stimulus (CS), or feared stimulus. If the participant cannot clearly remember the first event, they must also indicate being excessively fearful of and unable to confront the stimulus ever since the initial event, as well as not being excessively fearful before the event.

Classification for the vicarious conditioning pathway also allows for memories or no memories of the initial fearful event. In both cases, the participant must describe an event in which they saw someone become hurt, frightened, or distressed in the feared situation (i.e., family member, other person, or through some other media, such as television). If no

memories of the first event are reported, the participant must also indicate being excessively fearful of and unable to confront the stimulus ever since the initial event, as well as not being excessively fearful before the event.

Classification for the instructional pathway requires the participant to report no memories of the first fearful event, but an awareness of a non-fearful time before the fear developed. The participant must also describe the transmission of unpleasant stories, warnings, information, or instructions from family members, other people, or other media (such as radio and written media) and indicate being excessively fearful of and unable to confront the stimulus ever since the initial warning, as well as not being excessively fearful before the transmission. Classification for the 'non-conditioning traumatic event' pathway allows for memories or no memories of the initial fearful event. In either case, the participant must describe an event, including the presence of the feared stimulus but no independent UCS which caused the fear. If the participant cannot remember the very first event, they must also indicate being excessively fearful of and unable to confront the stimulus ever since the event, as well as not being excessively fearful before the event.

Classification for 'always been this way' requires the participant to report no memories of the first fearful event because they have always been fearful or anxious in the presence of the feared situation. The category of 'cannot remember' requires no memories of the initial event but an awareness of a prior non-fearful time, and failure to meet the criteria for all of the above categories. Responses which did not fit into any of the above categories were classified as 'uncodable'.

Therefore, the OQ seems to have incorporated a much broader range of potential pathways, including nonassociative pathways to fear (e.g., 'non-conditioning traumatic event', 'always been this way'), and also allows for people to report that they cannot remember the onset of their fear. Table 10 shows the results of the use of the OQ with fifty height-fearfuls in the study by Menzies and Clarke (1993).

Table 10. Classification of height-fearfuls into onset categories in the study by Menzies and Clarke (1993).

Category of Onset	*Type of Onset*	*Number of Subjects (N = 50)*	*Percentage of Subjects (%)*
Direct	Conditioning	9	18
Indirect	Vicarious	10	20
	Information/Instruction	4	8
Other	Non-conditioning traumatic event	6	12
	Always been this way	15	30
	Can't remember	4	8
	Can't classify	2	4

In Menzies and Clarke's (1993) study, more subjects claimed that their fear had always been present (n = 15), or had its origins in a nonassociative traumatic event (n = 6) than were classified into the direct conditioning category (Menzies & Clarke, 1993). Although 28% of subjects were indirect cases and only 18% were direct cases, this difference was not significant. It is also interesting and relevant to the present study that 42% of subjects were classified into nonassociative pathways compared to 46% in associative-learning categories (Menzies & Clarke, 1993).

Driving Situations

Few studies have attempted to examine the type of the driving situations for which people report fears (see Table 7). In their study, 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 subjects 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, discomfort (anxiety) and avoidance are both rated three times for each situation. Ratings on the discomfort or anxiety scale range from 'No discomfort or anxiety' (0) to

'Extreme discomfort or anxiety' (4), and from 'Never avoid' (0) to 'Always avoid' (4) on the avoidance scale. Results for the DSQ are reported as mean scores (range 0-4) across all individual items, and Table 7 provides the highest mean scores (i.e., higher than 2) reported by Ehlers et al. (1994).

The DSQ was used in the present study in an attempt to compare the ratings obtained by the present sample with the participants in the Ehlers et al. (1994) study. 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 particularly because of its length (see the section entitled 'Driving Situations' in Appendix B). The DSQ was essentially rearranged to make the presentation clearer and completion of the scale more efficient and less time-consuming. The modified DSQ was divided into two parts, one for ratings of discomfort and anxiety, and the other for ratings of 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 which were rated highly in the study by Ehlers et al. (1994). Ten items were removed because of redundancy, inapplicability, or risks to questionnaire length. In addition, 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'.

Driving History

Four items were included to assess the driving history of the participants. These items appear in the section entitled 'Driving History' in Appendix B, and asked participants how many driving-related accidents they had previously been involved in (from 'none' to '5 or more'), how long ago their most recent accident was (in years), whether they had avoided getting their driver's licence because of their fear, and whether they had been charged with any traffic offences (e.g., speeding, parking offences). The coding list for traffic offences can be seen in Appendix C.

Other Fears

A single-item section entitled 'Other Fears' asked the participant 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. The coding list for other fears can be seen in Appendix C.

Accident Fear Questionnaire

As has been previously stated, the present study allowed an opportunity to utilise measures that had only been used once in prior research to date, and to obtain an indication of their potential usefulness with people with driving-related fears. The OQ and DSQ are two such measures used in the present study, and the Accident Fear Questionnaire (AFQ; Kuch et al., 1995) was employed for similar reasons. The AFQ is a 20-item screening scale for accident phobia after a MVA, and was modelled after the Fear Questionnaire developed by Marks and Mathews (1979) (Kuch et al., 1995). Essentially, the AFQ is a measure of MVA-related avoidance (Kuch et al., 1995). The AFQ asks the participant about their MVA and their reactions to it. The first ten items of the AFQ explore the experience of the MVA and related anxiety, with such questions as 'Do you have nightmares about the accident?' and 'Do you easily get upset in the car?'. These ten items are rated as either 'Yes' or 'No', and ratings have been scored as the percentage of participants reporting positive across each item. Results reported by Kuch et al. (1995) for their sample of MVA survivors with accident phobia are compared with those from the present study in Table 30.

The second part of the AFQ consists of ten items which measure fear and avoidance in certain driving situations, and are rated on a scale from 'Would not avoid it' (0) to 'Always avoid it' (8). This yields a total AFQ score ranging from 0 to 80. Findings by Kuch et al. (1995) using this part of the AFQ are compared with the present results in Table 31.

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 participants who had experienced a MVA, and only those participants who had been involved in a MVA completed this section.

Impact of Event Scale

The revised Impact of Event Scale (IES-R; Horowitz, Wilner, & Alvarez, 1979) was used in the present study as a means of comparing the sample with other samples in studies using this standardised instrument. Extensive research exists which has used the IES-R, and a series of studies have used the IES-R with MVA victims. This research is presented in Tables 32 and 33 for ease of comparison with the results of the present study.

The IES-R is a 15-item measure of current subjective distress related to a specific event (Horowitz et al., 1979). The scale was based on a list of items consisting of commonly reported experiences of intrusion and avoidance, and was developed using a sample of 66 people admitted to an outpatient clinic for the treatment of stress response syndromes. The original 20-item scale was reduced to 15 items based on empirical cluster analysis of items which had significant item-to-subscale correlations beyond the 0.01 level of significance (Horowitz et al., 1979).

The IES-R can be seen in the section of Appendix B entitled 'Impact of Event'. Participants were asked to respond to each item in terms of how frequently the item was true for them during the past week. Items included such comments as 'I had dreams about it', 'I tried not to think about it', and 'Any reminder brought back feelings about it'. Items were rated on a scale from 'Not at all' (1) to 'Often' (4). The standard scoring procedure was used with ratings of 1 scored as 0, 2 as 1, 3 as 3, and 4 as 5 (Horowitz et al., 1979). Subscale scores can also be derived from the IES-R. The 7-item intrusion subscale (items 1, 4, 5, 6, 10, 11, and 14) ranges in score from 0-35, and the 8-item avoidance subscale (items 2, 3, 7, 8, 9, 12, 13, and 15) ranges from 0-40. The total IES-R score ranges from 0-75.

Severity thresholds for scores have also been used, with scores between 0-8 reflecting a low level of distress with minor reactions, scores between 9-19 indicating a medium level of distress with moderate reactions, and scores of 20 or more reflecting a high level of distress with reactions of clinical importance (Horowitz et al., 1979; Malt, Karlehagen, Hoff, Herrstromer, Hildingson, & Leymann, 1993). In the original study by Horowitz et al. (1979), the IES-R yielded a split-half reliability coefficient of $r = 0.86$, an internal consistency coefficient of $r = 0.78$ for the intrusion subscale and $r = 0.82$ for the avoidance subscale, and a one-week test-retest reliability of $r = 0.87$ for the total score ($r = 0.89$ and $r = 0.79$ for the intrusion and avoidance subscales, respectively). The correlation between the intrusion and avoidance subscales was $r = 0.42$ ($p<0.0002$), and was thought to indicate an association between the subscales but that they do measure different dimensions (Horowitz et al., 1979).

RESULTS

DATA SCREENING ISSUES

Dealing With Missing Data

Table 11 shows the percentages of missing data on the scales used in the present study. (Missing data on the modified Origins Questionnaire is discussed in a later section of this chapter.) Since all three scales were relatively short (eleven items or less), the decision to prorate those cases with only one item missing on each scale was made and is consistent with standard scoring instructions for other self-report measures such as the STAI-Y (Spielberger et al., 1983). This was considered preferable to other procedures for dealing with missing data, such as replacing them with mean values or deleting them, particularly given that the procedure was used only when one item was missing. In all other cases, listwise deletion was used. For cases with one item missing, the mean values were prorated as follows: For the BR scale, the total of the items was divided by ten; For the NT scale, the total of the items was divided by nine; And for the STAI-Y scale, the total of the items was divided by five. The percentage of cases prorated is also shown in Table 11.

Table 11. Percentages of missing data on the scales used in the present study.

Scale	*No. of items on scale*	*n with missing data*	*%*	*n with one item missing*	*%*
BR	11	61	32.1	17	8.9
NT	10	42	22.1	3	1.6
STAI-Y	6	36	18.9	0	0.0

Percentages rounded to one decimal place

Pathways To Fear

Initial results from the modified Origins Questionnaire (OQ) yielded pathway classifications for only 55% of cases, and 85 participants remained unclassifiable since their responses did not meet all of the original criteria for one pathway (Menzies and Clarke, 1993), as the first column of Table 12 shows.

Table 12. Classification of the sample into fear onset categories based on the original Menzies and Clarke (1993) criteria and the less restrictive criteria.

Pathway	*Original Criteria*		*Less Restrictive Criteria*	
	n	*%*	*n*	*%*
Classical conditioning	27	14.2	52	27.4
Vicarious conditioning	4	2.1	4	2.1
Informational conditioning	9	4.7	13	6.8
Non-conditioning traumatic event	17	8.9	28	14.7
Always been this way	48	25.3	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 classical, vicarious, and informational			2	1.1
Uncodable			8	4.2
Missing	85	44.7	2	1.1
Direct conditioning pathway	27	14.2	52	27.4
Indirect conditioning pathway	13	6.8	17	8.9

Percentages rounded to the one decimal place

Particularly surprising was the low frequency of classical (direct) conditioning cases, given that 78 (41%) participants reported having experienced a MVA. Indeed, one of the main reasons for selecting driving-related fears was that it is *known* that a MVA may have been a direct conditioning event in the onset of the fear. MVAs can reasonably be assumed to be memorable events from which some degree of classical conditioning may occur. However, this was not reflected in the initial classifications into pathways using the original OQ criteria.

In addition, initial hypothesis testing using independent t-tests revealed no significant differences between direct and indirect pathways on the fear severity scales, BR; $t(34) = -.91$, $p = .368$; NT: $t(32) = .05$, $p = .957$; STAI-Y: $t(32) = -1.95$, $p = .060$. Upon closer examination of questionnaire responses made by unclassified participants, it became clear that two factors were contributing to the lack of classifiable pathway designations. Firstly, the original criteria were restricted to *excessive fears*, and some participants did not meet such criteria because they reported not being *excessively* fearful of their most-feared driving-related situation. In other words, it appeared that, while some people met the original criteria and were responding as being excessively fearful, others had more moderate fears and responded as being not excessively fearful.

In light of this, then, it seemed reasonable for the purposes of the present study to allow more flexible criteria in order to classify more cases for analysis. In addition, this also seemed acceptable since an original purpose of the present study was to examine driving-related fears of any severity, from mild to severe anxiety and avoidance. Therefore, the researcher was interested not only in participants who were excessively fearful, but also in those who reported mild to moderate driving-related fears. The change in the criteria for pathway classification specified that, rather than having to indicate being 'excessively fearful of the feared stimulus ever since', the participant could respond negatively to this question in the event that they were not excessively fearful, but rather were more mildly fearful of the feared situation. [This change applies to questions 3(ii), 3(iii), 4(ii), 4(iii), 5(i), 6(i), and 7(i) in the origins section of the research questionnaire]. As a result of adopting this less restrictive criteria, an additional 59 (69%) of the 85 undesignated cases were able to be classified into fear onset pathways, as Table 12 shows.

The second factor contributing to the unclassified cases was that some participants reported *mixed* pathways. Rather than creating separate pathways for these cases, Menzies and Clarke (1993) dealt with mixed pathways by placing them in a 'Cannot classify' category, which was defined as requiring 'inconsistent answers that would otherwise lead to multiple classifications'. The present study, however, considered such multiple pathways to be of interest and worthy of individual classification. Therefore, another 16 (19%) unclassified cases could be accounted for by reports of mixed pathways, as Table 12 shows.

These were treated as separate categories for mixed classical and vicarious onset, mixed classical and informational events, mixed vicarious and informational onset, and mixed classical, vicarious, and informational events.

Chi-square tests were conducted to examine the proportions of subjects classified into the various onset categories as seen in Table 12. More subjects claimed that their fear had arisen in a non-associative traumatic event (n=28), or had always been present in their most-feared driving-related situations (n=48), than were classified into the direct conditioning pathway, $\chi^2 = 4.50$, $p < .05$. In addition, more subjects were classified into the direct conditioning category (n=52) than into the indirect conditioning pathway (n=17), $\chi^2 = 17.75$, $p < .0001$. In total, 85 subjects were classified into associative-learning categories (i.e., classical, vicarious, and informational conditioning, as well as mixed onset cases), compared to 76 subjects in pathways consistent with the nonassociative-learning account. This difference in proportions was not significant, $\chi^2 = .503$, $p = .478$.

EXAMPLES OF PATHWAY DESCRIPTIONS

This section of the chapter provides some examples of onset events described by participants throughout the questionnaire and how they were classified, in order to provide a picture of the types of events producing driving-related fears through different pathways.

Classical Conditioning

Participants were classified into the direct conditioning pathway based on a range of onset events. Most frequently, they had been involved in a MVA, which was broadly defined in the present study as being 'of any severity and involving at least one motorised vehicle'. Therefore, a MVA could include an accident involving two vehicles, or one vehicle colliding with other objects, such as a cyclist, fence, or another person. For example, one participant reported the following event:

> "I was riding (as a) passenger in my own car which was being driven by my husband...We were hit at my level by a driver who ran a stop sign at speed."

A particularly traumatic MVA was reported by a passenger (not her *first* MVA, however):

> "A girlfriend who had just got her licence was driving along a straight long stretch of open road where a car coming towards us, lost control, flew over us, hitting our car. A little 5-year (old) girl was thrown out (killed instantly)...We weren't hurt, just shaken. The driver of the other car had his head split open. The mother lost her arm and was screaming out, crying for her dead daughter. Two other children were seriously hurt."

Another participant described:

> "Cycling home from work...on a wet winter night at 5pm a car went past me and turned right in front of me...I couldn't stop in time and hit him...I flew a few feet and hit the concrete, my head narrowly missing a concrete wall. My bike was unharmed and I had to ride home very fearful and anxious."

Other cases in which designations of classical conditioning were made included near-miss incidents where a MVA was narrowly averted. For example, some participants described the following onset events:

> "I lost concentration and I think for only seconds I fell asleep while driving...I hit a curb, missed the lamp-post but dented the front passenger wheel- result, a puncture. I was very lucky. I was alone in the car at the time."

> "Driving on a narrow, rough, windy road notorious for bad accidents, (I) had a near-miss with a tanker causing us to just about go over a cliff landing in a river way below."

> "Our car and caravan slid in loose gravel at the side of the road...We had pulled over to let the build up of traffic pass. There was an underground stream under the road

> and as we were about to go over...the ground gave way under the left front wheel and I was virtually suspended in mid-air about 200ft above a gully. But the wheel was trapped in the hole so we didn't go over the cliff. My husband was driving at the time."

Direct conditioning was also classified in cases where participants reported particularly stressful situations while driving, which included the presence of the feared stimulus and an event which caused the fear, pain, or distress. For example:

> "The engine blew up. The car stopped and we had to be towed across the highway. The rope broke and we were stuck halfway with traffic coming towards us. Later we fixed the rope and then were towed back...A very frightening experience, especially in retrospect."

Vicarious Conditioning

Participants classified into the vicarious conditioning pathway reported events in which they saw a family member or another person become hurt, frightened, or distressed in the presence of the feared situation. A typical example was:

> "My mother would drive over the 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."

Another participant reported becoming fearful as a result of seeing others become fearful in the presence of the feared situation:

> "On numerous occasions in connection with my profession as a Fire Officer in the NZ Fire Service for 30 years. These are too numerous to relate, but increased my fear and awareness of the end result of my fear."

Instructional Conditioning

Classifications into the instructional conditioning pathway were based on descriptions of events in which the participant was told stories or given warnings or other information related to the feared situation, such as:

> "(My) father was a motor vehicle insurance assessor- I grew up with stories of teeth marks on dashboards, body parts and blood in cars."

> "(I) went to (an) anti-anxiety management group and an example was given about how would anxious people feel in a traffic jam compared to people that don't suffer. A long time after that (months, in fact), I started thinking about it when in traffic."

> "My parents are immigrants from Holland and consider NZ driving attitudes and behaviour atrocious, especially drinking and driving. They always warned me and my sister of the dangers of idiot driving; to us we were to drive sensibly and never be passengers in cars where drivers (were) irresponsible."

> "...Watching those shocking car crashes and bodies...shown on TV not only makes you feeling sick but can really put you off driving...you don't have to be in a car accident, it is bad enough watching or even helping the victims."

Non-Conditioning Traumatic Event

Classification for the non-conditioning traumatic event pathway required the presence of the phobic stimulus *without* an event which caused the fear, pain, or distress. Participants classified into this pathway reported initial onset situations in which no precipitating event occurred, such as panic-like symptoms and sudden, unexpected feelings of terror. For example:

"I didn't want to drive this particular night, but I had to. The person I was with was not very sympathetic. It was a dark country road that I had never driven before. I didn't know the area, and I didn't like the car I was driving. I didn't like the feel of it, nor did it feel safe. I was driving along, being told not to be so stupid. I didn't feel right, then suddenly this paralysing grip came over me, I felt like I was going to tip over, and the car was going to swerve out of control. I couldn't drive the rest of the way home. I was terrified."

"I was alone on the motorway at night in an old car and it became an immediate surge of panicky thoughts and I had all these physical symptoms that subsided when I reached my destination."

"Even though I had driven for years over the bridge and never given it a moment's thought, one day, about 4 years ago, I was driving over to work and suddenly totally out of the blue I had this feeling of going to faint for no particular reason. As it was peak hour traffic, it totally terrified me."

"I was driving to work as usual, along the motorway, when I became acutely aware of traffic feeding onto the motorway on my right as well as from the left. I suddenly felt an incredible fear of not being able to stay in my lane. I felt threatened and as if I had lost all control of where I was going and what I was doing."

'Always Been Fearful' Pathway

Most respondents in this category did not (and were not required to) make any comments, although those who did made statements such as:

"I have never been very confident driving",
"I don't feel my fear of driving is related to any one particular incident",
"Always been a nervous driver",

"I have always lacked confidence with driving, and feel that I am not a good driver and unable to drive properly", and

"For some reason I've always felt this way about driving- apprehensive. But as I get older it's only harder to overcome".

Mixed Pathways

Five participants reported mixed classical and vicarious conditioning events. In the following example, the participant reports the onset event as a classical conditioning event in which she also saw the children in the car become frightened and distressed:

> "I had 4 children in the back seat and 1 in the front...The car stalled on the hill, the hand brake did not work and the foot brake did not work while the motor was off... The car started going backwards, the kids were screaming 'we're going to crash'. I was trying to direct the car to a grassy embankment...as it accelerated I was going wildly from one side of the road to the other. The car went off the road just before the embankment and a shrub caught underneath stopped it. I stayed 'controlled' but inside was absolutely terrified."

Other participants reported separate classical and vicarious events which led to the onset of their fear. For example, one person described the following direct event:

> "When I was 12 I was hit by a car while walking down the street delivering papers- hospital for 2 weeks, thrown 20 feet..." and also a vicarious event:

> "My mom lost control of the vehicle and spun around the road...in the rain...".

Mixed classical and informational pathways were designated in eight cases. These tended to consist of some sort of MVA and separate information or instructions, such as descriptions of MVAs in newspapers, books, films, and other media. One participant described information provided while she was 9-14 years of age and a MVA at age 18 as pathways to her fear:

"When I was biking to work...and was a victim of a hit and run accident. I was left very dazed, bruised, and (with) concussion."

"Other Traffic Officers would tell me what sort of messes in accidents they had come across, beheaded people, burnt people, etc...If I don't watch where I am going and the traffic I'll be hit and killed. My father and mother drummed this into me as my father was a Traffic Officer. My father also took me to the V.I. Depot and showed me cars that people were killed in and showed me accident films showing what the Police saw when they arrived at the scene."

One participant reported vicarious and informational experiences as the origin of her driving-related fear. She described observing her mother's fear and anxiety as well as information from television, movies, and other media. Two people reported a combination of all three conditioning pathways as accounting for the origin of their fear.

Uncodable Cases

Eight participants were unable to be classified into onset pathways. These people either did not complete the section of the questionnaire regarding origins of fear, or their comments were unclassifiable, such as "I don't fear driving I am just not motivated to learn." Others described events in their lives which were unrelated to driving but which they attributed their driving-related fear to, such as the death of a loved one and having had major heart surgery.

OVERVIEW OF THE ANALYSIS

There were three major stages in the present analysis. Firstly, descriptive analyses were conducted in order to provide an indication of the nature of the sample and the extent of their driving-related fears. Secondly, the sample was divided into direct (classical) and indirect (vicarious and instructional) conditioning pathways and the hypotheses were

subsequently tested. Since the observational and informational pathways have been conceptualised as indirect conditioning pathways (Rachman, 1976) and considered to be one pathway in prior research (e.g., Öst, 1991), the present analysis combined the two into a single pathway. Thirdly, analyses were conducted comparing participants who reported experiencing at least one MVA with those who had not been involved in a MVA.

The statistical analyses used in the present study were performed using SPSSPC+ (Norusis, 1988). Prior to analysis, inspection of univariate descriptive statistics revealed no extreme outliers. In addition, although participants' Bodily Reactions (BR) ratings for the direct and indirect pathways were slightly positively skewed and their Negative Thoughts (NT) ratings for both pathways were slightly negatively skewed, the extent of nonnormality did not warrant data transformation.

Mean scores were calculated for the Bodily Reactions scale (BR; Öst & Hugdahl, 1981), the Negative Thoughts scale (NT; Öst & Hugdahl, 1981), and the short-form State-Trait Anxiety Inventory (STAI-Y; Marteau & Bekker, 1992; Spielberger, 1983). The correlations among these three fear severity scales are presented in Table 13.

Table 13. Correlations among the Bodily Reactions (BR), the Negative Thoughts (NT), and the short-form State-Trait Anxiety Inventory (STAI-Y) scales.

	STAI-Y	*NT*
BR	.3180**	.5795**
NT	.2098*	

** $p < .001$
* $p < .01$

Mean ratings for the three severity scales are presented in Table 14. The moderately strong correlation between the BR and the NT scales is consistent with the intention of the scales to measure distinct but related components (i.e., physiological and cognitive) of fear. In comparison, the lower correlation of the short-form STAI-Y with the BR and the NT scales reflects the general response mode intent of the STAI-Y.

Table 14. Means and SDs for the Bodily Reactions (BR), the Negative Thoughts (NT), and the short-form State-Trait Anxiety Inventory (STAI-Y) scales.

Scale	*Mean*	*SD*	*n*
BR	1.9611	.8185	124
NT	1.8919	.8085	124
STAI-Y	3.1882	.5675	124

BR: Item range (0-4 scale).
NT: Item range (0-4 scale).
STAI-Y: Item range (1-4 scale).

The most frequently reported driving-related fears across the entire sample regardless of ranked position (e.g., first-ranked, etc.) are presented in Table 15 (from the narratives coded by the researcher, derived from responses to the single-item section of the questionnaire entitled 'Your Fear') (See Appendix C for the coding list).

Table 15. The ten most frequently reported driving-related fears in the present study.

Self-reported Fear	*n*	*%**
1. Collision or accident (MVA)	77	40.5
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)	65	34.2
3. Driving on the motorway	27	14.2
4. Driving with certain people or drivers or other drivers in general	27	14.2
5. Driving in certain weather conditions	26	13.7
6. Driving in a traffic jam or congested, heavy traffic	25	13.2
7. Driving fast or in fast-moving traffic	22	11.6
8. Driving in an unfamiliar area or situation	21	11.1
9. Not being able to react or make decisions fast enough, or making errors in judgement while driving	19	10.0
10. Losing control of the car or not being in control of the driving situation	18	9.5

* Percent of respondents who included the fear item among their ranked fears, rounded to one decimal place. Items with the same percentage have been listed in alphabetical order.

DESCRIPTIVE ANALYSES

Descriptive analyses were initially conducted in order to describe the characteristics of the sample in more detail, particularly in relation to other studies, and to provide an indication of the extent of their driving-related fears.

Driving History

A current driver's licence was held by 170 (90%) of the sample, and 37 (19%) participants indicated they had avoided obtaining their driver's licence because of their driving-related fear(s). This suggests a relatively high level of avoidance. The sample had been driving for a mean of 20.98 years (SD = 14.47, range 0-64 years, n = 187). The number of MVAs reported by the sample can be seen in Table 16. Most (73%) of the sample reported 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, their most recent accident was, on average, 9.68 years ago (SD = 10.18, range 1 year or less - 40 years, n = 121).

Table 16. Number of MVAs reported by the sample.

Number of MVAs	*n*	*%*
none	45	23.7
1	55	28.9
2	38	20.0
3	17	8.9
4	11	5.8
5 or more	16	8.4

Percentages rounded to one decimal place

Traffic offences reported by the sample can be seen in Table 17. Most offences (28%) reported were either speeding or parking offences.

Table 17. Traffic offences reported by the sample (more than five participants).

Traffic Offence	*n*	*%**
Exceeding the speed limit or speed camera fines	39	20.5
Parking infringements and offences	15	7.9
Careless use of a motor vehicle	5	2.6
Failure to stop or following too close	5	2.6

* Percent of respondents who included the item among their ranked offences, rounded to one decimal place. Items with the same percentage have been listed in alphabetical order.

Other Fears

Other fears reported by the sample are shown in Table 18.

Table 18. Other fears reported by the sample (more than five participants).

Fear	*n*	*%**
Heights	33	16.8
Enclosed spaces	22	11.6
Flying	13	6.8
Deep water	10	5.3
Fire	8	4.2
Home being burgled	8	4.2
Death or dying	7	3.7
Spiders	7	3.7
Crowds or queues	6	3.2
Earthquakes or other natural disasters	6	3.2
Obsessive-compulsive behaviour (contamination, doubt)	6	3.2
Speaking in public	6	3.2
Being attacked or raped	5	2.6
Being evaluated or observed	5	2.6
Dogs	5	2.6
Elevators or escalators	5	2.6
Insects	5	2.6

* Percent of respondents who included the fear item among their ranked fears, rounded to one decimal place. Items with the same percentage have been listed in alphabetical order.

Fear Intensity and Helpseeking Behaviour

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 (SD = 3.00, n = 188). Table 19 provides information regarding which people the sample had spoken with about their driving-related fear(s).

Table 19. Percentage of the sample who had spoken with different people regarding their driving-related fear(s).

Person Spoken With	*n*	*%*
Friends	131	68.9
Partner or spouse	126	66.3
Other family members	121	63.7
Mental health professional	37	19.4
Medical professional	33	17.4
Other person	26	13.7

Percentages rounded to one decimal place.

Prior help from a mental health professional for any personal or emotional problems had been sought by 74 (39%) of participants. The extent to which the sample felt they needed professional psychological help for their driving-related fear and the likelihood that they would seek such help is shown in Table 20. As the means indicate, 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(s).

Table 20. Percentage of the sample who felt a need for and a likelihood to seek professional psychological help for their driving-related fear(s).

	Helpseeking Behaviour	*n*	*%*	*Mean (SD)*	*N*
Perceived Need for Help ***(scale 1-7)***				3.01 (1.92)	184
1	no need	61	32.1		
2		27	14.2		
3		24	12.6		
4		29	15.3		
5		20	10.5		
6		10	5.3		
7	extreme need	13	6.8		
Perceived Likelihood to Seek Help ***(scale 1-9)***				3.03 (2.63)	186
1	extremely unlikely	85	44.7		
2		25	13.2		
3		21	11.1		
4		8	4.2		
5		14	7.4		
6		3	1.6		
7		11	5.8		
8		3	1.6		
9	extremely likely	16	8.4		

* Percentages rounded to one decimal place.

Driving Situations

The highest mean anxiety ratings made on the modified Driving Situations Questionnaire (DSQ) used in the present study are shown in Table 21, while mean avoidance ratings are presented in Table 22. For both avoidance and anxiety, the highest mean rating was made for driving alone in some situation other than those itemised on the questionnaire. Examples of such situations included driving in an unfamiliar area, drunk drivers, driving on country roads, driving on open roads, driving at night, traffic lights, driving where children are playing on the side of the road, and driving when in a hurry. In the study by Ehlers et al. (1994), driving situations were grouped into 'other situations' (which included specific types of roads, such as bridges and tunnels) and 'specific circumstances' (such as heavy traffic, at night, unfamiliar car, fog, and rain) from which overall means were derived (see Table 23).

In the present study, however, each driving situation was examined individually, which made comparison with the Ehlers et al. (1994) study more difficult but which provided more specific information about feared driving situations.

Table 21. Mean discomfort / anxiety ratings and SDs in different driving situations.

Driving Situation	*Mean rating (SD)*	*n**
Discomfort / anxiety ratings *(0-4)*		
Driving alone- other situation	3.18 (1.17)	40
Driving accompanied with somebody who criticises your driving	3.05 (1.15)	141
Driving alone in fog	2.90 (1.24)	152
Driving alone with somebody who criticises your driving	2.87 (1.40)	118
Driving alone in an unfamiliar car	2.82 (1.34)	148
Driving alone at night	2.75 (1.23)	161
Driving accompanied in fog	2.74 (1.26)	147
Driving accompanied- other situation	2.74 (1.29)	43
Driving alone in heavy traffic	2.72 (1.27)	158
Driving alone on the motorway	2.69 (1.22)	154
Driving accompanied in heavy traffic	2.59 (1.30)	157
Driving alone when tired	2.59 (1.14)	140
Driving accompanied in an unfamiliar car	2.58 (1.32)	147
Driving alone when stressed for other reasons than driving	2.58 (1.16)	147
Driving accompanied when tired	2.54 (1.18)	137
Driving accompanied when stressed for other reasons than driving	2.52 (1.14)	141
Driving alone in rain	2.51 (1.23)	160
Driving accompanied on the motorway	2.51 (1.26)	151
Driving accompanied at night	2.48 (1.23)	157
Driving accompanied in rain	2.41 (1.25)	157
Other person driving- other situation	2.25 (1.75)	57
Driving alone over bridges	2.21 (1.44)	155
Driving alone with children in the car	2.20 (1.34)	127
Driving alone through tunnels	2.18 (1.40)	137
Other person driving in fog	2.12 (1.44)	161
Driving alone in the city	2.11 (1.40)	158
Driving accompanied over bridges	2.09 (1.42)	152
Driving accompanied with children in the car	2.09 (1.29)	133
Driving accompanied through tunnels	2.07 (1.37)	136
Driving accompanied in the city	2.00 (1.32)	159

* n = number of subjects who endorsed each driving situation (items were not always endorsed by all subjects)

Table 22. Mean avoidance ratings and SDs in different driving situations.

Driving Situation	*Mean rating (SD)*	*n*
Avoidance ratings ***(0-4)***		
Driving alone- other situation	2.65 (1.48)	40
Driving alone in an unfamiliar car	2.58 (1.48)	142
Driving alone with somebody who criticises your driving	2.43 (1.51)	116
Driving accompanied with somebody who criticises your driving	2.42 (1.55)	123
Driving alone when tired	2.39 (1.39)	148
Driving accompanied in an unfamiliar car	2.37 (1.53)	131
Driving accompanied- other situation	2.36 (1.59)	42
Driving alone on the motorway	2.34 (1.54)	153
Driving alone in heavy traffic	2.31 (1.45)	153
Driving alone at night	2.29 (1.42)	157
Driving accompanied when tired	2.27 (1.39)	137
Driving alone in fog	2.22 (1.50)	149
Driving accompanied on the motorway	2.19 (1.57)	140
Driving accompanied in heavy traffic	2.13 (1.46)	143
Driving accompanied when stressed for other reasons than driving	2.13 (1.38)	133
Driving accompanied in fog	2.12 (1.48)	136
Driving alone when stressed for other reasons than driving	2.10 (1.40)	145
Driving accompanied at night	2.08 (1.41)	145

Table 23. Mean discomfort / anxiety ratings and SDs in different driving situations reported in the study by Ehlers et al. (1994).

Discomfort / anxiety ratings (0-4)	*Phobics mean (SD)*	*Controls mean (SD)*
Driving alone on a freeway	3.00 (1.11)	.49 (.46)
Driving accompanied on a freeway	2.73 (1.07)	.41 (.50)
Driving alone in other situations	2.67 (.90)	.39 (.50)
Driving accompanied in other situations	2.55 (.97)	.33 (.39)
Driving alone under special circumstances	2.32 (1.03)	.96 (.77)
Driving accompanied under special circumstances	2.16 (1.02)	.92 (.73)
Other person driving (residential area, freeway, bridges, busy urban thoroughfare, tunnels)	1.36 (1.06)	.16 (.31)
Driving alone in busy urban thoroughfare	1.35 (1.22)	.17 (.23)
Other person driving under special circumstances	1.34 (1.02)	.92 (.71)
Driving accompanied in busy urban thoroughfare	1.30 (1.19)	.20 (.31)
Driving alone in residential area	.90 (.98)	.09 (.12)
Driving accompanied in residential area	.81 (.81)	.08 (.12)

For both anxiety and avoidance ratings, driving alone was consistently rated more highly than driving accompanied in all but two cases, which were 'driving with somebody who criticises your driving' and 'driving when stressed for other reasons than driving'. Driving alone and driving accompanied on a freeway were ranked the highest in the study by Ehlers et al. (1994), with means of 3.00 and 2.73, respectively. The comparative means from the present study were 2.69 and 2.51.

THE HYPOTHESES

Hypothesis 1:
Ascribed Pathway and Strength of Fear

As Table 15 showed, 52 (27%) participants were classified into the direct pathway (henceforth, Direct respondents) and 17 (9%) into the indirect pathway (henceforth, Indirect respondents). The hypothesis that respondents would ascribe strong fears to the direct pathway and moderate fears to the indirect pathway was tested using one-tailed independent t-tests. No significant differences were found, as Table 24 shows. Contrary to the prediction, there were no significant differences between Direct and Indirect respondents on the BR, the NT, and the STAI-Y scales. Furthermore, means on the BR and the NT scales were slightly higher for the *Indirect* respondents.

Table 24. Mean item ratings, SDs, and t-values for the Bodily Reactions (BR), the Negative Thoughts (NT), and the short-form State-Trait Anxiety Inventory (STAI-Y) scales according to ascribed pathway.

	Direct			*Indirect*				
Scale	***Mean***	***SD***	***n***	***Mean***	***SD***	***n***	***t (df)***	***p***
BR	1.9554	.722	43	2.0260	.922	14	-.30 (1,55)	.384
NT	1.8293	.829	41	2.0923	.975	13	-.96 (1,52)	.172
STAI-Y	3.2500	.539	38	3.1556	.498	15	.59 (1,51)	.280

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 25). Oneway 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. For these analyses, the mean scores for the pathways listed in Table 25 were compared with one another, as well as the mean scores for the direct and indirect pathways. The ANOVA revealed no significant effect among the pathways for BR, $F(5, 136) = 1.99$, $p = .08$; NT, $F(5, 132) = 1.09$, $p = .37$; and STAI-Y, $F(5, 128) = .73$, $p = .61$. The Bartlett-Box and Cochran's C statistics were used to test for homogeneity of variance and indicated that the variance did not differ significantly between the two groups.

Table 25. Means and SDs for the Bodily Reactions (BR), the Negative Thoughts (NT), and the short-form State-Trait Anxiety Inventory (STAI-Y) for participants classified into pathways other than direct and indirect conditioning.

	BR		*NT*		*STAI-Y*	
Pathway	***Mean (SD)***	***n***	***Mean (SD)***	***n***	***Mean (SD)***	***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*	1.79 (0.84)	13	1.68 (0.79)	13	2.99 (0.68)	14

* 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)

Hypothesis 2:

Ascribed Pathway and Anxiety Responses

Hypothesis 2 proposed that respondents would have higher levels of physiological than cognitive responses for directly-conditioned fears, but for indirectly-conditioned fears they would have lower physiological than cognitive responses. A repeated-measures multivariate analysis of variance (MANOVA) was conducted to determine whether the pattern of anxiety response mode differed significantly with ascribed pathway. The fear reactions response mode (the Bodily Reactions (BR) and the Negative Thoughts (NT) scales) was the within-subjects factor and the type of pathway (direct and indirect) was the between-subjects factor. Mean self-reported ratings on the BR and the NT scales are shown in Table 26. The MANOVA revealed no significant interaction effect, $F(1,50) = .05$, $p = .82$. Furthermore, there were no main effects for pathway, $F(1,50) = .58$, $p = .45$, or anxiety response mode, $F(1,50) = 2.75$, $p = .10$. The Box's M, Bartlett-Box, and Cochran's C statistics were used to test for homogeneity of variance and indicated that the variance did not differ significantly between the two groups.

Table 26. Mean item ratings and SDs for the Bodily Reactions (BR) and the Negative Thoughts (NT) scales according to ascribed pathway.

	BR			*NT*		
Pathway	***Mean***	***SD***	***n***	***Mean***	***SD***	***n***
Direct	1.985	.732	40	1.803	.821	40
Indirect	2.189	.878	12	1.950	.866	12

Hypothesis 3:

Ascribed Pathway and MVA Experiences

Hypothesis 3 proposed that respondents who had been involved in a MVA would be more likely to ascribe their fear to the direct pathway than those who had not been involved

in a MVA. Table 27 shows that almost all (93.5%) of the 46 respondents who reported experiencing at least one MVA ascribed their fear to the direct pathway. In comparison, only 39% of those who had *not* experienced a MVA ascribed their fear to the direct pathway. This prediction was analysed using a chi-square test, which revealed that the proportions were significantly different, $\chi^2 = 24.39$, $p < .00001$.

Table 27. Percentages of respondents in the direct and indirect pathways reporting having experienced or not experienced at least one MVA.

	MVA		*non-MVA*		
	n	***%***	***n***	***%***	χ^2
Pathway					
Direct	43	93.5	9	39.1	
Indirect	3	6.5	14	60.9	
					24.39*
Total	46	100.0	23	100.0	

* $p < .00001$

HYPOTHESES 1 AND 2 ON MVA RESPONDENTS

Given the lack of significant differences found in terms of testing Rachman's theory using the whole sample, and the significance of the third hypothesis regarding MVA experiences and pathway ascriptions, post-hoc analyses were conducted to examine the differences between participants who reported having experienced a MVA and those who did not. This analysis was undertaken in order to expand the ability of the study to test the hypotheses. A further rationale for this was that most (93.5%) participants who reported having experienced a MVA (henceforth, MVA respondents) ascribed their fear to the direct pathway, while 61% of those who had not been involved in a MVA (henceforth, non-MVA respondents) endorsed the indirect pathway. This also addressed concerns that Menzies and Clarke's (1993) Origins Questionnaire may have been excessively stringent in determining direct conditioning pathways. The following section focuses on comparing subjects who reported having experienced a MVA with those who reported no MVA history.

Hypothesis 1:

MVA Experiences and Strength of Fear

The hypothesis that MVA respondents would report strong fears (direct pathway) and non-MVA respondents would report moderate fears (indirect pathway) was tested using one-tailed independent t-tests. As Table 28 shows, no significant differences were found between MVA respondents and non-MVA respondents in terms of strength of fear. However, the difference in means on the BR scale approached significance, with MVA respondents reporting a higher mean BR score than non-MVA respondents.

Table 28. Mean item ratings, SDs, and t-values for the Bodily Reactions (BR), the Negative Thoughts (NT), and the short-form State-Trait Anxiety Inventory (STAI-Y) scales according to MVA experiences.

	MVA			*non-MVA*				
Scale	*Mean*	*SD*	*n*	*Mean*	*SD*	*n*	*t (df)*	*p*
BR	2.0778	.808	61	1.8474	.885	88	1.62 (1,147)	.05
NT	1.8373	.856	59	1.9247	.853	85	-.60 (1,142)	.27
STAI-Y	3.1939	.548	55	3.1279	.594	86	.66 (1,139)	.25

Hypothesis 2:

MVA Experiences and Anxiety Responses

A repeated-measures MANOVA was conducted to determine whether the fear severity score patterns differed significantly with MVA experiences, with factors anxiety response mode as the within-subjects factor (the Bodily Reactions (BR) and the Negative Thoughts (NT) scales) and MVA experiences as the between-subjects factor (MVA and non-MVA respondents). Mean self-reported ratings on the BR and the NT scales are shown in Table 29. The MANOVA revealed no significant interaction effect, $F(1,134)= 3.22$, $p =$

.08. Furthermore, there were no main effects for MVA experiences, F (1,134) = .18, p = .68, or anxiety response mode, F (1,134) = 2.08, p = .15. The Box's M, Bartlett-Box, and Cochran's C statistics were used to test for homogeneity of variance and indicated that the variance did not differ significantly between the two groups.

Table 29. Mean item ratings and SDs for the Bodily Reactions (BR) and the Negative Thoughts (NT) scales according to MVA experiences.

	BR			*NT*		
MVA Experiences	***Mean***	***SD***	***n***	***Mean***	***SD***	***n***
MVA	2.055	.812	56	1.845	.830	56
non-MVA	1.883	.879	80	1.906	.818	80

Although the interaction effect was not significant, it did approach significance and the pattern of means resembled that hypothesised, as Figure 1 shows.

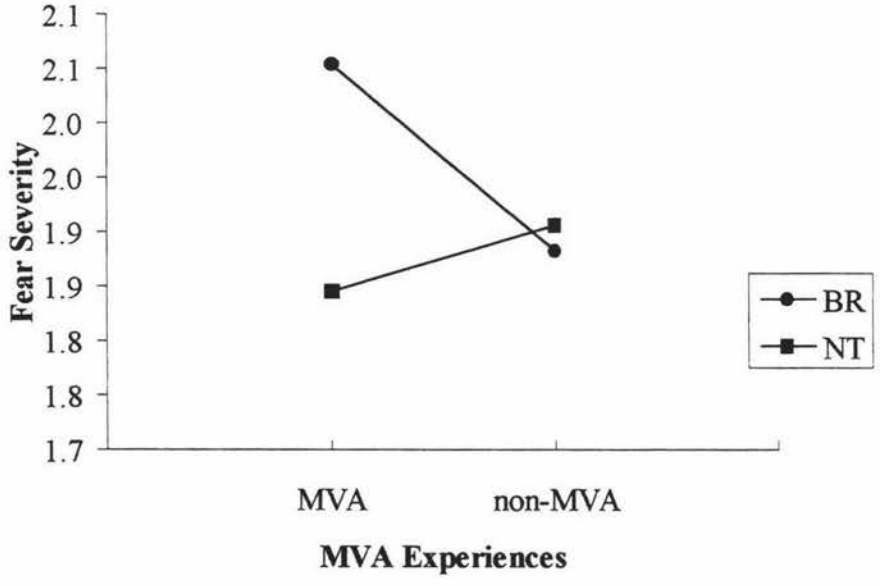


Figure 1. The relationship of MVA experiences to anxiety response patterns.

Accident Fear Questionnaire

Results from items 1 to 10 on the Accident Fear Questionnaire (AFQ; Kuch et al., 1995) can be seen in Table 30. All data are presented in order to provide an item-by-item comparison with prior research. 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 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 utilised in both studies. These comparisons are preliminary and descriptive in nature and should be interpreted cautiously given the relatively small sample in the study by Kuch et al. (1995).

Table 30. Results of AFQ items 1 to 10 compared with those from the study by Kuch et al. (1995) with 14 accident phobics.

Items	*n*	*% reporting positive*	
		Present Study	*Kuch et al. (1995)*
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

Table 31 shows the differences between means on items 11 to 20, again reflecting a difference in severity that may be inherent in the nature of the different samples employed. The sample used in the present study is clearly not as severe as those used in clinical research, even though people who have been involved in MVAs are examined separately. This may be because the average length of time since their MVA (9.68 years) in the present study was considerably longer that the mean (3.62 years) reported in the study by Kuch et al. (1995).

Table 31. Results of AFQ items 11 to 20 compared with those from the study by Kuch et al. (1995) with 14 accident phobics.

Items	*n*	*Mean (SD)*	
		Present Study	*Kuch et al. (1995)*
Since your accident, do you avoid:			
11. Driving 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)

The difference between studies in total scores on the AFQ was analysed using a two-tailed t-test, which revealed a significant difference, $t(1, 29) = 3.239$, $p<.001$. 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.

Impact of Event Scale

The means and standard deviations for the Impact of Event Scale for the present study as well as previous research using the IES-R can be seen in Table 32. Compared with other studies which have used the IES-R with MVA survivors, the means from the present study are relatively similar to studies of fearful and undiagnosed individuals. It was expected that the means for the present study would be lower than those from a sample experiencing PTSD reactions. The data in Table 32 are consistent with this prediction. Given the average length of time since the MVA in the present study (mean = 9.68 years), the means from the sample are either similar or higher than comparable studies, particularly those by Malt (1988) and Brom et al. (1993). These means suggest that the sample employed in the present study is comparable to those utilised in previous research. However, the sample size is still relatively small, therefore making such comparisons tentative.

Table 32. Summary of studies using the IES-R with MVA survivors, compared with the findings from the present study.

Study	*N*	*Time since MVA*	*Total IES-R Mean (SD)*	*Intrusion subscale Mean (SD)*	*Avoidance subscale Mean (SD)*
Fear reactions					
Kuch et al. (1995)	14	mean=3.6yrs	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 et al. (1993)	24	18 months	40.57 (14.94)	21.43 (8.14)	19.14 (11.02)
Kuch et al. (1995)	12	mean=3.6yrs	44.80 (8.42)	22.68 (4.39)	22.07 (5.20)
Undiagnosed					
Brom et al. (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=9.68yrs	22.92 (16.77)	11.50 (8.79)	11.90 (9.73)

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

Table 33 provides a breakdown of IES-R scores according to severity thresholds, which have been used in prior research to determine those fears which are of clinical importance. Scores from the present study are provided alongside those from previous research which has used severity thresholds for the IES-R (the study by Malt et al. (1993) provided no severity threshold scores for the total IES-R score). Scores between 0-8 reflect a low level of distress with minor reactions, scores between 9-19 indicate a medium level of distress with moderate reactions, and scores of 20 or more reflect a high level of distress with reactions of clinical significance (Horowitz et al., 1979; Malt et al., 1993). Overall, the scores in Table 33 indicate that the sample demonstrated a high level of distress, although both subscale scores reflected a moderate level of distress.

Table 33. Means, SDs, and severity thresholds for the total IES-R and the intrusion and avoidance subscales for the present study (n = 40) and the research by Malt et al. (1993) with 101 train drivers.

		% with level of distress		
Study	*n*	*Low (0-8)*	*Medium (9-19)*	*High (20-35)*
Malt et al. (1993)	101			
Intrusion subscale				
acute (hours to days post-accident)		43	43	14
1 month		67	25	8
1 year		76	16	8
Avoidance subscale				
acute (hours to days post-accident)		53	37	10
1 month		71	27	2
1 year		69	28	3
Present Study (mean = 9.68yrs post-MVA)	40*			
Intrusion subscale		40	43	18
Avoidance subscale		43	38	20
Total IES-R score		29	11	61

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

Reliability tests for the total IES-R yielded an internal consistency coefficient of $r = 0.89$, and the split-half reliability coefficient was $r = 0.88$. The intrusion subscale yielded an internal consistency coefficient of $r = 0.85$ and a split-half coefficient of $r = 0.77$. The coefficients for the avoidance subscale were $r = 0.82$ and $r = 0.84$, respectively. The correlation between the intrusion and avoidance subscales was $r = 0.67$ ($p<.001$), indicating a relatively high association between the subscales.

DISCUSSION

In the present study, no support was found for the predictions derived from Rachman's three-pathways theory of fear acquisition. Neither pathway ascriptions nor anxiety response patterns were in the hypothesised directions. The hypothesis that subjects with MVA experiences would be more likely to ascribe to the direct conditioning pathway was confirmed by the results. Post-hoc analyses comparing MVA respondents with non-MVA respondents revealed that predicted anxiety response patterns approached significance. For clarity and ease of comprehension, this chapter follows the same outline as that of the previous section, with the findings of descriptive analyses, hypotheses, and post-hoc analyses discussed respectively.

DESCRIPTIVE ANALYSES

Descriptive analyses provided an opportunity to gauge the nature and characteristics of the sample used in the present study. An unexpected finding was the frequency of driving-related fears and the number of people who volunteered their participation. An examination of gender ratios revealed that the sample was predominantly (92%) female. This disproportionate ratio was surprising, particularly when motor vehicle accident statistics are considered. For example, out of 16,870 people injured in MVAs on New Zealand roads in 1995, 59% (9,875) were male and 41% (6,995) were female (Traffic Research and Statistics Section, Land Transport Safety Authority, 1995). It would be expected from these statistics that more males would develop driving-related fears than females, although this was not reflected in the present findings. Similarly, the proportion of females was higher than that of males in all but one of the studies on driving-related fears summarised earlier in Table 2. Mathew et al. (1982) questioned whether the predominance of females in their sample indicated a higher prevalence of driving phobia among females or was better accounted for by sampling error. They noted, however, that the prevalence of phobias in general tends to be greater in females (Agras, Sylvester, & Oliveau, 1969; Mathew et al., 1982).

One possible explanation for this is that males may manifest other reactions to MVAs (e.g., PTSD), and perhaps do not exhibit driving-related fears to the degree that females do. Another possibility could be that the sampling methodology used in the present study was not conducive to recruiting male subjects with driving-related fears, and that males may be less likely to volunteer their participation in fear research or to seek help for driving-related fears. A less plausible explanation is that fewer males than females consume radio- and newspaper-based information. The implications of this finding for treatment highlight the importance of follow-up with female survivors of MVAs who may be potentially more 'at risk' for developing driving-related fears.

The sample was also characterised by an older age group, as 66% of the sample was aged between 30 and 59 years. The mean age of the sample was 46.5 years. This tendency for subjects with driving-related fears to be older is mirrored by previous research in the area in which respondents have ranged in age from a mean of 31.1 years to 51.3 years. This is also surprising considering the relatively young age of MVA victims. In 1995, almost two-thirds (60%) of all males and more than half (55.2%) of all females injured in MVAs on New Zealand roads were less than thirty years of age (Traffic Research and Statistics Section, Land Transport Safety Authority, 1995). This apparent delay in onset could be due to factors such as decreasing confidence, loss of driving skills, increasing importance of safety concerns, an increase in self-awareness and self-consciousness, or a possible reluctance of younger people to complete questionnaires. Whatever the cause, the present study is consistent with previous research which suggests that driving-related fears tend to be associated with females and an older age group.

In terms of driving history, it appears from the results that the sample was characterised by a relatively high level of avoidance, as almost one-fifth (19%) of respondents indicated having avoided obtaining a driver's licence because of their driving-related fear(s). This was a striking finding, especially considering the nonclinical nature of the sample and drivers' licence statistics. In 1996, 2,536,888 people in New Zealand aged 19 years and older (from a population of 2,600,000) held a current car or light van licence (20% of these people also held a motorcycle licence). Therefore, only 2.4% (63,112) of the population did not hold a licence in 1996, which is in stark contrast to the 19% obtained in

the present sample with driving-related fears. This finding seems to reflect the impact of driving-related fears on people's lives.

This conclusion was supported by the results of the section on fear intensity and helpseeking behaviour, which indicated a moderate self-reported rating of how much the fear interfered with the individual's daily life. However, despite this moderate level of distress, on average the sample rated a low to medium perceived need for and likelihood to seek help. These ratings were lower than those obtained in a study of 107 nonclinical university students (Deane & Todd, 1996), although the latter study did not examine the same problem domain as in the present study.

Almost two-fifths (39%) of the sample had sought prior help for personal or emotional problems, which is very similar to the 40% of subjects in the study by Deane and Todd (1996) who had sought such help. This suggests that a percentage of those with driving-related fears may have some kind of 'emotional susceptibility' in terms of experiencing personal or emotional difficulties. This indication is supported by the results of other fears endorsed by respondents in the present study. A range of other fears were reported, although fears of heights and of enclosed spaces were predominant and were endorsed by 29% of the sample. However, what is unclear regarding this vulnerability hypothesis is whether people with driving-related fears are susceptible to many different kinds of fears, or whether people become fearful of driving-related situations and *then* develop a susceptibility to other fears. Future research may need to focus on establishing cause and effect with respect to any vulnerability hypothesis.

Also of interest was the finding that, of those respondents who reported having experienced at least one MVA, their most recent accident occurred on average almost ten years ago. While the average time since the MVA was lengthy, it cannot be ascertained whether the MVA was the onset event for the fear or whether the driving-related fear was present prior to the MVA. If a MVA was of any influence in the onset of their driving-related fears, it seems safe to assume that the sample had been fearful for a relatively long period of time.

Descriptive comparisons were made between feared driving situations from the ratings on the modified Driving Situations Questionnaire (DSQ) and the narratives obtained

from the initial self-report item ('Your Fear'). It was expected that particularly difficult driving manoeuvres, stressful driving situations, and MVAs would be rated highly on the DSQ and also reported on the open-ended question. However, an item with a relatively high rating on the DSQ was 'driving alone or accompanied with somebody who criticises your driving' (see Tables 22 and 23). In addition, this item was consistently ranked highly for *both* anxiety and avoidance ratings, and was endorsed by *more* respondents than the highest-ranked situation ('driving alone- other situation'). Indeed, 74% of respondents indicated 'high anxiety' in regard to 'driving accompanied with somebody who criticises your driving', while 62% made relatively high anxiety ratings regarding 'driving alone with somebody who criticises your driving'. Avoidance rankings for the same item were made by 65% (driving accompanied) and 61% (driving alone) of respondents.

In comparison, on the open-ended question, the category 'driving with certain people' was coded to include 'driving with people who criticise one's driving', although it also included other situations, such as 'having no control over other drivers', 'being pressured by other drivers', and 'other drivers in general' (see Appendix C). 'Driving with certain people' was reported by 14% of respondents. This finding suggests that the DSQ provides a prompt to respondents to endorse fears that they would otherwise not have self-reported using an open-ended question. Further evidence for this suggestion is that some items which were reported by relatively few (less than 15%) respondents were ranked by comparatively high proportions (72-85%) of respondents on the DSQ (e.g., 'driving on the motorway', 'driving in certain weather conditions', and 'driving in heavy traffic'). Furthermore, implications for treatment are evident from high ratings of concern regarding driving with people who criticise one's driving. In particular, this suggests that people are concerned about negative evaluation, and that an intervention for such people might include an assertiveness-training component. However, these suggestions are tentative given the exploratory and descriptive nature of the present study.

Therefore, the results of the initial descriptive analyses indicated that the sample was characterised by quite a high level of anxiety and avoidance associated with their driving-related fears. The sample was predominantly female and aged between 30 and 60. It is also notable that the driving-related fears of the sample appeared to be of sufficient severity to

have behavioural effects such as avoidance of obtaining a driver's licence. The results seem to indicate that the DSQ may be helpful in terms of prompting people to endorse otherwise unreported (or underreported) driving-related fears. It could also be argued that the DSQ is useful because it allows *some* specification of situations which would otherwise fall into some amorphous 'other' category. The findings also suggest that obtaining self-reported fear is useful, as respondents endorsed self-report items which did not appear on the DSQ, such as fears of having MVAs.

THE HYPOTHESES

Ascribed Pathway and Strength of Fear

The hypothesis that respondents would ascribe strong fears to the direct pathway and moderate fears to either of the two indirect pathways was not supported by the results for the Bodily Reactions (BR) and the Negative Thoughts (NT) scales. The pattern of results for the short-form state anxiety (STAI-Y) scale, however, was in the predicted direction, although the difference in mean scores between the direct and indirect pathways did not reach significance.

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 Table 8 summarised, the three existing studies in the area all reported percentages of between 70% and 100% for direct pathway ascriptions. 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, while previous studies have reported percentages of 25% (Sartory et al., 1992) and 28% (Ehlers et al., 1994). Particularly surprising was the very low proportion of vicarious conditioning respondents in the present study (2.1%), while the two studies previously mentioned reported percentages of 19% and 12%, respectively, for vicarious pathway ascriptions.

This discrepancy in pathway ascriptions between the present study and previous research on the acquisition of driving-related fears 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, have 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). The ascriptions in the present study, however, 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 (63%) 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.

Nevertheless, it cannot be assumed that the ascription to nonassociative pathways to fear necessarily means that there are no memories of onset events. In particular, 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 connect such small events with the original conditioning pathway, hence reporting *no memories* of any associative-learning events. This would suggest important implications for attempting to deal with memory difficulties in future research. Indeed, this 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 and their contribution to fear acquisition.

In addition, 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 concur with those of Menzies

and Clarke (1993), who used a nonclinical sample of fifty height-fearful university students. As Table 34 shows, both studies found that significantly more respondents claimed that their fear had always been present, or had arisen in a non-conditioning traumatic event (i.e., nonassociative pathways to fear), than were classified into the direct conditioning pathway. Indeed, very few subjects were classified into the classical conditioning pathway in both studies, which is in sharp contrast to the percentages reported by Öst and his colleagues, whose series of studies found that between 45.5% and 81.3% of subjects ascribed to the direct pathway (Menzies & Clarke, 1993). However, the studies by Öst and colleagues used a clinical sample, which may account for the findings.

Table 34. Classification of fearful respondents into onset categories based on the OQ in the present study and in research by Menzies and Clarke (1993) with 50 height-fearful subjects.

	Present Study		*Menzies & Clarke (1993)*	
Pathway	***n***	***%***	***n***	***%***
Direct	52	27.4	9	18.0
Indirect	17	8.9	14	28.0
Associative* (Direct + Indirect)	85	44.7	23	46.0
Nonassociative*	76	40.0	21	42.0

*Associative pathway: Direct and Indirect respondents
Nonassociative pathway: Non-conditioning traumatic event and 'Always been this way'

The difference in pathway ascriptions found in the present study compared with those in other research may also be due to the nature of the fear investigated in the present study. Öst and his colleagues have never studied driving-related fears, and it is possible that the low percentage of cases in the Direct and Indirect pathways in the present study was due to differences between the characteristics of different fears, as suggested by Menzies and Clarke (1993). However, the use of a different measure to investigate the origins of fear (OQ) in the present study may also have contributed to the disparate findings. It has been argued that the use of Öst and Hugdahl's (1981) POQ 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.

A further possible reason for the low percentage of Direct respondents in the present study may concern the characteristics of the present sample. Respondents were a nonclinical sample of community volunteers recruited through advertising, rather than phobic patients who had sought treatment for their driving-related fear. While their anxiety and avoidance behaviour responses suggested that some were very distressed and experiencing symptoms consistent with phobic-level problems, it has previously been acknowledged that the sample was not as severe or symptomatic as phobic groups. Although Rachman (1977) and Öst and Hugdahl (1985) have argued that common, everyday fears are more likely to be acquired indirectly than classically conditioned, the present study does not support this conclusion. However, it is important to be aware of the different criteria for pathway ascriptions that have been used in these studies. Nevertheless, generalisations from the present study to clinical samples are difficult to make, and confirmation of the present results with phobic subjects who are seeking treatment is necessary.

It is notable that the highest mean BR and NT 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 spontaneous panic attacks as the pathway to their fear. Such panic attacks are typically accompanied by quite severe physical symptoms and distressing negative cognitions (Kaplan et al., 1994). However, it is surprising that Direct respondents do not have a similar or higher mean BR score, particularly for those who experienced MVAs and sustained physical injuries as a result. The mean STAI-Y scores for all pathways are within a relatively narrow range from 2.98 to 3.25, indicating a similar level of state anxiety across all pathway ascriptions. These results may have been influenced by the change in instructions from asking respondents to *think about* facing their most-feared driving-related situation, to *imagining* having to face it.

Another contributing factor influencing the findings may have been inadequate sample size (especially the difference in sample size between direct and indirect pathway groups). Post-hoc power analyses were conducted to examine this in more detail. The power of a statistical test is the probability that it will produce a statistically significant result given that a real effect does exist (Cohen, 1988). Power estimation is useful when

interpreting nonsignificant effects, since when power is low, a null result is ambiguous and either means that there is no effect, or there is an effect but the study was not sensitive enough to detect it (Fagley, 1985, cited in Whittington & Podd, 1996).

Because sample sizes were unequal, harmonic means were calculated (see Appendix E for calculations). Statistical power was calculated by using GPOWER, a general power analysis programme (Faul & Erdfelder, 1992), which requires the specification of the population effect size (ES), the sample size, and the alpha level (Cohen, 1988). The ES was set at a medium level (d = .50) and the alpha level for a one-tailed t-test was set at $a^1 = .05$. Power was 48% for the BR t-test, 46% for the NT t-test, and 49% for the STAI-Y t-test.

These low power values prompted a subsequent analysis of the sample size required to detect a significant effect, if one existed. This analysis was also performed using GPOWER, and requires values for the significance criterion, the ES to be detected, and the desired power to determine the sample size (Cohen, 1988). The ES was set at a medium level of d = .50, the alpha level at $a^1 = .05$, and the desired power at a conventional level of P = .80 (Cohen, 1988). The required sample size *per group* given these values would be n = 51, which is consistent with the possibility that small sample sizes, particularly for the Indirect group, were likely to be influential in producing the null result obtained.

Ascribed Pathway and Anxiety Responses

The hypothesis that Direct respondents would report higher physiological than cognitive anxiety responses, and that Indirect respondents would report more elevated cognitive than physiological response patterns received no support in the present study. Although the pattern for Direct respondents was in the predicted direction, it did not reach significance. Furthermore, the predicted higher cognitive response pattern for Indirect respondents was not found, and these respondents reported the same (non-significant) higher physiological than cognitive ratings found for Direct respondents.

The present lack of support for Rachman's proposition that the 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. Since Rachman's hypotheses have not been previously evaluated with a sample of people with driving-related

fears, the present findings can only be compared with prior studies in the general fear acquisition literature. Three nonclinical studies have reported no relationship between ascribed pathway and anxiety response patterns (DiNardo et al., 1988; Menzies & Clarke, 1993; Withers & Deane, 1995). The higher BR anxiety responses found in the present study for both Direct and Indirect respondents are consistent with a clinical study of agoraphobia (Merckelbach et al., 1989) and a nonclinical study of university students (Withers & Deane, 1995).

The series of studies by Öst and his colleagues (Öst, 1991; Öst & Hugdahl, 1981, 1985) with phobic groups found limited support for the predicted anxiety response pattern. In two studies with blood, dental, and injection phobics, BR scores were higher than NT scores for both Direct and Indirect respondents (Öst, 1991; Öst & Hugdahl, 1985). In another study, this pattern was replicated with animal phobics, although the reverse was found for social phobics and claustrophobics: NT scores were higher than BR scores for both Direct and Indirect respondents (Öst & Hugdahl, 1981).

Therefore, the present lack of support for the differential-anxiety-response hypothesis is consistent with previous research using both clinical and nonclinical samples. A possible reason for the lack of support for the response pattern hypothesis may be related to the finding in clinical practice that people often have difficulty thinking about their thoughts (Hawton, Salkovskis, Kirk, & Clark, 1989). People may believe that problems occur unpredictably because they pay little attention to their thoughts before, during, and after symptom events (Hawton et al., 1989). Therefore, it may be difficult for the person to identify relevant thoughts, either because the thoughts are not attended to, or because they are discounted as exaggerated when the person is not upset (Hawton et al., 1989). Another suggestion espoused by Withers and Deane (1995) was that an element of social desirability may operate when respondents rate items on the Negative Thoughts (NT) scale. They raised the question of whether the items on the NT scale were more suggestive of an 'undesirable' mental state than those on the BR scale, citing examples of items such as 'I will lose control and do something crazy' and 'I can't stand it any longer'. Withers and Deane (1995) noted that it may be socially undesirable to admit to such intense cognitive reactions,

and suggested that future research include a social desirability scale to investigate this in more detail.

Another possible explanation concerns the minimal psychometric research on the BR and the NT scales, which makes it difficult to judge whether higher BR than NT ratings are typical of nonclinical samples (Withers & Deane, 1995).

A GPOWER analysis was conducted on the MANOVA related to this hypothesis. However, the tests for the interaction and pathway effects were not studied, as it does not make sense to calculate power and required sample sizes for F-values (effect sizes) less than d = 1 (Cohen, 1988). For the ES, Cohen's *f* was calculated from partial η^2 (Cohen, 1988), which was based on the following expression: partial η^2 = [F × (df effect)] ÷ [F × (df effect) + df error]. Partial η^2 slightly overestimates the magnitude of the effect in the population, but has the advantage of being consistent and applicable to all F tests (Norusis, 1989). Cohen's ES for an F test was then determined from partial η^2 using the relation, $f = [\eta^2 / (1-\eta^2)]^{1/2}$ (Cohen, 1988). Statistical power for the anxiety response mode effect was 35% (f^2 = .05, N = 52, a = .05) (see Appendix F for calculations of ES). The required sample size for this analysis to detect an effect if one existed in the population was N = 68 (ES = .35, P = .80, a = .05), or n = 34 per group. Again, the sample sizes for the Indirect groups are clearly below this level.

Ascribed Pathway and MVA Experiences

The results supported the hypothesis that respondents who had been involved in a MVA would be more likely to ascribe their fear to the direct pathway than those who had not been involved in a MVA. One reason for the difference in proportions between the MVA and non-MVA groups involves respondents' memories of onset events. The underlying assumption is that the greater memorability of MVAs as onset events increases the likelihood of direct pathway ascriptions, since the fear derived from MVAs is classically conditioned. This would also imply that onset events experienced by non-MVA respondents will be less memorable than MVAs, which is consistent with the findings.

One factor which the present study did not investigate but which may play an important role in the phenomenon is the role of physical injury, particularly head trauma, in the memorability of the MVA and, hence, subsequent pathway ascriptions. It may be that MVA victims who sustain such injuries and suffer amnesic episodes are more likely to construct 'causes' for their driving-related fears from personal theories and beliefs (Withers & Deane, 1995).

For clarity, a brief explanation is required regarding those respondents who fell outside of the two groups examined in the hypothesis. Direct respondents who reported no experiences of MVAs typically were involved in particularly stressful driving situations or near-miss incidents in which a MVA was narrowly averted, as described in the Results section. In these cases, no MVA occurred, although the incidents described were classical conditioning events. Indirect respondents who reported MVA experiences, on the other hand, attributed their fear onset to an indirect event and were involved in MVAs subsequent to the initial onset of their driving-related fear.

HYPOTHESES 1 & 2 ON MVA RESPONDENTS

MVA Experiences and Strength of Fear

The post-hoc hypothesis that MVA respondents (primarily Direct respondents) would report strong fears and non-MVA respondents (primarily Indirect respondents) would report moderate fears was not supported by the results. Although the mean scores for the BR and the STAI-Y scales were in the predicted direction, the NT scores were opposite to the hypothesised pattern. The difference in means for the BR scores approached significance, and a power analysis using GPOWER indicated power of 91% for the BR t-test, 90% for the NT t-test, and 89% for the STAI-Y t-test (n as per harmonic means (see Appendix E), $d = .50$, $a^1 = .05$). Further analysis indicated a required sample size of $n = 51$ ($P = .80$, $d = .50$, $a^1 = .05$) per group for this effect to be detected if an effect did indeed exist (Cohen, 1988). Considering both groups for each t-test met this standard yet the

results were nonsignificant, this questions the existence of the effect in the population, particularly since the statistical power of the tests was high.

MVA Experiences and Anxiety Responses

The post-hoc hypothesis that MVA respondents would report higher physiological than cognitive anxiety responses, and that non-MVA respondents would report more elevated cognitive than physiological response patterns was not confirmed by the findings. Although the anxiety response patterns were in the predicted direction as Figure 1 showed, they did not reach significance. No firm comparisons can be made regarding this hypothesis with other research, as no other studies have investigated similar anxiety response patterns with MVA and non-MVA respondents. As has been previously discussed, this lack of support for the hypothesis could have been due to the operation of a social desirability response set. Another possible reason is that it may be easier for respondents to think about their physiological reactions than to examine their cognitive responses to their driving-related fear. However, since the pattern of anxiety responses is in the predicted direction, the most probable explanation for a lack of support for the hypothesis is inadequate sample size. A GPOWER power analysis was calculated using the same formulas for Cohen's f as described earlier in the test of the same hypothesis on all respondents (see Appendix F for calculation of ES). Analyses were conducted for the interaction and anxiety response mode effects only, as the MVA effect was less than d = 1 (Cohen, 1988). Statistical power for the anxiety response mode effect was 37% (f^2 = .02, N = 80, a = .05), and was also 37% for the interaction effect (f^2 = .02, N = 136, a = .05). The required sample size for this analysis to detect an effect if one existed in the population was N = 128 (ES = .25, P = .80, a = .05), or n = 64 per group.

Accident Fear Questionnaire

The present results using the Accident Fear Questionnaire (AFQ) could only be compared with those reported by Kuch et al. (1995), and generally indicated a lower

percentage endorsement of items 1 to 10 and lower mean ratings on items 11 to 20, which is consistent with the nonclinical nature of the sample. Respondents' ratings on items 1 to 10 of the AFQ seemed to reflect less severe accidents and posttraumatic reactions compared with the phobic group studied by Kuch et al. (1995). This was particularly notable on the items related to loss of consciousness, posttraumatic nightmares, and a reduction in driving. Other items which reflected more fearful reactions, such as being nervous before trips, telling the driver what to do, and expectations of future MVAs were endorsed at similar rates.

Total AFQ scores also reflected a significant difference in severity, most likely due to differences in the nature of the samples, particularly the difference in time since the last MVA. In the present study, the mean length of time since the last MVA was almost ten years, while Kuch et al. (1995) reported an average period of 3.62 years, which is considerably shorter than that found in the present study. The elevated ratings on the AFQ items in the Kuch et al. (1995) study may be due to less elapsed time since the MVA, and therefore more vivid memories and recollections of the incident. Future research of a longitudinal nature would be able to establish the influence of time since the MVA on memories of MVAs. The AFQ may be of utility in assessing MVA victims, particularly as a means of gauging the severity of reaction and identifying those at risk for developing more severe problems. More studies are required, however, to establish psychometric properties for this instrument.

Impact of Event Scale

The present findings using the IES-R reflect relatively severe reactions. At a descriptive level, the intrusion and avoidance subscales of the IES-R suggest that the sample in the present study scored higher than those from other studies at six months to one year reactions (Brom et al., 1993; Malt, 1988; Malt et al., 1993). A surprising finding was that 61% (n = 23) of the sample who had been in a MVA reported *'high'* levels of distress after an average of more than *nine years* post-MVA. This result suggests a need for future research to examine the reasons why these people remain so distressed for such long periods

of time after their MVA. In particular, studies need to clarify whether the driving-related fears that these people report are their main difficulty, or whether people are experiencing more extended psychological difficulties. In addition, clarification of whether these fears are sufficiently distinct to warrant separate intervention is required. An additional descriptive analysis was conducted to examine fear intensity and helpseeking behaviour reported by MVA respondents using IES-R severity thresholds (scores between 0-8 reflect a low level of distress, 9-19 a medium level, and 20 or more a high level of distress). As Table 35 shows, those reporting high levels of distress on the IES-R also seemed to report more interference of the fear with their daily lives (fear intensity), as well as a greater perceived need for and likelihood to seek help. It was unexpected that less of those in the 'high' level of distress group had sought prior help. However, this may explain why these people reported such high distress levels and why their perceived need for and likelihood to seek help ratings are relatively high.

Table 35. Descriptive analysis of those who reported low, moderate, and high levels of distress on the IES-R in terms of fear intensity and helpseeking behaviour.

Level of distress on IES-R	*n*	*Fear Intensity (scale 0-10) Mean (SD)*	*Perceived Need for Help (scale 1-7) Mean (SD)*	*Likelihood to Seek Help (scale 1-9) Mean (SD)*	*Prior Help Sought (% responding positive)*
Low (0-8)	11	5.09 (3.33)	3.45 (1.75)	2.45 (1.69)	64
Moderate (9-19)	4	4.50 (3.11)	1.75 (0.96)	1.00 (0.00)	0
High (20+)	23	5.70 (3.44)	3.70 (2.29)	3.48 (2.69)	35

CONCLUSIONS AND RECOMMENDATIONS

The strength of the present study is its attempt to control for distortions in memory as respondents recall the origins of their fear. Past fear acquisition research has used measures which have been criticised for their lack of control over retrospective judgements made as respondents construct reasons for their fears (Merckelbach et al., 1996). As a result of this, null results have been explained in terms of potential uncontrolled memory distortions, and the research on fear acquisition has provided inconsistent results regarding Rachman's three-pathways theory. The present study attempted to address this problem by selecting driving-related fears as the phenomenon of interest, as it could be assumed that MVAs may account for at least some proportion of these fears. The present study is also one of the few investigations of nonassociative pathways to fear, and uses a relatively new instrument (the OQ) employed in only one other study to date. In addition, this measure provided an opportunity to investigate largely ignored pathways to fear, such as mixed conditioning origins and cases in which respondents could recall no memories of the onset of their fear. The OQ provided important information regarding pathways to fear, and results obtained in the present study challenge the ability of Rachman's theory to adequately explain the onset of driving-related fears. However, this is not to discount the importance of direct and indirect conditioning events, but highlights the need for future research to examine other pathways to fear as well as conditioning events. Several limitations of the present study prevent firmer conclusions regarding the findings.

Limitations of the Present Study

Despite the 190 respondents who returned completed questionnaires, a number of subjects were not able to be included in the analyses of hypotheses because of missing data on the BR, the NT, and the STAI-Y scales. This meant that the responses of some respondents (see Table 11) had to be excluded from the main analyses, thereby losing potentially important information regarding pathways to fear. A possible solution to this would be to provide respondents with more assistance to help them complete all items.

An important limitation involves the absence of any clear estimation of the incidence rate of driving-related fears in the population. Because the present study was preliminary in nature, a broad definition of driving-related fears was used and no diagnostic methods were employed to estimate a base rate. Epidemiological studies are an important indication for future research, in order to establish the base rate of driving-related fears in the population. This would enable subsequent studies to more clearly identify the severity of their samples and the treatment needs of respondents.

The small number of Indirect respondents may have been due to small sample size, or it may be that driving-related fears tend not to be indirectly conditioned. However, the latter explanation seems unlikely given the amount of media advertising dedicated to road safety campaigns and information provided by those who have been involved in dangerous and perhaps even fatal MVAs.

A potential flaw in the present design is that hypotheses were tested using one driving-related fear, that is, the respondents' most-feared driving-related situation. This meant that hypotheses were examined by investigating the severity of the BR, the NT, and the STAI-Y mean scores. A clearer picture from which hypotheses could be tested would be gained by using *two different-strength fears*- the most-feared situation (strong fear) and least-feared situation (moderate fear), as used by Withers and Deane (1995). This would enable clearer comparisons between pathways and better ability to test hypotheses. An additional limitation associated with this is that, while completing the relatively long (sixteen pages) questionnaire, respondents may have generalised their responses over *all* of their driving-related fears, rather than rating items with respect to their *most-feared* situation only. In turn, this may have caused ratings to be lower than if respondents were ensured to be on-task with their most-feared situation in mind. This response set could have been alleviated by asking respondents to write their most-feared driving-related situation at the top of each page, or by requesting subjects to complete the questionnaire at a later time if they began to feel fatigued.

No comparison groups were used in the present study (neither clinical nor control groups), which adds to the lack of external validity of the study in terms of generalising to other populations with driving-related fears. Future research would benefit from comparing

nonclinical respondents with both clinical, treatment-seeking samples and non-fearful individuals.

One of the more pertinent limitations of the present study is the limited psychometric properties for the measures utilised. Although the BR and the NT scales have been used in much prior fear acquisition research, little psychometric data has been reported on these two Phobic Origins Questionnaire (POQ) scales (Menzies & Clarke, 1993). Furthermore, the OQ, the DSQ, and the AFQ have each only been used in one study prior to the present thesis, and very little psychometric data has been provided for these questionnaires. The present study suggests a tentative use for the OQ as a comprehensive fear-onset questionnaire, the AFQ as a useful screening instrument for MVA-related fears, and the DSQ as a prompt for people to endorse fears they otherwise would not have self-reported. However, the use of the OQ depends on the goals and purposes of the research. It is clear from the present study that future research needs to focus on deriving more comprehensive psychometric data for these measures.

Previous research has suggested that panic attacks may be important onset events in the acquisition of driving-related fears (Ehlers et al., 1994; Himle et al., 1991; Munjack, 1984; Sartory et al., 1992). In the present study, panic attacks were classified into the non-conditioning traumatic event category, a nonassociative pathway, since such attacks typically were not associated with any identifiable unconditioned stimulus. The non-conditioning traumatic event pathway accounted for 14.7% (n = 28) of respondents, which is substantially lower than the percentages obtained in the studies listed above, which were 40%, 75%, 48.6%, and 65%, respectively. This finding is difficult to explain without diagnoses based on comprehensive interviews, and further research is needed to delineate more clearly the role of panic attacks in the onset of driving-related fears and the overlap between driving phobia, panic disorder, agoraphobia, and other anxiety disorders (Craske, 1991). Suffice it to say that in the present sample a smaller proportion of fear onset events were attributed to panic attacks.

A final limitation of the present study is the lack of investigation into cognitions associated with driving-related fears. Particularly relevant to the present study is the reasons why 35 respondents reported being involved in a MVA, yet they did not mention the MVA

anywhere in the section on the origins of fear, and did not ascribe to the direct conditioning pathway. Essentially, some subjects reported a 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.

Summary of the Findings

Rachman predicted that conditioning experiences were related to the strength of fear. The present study supported neither this proposition, nor the hypothesis that MVA experiences were associated with different levels of fear severity. Rachman also proposed that conditioning experiences were related to anxiety response patterns. No support was found for this differential-anxiety-response hypothesis in the present study, although the test with MVA respondents was in the hypothesised direction and approached significance. The present study concurs with the conclusion reached by Withers and Deane (1995) that the differential-anxiety-response hypothesis is an insufficiently developed prediction which has consistently failed to be supported across a range of both clinical and nonclinical studies.

Despite the lack of support for Rachman's theory, the findings of the present study have important clinical implications. Firstly, the present study has demonstrated the frequency with which driving-related fears occur in relation to other fears, and the relatively high proportion who attribute quite severe, debilitating fears to MVAs. Secondly, high levels of distress reported by the sample almost ten years after their MVA suggests implications for treatment-seeking, such as post-MVA de-briefing and intervention. Furthermore, the finding that almost 40% of the sample had sought prior psychological help suggests an emotional vulnerability of the present sample with driving-related fears. Thirdly, treatment implications are also evident from the findings on the DSQ. Driving with critical people emerged as a highly-rated feared situation, suggesting the role of fear of negative evaluation and of assertiveness-training as a component of treatment. Fourthly, the present study has implications for the investigation of fear acquisition in both research and clinical practice. The present results suggest the utility of the OQ and highlight the importance of considering nonassociative pathways to fear. This suggests that researchers and clinicians

should avoid insisting upon searching for traumatic events consistent with the conditioning model, and that, in fact, 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 indicate the possible role of UCS inflation in the acquisition of driving-related fears, which may further complicate both the research and treatment of these fears.

Suggestions for Future Research

On the basis of the present findings, four possibilities emerge for future research.

Research on the Memorability of Onset Events and the Stability of Driving-Related Fears

The first new direction involves an attempt to address the difficulties with retrospective accounts that have plagued previous research. Studies of MVA victims soon after their accidents- perhaps even as part of their post-MVA assessment- 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 would also enable the identification of mild UCS's which may contribute to UCS inflation.

A related possibility that would provide richer information would be to conduct longitudinal research with MVA victims, in order to study the types of memory distortions that may creep into delayed accounts of survivor's experiences of and their symptomatology following MVAs (Dollinger, O'Donnell, & Staley, 1984; Merckelbach et al., 1996; Norris & Kaniasty, 1992). Longitudinal studies are also needed to clarify and evaluate the following possibilities: Do driving-related fears occur spontaneously and without clear childhood environmental onset events? Are subsequent indirect conditioning processes following MVAs responsible for a chronic course of driving-related fears? (Merckelbach et al., 1996). However, longitudinal studies are difficult and expensive ventures, and a partial solution to this method would be to conduct a one-year follow-up with the sample used in the present

study. This type of study would provide information about any changes in symptomatology, test-retest reliability, and the stability of driving-related fears.

Previous problems with the reliability of delayed accounts of indirect onset events may be addressed in future research by assessing whether individuals present during a MVA develop similar driving-related fears to other observers. This would permit a more reliable evaluation of the role of indirect pathways to fear.

The Role of Cognitions in Fear Acquisition

The second potential new direction involves an investigation of the role of cognitions in the acquisition of driving-related fears. The finding in the present study that some respondents reported being involved in a MVA but did not attribute their driving-related fear to that MVA suggests that some examination of the attributional processes of MVA victims is warranted.

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. Recent research also suggests that the overprediction of fear stems from the overprediction of danger and the underprediction of safety (Taylor & Rachman, 1994). 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).

Psychometric Research

The third new direction relates to the measures used in the present study, and the lack of psychometric data available on these measures. In particular, the OQ showed

promise in the present study as a potentially useful, more comprehensive alternative to the POQ which has been used in prior fear acquisition research. More studies are needed, however, to develop reliability and validity data on the OQ and other measures used in the present study. The clinical implications of this research would be broad, and such studies would enable the development of a comprehensive battery to identify MVA survivors at risk of ongoing psychological problems. Such early intervention with those identified as 'at risk' may prevent more severe and pervasive problems.

Comorbidity Research

The fourth direction involves research which evaluates the nature of driving-related fears and phobias with respect to other anxiety disorders, particularly panic disorder and agoraphobia. Much of prior driving-related fear research has commented upon the apparently intertwined nature of driving-related fears and phobias and panic attacks (Ehlers et al., 1994; Herda et al., 1993; Himle et al., 1991). Research has found that subjects with driving phobia rarely fit neatly into DSM-IV diagnostic categories (Ehlers et al., 1994; Herda et al., 1993). Such research may have implications for treatment, depending on the hierarchy of concerns for each individual. In addition, depending on how the fear was acquired, treatment may proceed differently. For example, for people who report panic attacks as their main concern, therapy may be more beneficial if it focuses on interoceptive exposure or on the cognitive distortions underlying the symptoms of fear (Ehlers et al., 1994). In comparison, for survivors of MVAs concerns may centre on future MVAs and their lack of control over the driving behaviour of others, and treatment may focus on driver safety skills programmes and information about how to deal with emergency situations (Ehlers et al., 1994). Knowledge of the nature of driving-related fears and phobias in association with other anxiety disorders has the potential to influence the treatment process in these ways, and ensure that therapy is as efficient yet beneficial as possible.

REFERENCES

Accident Rehabilitation and Compensation Insurance Corporation (1995). *Injury statistics 1994 and 1995.* New Zealand: Accident Rehabilitation and Compensation Insurance Corporation.

Agras, S. (1985). *Panic: Facing fears, phobias, and anxiety.* NY: W.H. Freeman & Co.

Agras, S., Sylvester, D., & Oliveau, D. (1969). The epidemiology of common fears and phobias. *Comprehensive Psychiatry, 10,* 151-156.

Agras, W.S., & Jacob, R.G. (1981). Phobia: Nature and measurement. In M. Mavissakalian & D.H. Barlow (Eds.), *Phobia: Psychological and pharmacological treatment* (pp. 35-62). NY: Guilford.

Allodi, F.A. (1974). Accident neurosis: Whatever happened to male hysteria? *Canadian Psychiatric Association Journal, 19,* 291-296.

American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, D.C.: Author.

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, D.C.: Author.

Bamber, J.H. (1979). *The fears of adolescents.* London: Academic Press.

Barlow, D.H. (1988). *Anxiety and its disorders: The nature and treatment of anxiety and panic.* NY: Guilford.

Beck, A.T., Emery, G., & Greenberg, R.L. (1985). *Anxiety disorders and phobias: A cognitive perspective.* NY: Basic Books.

Blanchard, E.B., Hickling, E.J., & Taylor, A.E. (1991). The psychophysiology of motor vehicle accident related posttraumatic stress disorder. *Biofeedback and Self-Regulation, 16,* 449-458.

Blanchard, E.B., Hickling, E.J., Taylor, A.E., & Loos, W.R. (1995). Psychiatric morbidity associated with motor vehicle accidents. *Journal of Nervous and Mental Disease, 183,* 495-504.

Blanchard, E.B., Hickling, E.J., Taylor, A.E., Loos, W.R., & Gerardi, R.J. (1994). Psychological morbidity associated with motor vehicle accidents. *Behaviour Research and Therapy, 32,* 283-290.

Blanchard, E.B., Hickling, E.J., Taylor, A.E., Loos, W.R., Forneris, C.A., & Jaccard, J. (1996). Who develops PTSD from motor vehicle accidents? *Behaviour Research and Therapy, 34,* 1-10.

Blumenfield, M., & Malt, U.F. (1996). Psychological issues. In R.R. Ivatury & C.G. Cayten (Eds.), *The textbook of penetrating trauma* (pp.1113-1119). Baltimore: Williams & Wilkins.

Bourne, E.J. (1990). *The anxiety and phobia workbook.* Oakland, CA: New Harbinger Publications, Inc.

Bowlby, J. (1975). *Attachment and loss (Vol.2).* London: Penguin.

Braverman, M. (1980). Onset of psychotraumatic reactions. *Journal of Forensic Sciences, 20,* 821-825.

Breslau, N., Davis, G.C., Andreski, P., & Peterson, E. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry, 48,* 216-222.

Brom, D., Kleber, R.J., & Hofman, M.C. (1993). Victims of traffic accidents: Incidence and prevention of post-traumatic stress disorder. *Journal of Clinical Psychology, 49,* 131-140.

Burstein, A. (1989a). Intrusion and avoidance symptoms in PTSD. *American Journal of Psychiatry, 146,* 1518.

Burstein, A. (1989b). Posttraumatic stress disorder in victims of motor vehicle accidents. *Hospital and Community Psychiatry, 40,* 295-297.

Catania, A.C. (1992). *Learning* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Cattell, R.B., & Scheier, I.H. (1961). *The meaning and measurement of neuroticism and anxiety.* NY: Ronald Press.

Cloninger, C.R. (1988). Anxiety and theories of emotion. In R. Noyes Jr., M. Roth, & G.D. Burrows (Eds.), *Handbook of anxiety, Volume 2: Classification, etiological factors and associated disturbances* (pp.1-30). London: Elsevier.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155-159.

Cook, M., & Mineka, S. (1989). Observational conditioning of fear to fear-relevant versus fear-irrelevant stimuli in rhesus monkeys. *Journal of Abnormal Psychology, 98,* 448-459.

Costello, C.G. (1982). Fears and phobias in women: A community study. *Journal of Abnormal Psychology, 91,* 280-286.

Craske, M.G. (1991). Phobic fear and panic attacks: The same emotional states triggered by different cues? *Clinical Psychology Review, 11,* 599-620.

Culpan, R., & Taylor, C. (1973). Psychiatric disorders following road traffic and industrial injuries. *Australian and New Zealand Journal of Psychiatry, 7,* 32-39.

Dalal, B., & Harrison, G. (1993). Psychiatric consequences of road traffic accidents: Consider somatoform pain disorder. *British Medical Journal, 307,* 1282.

Davey, G.C.L. (1995). Preparedness and phobias: Specific evolved associations or a generalised expectancy bias? *Behavioral and Brain Sciences, 18,* 289-325.

Davis, G.C., & Breslau, N. (1994). Post-traumatic stress disorder in victims of civilian trauma and criminal violence. *Psychiatric Clinics of North America, 17,* 289-299.

de L. Horne, D.J. (1993). Traumatic stress reactions to motor vehicle accidents. In J.P. Wilson & B. Raphael (Eds.), *International Handbook of Traumatic Stress Syndromes* (pp.499-506). NY: Plenum Press.

Deane, F.P., & Chamberlain, K. (1994). Treatment fearfulness and distress as predictors of professional psychological help-seeking. *British Journal of Guidance and Counselling, 22,* 207-217.

Deane, F.P., & Todd, D.M. (1996). Attitudes and intentions to seek professional psychological help for personal problems or suicidal thinking. *Journal of College Student Psychotherapy, 10,* 45-59.

DiNardo, P., Guzy, L.T., & Bak, R.M. (1988). Anxiety response patterns and etiological factors in dog-fearful and non-fearful subjects. *Behaviour Research and Therapy, 26,* 245-251.

Doctor, R.M., & Kahn, A.P. (1989). *The encyclopedia of phobias, fears, and anxieties.* NY: Facts on File.

Dollinger, S.J., O'Donnell, J.P., & Staley, A.A. (1984). Lightning-strike disaster: Effects on children's fears and worries. *Journal of Consulting and Clinical Psychology, 52,* 1028-1038.

Eaton, W.W., Dryman, A., & Weissman, M.M. (1991). Panic and phobia. In L.N. Robins & D.A. Regier (Eds.), *Psychiatric disorders in America: The epidemiological catchment area study* (pp. 155-179). NY: Free Press.

Edelmann, R.J. (1992). *Anxiety theory, research and intervention in clinical and health psychology.* Chichester: John Wiley & Sons.

Ehlers, A., Hofmann, S.G., Herda, C.A., & Roth, W.T. (1994). Clinical characteristics of driving phobia. *Journal of Anxiety Disorders, 8,* 323-339.

Emmelkamp, P.M.G. (1982). *Phobic and obsessive-compulsive disorders: Theory, research, and practice.* NY: Plenum.

Emmelkamp, P.M.G., & Scholing, A. (1994). Behavioral interpretations. In B.B. Wolman & G. Stricker (Eds.), *Anxiety and related disorders: A handbook* (pp.30-56). NY: Wiley.

Emmelkamp, P.M.G., Bouman, T.K., & Scholing, A. (1992). *Anxiety disorders: A practitioner's guide.* Chichester, NY: Wiley.

Epstein, R.S. (1993). Avoidant symptoms cloaking the diagnosis of PTSD in patients with severe accidental injury. *Journal of Traumatic Stress, 6,* 451-458.

Fairbank, J.A., DeGood, D.E., & Jenkins, C.W. (1981). Behavioral treatment of a persistent post-traumatic startle response. *Journal of Behavior Therapy and Experimental Psychiatry, 12,* 321-324.

Faul, F., & Erdfelder, E. (1992). *GPOWER: A priori, post hoc, and compromise power analyses for MS-DOS* [computer program]. Bonn, Federal Republic of Germany: Bonn University, Department of Psychology.

Feinstein, A., & Dolan, R. (1991). Predictors of post-traumatic stress disorder following physical trauma: An examination of the stressor criterion. *Psychological Medicine, 21,* 85-91.

Figley, C.R. (Ed.) (1985). *Trauma and its wake: The study and treatment of PTSD.* NY: Brunner/ Mazel.

Goldberg, L., & Gara, M.A. (1990). A typology of psychiatric reactions to motor vehicle accidents. *Psychopathology, 23,* 15-20.

Gray, J.A. (1991). *The psychology of fear and stress* (2nd ed.). NY: Cambridge.

Green, M.M., McFarlane, A.C., Hunter, C.E., Griggs, W.M. (1993). Undiagnosed post-traumatic stress disorder following motor vehicle accidents. *Medical Journal of Australia, 159,* 529-534.

Hallam, R.S., & Hafner, R.J. (1978). Fears of phobic patients: Factor analyses of self-report data. *Behaviour Research and Therapy, 16,* 1-6.

Hagström, R. (1995). The acute psychological impact on survivors following a train accident. *Journal of Traumatic Stress, 8,* 391-400.

Hawton, K., Salkovskis, P.M., Kirk, J., & Clark, D.M. (1989). *Cognitive behaviour therapy for psychiatric problems: A practical guide.* Oxford: Oxford University Press.

Herda, C.A., Ehlers, A., & Roth, W.T. (1993). Diagnostic classification of driving phobia. *Anxiety Disorders Practice Journal, 1,* 9-16.

Hickling, E.J., & Blanchard, E.B. (1992). Post-traumatic stress disorder and motor vehicle accidents. *Journal of Anxiety Disorders, 6,* 285-291.

Hickling, E.J., Blanchard, E.B., Schwarz, S.P., & Silverman, D.J. (1992a). Headaches and motor vehicle accidents: Results of the psychological treatment of post-traumatic headache. *Headache Quarterly, 3,* 285-289.

Hickling, E.J., Blanchard, E.B., Silverman, D.J., & Schwarz, S.P. (1992b). Motor vehicle accidents, headaches and post-traumatic stress disorder: Assessment findings in a consecutive series. *Headache, 32,* 147-151.

Himle, J.A., Crystal, D., Curtis, G.C., & Fluent, T.E. (1991). Mode of onset of simple phobia subtypes: Further evidence of heterogeneity. *Psychiatry Research, 36,* 37-43.

Hodge, J. (1971). The whiplash neurosis. *Psychosomatics, 12,* 245-249.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of event scale: A measure of subjective stress. *Psychosomatic Medicine, 41,* 209-218.

Jaworowski, S. (1992). Traffic accident injuries of children: The need for prospective studies of psychiatric sequelae. *Israeli Journal of Psychiatry and Related Sciences, 29,* 174-184.

Jones, I.H., & Riley, W.T. (1987). The post-accident syndrome: Variations in the clinical picture. *Australian and New Zealand Journal of Psychiatry, 21,* 560-567.

Jones, R.W., & Peterson, L.W. (1993). Post-traumatic stress disorder in a child following an automobile accident. *The Journal of Family Practice, 36,* 223-225.

Judd, F.K., & Burrows, G.D. (1988). Specific or simple phobias. In R. Noyes Jr., M. Roth, & G.D. Burrows (Eds.), *Handbook of anxiety, Volume 2: Classification, etiological factors and associated disturbances* (pp.321-339). London: Elsevier.

Kanfer, F.H. (1985). The limitations of animal models in understanding anxiety. In L.H. Tuma & J.D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp.245-260). Hillsdale, NJ: Lawrence Erlbaum.

Kaplan, H.I., Sadock, B.J., & Grebb, J.A. (1994). *Synopsis of psychiatry: Behavioral sciences clinical psychiatry* (7th ed.). Baltimore, Maryland: Williams & Wilkins.

Karlehagen, S., Malt, U.F., Hoff, H., Tibell, E., Herrstromer, U., Hildingson, K., & Leymann, H. (1993). The effect of major railway accidents on the psychological health of train drivers-II. A longitudinal study of the one-year outcome after the accident. *Journal of Psychosomatic Research, 37,* 807-817.

Kidd, P.S. (1993). Self-protection: Trauma patients' perspectives of their motor vehicle crashes. *Qualitative Health Research, 3,* 320-340.

Koch, W.J., & Taylor, S. (1995). Assessment and treatment of motor vehicle accident victims. *Cognitive and Behavioral Practice, 2,* 327-342.

Kuch, K. (1988). Eliminating posttraumatic driving phobias: A reply to Dr. Blonstein. *The Behavior Therapist, 11,* 238.

Kuch, K., Cox, B.J., & Direnfeld, D.M. (1995). A brief self-rating scale for PTSD after road vehicle accident. *Journal of Anxiety Disorders, 9,* 503-514.

Kuch, K., Cox, B.J., Evans, R., & Shulman, I. (1994). Phobias, panic, and pain in 55 survivors of road vehicle accidents. *Journal of Anxiety Disorders, 8,* 181-187.

Kuch, K., Evans, R.J., & Mueller-Busch, C. (1993). Accidents, anxiety and chronic pain. *The Pain Clinic, 6,* 3-7.

Kuch, K., Evans, R.J., Watson, P.C., Bubela, C., & Cox, B.J. (1991). Road vehicle accidents and phobias in 60 patients with fibromyalgia. *Journal of Anxiety Disorders, 5,* 273-280.

Kuch, K., Swinson, R.P., & Kirby, M. (1985). Post-traumatic stress disorder after car accidents. *Canadian Journal of Psychiatry, 30,* 426-427.

Lewis, A. (1980). Problems presented by the ambiguous word 'anxiety' as used in psychopathology. In G.D. Burrows & B. Davies (Eds.), *Handbook of studies on anxiety* (pp.1-15). Amsterdam: Elsevier/North-Holand Biomedical Press.

Levine, B.A., & Wolpe, J. (1980). *In vivo* desensitization of a severe driving phobia through radio contact. *Journal of Behavior Therapy and Experimental Psychiatry, 11,* 281-282.

Levitt, E.E. (1980). *The psychology of anxiety* (2nd ed). Hillsdale, NJ: Erlbaum.

Lindemann, C. (1994). Phobias. In B.B. Wolman & G. Stricker (Eds.), *Anxiety and related disorders: A handbook* (pp.161-176). NY: Wiley.

Lundin, T. (1995). Transportation disasters: A review. *Journal of Traumatic Stress, 8,* 381-389.

Malt, U. (1988). The long-term psychiatric consequences of accidental injury : A longitudinal study of 107 adults. *British Journal of Psychiatry, 153,* 810-818.

Malt, U. (1994). Traumatic effects of accidents. In R.J. Ursano, B.G. McCaughey, & C.S. Fullerton (Eds.), *Individual and community responses to trauma and disaster: The structure of human chaos* (pp.103-135). Cambridge: Cambridge University Press.

Malt, U., Myhrer, T., Blikra, G., & Hϕivik, B. (1987). Psychopathology and accidental injuries. *Acta Psychiatrica Scandinavica, 76,* 261-271.

Malt, U.F., & Olafsen, O.M. (1992). Psychological appraisal and emotional response to physical injury: A clinical, phenomenological study of 109 adults. *Psychiatric Medicine, 10,* 117-134.

Malt, U.F., Hϕivik, B., & Blikra, G. (1993). Psychosocial consequences of road accidents. *European Psychiatry, 8,* 227-228.

Malt, U.F., Karlehagen, S., Hoff, H., Herrstromer, U., Hildingson, K., & Leymann, H. (1993). The effect of major railway accidents on the psychological health of train drivers-I. Acute psychological responses to accident. *Journal of Psychosomatic Research, 37,* 793-805.

Marks, I.M., & Mathews, A.M. (1979). Brief standard self-rating for phobic patients. *Behaviour Research and Therapy, 17,* 263-267.

Marteau, T.M., & Bekker, H. (1992). The development of a six-item short form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology, 31,* 301-305.

Mathew, R.J., Weinman, M.L., Semchuk, K.M., & Levin, B.L. (1982). Driving phobia in the city of Houston: A pilot study. *American Journal of Psychiatry, 139,* 1049-1051.

Mavissakalian, M., & Barlow, D.H. (Eds.) (1981). *Phobia: Psychological and pharmacological treatment.* NY: Guilford.

May, R. (1950). *The meaning of anxiety.* NY: Ronald Press.

Mayou, R. (1992). Psychiatric aspects of road traffic accidents. *International Review of Psychiatry, 4,* 45-54.

Mayou, R., Bryant, B., & Duthie, R. (1993). Psychiatric consequences of road traffic accidents. *British Medical Journal, 307,* 647-651.

Mayou, R., Simkin, S., & Threlfall, J. (1991). The effects of road traffic accidents on driving behaviour. *Injury, 22,* 365-368.

McCaffrey, R.J., & Fairbank, J.A. (1985). Behavioral assessment and treatment of accident-related posttraumatic stress disorder: Two case studies. *Behavior Therapy, 16,* 406-416.

McDonald, A.S., & Davey, G.C.L. (1996). Psychiatric disorders and accidental injury. *Clinical Psychology Review, 16,* 105-127.

McNally, R.J., & Steketee, G.S. (1985). The etiology and maintenance of severe animal phobias. *Behaviour Research and Therapy, 23,* 431-435.

Medetsky, H.A., & Parnes, L. (1993). The psychological examination in motor vehicle accidents. *American Journal of Forensic Psychology, 11,* 47-60.

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.

Menzies, R.G., & Clarke, J.C. (1995). The etiology of phobias: A nonassociative account. *Clinical Psychology Review, 15,* 23-48.

Merckelbach, H., de Jong, P.J., Muris, P., & van den Hout, M.A. (1996). The etiology of specific phobias: A review. *Clinical Psychology Review, 16,* 337-361.

Mineka, S. (1985). Animal models of anxiety-based disorders: Their usefulness and limitations. In L.H. Tuma & J.D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp.199-244). Hillsdale, NJ: Lawrence Erlbaum.

Modlin, H.C. (1967). The postaccident anxiety syndrome: Psychosocial aspects. *American Journal of Psychiatry, 123,* 1008-1012.

Morris, R.J., & Kratochwill, T.R. (1983). *Treating childrens' fears and phobias: A behavioral approach.* NY: Pergamon.

Mowrer, O. (1939). A stimulus-response analysis of anxiety and its role as a reinforcing agent. *Psychological Review, 46,* 553-565.

Munjack, D.J. (1984). The onset of driving phobias. *Journal of Behavior Therapy and Experimental Psychiatry, 15,* 305-308.

Nietzel, M.T., Bernstein, D.A., & Russell, R.L. (1988). Assessment of anxiety and fear. In A.S. Bellack & M. Hersen (Eds.), *Behavioral assessment: A practical handbook* (3rd ed.). NY: Pergamon Press.

Norris, F.H., & Kaniasty, K. (1992). Reliability of delayed self-reports in disaster research. *Journal of Traumatic Stress, 5,* 575-588.

Norusis, M.J. (1988). *SPSS/PC+ Advanced statistics v2.0: For the IBM PC/XT/AT and PS/2.* Chicago, IL: SPSS Inc.

Noyes, R., Hoenk, P.R., Kuperman, S., & Slymen, D.J. (1977). Depersonalisation in accident victims and psychiatric patients. *Journal of Nervous and Mental Disease, 164,* 401-407.

Ollendick, T.H., & King, N.J. (1991). Origins of childhood fears: An evaluation of Rachman's theory of fear acquisition. *Behaviour Research and Therapy, 29,* 117-123.

Ollendick, T.H., Yang, B., King, N.J., Dong, Q., & Akande, A. (1996). Fears in American, Australian, Chinese, and Nigerian children and adolescents: A cross-cultural study. *Journal of Child Psychology and Psychiatry, 37,* 213-220.

Öst, L-G. (1985). Ways of acquiring phobias and outcome of behavioral treatments. *Behaviour Research and Therapy, 23,* 683-689.

Öst, L-G. (1991). Acquisition of blood and injection phobia and anxiety response patterns in clinical patients. *Behaviour Research and Therapy, 29,* 323-332.

Öst, L-G., & Hugdahl, K. (1981). Acquisition of phobias and anxiety response patterns in clinical phobias. *Behaviour Research and Therapy, 19,* 439-447.

Öst, L-G., & Hugdahl, K. (1983). Acquisition of agoraphobia, mode of onset and anxiety response patterns. *Behaviour Research and Therapy, 21,* 623-631.

Öst, L-G., & Hugdahl, K. (1985). Acquisition of blood and dental phobia and anxiety response patterns. *Behaviour Research and Therapy, 23,* 27-34.

Parker, N. (1977). Accident litigants with neurotic symptoms. *Medical Journal of Australia, 2,* 318-322.

Pilowsky, I. (1985). Cryptotrauma and "accident neurosis'. *British Journal of Psychiatry, 147,* 310-311.

Platt, J.J., & Husband, S.D. (1987). Posttraumatic stress disorder and the motor vehicle accident victim. *American Journal of Forensic Psychology, 5,* 39-42.

Rachman, S. (1976). The passing of the two-stage theory of fear and avoidance: Fresh possibilities. *Behaviour Research and Therapy, 14,* 125-131.

Rachman, S. (1977). The conditioning theory of fear-acquisition: A critical examination. *Behaviour Research and Therapy, 15,* 375-387.

Rachman, S. (1984). Anxiety disorders: Some emerging theories. *Journal of Behavioral Assessment, 6,* 281-299.

Rachman, S. (1985). A note on the conditioning theory of fear acquisition. *Behavior Therapy, 16,* 426-428.

Rachman, S. (1991). Neo-conditioning and the classical theory of fear acquisition. *Clinical Psychology Review, 11,* 155-173.

Rachman, S., & Bichard, S. (1988). The overprediction of fear. *Clinical Psychology Review, 8,* 303-312.

Rheingold, H.L. (1974). General issues in the study of fear. In M. Lewis & L.A. Rosenblum (Eds.), *The origins of fear* (pp.249-254). NY: Wiley.

Rimm, D.C., Janda, L.H., Lancaster, D.W., Nahl, M., & Dittmar, K. (1977). An exploratory investigation of the origin and maintenance of phobias. *Behaviour Research and Therapy, 15,* 231-238.

Rowan, D., & Eayrs, C. (1987). *Fears and anxieties.* London: Longman.

Salkovskis, P.M., & Kirk, J. (1989). Obsessional disorders. In K. Hawton, P.M. Salkovskis, J. Kirk, & D.M. Clark (Eds.), *Cognitive behaviour therapy for psychiatric problems: A practical guide* (pp.129-168). Oxford: Oxford University Press.

Sartory, G., Roth, W.T., & Kopell, M.L. (1992). Psychophysiological assessment of driving phobia. *Journal of Psychophysiology, 6,* 311-320.

Spielberger, C.D. (1985). Anxiety, cognition and affect: A state-trait perspective. In L.H. Tuma & J.D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp.171-182). Hillsdale, NJ: Lawrence Erlbaum.

Spielberger, C.D., Gorsuch, R.L., Lushene, R.E., Vagg, P.R., & Jacobs, G.A. (1983). *Manual for the State-Trait Anxiety Inventory.* Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C.D., & Krasner, S.S. (1988). The assessment of state and trait anxiety. In R. Noyes Jr., M. Roth, & G.D. Burrows (Eds.), *Handbook of anxiety, Volume 2: Classification, etiological factors and associated disturbances* (pp.31-51). London: Elsevier.

Tarsh, M.J., & Royston, C. (1985). A follow-up study of accident neurosis. *British Journal of Psychiatry, 146,* 18-25.

Taylor, C.B., & Arnow, B. (1988). *The nature and treatment of anxiety disorders.* NY: Free Press.

Taylor, S. (1994). The overprediction of fear: Is it a form of regression toward the mean? *Behaviour Research and Therapy, 32,* 753-757.

Taylor, S. (1995). Stimulus estimation and the overprediction of fear: A comment on two studies. *Behaviour Research and Therapy, 33,* 699-700.

Taylor, S., & Koch, W.J. (1995). Anxiety disorders due to motor vehicle accidents: Nature and treatment. *Clinical Psychology Review, 15,* 721-738.

Taylor, S., & Rachman, S. (1994a). Role of selective recall in the overprediction of fear. *Behaviour Research and Therapy, 32,* 741-746.

Taylor, S., & Rachman, S.J. (1994b). Stimulus estimation and the overprediction of fear. *British Journal of Clinical Psychology, 33,* 173-181.

Theorell, T., Leymann, H., Jodko, M., Konarski, K., Norbeck, H.E., & Eneroth, P. (1992). "Person under train" incidents: Medical consequences for subway drivers. *Psychosomatic Medicine, 54,* 480-488.

Thompson, A., & McArdle, P. (1993). Psychiatric consequences of road traffic accidents: Children may be seriously affected. *British Medical Journal, 307,* 1282-1283.

Torgersen, S. (1979). The nature and origin of common phobic fears. *British Journal of Psychiatry, 134,* 343-351.

Thyer, B.A. (1987). *Treating anxiety disorders: A guide to human service professionals.* Newbury Park, CA: Sage.

Traffic Research and Statistics Section, Land Transport Safety Authority (1995). *Motor accidents in New Zealand 1995.* Wellington, New Zealand: Land Transport Safety Authority.

Traffic Research and Statistics Section, Land Transport Safety Authority (1996). *Motor accidents in New Zealand 1996.* Wellington, New Zealand: Land Transport Safety Authority.

Tsuang, M.T., Boor, M., & Fleming, J.A. (1985). Psychiatric aspects of traffic accidents. *American Journal of Psychiatry, 142,* 538-546.

Vrana, S., & Lauterbach, D. (1994). Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress, 7,* 289-302.

Walker, J.I. (1981). Posttraumatic stress disorder after a car accident. *Postgraduate Medicine, 69,* 82-86.

Watson, J.B. (1924). *Behaviorism.* NY: Norton.

Weissman, M.M. (1985). The epidemiology of anxiety disorders: Rates, risks, and familial patterns. In L.H. Tuma & J.D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp.275-296). Hillsdale, NJ: Lawrence Erlbaum.

White, K., & Davey, G.C.L. (1989). Sensory preconditioning and UCS inflation in human fear conditioning. *Behaviour Research and Therapy, 27,* 161-166.

Whittington, C.J., & Podd, J.V. (1996). Human performance and physiology: A statistical power analysis of ELF electromagnetic field research. *Bioelectromagnetics, 17,* 274-278.

Withers, R.D., & Deane, F.P. (1995). Origins of common fears: Effects on severity, anxiety responses and memories of onset. *Behaviour Research and Therapy, 33,* 903-915.

Wolman, B.B. (1994). Defining anxiety. In B.B. Wolman & G. Stricker (Eds.), *Anxiety and related disorders: A handbook* (pp.3-10). NY: Wiley.

Wolman, B.B., & Stricker, G. (Eds.) (1994). *Anxiety and related disorders: A handbook.* NY: Wiley.

Wolpe, J. (1981). The dichotomy between classical conditioned and cognitively learned anxiety. *Journal of Behavior Therapy and Experimental Psychiatry, 12,* 35-42.

APPENDIX A

MEDIA COVERAGE TO RECRUIT PARTICIPANTS

Evening Standard
Monday July 8
1996
Page 6

Nervous drivers sign here. . .

by Nicola Patrick

IF YOU feel nervous when driving in heavy rain, are overly careful when using pedestrian crossings, or avoid driving on motorways, Joanne Taylor wants to hear from you.

The Massey University postgraduate psychology student is looking for people to help her complete her thesis on driving-related fears.

She says driving-related fears are far more common than people think, and that she's looking for "anybody of any age" to fill out a confidential questionnaire on their fears, which will take 30-40 minutes.

Driving-related fears include fears of driving on country roads and driving at night, and fears of oncoming traffic, icy roads, blind corners, animals on the side of the road, and cars overtaking. Some people are also afraid of sitting in the front seat.

Though drivers' fears are well-known, there have been few studies of fears of the general population, she says.

Most of the studies have been conducted on clinical patients — people seeking treatment for severe behaviour problems.

Auckland's Phobic Trust is interested in the results of Joanne's study, as it wants to compare them with the findings concerning 30 people currently in treatment for driving-related fears.

She says some people's lifestyles are affected to the extent they do not travel by car because of their fears.

But people can still feel "pretty anxious" even about little things. "And most of it (the research) shows driving fears are really really common."

Joanne hopes her research will increase awareness and understanding of the problem, and eventually allow treatments to be developed.

She is currently enrolled in a clinical psychology programme, and hopes her masterate will lead to a doctorate.

Anyone interested can phone Joanne on 359-4596 or her supervisor, Dr Frank Deane, on 350-4126.

Mμ
Issue 22
22-29 July
1996
Pages 3-4

Wanted: fearful volunteers

If you have a fear of driving, then Massey University Psychology postgraduate student Joanne Taylor would like to hear from you.

Joanne, who is doing the research for her Master's thesis in Psychology, needs volunteers from around New Zealand who have any type of driving-related fear.

"I want to get the extremes of fear. So I would like to hear from people who may feel a little anxious when they get in a car but drive anyway, and from people who totally avoid driving.

"Some people will do things like drive an extra half hour to avoid a certain intersection, or other sort of behaviour like that, which is also of interest to me," she said.

Joanne has two aims for her thesis. Firstly, because there is little research on driving fears she believes it is important to find out the severity of people's fears, how the fears develop, what help they are seeking and the kinds of situations feared.

"This will assist the practitioners who help to treat these people, because it will give them a better understanding of the problems." she said.

Joanne said a treatment programme

Continued on page 4

Continued from page 3

tailored to the needs of people with driving fears could be initiated from her thesis. The Phobic Trust in Auckland has already expressed interest in the results of her thesis.

"Even though driving fears are common, there has been little research to find out what people's needs are and why they worry about driving," she said.

Her second aim is to help the people who volunteer for the study. Filling out the questionnaire could be the first step in helping themselves to understand their fears.

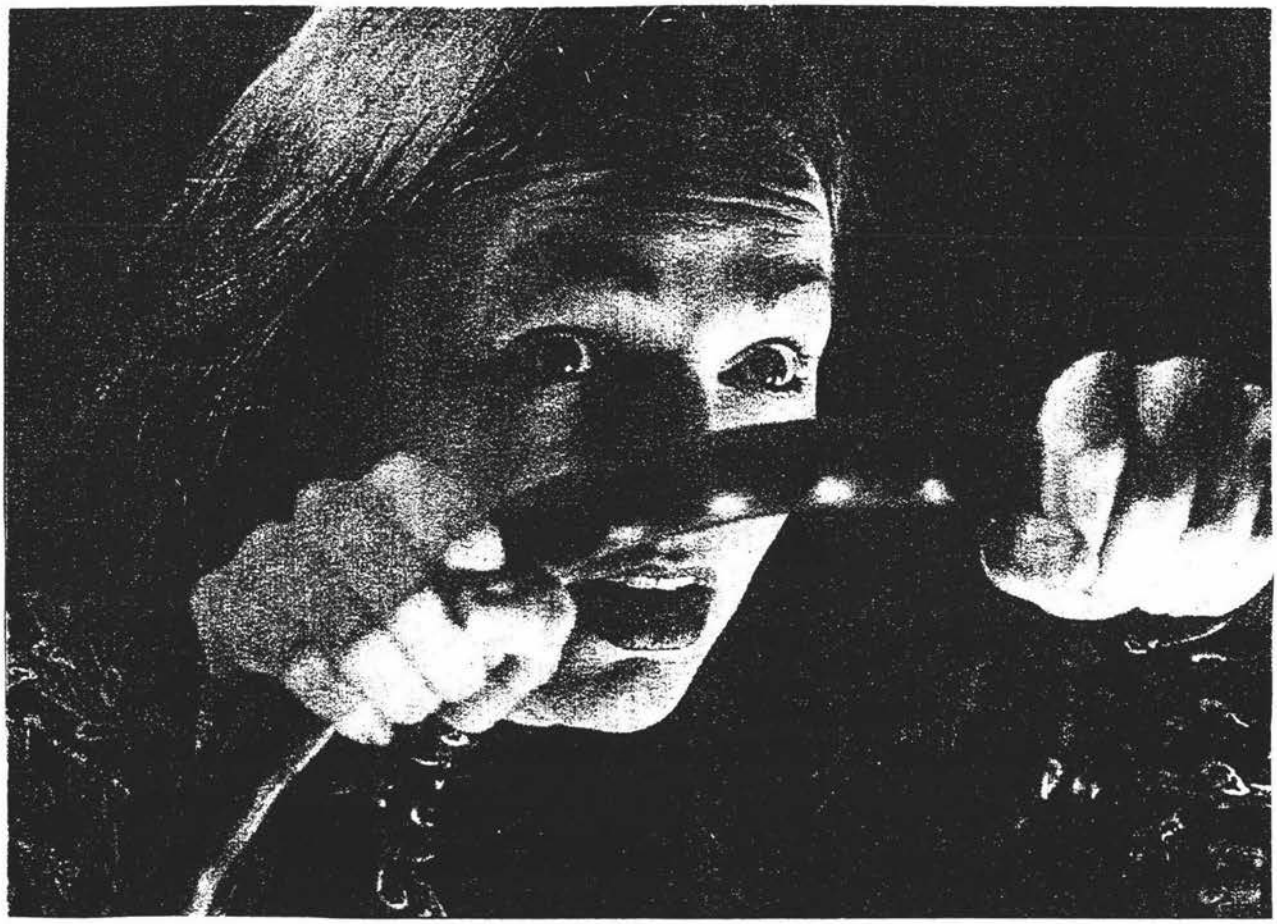
"It also helps people to know that they are not the only people who fear these situations," she said.

Joanne pointed out that advertising over the past year or so, about the dangers of drinking and driving has most likely made driving even more difficult, as people were made more aware of the dangers.

Any volunteers will be asked to fill out a confidential questionnaire, which takes about 30-40 minutes. Volunteers will receive a summary of the results when Joanne has completed her study, probably in December this year.

If you can help Joanne, phone her on 359-4596 or her supervisor Dr Frank Deane on 350-4126.

Tribune
Sunday July 30
1996
Page 2



PHIL DOYLE

HIGHWAY HORRORS . . . driving is a nightmare for many New Zealanders

Fear drives many motorists

THE terror begins for a Manawatu woman when she turns on her car's ignition switch.

Her head aches, her stomach cramps and the panic attacks which last throughout the journey begin.

The cause of her agony is an uncontrollable fear each trip will be her last, that her car will plunge over a cliff and her body not be found for days.

The improbability of her nightmare coming true gives her no relief. The woman, like many other New Zealand motorists, is being driven to distraction by her traffic fears.

Just what causes those fears is being researched by Palmerston North postraduate student Joanne Taylor, for a psychology Masters thesis.

Miss Taylor (22) is looking for 200 motorists from around the country who have a fear of driving. She has 50 volunteers so far.

Among those is a woman who hyperventilates with dread her car will be shunted off the road and submerged into a watery grave.

They also include a man who repeatedly retraces his journeys, for fear he has unknowingly hit a pedestrian.

Less extreme examples include two Palmerston North people who daily drive kilometres out of their way to avoid certain intersections they fear are dangerous.

"It takes hours out of their lives and money in petrol," Miss Taylor said.

Other driver fears include heavy rain, being hit from the left at intersections, fear of a vehicle's power, being scrutinised by other drivers, parallel parking, passing trucks and lack of vision from misted windows.

In some cases those fears had crippling effects, including panic attacks, heart palpatations, dizziness, stomach cramps and accelerated breathing.

Miss Taylor said her study was aimed at finding the cause and severity of driving fears, providing raw material for health practitioners to treat the conditions. The Phobic Trust, in Auckland, was interested in the thesis.

Her research would also raise awareness, allowing sufferers to realise they were not alone in their fears.

She said recent advertising about the dangers of drink driving had probably intensified concerns about being on the road.

Miss Taylor is now considering developing a treatment programme, for a doctorate of philosophy.

She is looking for people in Auckland and Wellington, to study fears associated with motorway driving.

Volunteers can contact Miss Taylor on free-dial telephone number, 0800 111-828.

— LEE UMBERS

Sunday Star Times
Sunday August 4
1996
Page 3

Does driving frighten you

by Susan Campion

MASSEY University psychology post-graduate student Joanne Taylor needs volunteers to help her with her thesis.

No, she's not asking you to help her write it, she wants to hear from people with driving-related fears.

This could mean feeling uptight when in a car as a passenger, drivers frightened of cyclists and pedestrians or cyclists and pedestrians frightened of drivers, drivers and passengers with a fear of motorways, bridges, night-time driving, changing lanes, driving in the city or the country, black frosts, heavy rain, kids on the roads, heavy traffic, driving an unfamiliar car, backseat drivers or the fear of being driven by certain drivers.

Joanne says some people drive even though they have one or some of these fears — they simply avoid the situation they fear.

To do her research she needs to talk with such people. This won't involve an interview — instead volunteers will be asked to fill out a questionnaire which takes 30-40 minutes to complete. The questionnaire looks at what a person's fears are and how they developed.

Joanne's thesis will help professionals understand the problems. Already the Phobic Trust in Auckland is interested in the results.

The questionnaire also looks at whether people with driving-related fears have sought help and whether they are likely to.

The contents of the questionnaire wil be completely confidential. If you can help phone her on 359-4596 or Dr Frank Deane on 350-4126.

APPENDIX B

THE RESEARCH QUESTIONNAIRE

FEAR OF DRIVING

Information Sheet

This information sheet is for you to keep. Please read it carefully, then detach it before you return the questionnaire.

This sheet provides information about a study being conducted by **Joanne Taylor**, a Massey University Psychology postgraduate student who is under the supervision of **Dr Frank Deane**, a Massey University Psychology Department senior lecturer. The study has been approved by the Massey University Human Ethics Committee.

The aim of this study is to look at your thoughts and feelings regarding your driving fear and to determine what factors led to the development of your fear.

You will be asked to complete a questionnaire which will take approximately 30 to 40 minutes of your time.

If you take part in this study, you have the right to:

- Refuse to answer any particular question, and to withdraw from the study at any time
- Ask any further questions about the study that occur to you during your participation
- Provide information on the understanding that it is completely confidential to the researcher. It will not be possible to identify you in any reports that are prepared from the study.
- Receive a summary of the results upon request when the study is finished.

Now that you have read the information sheet, please decide whether or not you wish to take part in the study. It is assumed that filling in the questionnaire implies consent.

If you have any additional questions about any aspect of the study, the researcher can be contacted at **359 4596**, or through Dr Frank Deane, 350 4126.

Thank you

Researcher: Joanne Taylor

It is assumed that filling in the questionnaire, implies consent.

GENERAL INFORMATION

Age: _____ (years) **Sex:** (Circle one) Female Male

Ethnic Origin: (Circle one) European Maori Polynesian Asian Other

Marital Status: (Circle one) Single Married Widowed

Divorced Separated De facto

How many years have you been driving? _____ (years)

Do you have a valid driver's licence? (Circle one) YES NO

YOUR FEAR

People fear different things about driving. Describe **your** driving-related fear in the space below. If you have more than one driving-related fear, please write all of them down, but list them from the most feared to the least feared, as best as you can.

The rest of the questionnaire concerns your **most-feared driving situation**.

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

THE INTENSITY OF YOUR FEAR

1. How much does your fear of driving interfere with your daily functioning? (Circle one)

0 1 2 3 4 5 6 7 8 9 10
Not at all Moderately Extremely

2. 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): _____

3. Have you ever received psychological help from a mental health professional for **any** personal or emotional problems you have experienced? (Circle one) YES NO

4. 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

THE ORIGIN OF YOUR FEAR

1. Can you remember when your driving-related fear **first** appeared? That is, can you recall the **very first** actual occasion where you were excessively fearful or anxious in the presence of the feared situation? (Please choose one of the three alternatives below and tick the appropriate box. If none of these alternatives seem appropriate, please explain why in the space headed 'Comments' provided below.)

[ ] **A. YES.** I can clearly remember the **first** occasion where I was excessively fearful or anxious in the presence of the feared situation.

[ ] **B. NO.** Although I clearly remember a time before my fear developed when I was not even mildly distressed by this situation, I cannot remember the **first** occasion where I was excessively fearful or anxious.

[ ] **C. NO.** I cannot remember the first occasion because I have **always** been fearful or anxious in the presence of the feared situation.

Comments

_____
_____
_____
_____

If you chose alternative A in question 1, please continue with question 2.(i) below.

If you chose alternative B in question 1, do not answer any part of question 2. Please turn to page 6 and continue at question 3.(i).

If you chose alternative C in question 1, or none of the three alternatives, please continue on page 12.

2.(i) In the space provided below, describe the events of that **very first** occasion where you were excessively fearful or anxious in the presence of the feared situation.

_____
_____
_____
_____
_____

2.(ii) How old were you at the time of this first fearful incident? _____ (years)

2.(iii) Was the initial fearful incident, that you described on the previous page, the very first time that you had ever been in the presence of the feared situation?

YES [ ]
NO [ ]

2.(iv) In the initial fearful incident, was your fear preceded by **some other** upsetting event? i.e. On that occasion, were you hurt, frightened, or distressed by **something else** when in the presence of the feared situation?

YES [ ]
NO [ ]

If YES, please specify what hurt, frightened, or distressed you in the space provided below.

_____
_____
_____
_____
_____

3.(i) Did anyone in your family fear the same situation?

YES [ ]
NO [ ]

If YES, please indicate which members of your family feared the same situation by ticking the relevant boxes below:

Mother [ ]
Father [ ]
Sibling [ ]
Other family member (Please specify) _____ [ ]

3.(ii) Did you ever actually **see** your family member(s) become hurt, frightened, or distressed in the presence of the feared situation?

YES [ ]
NO [ ]

If YES, please describe the incident(s) in the space provided below.
If NO, please continue at question **3.(iii)** on the **next page.**

_____
_____
_____
_____

Have you been excessively fearful of the feared situation ever since the incident(s) involving your family member(s)?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after the incident(s) involving your family member(s)?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** the incident(s) involving your family member(s)?

YES [ ]
NO [ ]

How old were you at the time of the incident(s) involving your family member(s)?

_____ (years)

3.(iii) Did anyone in your family ever tell you unpleasant stories involving the feared situation, or warn you of some danger associated with the feared situation?

YES [ ]
NO [ ]

If YES, please indicate who told you these stories or warnings and then describe the nature of the stories or warnings in the space provided below.

If NO, please turn to **page 8** and continue at question **4.(i).**

Mother [ ]
Father [ ]
Sibling [ ]
Other family member (Please specify) _____ [ ]

_____
_____
_____
_____

Have you been excessively fearful of the feared situation ever since your family member(s) told you the stories/warnings that you described above?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after your family member(s) told you these stories/warnings?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** your family member(s) told you these stories/warnings?

YES [ ]
NO [ ]

How old were you at the time that your family member(s) told you these stories/warnings?

_____ (years)

4.(i) Did you know anyone else, other than members of your family, who was anxious or distressed by the same feared situation?

YES [ ]
NO [ ]

If YES, how many others did you know? _____

4.(ii) Did you ever actually **see** anyone, other than members of your family, become hurt, frightened, or distressed in the presence of the feared situation?

YES [ ]
NO [ ]

If YES, please describe the incident(s) in the space provided below.
If NO, please turn to the top of the **next page** and continue at question **4.(iii).**

_____
_____
_____
_____
_____

Have you been excessively fearful of the feared situation ever since the incident(s) described above?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after the incident(s) described above?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** the incident(s) described above?

YES [ ]
NO [ ]

How old were you at the time of the incident(s) described above? _____ (years)

4.(iii) Did anyone, other than members of your family, ever tell you unpleasant stories involving the feared situation, or warn you of some danger associated with the feared situation?

YES [ ]
NO [ ]

If YES, please describe the nature of the stories or warnings in the space provided below.
If NO, please continue at question **5.(i) below.**

_____
_____
_____
_____

Have you been excessively fearful of the feared situation ever since you were told these stories/warnings?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after you were told you these stories/warnings?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** you were told these stories/warnings?

YES [ ]
NO [ ]

How old were you at the time that you were told these stories/warnings? ____ (years)

5.(i) Did you ever read, see on television or at the movies, or hear on the radio, anything unpleasant about the feared situation?

YES [ ]
NO [ ]

If YES, please describe the incident(s) in the space provided below.
If NO, please turn to the **next page** and continue at question **6.(i).**

_____
_____
_____

Have you been excessively fearful of the feared situation ever since the incident(s) described above?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after the incident(s) described above?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** the incident(s) described above?

YES [ ]
NO [ ]

How old were you at the time of the incident(s) described above? _____ (years)

6.(i) Were you ever hurt or injured in the presence of the feared situation?

YES [ ]
NO [ ]

If YES, please describe the incident(s) in the space provided below.
If NO, please turn to the **next page** and continue at question **7.(i).**

_____
_____
_____
_____
_____

Have you been excessively fearful of the feared situation ever since the incident(s) described above?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after the incident(s) described above?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** the incident(s) described above?

YES [ ]
NO [ ]

How old were you at the time of the incident(s) described above? ____ (years)

7.(i) Can you recall any earlier occasions in which you were at least mildly anxious or fearful in the presence of the feared situation?

YES [ ]
NO [ ]

If YES, please describe the incident(s) in the space provided below.
If NO, please continue at question **8 below.**

Have you been excessively fearful of the feared situation ever since the incident(s) described above?

YES [ ]
NO [ ]

Were you ever able to confront the feared situation with complete ease after the incident(s) described above?

YES [ ]
NO [ ]

Were you already excessively fearful of the feared situation **before** the incident(s) described above?

YES [ ]
NO [ ]

How old were you at the time of the incident(s) described above? ____ (years)

8. In the space provided below, please describe anything that you believe is relevant to the understanding of the onset of your fear that has not been covered in this section of the questionnaire.

DRIVING SITUATIONS

Listed below are different driving situations that you may find uncomfortable or frightening. Please indicate to what degree you **feel uncomfortable or anxious** in the driving situation when you are (1) **driving alone**, (2) when a **trusted companion is a passenger**, *and* (3) **when another person is driving.** If some situations are not relevant to you, please ignore them and rate those which are applicable to your situation.

Rate your amount of discomfort and anxiety by circling the appropriate number on the scale below following each situation.

0	1	2	3	4
No discomfort or anxiety	Little discomfort or anxiety	Moderate discomfort or anxiety	Much discomfort or anxiety	Extreme discomfort or anxiety

DRIVING SITUATION	DRIVING ALONE	DRIVING ACCOMPANIED	OTHER PERSON DRIVING
1. Suburban areas	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
2. Town/city	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
3. Motorways	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
4. Bridges	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
5. Tunnels	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
6. Heavy traffic	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
7. Driving at night	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
8. Driving in an unfamiliar car	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
9. Driving in fog	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
10. Driving in rain	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
11. Driving when tired	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
12. Driving when stressed for other reasons than driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
13. Driving with somebody who criticises your driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
14. Driving with children in the car	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
15. Other _____	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

Now indicate to what degree you **avoid** driving in each situation when you are (1) **driving alone**, (2) when a **trusted companion is a passenger**, *and* (3) **when another person is driving.** Again, rate those which are relevant to you and ignore those which are not.

Rate your avoidance by circling the appropriate number on the scale below following each situation.

0	1	2	3	4
Never avoid	Rarely avoid	Avoid about half of the time	Avoid most of the time	Always avoid

DRIVING SITUATION	DRIVING ALONE	DRIVING ACCOMPANIED	OTHER PERSON DRIVING
1. Suburban areas	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
2. Town/city	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
3. Motorways	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
4. Bridges	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
5. Tunnels	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
6. Heavy traffic	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
7. Driving at night	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
8. Driving in an unfamiliar car	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
9. Driving in fog	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
10. Driving in rain	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
11. Driving when tired	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
12. Driving when stressed for other reasons than driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
13. Driving with somebody who criticises your driving	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
14. Driving with children in the car	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
15. Other (Please specify): _____	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

DRIVING HISTORY

1. How many driving-related accidents involving vehicles, objects, people, or animals have you had? (Circle one)

   none 1 2 3 4 5 or more

2. If you have had an accident, how long ago was the most recent one? _____(months)

3. Have you avoided getting your driver's licence because of your fear? (Circle one)

   YES NO

4. List below any traffic offences in which you have engaged.

_____

_____

_____

_____

_____

OTHER FEARS

1. List below any **other fears** that you have, besides your driving-related fear.

_____

_____

_____

_____

_____

_____

If the onset of your driving-related fear is unrelated to a motor vehicle accident, you have completed the questionnaire. Thank you for your cooperation. Please return the questionnaire in the freepost, self-addressed envelope provided. If you feel you need help for your driving-related fear(s), then you may contact your local hospital psychological service or locate a psychologist (Registered) in the Yellow Pages of the telephone directory.

If your driving-related fear developed primarily as a result of a motor vehicle accident, please complete the final section of the questionnaire on the following pages. A motor vehicle accident may be of any severity and may be defined as involving at least one motorised vehicle.

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	Sometimes	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 return the questionnaire in the freepost, self-addressed envelope provided.

APPENDIX C

CODING LISTS

SELF-REPORTED FEAR

1.	Accident	Accident scene (where have had accident or a current accident scene)
2.	Accomp	Driving accompanied or with passengers
3.	Alone	Driving alone
4.	Barrier	Driving next to roadside barriers
5.	Break	Car breaking down (e.g., flat tyre, mechanical problems)
6.	Car	Driving own or other person's car or van, or driving an unfamiliar car, or others driving my car
7.	Children	Driving with children in the car
8.	Collision	Collision or accident (as a driver, passenger, pedestrian, cyclist, motorcyclist) Injuring or killing self/others/animals due to own driving Being crushed in a car
9.	Control	Losing control of the car or not being in control of the driving situation Not being able to stop
10.	Crossing	Oncoming traffic crossing the centre line and crashing into me
11.	Cycling	Hitting cyclists or being hit while cycling
12.	Drunk	Drunk drivers
13.	Fast	Driving fast or in fast-moving traffic Others driving fast
14.	Footpath	Seeing children or animals on the footpath
15.	General	Driving in general or being a driver
16.	Hit	Having unknowingly hit someone
17.	Jam	Traffic jam or congested, heavy traffic (fast- or slow-moving)
18.	Lanes	Changing lanes in general, in the city, or on the motorway Others changing lanes around me
19.	Law	Seeing a law enforcement vehicle
20.	Licence	Getting a driver's licence
21.	Mway	Driving on the motorway (merging onto it, driving in the fast, middle, or left lanes) Driving on a motorway without a shoulder for emergencies Driving next to median strips on the motorway
22.	Off	Driving off a road or cliff Not being found
23.	Oneway	Driving down a oneway street
24.	Option	Optional driving
25.	Overtake	Overtaking or misjudging distance Overtaking parked or big vehicles
26.	Overturn	Overturning the car
27.	Panic	Having a panic attack while driving with noone to help if this happens Being judged by other drivers
28.	Parking	Parking (pulling into or out from a park; parallel parking)
29.	Passenger	Being a passenger
30.	Pass	Passing or being passed

31. Pedest Being a pedestrian, being hit on a crossing, or hitting a pedestrian
32. People Driving with certain people (who criticise my driving)
    Driving with certain drivers
    Having no control over other drivers, or other drivers in general
    Being pressured by other drivers to keep up
33. Petrol Getting petrol or oil
34. Power The power of the car and being in control of it (responsibility, confidence)
35. React Not being able to react or make decisions fast enough
    Making errors in judgement while driving
    Impatience or concentration not good enough
36. Road Certain road conditions (e.g., open road, country, gravel, wet, icy, road next to a cliff, winding, steep, bridge, overpass, tunnel, narrow, reverse down a hill, road quality)
37. Round Driving through a roundabout
38. Seat Travelling in a certain seat (front passenger, left back, or right back seat)
39. School Driving past a school or school bus
40. Sleep Falling asleep at the wheel
41. Slides Going into a slide
42. Strange Driving in an unfamiliar area or situation; getting lost
43. Tailgated Being tailgated or hit from the back
44. Tired Driving when tired or otherwise stressed
45. Truck Driving behind or in front of a truck; passing a truck
    Suction from large vehicles
46. Turning Turning (right, left, U-turn)
47. Waiting Waiting or stopping at traffic lights or intersections
    Being hit in these situations (by people running pedestrian crossings and stop signs)
    Failure of power to the lights at an intersection
48. Water Being in a car under water
49. Weather Driving in certain weather conditions (e.g., at night, in rain, fog)
50. Works Driving through road works or road construction areas
51. Other
52. Anticipate Anticipating a trip
53. Physical Fainting while driving, dizziness, or physical collapse
54. Window Windows misting up
55. Claustro Being in a claustrophobic driving situation (e.g., being trapped in a car, driving in the middle lanes)
56. Long Travelling on long journeys
57. Fire Car catching fire

TRAFFIC OFFENCES

(based on Statistics Department information)

1. Driving or attempting to drive under the influence of drink or drugs
2. Breath or blood alcohol offences
3. Failure to fulfil duties after an accident
4. Driving in a dangerous manner
5. Careless use of a motor vehicle
6. Overtaking offences
7. Failure to keep to the left
8. Failure to yield right of way
9. Failure to stop or following too close
10. Exceeding the speed limit or speed camera fines
11. Failure to comply with road signs
12. Lighting offences
13. Mechanically defective or unsafe vehicle
14. Failure to obey an officer
15. Warrant of fitness offences
16. Driver's licence offences
17. Driving whilst disqualified
18. Vehicle licences and registration offences
19. Safety belt offences
20. Cycling offences
21. Pedestrian offences
22. Parking infringements and offences
23. Riding a motorcycle without a helmet
24. Other

OTHER FEARS
(based on Fear Survey Schedule version)

1. A lull in conversation
2. Aeroplanes or flying
3. Angry people
4. Animals
5. Automobile accidents or accidents
6. Automobiles
7. Bats
8. Being alone (at night)
9. Being attacked or raped
10. Being criticised
11. Being evaluated or observed
12. Being ignored
13. Being in charge or responsible for decisions
14. Being self-conscious
15. Being teased
16. Being touched by others
17. Being watched working
18. Being with a member of the opposite sex
19. Being with drunks
20. Birds
21. Cats
22. Cemeteries
23. Conflict, aggression, or violence
24. Crossing streets
25. Crowds or queues
26. Dark places
27. Dead bodies
28. Death and dying
29. Deep water (ocean, drowning)
30. Dentists or doctors
31. Dirt
32. Dogs
33. Dull weather
34. Earthquakes or other natural disasters
35. Elevators or escalators
36. Enclosed spaces (claustrophobic)
37. Entering a room where others are seated
38. Failure
39. Fainting/dizziness
40. Falling (from heights)
41. Feeling angry
42. Feeling different from others
44. Fire
45. Future
46. Head under water
47. Heights
48. Home being burgled
49. Human blood (+sight of)
50. Illness or injury to a loved one
51. Incapacitation in old age
52. Insects (+moths)
53. Journeys or travel
54. Looking foolish or stupid
55. Losing a loved one
56. Losing a job
57. Losing control
58. Loud noises or voices
59. Making mistakes
60. Medical odours
61. Mental illness
62. Needles or injections
63. Nude people
64. Obesity
65. Open spaces (agoraphobia)
66. Open wounds
67. People in authority
68. People with deformities
69. Premature or missing heartbeats
70. Rodents, rats, or mice
71. Roller coasters or skating
72. Sickness
73. Sight of sharp objects
74. Sirens
75. Snakes
76. Speaking in public
77. Spiders
78. Strange places, shapes, or people
79. Suffocating
80. Surgical operation
81. Taking tests
82. Tough looking people
83. Thunder, lightning, or wind
84. Ugly people
86. Weapons

87. Worms
88. Other
89. OCD-related fears (e.g., checking, trichotillomania, washing)
90. Social occasions
91. Panic attacks
92. Effects of accident on family
93. Destitution
94. Operating machinery
95. People
96. Loss

APPENDIX D

INSTRUCTIONS FOR SCORING THE ORIGINS QUESTIONNAIRE ("THE ORIGIN OF YOUR FEAR")

Classification into the following categories can be readily made from the origins questionnaire:

1. **Classical conditioning**
2. **Vicarious conditioning**
3. **Information / instruction**
4. **Non-conditioning traumatic event**
5. **Always been this way**
6. **Cannot remember**
7. **Cannot classify**

1. Classification for **category 1 (classical conditioning)** requires either answer A or answer B at Question 1. If answer A at Question 1, the subject must describe an initial event at 2(i) or 2(iv) that includes an independent UCS (that caused fear, pain, or distress) and the presence of the CS (the phobic stimulus). If answer B at Question 1, the subject must describe such an event at Question 6 or 7 and indicate that they have been excessively fearful of the stimulus, or unable to confront the stimulus, ever since. In addition, they must also indicate that they were not excessively fearful *before* the event.

2. Classification for **category 2 (vicarious conditioning)** requires either answer A or answer B at Question 1. If answer A at Question 1, the subject must describe an initial event at 2(i) in which they saw someone become hurt, frightened, or distressed in the presence of the phobic object or situation. If answer B at Question 1, the subject must describe such an event at Question 3(ii), 4(ii), or 5(i) and indicate that they have been excessively fearful of the stimulus, or unable to confront the stimulus, ever since. In addition, they must also indicate that they were not excessively fearful *before* the event.

3. Classification for **category 3 (information / instruction)** requires answer B at Question 1. In addition, the subject must describe the transmission of unpleasant stories, warnings, instructions, or information at Question 3(iii), 4(iii), or 5(i) and indicate that they have been excessively fearful of the stimulus, or unable to confront the stimulus, ever since. In

addition, they must also indicate that they were not excessively fearful *before* the transmission of this information.

4. Classification for **category 4 (non-conditioning traumatic event)** requires either answer A or answer B at Question 1. If answer A at Question 1, the subject must describe an initial event at 2(i) that includes the presence of the CS (the phobic stimulus) but does not include the presence of an independent UCS (that caused fear, pain, or distress). If answer B at Question 1, the subject must describe such an event at Question 7 and indicate that they have been excessively fearful of the stimulus, or unable to confront the stimulus, ever since. In addition, they must also indicate that they were not excessively fearful *before* the event.

5. Classification for category 5 requires answer C at Question 1.

6. Classification for category 6 requires answer B at Question 1 and failure to satisfy the requirements for categories 1 to 4 from Question 3 onwards.

7. Classification for category 7 requires inconsistent answers that would otherwise lead to multiple classifications.

APPENDIX E

CALCULATION OF HARMONIC MEANS FOR T-TEST POWER ANALYSES

Formula: $$n' = \frac{2n_A n_B}{n_A + n_B}$$

For t-tests in Table 24 (page 72):

BR: $n_A = 43$ $n_B = 14$ $$n' = \frac{2(43)(14)}{43+14} = \frac{1204}{57} = 21$$

NT: $n_A = 41$ $n_B = 13$ $$n' = \frac{2(41)(13)}{41+13} = \frac{1066}{54} = 19$$

STAI-Y: $n_A = 38$ $n_B = 15$ $$n' = \frac{2(38)(15)}{38+15} = \frac{1140}{53} = 21$$

For t-tests in Table 28 (page 76):

BR: $n_A = 61$ $n_B = 88$ $$n' = \frac{2(61)(88)}{61+88} = \frac{10736}{149} = 72$$

NT: $n_A = 59$ $n_B = 85$ $$n' = \frac{2(59)(85)}{59+85} = \frac{10030}{144} = 69$$

STAI-Y: $n_A = 55$ $n_B = 86$ $$n' = \frac{2(55)(86)}{55+86} = \frac{9460}{141} = 67$$

APPENDIX F

CALCULATION OF EFFECT SIZES FOR MANOVA POWER ANALYSES

Formulae: $$\text{partial } \eta^2 = \frac{[F \times (\text{df effect})]}{[F \times (\text{df effect}) + \text{df error}]}$$

$$f = [\eta^2 / (1-\eta^2)]^{1/2}$$

For MANOVA in Table 26 (page 74):

$$\text{partial } \eta^2 = \frac{[2.75 \times 1]}{[(2.75 \times 1) + 50]} = \frac{2.75}{52.75} = 0.05$$

$f = [.05 / (1-.05)]^{1/2} = (.05 / .95)^{1/2} = (.05)^{1/2} = .23$
$f^2 = .05$

For MANOVA in Table 29 (page 77):

Interaction effect:

$$\text{partial } \eta^2 = \frac{[3.22 \times 1]}{[(3.22 \times 1) + 134]} = \frac{3.22}{137.22} = 0.02$$

$f = [.02 / (1-.02)]^{1/2} = (.02 / .98)^{1/2} = (.02)^{1/2} = .14$
$f^2 = .02$

Main effect for anxiety response mode:

$$\text{partial } \eta^2 = \frac{[2.08 \times 1]}{[(2.08 \times 1) + 134]} = \frac{2.08}{136.08} = 0.015$$

$f = [.015 / (1-.015)]^{1/2} = (.015 / .985)^{1/2} = (.015)^{1/2} = .123$
$f^2 = .02$