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The human factors associated with responding to emergency vehicles

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Abstract

E*mergency vehicles* undertake *emergency driving*, using lights and sirens, to move rapidly through traffic in response to situations where life and property are at risk. For the *emergency driving* to be effective, other motorists need to drive in a manner that facilitates their passage. Despite laws to support this, problematic encounters can result in emergency vehicles being unable to get through. The current research expanded on earlier exploratory research into motorists' encounters with emergency vehicles (Grant, 2010) to examine psychological factors involved with motorists' responses to emergency vehicles. A construct validity approach was used to develop a scale through which a larger representative sample could be assessed. A qualitative study with emergency service drivers and motorists combined with existing literature to provide the basis for the scale development, and the subsequent testing and refinement resulted in the Responding to Emergency Vehicles Scale (REVS).

The data obtained throughout development of the scale, from 1089 participants, were used to investigate psychological factors associated with responding to emergency vehicles and have identified the following overarching factors: Reasons for responding to emergency vehicles; attitudes and beliefs about emergency vehicles/services; appraisal of the encounter and their ability to respond; prior associations with emergency services personnel, or vehicles; and beliefs around punishment. The study also explored participants' demographic factors relative to their reported driving behaviours during emergency vehicle encounters. Lastly, it identified the needs of the emergency service drivers during encounters, suggesting that existing road safety messages were inconsistent with actual needs of emergency service drivers, and suggested an alternative model of response.

Overall, the psychological factors provided an understanding of the participants' aptitude to be trained to respond more effectively. Their strong pro-social intentions indicated

an intention to respond appropriately to emergency vehicles and they were cognisant of the potential consequences of not doing so. Their generally positive views about emergency vehicles as well as associated services, and beliefs in the appropriateness of punishment further supported their willingness to respond appropriately. Finally, participants reported that they were aroused by emergency vehicles encounters, but not stressed to the extent they were incapable of responding.

Whilst the research was undertaken from a predominately theoretical lens, the applied nature of the phenomenon under scrutiny yielded findings that can inform policy around responding to emergency vehicles. Specifically, the findings suggest the need to embed explicit training on emergency vehicles within the existing driver training framework. They also recommend amendment to the road safety message used to guide motorists' actions during encounters with emergency vehicles. Future studies could confirm the appropriateness of the recommended response model with a larger sample of emergency service drivers, and use the REVS to assess larger samples and different driving populations.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

i. *incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;*

ii. *contain any material previously published or written by another person except where due reference is made in the text of this thesis; or*

iii. *contain any defamatory material;*

20/12/2017

PAULINE GRANT

Acknowledgement

Life is what happens when you are trying to complete a PhD. And it doesn't stop happening, just because you're busy with research, analysing data or writing a thesis. I stopped trying to keep track of the 'things' that happened during my candidature, but I will say, to my beautiful children Kirsten and Cameron – your strength is my strength and I thank you for being the wonderful people you are.

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Lastly, to my fellow emergency service workers, wherever you are, and whatever colour uniform you wear. Thank you for your service to your communities; for putting yourselves out there, time and again, to help others and save lives. Too many of those lives are lost on the road. So here is hoping that the outcomes from this research can assist in making those roads a little bit safer for you and other motorists, so you can get where you need to go, and keep doing your amazing work.

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CHAPTER ONE: Introduction

Chapter one introduces the problems associated with motorists' encounters with emergency vehicles where ineffective responding by other motorists can delay the emergency vehicle, and in extreme cases, result in crashes with fatal consequences. It highlights the gap in the existing body of research, which gives limited consideration to the role of the motorist in these encounters. It is argued that this gap may be addressed through psychological research that explores the phenomenon of motorists' encounters with emergency vehicles.

An emergency crew receives notification that someone needs help. The situation is urgent and they need to get there as soon as possible to protect life or property. The crew gets into the vehicle, activates emergency lights and siren, and starts driving.

The crewmember in the passenger seat is on the radio getting further updates on the task, giving directions to the driver, relaying the details of the task to the driver, and trying to telephone the person in need to let them know they are on their way.

The driver is driving as quickly and safely as they can, to get to the person they need to help. They are watching out for other vehicles on the road, the streets they need to take, pedestrians, cyclists; anything that might create a risk for themselves or someone else.

The emergency vehicle approaches a set of traffic lights that have turned red. The driver stops to make sure it is safe to cross. They need to ensure the other motorists do not just respond to their green light; that they have noticed the emergency vehicle and are giving way to it. The law says other motorists must give way, but that is not the point.

The traffic has stopped. No vehicles are moving. It appears safe to go.

The emergency vehicle enters the intersection and WHAM! Their world turns upside down as their vehicle overturns and ends up on its side. Another vehicle had hit them as they tried to cross the intersection.

Fortunately, no one has been hurt. The emergency vehicle occupants are only dazed and the other driver is okay. Unfortunately, they will not be attending the emergency.

E*mergency vehicles* use lights and sirens to move rapidly through traffic in response to situations where life and property are at risk. To hasten their passage, they drive in a manner that may otherwise be contrary to the road rules. They can undertake this *emergency driving*, without risk of penalty, because the vehicles are exempt from complying with the traffic regulations in these circumstances (r.280 – 282 Road Traffic Code (RTC), 2000).

To facilitate emergency driving, other motorists need to drive in a manner that allows emergency vehicles to move past them and through the traffic. Within many countries, laws exist that require the motorists to facilitate their passage and give way to emergency vehicles. Within Western Australia, the law requires motorists to "make every reasonable effort to give a clear and uninterrupted passage" to emergency vehicles (r.60 RTC, 2000). However, it is not the law but the motorists' compliance with the law, and cooperation with emergency vehicles, that dictates the success of emergency driving.

Prior exploratory research into motorists' encounters with emergency vehicles (Grant, 2010) has suggested that individuals are generally willing to cooperate and give way to emergency vehicles. However, this is not always reflected in their manner of driving, and there are instances where some motorists drive in a manner that hinders the passage of emergency vehicles, which results in delays or rerouting. In some cases, problematic encounters have resulted in crashes with serious or fatal consequences.

Research around problematic emergency vehicle encounters has used these crashes to quantify the problem. Comparing crash data for emergency and non-emergency vehicles found that emergency vehicles were more likely to be involved in crashes than comparably sized non-emergency vehicles, and those crashes were more likely to involve injuries (Lenne, Triggs, Mulvihill, Regan, & Corben, 2008; Ray & Kupas, 2005). Some crash related research refers to the wake-effect, whereby it is not the emergency vehicle, but vehicles in the vicinity of the emergency who are involved in crashes (Albertsson & Bylund, 2010; Clawson, Martin,

Cady, & Maio, 2014; Sundström & Albertsson, 2012). In 2005, the National Roads and Motorists Association (NRMA) found that failing to give way to emergency vehicles resulted in one crash per day in Australia (Anonymous, 2008; NRMA, 2006). Whilst NRMA did not report the severity of those crashes, highly publicised cases within Australia have resulted in fatalities with civilian motorists (Knowles, Pennells, Banks, & Cowan, 2012), emergency service personnel (2003) and multiple fatalities ("Fire truck in deadly crash on way to blaze," 2011). These frequently result in calls for emergency services to review emergency driving policy (WA State Coroner, 2016).

Understanding the situation surrounding emergency vehicles in Western Australia requires consideration, not only of the inherent dangers associated with emergency driving, but of the increasing pressures being placed on the road systems and public infrastructure. Between 2010 and 2015, the number of motor vehicles in Western Australia has increased at a rate of 3.3% per annum (ABS, 2015). At last report, there were 2,185,409 vehicles registered to drive on Western Australian roads. Whilst this may not be a large number in comparison to other locations, the rate of growth has resulted in increased road usage and greater demand on infrastructure (Lowthian et al., 2011). The concurrent increase in demand for emergency services has seen ambulances being dispatched on average every two and a half minutes (St John Ambulance, 2015) and at last reported callout figures for the fire service vehicles indicated that they responded to an incident every 19 minutes (FESA, 2010).

Consistent with the increase in motor vehicles, the Western Australian population has grown steadily since 2005 (ABS, 2014), with an increase of 8.7% in the period 2011 to 2016 (ABS, 2017). The urban sprawl that has occurred to accommodate the population has also created additional pressure by increasing emergency vehicle response distances and times (Griffin & McGwin Jr, 2013; Trowbridge, Gurka, & O'Connor, 2009). To address these

issues, emergency vehicles are required to travel more frequently and through heavier traffic, which means that the cooperation of motorists becomes increasingly important.

Existing literature from a variety of disciplines, looking at problems associated with emergency vehicle encounters, has predominately focused on emergency vehicles and their drivers. It has considered the reasons for undertaking emergency driving (e.g. Brison et al., 1992; Christensen & Høyer, 2008), the design and detection of emergency vehicles (e.g. Balastegui, Romeu, Clot, & Martin, 2013; Cotterill & Easter, 2011), the crash prevalence and demographics (e.g. Drucker et al., 2013) and the overall utility of emergency driving (e.g. Clawson, Martin, Cady, & Maio, 1997; Custalow & Gravitz, 2004; Sánchez-Mangas, García-Ferrrer, de Juan, & Arroyo, 2010). However, very little of the research has considered the role of the other motorists during these encounters (Burke, Sales, & Kincaid, 2001; Custalow & Gravitz, 2004; Grant, 2010; Lenne et al., 2008; Saunders & Gough, 2003). It therefore seemed appropriate that, to further explore the problems around emergency vehicles interacting with other motorists, it was necessary to understand other facets of such encounters.

In considering what might inform understanding of the role of the other motorists, it was acknowledged there was an existing, substantial body of research around traffic safety and driver behaviour. This research provides several different models to explain driving skill and ability, offending behaviours (i.e., driving in manner contrary to the prevailing laws) and choices made under various driving conditions. However, despite volume of research, there was no universally accepted model of driving behaviour (Fuller, 2005; Lewis-Evans, de Waard, & Brookhuis, 2011) that could be relied upon to inform the role of the motorist. Few of the models had been applied to the drivers of emergency vehicles and none to the other motorists who encountered the emergency vehicles. Hadden did, however, provide a matrix

that acknowledged the roles of, vehicle factors, environmental factors and human factors, including knowledge, attitudes and education (Haddon, 1968, 1972, 1980).

For the past 60 years, psychological theories have also been used to inform understanding of driver behaviour (Brown, 1997). They have been either applied in their own right, or used to underpin driver behaviour models. General psychological theories such as stress and coping (Lazarus & Folkman, 1984), theory of planned behaviour (Ajzen, 1991), and cooperation (Tyler, 1990, 2006) have been applied to motorists in different contexts including some emergency driving. Additionally, two exploratory psychological studies considered the motorists' experiences and perceptions during emergency vehicle encounters (Grant, 2010; Saunders & Gough, 2003). These studies suggested there was utility in using psychological constructs to understand the role of the motorist. Whilst neither study was generalisable, they did suggest that further examination with a larger and representative sample, might provide greater understanding of the phenomenon, and provide results that were generalisable to the broader motoring community. However, there was no existing measure that could be used to undertake the required quantitative assessment. Therefore, the development of a scale to identify and measure those factors associated with emergency vehicle encounters was required to address this lack of knowledge on the role of the motorist. The results of such an investigation would be able to inform driver education programmes and policy, thus facilitating better interactions between motorists and emergency vehicles and addressing the concerns of the public and officials.

Aims and Research Questions

This study was undertaken to address the dearth of research into the role of motorists during emergency vehicle encounters. It aimed to examine the psychological factors involved with motorists' responses to emergency vehicles, with a large representative sample, and provide results that could be generalised to the broader population. However, the

underpinning theoretical model was not yet identified nor were there any existing measures identified as being able to facilitate the larger investigation, so a sequential mixed methods design was adopted. In this research, a qualitative study with motorists and emergency service drivers was undertaken to identify the psychological themes associated with the phenomenon of responding to an emergency vehicle. The psychological themes identified in the qualitative exploration provided the basis for developing a scale. As part of the development of the scale, its repeated administration to a larger and representative sample of Western Australian drivers determined the psychological factors associated with responding to an emergency vehicle, as generalisable to the broader Western Australian community.

Through the process of qualitative exploration and scale development, the research sought to answer the questions:

Question 1. What is an effective response to an emergency vehicle?

Question 2. What psychological processes are involved with motorists' responses after detecting an emergency vehicle?

Question 3. What psychological factors are associated with effective responding to an emergency vehicle?

Question 4. What demographic factors are associated with effective responding to an emergency vehicle?

Structure of the Thesis

This thesis first reviews the existing body of knowledge on emergency driving, focusing on the role of the motorist when encountering emergency vehicles. Chapter two also provides an overview of driver behaviour models and psychological theories that may inform understanding of emergency vehicle encounters. This review confirms the limited available literature on the role of the motorist during encounters with emergency vehicles, and the need

to undertake qualitative exploration with motorists and emergency service drivers, as well as develop a scale to facilitate larger investigation.

Chapter three outlines the construct validity approach to scale development (Simms & Watson, 2007) used to develop a Responding to Emergency Vehicles Scale (REVS). Chapter four describes the qualitative research undertaken with the motorists and emergency service drivers to supplement the existing literature on the role of the motorist during emergency vehicle encounters. The data obtained from this qualitative research are presented and discussed, and the resultant analyses provide the constructs used to develop the items for the preliminary REVS. Chapter five outlines the processes used to develop the Preliminary REVS items and reports on the pilot testing undertaken.

Chapters six, seven and eight outline the successive administration, analysis, and refinement of the developing scale in accordance with the construct validity approach to scale development (Simms & Watson, 2007). Chapter six reports on the first administration of the Preliminary REVS to a representative sample of Western Australian motorists. Chapter seven reports on the second administration of the Revised REVS, to a second representative sample, in conjunction with an assessment for the presence of social desirability bias ,which has been found to affect driver self-report measures (af Wåhlberg, 2010b). It also reports on the temporal validity assessment undertaken with a separate convenience sample of Western Australian motorists. Chapter eight further reports on the administration of the Final REVS to the third representative sample of Western Australian motorists, along with other scales considered to be similar or relevant to the REVS.

Chapter nine considers the overall results of the REVS administration relative to the research questions posed. The research findings are then oriented within the broader body of knowledge on emergency vehicles and driver behaviour. It identifies the contribution this research has made to understanding the role of the motorist in emergency vehicle encounters

and the factors associated with effective responding. In chapter ten, the strengths and weaknesses of the research are discussed and recommendations made for policy consideration and future research.

Definitions

Given the varied terminology used in the area of road safety and driver behaviour research, a list of definitions is given to clarify the terminology used in the thesis.

Emergency driving – this term is used to refer to emergency vehicles operating under lights and sirens. By that, the vehicle is displaying flashing red and/or blue lights, and may be sounding an alarm, whilst relying on the provisions within the road traffic code to drive contrary to the prevailing road traffic regulations.

Emergency service – the term emergency service is used as a general reference for organisations that operate emergency vehicles. The main Western Australian organisations referred to by this term are St John Ambulance (SJA), Department of Fire and Emergency Services (DFES), and Western Australia Police (WA Police). However, the term may also extend to other organisations such as Red Cross (blood and urgent medical supplies) and Western Power (electricity supply).

Emergency vehicle – the statutory definition of emergency vehicle in Western Australia is:

> *"emergency vehicle* means a motor vehicle —
> (a) when conveying a police officer on official duty or when that vehicle is stationary at any place connected with the official duty; or
> (b) of a fire brigade on official duty in consequence of a fire or an alarm of fire or of an emergency or rescue operation where human life is reasonably considered to be in danger; or
> (c) being an ambulance, answering an urgent call or conveying any injured or sick person to any place for the provision of urgent treatment; or
> (d) being used to obtain or convey blood or other supplies, drugs or equipment for a person urgently requiring treatment and duly authorised to carry a siren or bell for use as a warning instrument; or

> (e) duly authorised as an emergency vehicle for the purposes of these regulations, by the CEO;" (Regulation 3 RTC, 2000)

In essence, any vehicle conveying a police officer on official duty is an emergency vehicle; it does not have to be a police vehicle, merely contain a police officer. Fire brigade, ambulance and blood/supply vehicles are only emergency vehicles when they are responding to an emergency or transporting urgent supplies. Other vehicles may be specified by the Chief Executive Officer of the Department of Transport as emergency vehicles. This can include Western Power fault vehicles and State Emergency Service vehicles but a full list of duly authorised vehicle is not publicly available.

Within this thesis, the term emergency vehicle is used in accordance within its legal definition, however, it is recognised that this is not always consistent with the interpretation given to it by motorists, as is discussed in later chapters.

Carriageway - the bituminised surface of the road way, excluding any verges, median strips, or other reserves.

Contra flow - refers to driving on the wrong side of the road, against the oncoming traffic.

Crash – Western Australian emergency services generally use the term crash when referring to collisions or accidents involving one or more motor vehicles, irrespective of the presence or absence or personal injury as a result of the event. However, the term accident may be used interchangeably, throughout the thesis, dependent upon the context or literature to which it may refer.

Fire engine/fire appliance – Fire service vehicles may be referred to as fire engines, tenders, fire trucks or appliances, depending upon the locality of the fire service and the knowledge of the individual using the terminology. The Road Traffic Act (1974) refers to them as vehicles belonging to a fire brigade. These terms may be used interchangeably, dependent upon the context.

Pursuit driving - police continuing to follow a vehicle that is attempting to evade them. This does not include police travelling to a specific location in response to an incident or request for assistance, or attempting to intercept a vehicle for the purposes of law enforcement (that is not otherwise attempting to evade police). It should be noted that this manner of emergency driving is beyond the scope of the current research.

Western Australian motorist - is a motorist who drives on Western Australian roads. This is not limited to a person who resides in Western Australia, nor to one who holds a driver's licence (Western Australian or otherwise) as it is the intent of this thesis to consider an individual's capacity to drive, rather than their authority to do so.

CHAPTER TWO: Literature Review

This chapter presents the existing body of knowledge on emergency driving, specifically in relation to the role of the motorist. It reviews the main driver behaviour models used to inform driver behaviour research and other psychological theories that may assist in understanding emergency vehicle encounters. Overall, the literature review demonstrates the existing limited understanding of the role of the motorist during encounters with emergency vehicles on Western Australian roads, and the psychological theories relevant to the qualitative and quantitative research reported in subsequent chapters.

The preceding chapter indicated a problem exists with some motorists' encounters with emergency vehicles in that some of the encounters resulted in delays and crashes. In considering the existing knowledge that may inform understanding of the phenomenon of responding to emergency vehicles, a substantial body of research exists on emergency vehicles and associated problems such as crash involvement, and non-detection. The following is a review of this literature with attention paid to the role of the other motorists, and currently proposed solutions. Subsequent to the review of this emergency vehicle related literature, the chapter reviews the prevailing psychological theories and driver behaviour models that inform understanding of the role of the motorist in emergency vehicle encounters.

Existing research on emergency vehicle encounters

Literature on emergency vehicle encounters was obtained from EBSCOhost, Elsevier, ProQuest, PsycARTICLES, Sage Publications, and ScienceDirect, using search terms of ambulance, police, fire, emergency driving, emergency vehicle, driver/driving, response to emergency vehicle, give way, and yield. Additional related literature was also identified through the original search results. Articles were screened for those which addressed problematic encounters such as crashes, or some facet of motorists' interaction with emergency vehicles, e.g. such as emergency vehicle detection,

The literature review revealed that existing research surrounding emergency vehicle encounters has focused on the emergency services, vehicles, and drivers through analysis of crashes involving emergency vehicles; research on audio visual detection of emergency vehicles; and technical and other recommendations aimed at facilitating the safe passage of emergency vehicles. Much of this research has been drawn from the crash domain, analysing the demographics and antecedents of crashes involving emergency vehicles. Research on audio visual detection of emergency vehicles has considered the design and utility of the sirens, and the use of lighting and other visual materials. The literature containing

recommendations for improving the passage of the vehicles has considered technical solutions, public education campaigns and even the cessation of emergency driving. The following review considers this literature from the context of how it informs understanding of the role of the motorist during emergency vehicle encounters.

Crash based research

The existing research on problematic emergency vehicle encounters, which was based on their involvement in road crashes, has reviewed crash demographics (Burke et al., 2001; Custalow & Gravitz, 2004; Drucker et al., 2013; Gormley, Walsh, & Fuller, 2008; Lundälv, 2007; Ray & Kupas, 2005, 2007; Symmons, Haworth, & Mulvihill, 2005), injury prevalence (Becker, Zaloshnja, Levick, Li, & Miller, 2003; Drucker et al., 2013; Kahn, Pirrallo, & Kuhn, 2001; Proudfoot et al., 2006; Symmons et al., 2005) and crash frequency relative to similar sized non-emergency vehicles (Ray & Kupas, 2005). It revealed that emergency vehicles were more likely to be involved in crashes than similar sized non-emergency vehicles, and that these crashes were more likely to result in injury (Ray & Kupas, 2005), occur on route to the emergency (Gormley et al., 2008) and were a significant cause of death for emergency service personnel (Burton, 2007; Maguire, Hunting, Smith, & Levick, 2002; Proudfoot et al., 2006). A recent review by Drucker et al. (2013) found that emergency vehicle crashes were more likely to occur in urban areas and at four way intersections. They were also more likely to occur during daytime, involve male drivers as the other motorist, and occur in situations where there was no other reported distraction or obstruction to their view. Collectively the studies have provided empirical support that a problem exists with emergency vehicles travelling on roads, as their involvement in crashes has been proportionately higher than non-emergency vehicles (Ray & Kupas, 2005) and have a greater risk of injury (Drucker et al., 2013; Ray & Kupas, 2005).

Whilst the crash research supports the assertion that a problem exists with emergency vehicles, it is limited in its usefulness in informing understanding of the role of the motorist. Research based on crash data, by nature, only incorporates crashes; it cannot address near misses or other adverse incidents (Tarko, Boyle, & Montella, 2013). Additionally, the use of crash data for research has been criticised for potential bias due to the self-report methodology often used for data collection, and for the propensity for drivers to present themselves in a more favourable light (af Wåhlberg, 2009). Lastly, the research generally presented a description of the crashes but did not explore causation; only in their conclusions did they comment on what might cause the crashes. The suggestions included decreased opportunity to react appropriately due to increased speed (Lenne et al., 2008) the unpredictability of other road users (Lenne et al., 2008), lack of public awareness of emergency vehicles (Burke et al., 2001), general factors such as alcohol consumption (Custalow & Gravitz, 2004) and the inherently dangerous nature of emergency driving (Custalow & Gravitz, 2004; Sanddal, Albert, Hansen, & Kupas, 2008). Therefore, whilst the crash based literature supports that a problem exists, and indicates road topography where problems are more likely to occur. it cannot address why the crashes occur or the role of the motorist in those crashes.

Detection

Another body of literature on emergency vehicles related to hazard perception and detection through audio visual cues. In the context of driving, hazard perception involves the detection and evaluation of events that pose a risk to the driver (Crundall et al., 2012) such as the approach of an emergency vehicle. Research has demonstrated that the ability to detect hazards varies with age and driving experience (Crundall et al., 2012; Horswill, Kemala, Wetton, Scialfa, & Pachana, 2010), and the speed and accuracy with which this occurs can influence responses to those events (Grayson, Maycock, Groeger, Hammond, & Field, 2003).

Research has also demonstrated that hazard perception can improve with training (Horswill, Taylor, Newnam, Wetton, & Hill, 2013), even with experienced drivers.

Research around detection through audio visual cues considered factors that aided or inhibited the vehicle's ability to be detected by other motorists. The research found that certain lighting combinations, colours, and flash patterns were more detectable than others (Cotterill & Easter, 2011; Ng & Chan, 2008; Schieber, Willan, & Schlorholtz, 2006; Solomon, 1990; Turner, Wylde, Langham, & Morrow, 2014; Tuttle, Sayer, & Buonarosa, 2009). It also found that some light and sound patterns conveyed greater urgency than others (Baldwin & Lewis, 2014) and there were circumstances where visual devices could be more hazardous than helpful, such as overuse of reflective material (Cassidy, Brooks, & Anderson, 2005).

The body of research on detection also considered the design and use of emergency vehicle sirens. It identified problems with being able to detect a siren, which arose from high radio noise and impairments to hearing (Balastegui et al., 2013). It also explored the problems with determining the direction that a siren was coming from (Caelli & Porter, 1980; Wallace & Fisher, 1998) and detecting a siren over different distances (Miller & Beaton, 1994). Some of these problems could be addressed through directional enhancements (Withington, 2000) and changes to tone and frequency (Balastegui et al., 2013; Catchpole & Mckeown, 2007), however, this would presuppose that the problem with emergency vehicles encounters was the motorists' ability to detect emergency vehicles. Whilst this might well be an issue, it cannot explain the phenomenon of motorists failing to respond appropriately, even after having detected an emergency vehicle.

Technological Solutions

The existing literature has provided information about technological methods for improving the passage of emergency vehicles. This included pre-emptive systems that

allowed emergency vehicles to control the traffic light as it approached, creating a 'green light corridor' and facilitating continuous passage (Hussin, Ismail, Murrali, & Kamarudin, 2012; Qin & Khan, 2012; Tanaka, Yamada, Tamasaku, & Inaba, 2013; Yun, Park, Lee, & Oh, 2011). As emergency vehicle crashes were shown to occur at intersections controlled by traffic lights (Drucker et al., 2013; Lenne et al., 2008) this strategy has merit (Lenne et al., 2008). Pre-emptive systems have been introduced into Queensland but they are yet to be adopted more broadly in Australia, and only address one area where problematic encounters occur.

The second technological solution within the literature was an early warning device (Finucane, 2010; Senart, Bouroche, & Cahill, 2008) where transmitters were fitted to emergency vehicles and receivers inside other vehicles. The approach of an emergency vehicle triggered an audio-visual alert in other vehicle, warning motorists than an emergency vehicle was nearby. These systems had a demonstrated ability to enhance awareness of, and response to, emergency vehicles (Lenne et al., 2008). However, they have been opposed in Western Australia (Cornelissen & Rudin-Brown, 2010) as the most readily available receiver was one built into a radar detector; an illegal device in most Australian states. Additionally, whilst early warning devices were shown to facilitate response, it presupposed that motorists would respond correctly given sufficient time (or warning) to do so.

Public Education Campaigns

The review of the literature also revealed multiple attempts to educate the public through media campaigns. Within Australia, government agencies and motoring groups have provided information to the public on the emergency vehicles' purpose, appropriate road behaviour for motorists, and penalties associated with noncompliance (e.g., Department of Transport, 2010a; "Give way to emergency vehicles," n.d.; NRMA, 2006; "Qld: Tougher penalties for motorists," 2007). Emergency services released press statements regarding the

issue (e.g., FESA, 2007; Stephens, 2010). Internationally, Dubai, India, Hong Kong, and Singapore conducted advertising campaigns encouraging more appropriate responses (e.g., Govt Hong Kong, 2009; Moukhallati, 2016; SCDF, 2006; The Hindu, 2010). Most recently within Western Australia, the Road Safety Commission produced an online publication addressing problematic driving situations. It included the requirement responding to respond to emergency vehicles as one of the 12 most misunderstood road rules (Road Safety Commission, 2015). Whilst this, and other road safety campaigns have endeavoured to adopt more sound marketing practices (Wundersitz & Hutchinson, 2011), their effect remains unclear as they are generally without empirical support or evaluation (Elliott, 2011; Poulter & McKenna, 2010; Wundersitz & Hutchinson, 2011), and it is equally uncertain whether the information they convey delivers a message that is clear, explicit and constructive.

Stop Emergency Driving

Within the literature there were articles, such as Clawson (2002), that proposed the only remedy for problems surrounding emergency vehicles' encounters with other motorists was to stop emergency driving. It was that the time saved by the emergency driving was negligible in comparison to the increased risk it created (Dami, Pasquier, & Carron, 2014; Ho & Casey, 1998; Petzäll, Petzäll, Jansson, & Nordström, 2011). Research on ambulance response times argued that the reduction in traveling time was not practically significant as few patients received hospital intervention within that time (Brown, Whitney, Hunt, Addario, & Hogue, 2000; Hunt et al., 1995; Merlin, Marques-Baptista, Baldino, Prasto, & Ohman-Strickland, 2010; O'Brien, Price, & Adams, 1999; Ross et al., 2016). Emergency driving by fire and emergency services was also challenged through conflicting findings around the correlation between fire damage and time, with research finding that time was a significant factor (Challands, 2010; Lu et al., 2014), but only for uncontained fires (Holborn, Nolan, & Golt, 2004), and that time was only one of many factors contributing to a fire's outcome

(Holborn et al., 2004). Overall, it was asserted that the negligible time saved by emergency driving, and the increased risk to emergency service personnel were sufficient reason to warrant the cessation of emergency driving (Chung, 2013; Clawson, 2002; Slattery & Silver, 2009).

To counter the argument against emergency driving, other research on ambulances found that emergency driving significantly reduced the transport times for urban (Dami et al., 2014; Ho & Casey, 1998; Petzäll et al., 2011) and rural (Ho & Lindquist, 2001; Petzäll et al., 2011) ambulances by up to 2.9 minutes and 8.9 minutes respectively. It was also demonstrated that the time saved by emergency driving was significant to cardiac patients, where receiving emergency medical treatment within four (Blackwell & Kaufman, 2002) or five (Soares-Oliveira, Egipto, Costa, & Cunha-Ribeiro, 2007) minutes significantly increased their likelihood of survival. This reason alone was considered sufficient to justify the use of faster response vehicles (i.e. motorcycles) to carry defibrillators in some countries for more efficient emergency response in heavy traffic (Soares-Oliveira et al., 2007), and for other emergency services to be cross trained in cardiac response and carry defibrillation devices (Christensen & Høyer, 2008; Jermyn, 1999; Lerner, Billittier, Moscati, & Adolf, 2003). Additionally, earlier treatment of general patients was also shown to result in lesser medical interventions (Postma et al., 2011), decreased post-rehabilitation requirements (Dinh et al., 2013) and improved survival rates (Dinh et al., 2013; Postma et al., 2011). As such, there are circumstances that warrant the continuation of emergency driving to save lives.

Overall, the emergency vehicle related research has supported the assertion that a problem existed around emergency driving that increased the risk of crashing and subsequent injury, yet it could not provide guidance as to the causes of those crashes, nor could it address other adverse encounters that did not result in crashes. The research did indicate that attempts had been made to facilitate effective passage for emergency vehicles, through technological

innovations, which addressed audio-visual detection and offered potential solutions. The literature review also highlighted attempts to rectify the problem through public education media campaigns, but the utility of this approach was undermined by its lack of empirical evidence and potentially unsuitable message. Finally, the review acknowledged the literature arguing for the cessation of emergency driving, countering that emergency driving significantly increased survival rates for some people in need of urgent assistance. The next stage of this literature review discusses the driving behaviour research that might inform understanding of the role of the motorist during emergency vehicle encounters.

Driving Research

A significant body of research exists, which has proposed models of driving behaviour that may be applicable to the phenomenon of responding to emergency vehicles. The models have been adapted and transformed over time (Vaa, 2014) and applied to numerous driving situations. Due to the variety of models available, researchers in the field have attempted to consolidate the research (Fuller, 2005), into one universally accepted model, but this had not yet been achieved (Lewis-Evans et al., 2011). In trying to determine which model might inform this current research, it was important to note that, based on the conceptualisation of driving as a combination of skill and choice, two main model classes had emerged from the literature, being cognitive models and motivational models. Cognitive models developed either through the integration of independent cognitive theories, or the generalisation of common elements of cognitive theories (Salvucci, 2007). These were generally used in technical applications such as intelligent vehicle systems (e.g. Liu, Wang, Li, Xu, & Gui, 2009; Maag, Mark, & Krüger, 2010). Motivational models considered the driver's behaviour relative to the level of risk associated with driving.

Within the motivational models, constant monitoring theories, such as risk homeostasis theory (Wilde, 1976) and risk allostasis theory (Fuller, 2005, 2011), provided

that there was a cost and benefit trade-off between risky and safe behaviours. Drivers adjusted their behaviour to maintain a specific level or range of risk, as based upon their perceptions of their own capability, relative to the demands of the task. Alternatively, the threshold monitoring theories underpinning some motivational models argued that risk was only perceived in certain situations, or when a threshold was exceeded. When this occurred, drivers would act in a manner that reduced the risk (Fuller, 1984; Lewis-Evans et al., 2011; Summala, 1988). As an extension of this, the safety margin model (Summala, 2005) argued that driving performance was based on the maintenance of safety margins, and that surpassing those margins created unpleasant feelings that the driver would seek to reduce (Lewis-Evans et al., 2011). The driver behaviour models have been applied to numerous driving situations, however, the lack of knowledge of the psychological factors associated with encountering emergency vehicles, made it difficult to determine whether a risk based model was appropriate to understanding encountering emergency vehicles.

Driving related surveys

In addition to driver behaviour models that may inform research on emergency vehicle encounters, a review of other literature potentially relevant to the current research revealed a significant number of driving related surveys, which covered driving skills (performance) and driving styles (behaviour). Many of these surveys were developed in response to increasing incidence of road rage (i.e. angry or aggressive driving). This includes the Driving Anger Scale (Deffenbacher, Oetting, & Lynch, 1994), the Propensity for Angry Driving Scale (DePasquale, Geller, Clarke, & Littleton, 2001), and Australian Propensity for Angry Driving Scale (Leal & Pachana, 2008, 2009). These surveys were designed to assess the motorist's tendency towards expressions of anger or vengeance, and attempted to predict crash involvement. Others, such as Harris et al. (2014) sought to counter the focus on negative aspects of driving with the Prosocial and Aggressive Driving Inventory, which

included a subscale on pro-social driving behaviours. Alternatively, some scales addressed the impact of emotional states rather than behaviour, such as fear (Driving Cognitions questionnaire (Ehlers et al., 2007)), anxiety (Driving Behaviour Survey (Clapp et al., 2011)) and stress (driver behaviour inventory (Gulian, Matthews, Glendon, Davies, & Debney, 1989)). Scales that considered the skill of driving involved self-assessment of driving skills (Driving skills inventory (Lajunen & Summala, 1995) and the likelihood of committing errors and violations (Driver Behaviour Questionnaire (Reason, Manstead, Stradling, Baxter, & Campbell, 1990)). Overall the scales have been repeatedly applied to a variety of motorists, including their use for cross cultural assessments. Whilst they may have been applicable to the phenomenon of motorists encountering emergency vehicles, it was not known what emotional, behavioural, or other psychological factors were relevant.

Overall, there has been a large body of research that investigates driving behaviour, which has provided cognitive and motivational models that could be applied to the technical aspects of driving or to more general driving situations. As the current research progressed it may have become possible to identify a driver behaviour model applicable to emergency vehicle encounters. However, at this point, it was unclear which model would give most utility. As such, rather than endeavouring to remain within the confines of an existing driver behaviour model and/or survey, the current research sought to maintain a broad theoretical perspective so that the resultant data would later identify which theories or models may be applicable. Based on what is known about emergency vehicle encounters, the following section reviews psychological theories that may be applicable to the phenomenon.

Psychological Theories Applicable to Emergency Vehicle Encounters

In addition to the driver behaviour models and surveys, psychological theories may be used to understand the phenomenon of encountering emergency vehicles. They may assist in understanding what motivates drivers to cooperate with emergency vehicles, how they

respond in potentially stressful situations, and how their attitudes and beliefs might influence their behaviour. Theories that may be applicable include prosocial behaviour and cooperation (Penner, Dovidio, Piliavin, & Schroeder, 2005), compliance with the law (Tyler, 1990, 2006), theory of planned behaviour (Ajzen, 1991), attitude theory (Eagly & Chaiken, 1993), priming (Lander, Bruce, Smith, & Hancock, 2009; Martin & Greer, 2011; Tulving & Schacter, 1990), mere exposure effect (Bornstein, 1989; Zajonc, 1968; Zajonc, 2001), and stress and coping (Lazarus & Folkman, 1984). Some of these theories have been applied extensively to driver behaviour, such as the theory of planned behaviour (e.g. Dinh & Kubota, 2013; Elliott, Armitage, & Baughan, 2007; Forward, 2006; Poulter, Chapman, Bibby, Clarke, & Crundall, 2008), whilst others such as mere exposure effect, have had little application. Following is an outline of the theories that may be applicable to understanding motorists' interactions with emergency vehicles.

Prosocial behaviour, cooperation with and obedience of the law.

Theories that may assist in understanding motorists' responses to emergency vehicles, include those that consider how a person behaves within a society, and particularly, how they interact and/or cooperate with other motorists. This behaviour can be informed by theories such as prosocial behaviour (Penner et al., 2005), cooperation (Biel, Snyder, Tyler, & Van Vugt, 2012), and compliance with the laws that govern driving and road usage (Beetham, 1991; Tyler, 1990, 2006).

Broadly speaking, prosocial behaviour is behaviour that may be defined by some sectors of society as being beneficial to the people within that society (Penner et al., 2005). It is not behaviour that arises from obligations such as those engendered by employment contexts, but something that is undertaken with the expectation that the action will ultimately benefit the individual through the improvement of society. Prosocial behaviour may include helping another person, volunteering through an organisation, or cooperating on a broader

scale within a society. Where helping and volunteering imply that some individuals are in greater need than others (i.e. helper and helped), cooperation generally involves individuals with equal needs.

Cooperation is said to arise from a social dilemma; in that, the individual would be better off for not cooperating, but society would be better off if they did (Biel et al., 2012). This cooperation may take the form of sharing a resource, or working towards the public good, and it may require action or restraint from the individual.

There are several factors that influence the extent to which an individual cooperates including prosocial motivations, social influence, and social identity. An individual's social value orientation may be prosocial (altruistic or co-operative) or pro-self (individualist or competitive) (Liebrand, Jansen, Rijken, & Suhre, 1986), and would affect their preference for allocating resources either to themselves or others. It would also affect how they evaluate the outcome of cooperating (Bogaert, Boone, & Declerck, 2008). A prosocial individual would put the needs of society before their own whereas a pro-self individual would put their own needs first. This motivation would also affect how they evaluate the outcome of cooperating (Penner et al., 2005). The social influences that would affect an individual's cooperation include conditions such as anonymity and the presence of others (Penner et al., 2005). These can result in non-cooperative behaviours from some individuals due to a bystander effect (inaction with the expectation that someone else will help) or free riding (the perception that they cannot be identified as having failed to help). Social identity can influence an individual's propensity to cooperate based on their identification with a particular group. With that, individuals are more likely to cooperate with the members and rules of their own group than with those they perceive as being from a different group (Biel et al., 2012).

One area where cooperation is necessary for the benefit and safety of society is road usage. Driving safely on the roads requires individuals to use them in a systemically

cooperative manner, and achieving cooperation on that scale requires some form of coordination, usually through a regulatory body (Biel et al., 2012; Penner et al., 2005). The regulatory body establishes a system of rules or laws to govern the use of roads, and in doing so, creates a system that aims to be safe. The rules created within this system restrict the actions of individual motorists, but facilitate the cooperative movement of road users as a whole. Within the context of traffic and road safety in Western Australia, the rules are created by the state government, through enactment of road traffic laws that are subsequently enforced by the police and related organisations.

For a system of road rules to be effective, the rules do not only need to exist, motorists must also abide by them; they must obey the law. When considering an individual's obedience to these road rules, research around why people obey the law has generally found that individuals were more likely to cooperate and comply if they perceived the rules, and the regulatory bodies who create and/or enforce them, to be legitimate (Beetham, 1991; Tyler, 1990, 2006). Consistent with this, research into public willingness to cooperate with police found that people were affected by how legitimate they perceived the rules (Murphy & Cherney, 2012), and the police to be (Murphy, Hinds, & Fleming, 2008). The more legitimate police were perceived to be, the more likely people were to cooperate with them and with the laws. Conversely, when perceived legitimacy was absent, motorists were less likely to cooperate, and more likely to break the law. As such, the cooperation within Western Australia hinges upon the road traffic laws, government and police being perceived as legitimate.

In the absence of voluntary compliance with the law, some other mechanism is required to compel motorists to obey the rules. This could take the form of a punitive process or penalty intended to make noncompliance injurious and undesirable (Beetham, 1991). However, for such penalties or processes to act as deterrents, they need to be either

sufficiently severe so to act as a deterrent themselves; or have such a high probability of being enforced that individuals would expect to be penalised if they broke the law (Tyler, 1990, 2006). Irrespective of likelihood or severity of penalties, reliance upon punitive measures is resource intensive as well as undesirable, and it is more effective to foster cooperation through legitimate authority (Saphire, 1978).

Within the context of emergency driving, laws exist to facilitate the passage of emergency vehicles. These allow emergency vehicles to be driven differently from other vehicles, and require other motorists to facilitate their passage by yielding to emergency vehicles. This effectively gives emergency vehicles greater right to the road than other motorists, creating an inequity among road users. As such, the legitimacy of the service undertaking emergency driving, may be an important aspect in understanding motorists' responses during encounters with those vehicles. Further to that, laws around emergency driving provide that penalties may be applied to motorists who fail to give way to emergency vehicles. Therefore compliance, or lack thereof, may also be associated with the severity or likelihood of penalties. As such, issues related to cooperation and compliance with law may assist in understanding the phenomenon. However, this is unlikely to explain why one individual's response is more effective than another's, in circumstances where both indicate similar intentions to cooperate (Biel et al., 2012; Penner et al., 2005). Therefore, other psychological theories may also be required to help understand the phenomenon. One such as the theory of planned behaviour, which is considered next.

Theory of planned behaviour.

In its purest form, the Theory of Planned Behaviour (TPB) provides that an individual's attitudes, subjective norms and perceived behavioural control, combine to form their intentions to act in a certain manner (Ajzen, 1991). The individual's intentions, in addition to perceived behavioural control, subsequently influence their actual behaviour.

TPB has been used extensively in driving studies, such as investigations into intentions to contravene road rules (Forward, 2006; Parker, Manstead, Stradling, Reason, & Baxter, 1992), intention to speed (Atombo, Wu, Zhong, & Zhang, 2016; Dinh & Kubota, 2013; Elliott, Armitage, & Baughan, 2003; Elliott & Thomson, 2010; Lheureux, Auzoult, Charlois, Hardy- Massard, & Minary, 2016), and in the general prediction of intended driving behaviours (Bazargan-Hejazi et al., 2017; Elliott et al., 2007; Moyano Díaz, 2002), and related. In the context of emergency services, TPB has been used to explore behaviours such as intention of police to arrest a person (Thornton & McGlynn, 1998), intention of police to adopt safe practices (Levin, 1999), and adopt healthy behaviours (Hyland, Boduszek, Shevlin, & Adamson, 2012).

Despite its previous application to driving and emergency situations, TPB has been criticised for its poor ability to predict actual behaviour (Armitage & Conner, 2001) and inability to fully account for the effect of other variables such as age and gender (Christopher, Paul, & Mark, 2002). It was also found to lack utility in many of its applications, unless other factors were included such as emotion (Mohiyeddini, Pauli, & Bauer, 2009) or implementation intention (Gollwitzer, 1993). As such, TPB may be useful in explaining how motorists intend to respond to emergency vehicles, however, earlier exploratory research (Grant,2010) suggested that situational factors may result in motorists not responding as they had intended. Therefore, other theories were considered, with the next being is attitude theory.

Attitude theory.

Attitude theory has been applied extensively in the context of driving and emergency services and may inform our understanding of emergency vehicle encounters. Attitudes are essentially psychological tendencies, internal to individuals, that bias their evaluations (Eagly & Chaiken, 1993). Acquired through cognitive, affective, and behavioural processes, the bias

may be favourable or unfavourable. Cognitive acquisition of an attitude arises from the receipt of information about an object prior any affective or emotional response. Affective acquisition arises from the pairing of an object with an affective state (e.g. fear) prior to any cognitive processing, and undertaking a behaviour can result in the acquisition of an attitude from that behaviour (Eagly & Chaiken, 1993).

Attitudes can vary in valence, direction, intensity and extremity and they are often given different labels. Depending upon the object to which they relate, they may be referred to as prejudices (attitudes towards minority groups), social attitudes (towards social groups), liking and attraction (towards individuals), and self-esteem (towards oneself). Attitudes cannot be directly observed, but may be inferred through their expression (Eagly & Chaiken, 1993) which, similar to their acquisition, may be cognitively, affectively and behaviourally. Cognitive expression can be overt or covert, in that the individual may be aware of their attitude, or it may occur as an unconscious bias. Affective expression of an attitude includes feelings, moods, and emotion. Behavioural expression encompasses both actions and intentions to act (Eagly & Chaiken, 1993).

Attitude theory been used extensively to facilitate understanding of driving behaviours (e.g. Hennessy & Wiesenthal, 2005; Mann & Lansdown, 2009; National Highway Traffic Safety, 2011; Sinclair, 2013). It has also been used within an emergency service context, including law enforcement research, which has looked at both attitudes towards police (Chermak, McGarrell, & Gruenewald, 2006; Egharevba & Crentsil, 2013; Geistman & Smith, 2007; O'Connor, 2008), and attitudes of police (Logan, Shannon, & Walker, 2006; Sun, Cretacci, Yunin, & Jin, 2009; Wortley, 2003). Ambulance related research has considered attitudes relative to their operating environment and protocols (Ødegaard et al., 2007; Porter et al., 2008; Squires & Mason, 2004; Toloo et al., 2013). Fire service research has considered

attitudes towards colleagues, conditions, and safety within the workplace (Holgate & Clancy, 2009; Redman & Snape, 2006; Slack, 1989)

In addition to its application to emergency services, there has been substantial research on the link between attitude and behaviour (Iversen & Rundmo, 2004). A meta-analysis of research into the attitude behaviour relationship demonstrated a significant association between attitudes and future behaviour (Kraus, 1995). Conversely, individuals have a demonstrated ability to act inconsistently with their attitudes (Eagly & Chaiken, 1993) and attitudes have been found to predict some behaviours better than others (Wallace, Paulson, Lord, & Bond, 2005). With its application to both driving behaviours and emergency services, attitude theory may be useful in understanding a motorists' beliefs and commitments towards emergency vehicles and services as well as some of their behaviours. Next, the applicability of priming and mere exposure effect is considered.

Priming and mere exposure effect.

Earlier exploratory research (Grant, 2010) suggested motorists' responses to emergency vehicles were influenced by whether or not they had some previous exposure to emergency services, vehicles, or personnel. This appeared to facilitate their detection or awareness of that service. The effect of this prior exposure appeared consistent with some form of priming or mere exposure effect.

Mere exposure effect provides that familiarity with a stimulus (e.g. prior exposure to an emergency service in some way) increases an individual's response to that stimulus, or similar stimuli. This is generally in the context of preference or liking (Bornstein, 1989; Zajonc, 1968; Zajonc, 2001) as it is presumed that the familiarity through exposure increases mental processing speed, or perceptual fluency of the stimulus, making retrieval faster and therefore affectively positive (Zhang & Zebrowitz, 2012). In the context of emergency

vehicles, it could be that prior exposure to an emergency service assists the person to recognise that service.

The exposure does not need to be a conscious process as research has shown that shorter exposure times can also result in increased liking (Stafford & Grimes, 2012). However, too much exposure to something may decrease liking of it (Bornstein, 1989), such as might occur in areas of high emergency vehicle traffic. Additionally, ongoing exposure to something negative, such as an adverse encounter with police, will increase the negative affect associated with it (Craver-Lemley & Bornstein, 2006).

Priming occurs where exposure to one stimulus influences an individual's response to another stimulus (Lander et al., 2009; Martin & Greer, 2011; Tulving & Schacter, 1990). The effect of priming may be faster processing speed relative to the subsequent stimulus, but the subsequent stimulus does not have to be exactly the same as the previous stimulus. The priming can be perceptual (similar form and same modality) or conceptual (similar meaning) (Tulving & Schacter, 1990).

Whilst priming and mere exposure effect are applicable to a myriad of contexts neither appear to have been applied to driving or emergency vehicles. However, research on the effect of a survey about risky driving found that, weeks after completing a risky driving behaviour questionnaire, participants demonstrated decreased risk-taking behaviours (Falk, 2010). Therefore, as indicated in the earlier research (Grant, 2010) mere exposure and priming may facilitate an understanding of why individuals exposed to emergency services and vehicles respond more favourably to emergency vehicle encounters, and the effect that a survey about emergency vehicle encounters may have on subsequent behaviour. Other psychological theories that may inform the research are those pertaining to stress and coping.

Stress and coping.

Prior research into motorists' experiences with emergency vehicles suggested that theories around stress and coping may be useful to interpreting the experience (Grant, 2010). In particular, Lazarus and Folkman's (1984) transactional model of stress and coping was useful in exploring the arousal that could result from individuals' appraisals of the encounter as stressful, their perception of their capacity to cope, and the behavioural and cognitive processes undertaken to do so. Further to that, stress and coping research, which considers individuals' responses to perceived threats and challenges, has been regularly applied to driving situations (e.g. Desmond & Matthews, 2009; Shamoa-Nir & Koslowsky, 2010; Taubman-Ben-Ari, Mikulincer, & Iram, 2004; Westerman & Haigney, 2000; Yamada et al., 2008),

In considering how theories of stress and coping may inform this research, it is important to note that, although there has been little consensus on the concept of stress, it may generally be considered to embody an individuals' perceptions of, and responses to, events that tax their perceived capabilities. Earlier models viewed stress as an automatic physiological or psychological response to external factors (i.e. Canon's 'flight or fight' model and Selye's general adaptation syndrome), however, more recent theories have incorporated the individual in a more active role. Two theoretical models, which have sought to explain individuals' responses to stressful events include conservation of resource theory (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014; Hobfoll, 1989; Hobfoll, Freedy, Lane, & Geller, 1990) and Lazarus and Folkman's transactional model of stress and coping (Folkman, Tedlie, & Moskowitz, 2004; Lazarus, 2000; Lazarus & Folkman, 1984).

Conservation of Resource Theory

In the conservation of resource theory, Hobfoll (1989) purport that individuals strive to build resources, and were subsequently threatened by the actual or potential loss of those

resources. Resources in this context are "objects, personal characteristics, conditions (e.g. relationship or employment status), or energies that were valued by the individual or that served as a means of attainment of those [resources]" (Hobfoll, 1989, p. 516). In this model, stress is the response to an environment that threatens individuals' resources, causes some loss of resources, or where there is a lack of resources. These environments include both perceived and actual situations.

Transaction Model of Stress and Coping

Lazarus and Folkman's (1984) transactional model of stress and coping is based upon an individuals' appraisals of events, and of their ability to cope with the events. In this model, when confronted by a situation, individuals conduct two, somewhat concurrent, appraisals. One determines whether the situation is likely to have an outcome that is irrelevant (no personal impact); stressful, or benign-positive (outcome is perceived as challenging yet positive). A perception of a stressful outcome is likely when individuals anticipate an outcome that is challenging in some way, or has the potential to result in harm and/or loss (Lazarus & Folkman, 1984). Concurrent to the evaluation of an outcome as stressful or not, the second appraisal assesses the personal and situational factors that underpin the available coping strategies, the ability to carry out those strategies, and the likelihood of success. Thus, the ability to cope with a situation influences perception of its stressfulness.

The second appraisal process is influenced by an individuals' commitments and beliefs associated with the situation (Lazarus & Folkman, 1984). Beliefs are considered to be personally or culturally formed perceptions that affect the way people understand themselves and their environment. This can include beliefs of personal control, self-mastery, ability to control the environment, stereotypes (Hamilton, 2000), or be existential, such as their belief in God. Commitments are things that are important and meaningful to individuals; situations

where strong commitments exist could be perceived as more threatening or harmful to individuals and heighten sensitivity to cues relating to those commitments (Lazarus & Folkman, 1984). In response to this, greater commitments usually result in greater effort to counter a threat.

The coping strategies that may be undertaken by the individual include problem focused coping and emotion focused coping (Folkman & Lazarus, 1988; Folkman & Moskowitz, 2000; Glanz & Schwartz, 2008; Lazarus & Folkman, 1984; McHaffie, 1992). Problem focused coping includes active strategies such as gathering information and undertaking particular behaviours, whereas emotion focused coping includes affective responses and strategies for changing the way individuals think about an event. These coping processes may be construed as positive strategies, such as meaning focused coping (e.g. positive or spiritually based reappraisal), but may also include the use of defence mechanisms, such as avoidance or denial (Cramer, 2000, 2001; Erdelyi, 2001).

Critiques of Stress and Coping Theories

Hobfoll and Lazarus have been critical of each other's theories, with Hobfoll (1989, 1990) arguing that Lazarus's transactional model was tautological in that both sides of the model (stressor and coping) were reliant upon the individual's perception. He was also critical of its failure to recognise the objective environment, as that would result in some demands on resources not being recognised as such because individuals would have perceived the situations as challenges rather than stressors. However, in Lazarus's view, what Hobfoll alluded to as stress, was more consistent with definitions of depression (Lazarus, 1990)

Conversely, it could be argued there are similarities between the two models. Hobfoll's non-physical resources, and the beliefs and commitments that underpin Lazarus's appraisal process are both constructs, which relate to subjective personal attributes of

individuals, such as. the happiness of a marriage (condition resource) or self-mastery (belief). Hobfoll's criticism of the role of perception seems misplaced when his own model relies upon an individual's perception of threat/loss to their resources. Lastly, Hobfoll's argument, that stress arising from something other than a loss of resource was not stress, appeared redundant as the definition of resource encompassed so much.

Overall, both models have the capacity to be applied to driving situations, but only Lazarus and Folkman's model has previously been used in driving related literature. By way of example, Shamoa-Nir and Koslowsky (2010) assessed the utility of the stress and coping model as an explanation for aggressive driving, finding it suitable to determine associations between aggressive driving and stress, and between hostile behaviour and coping through problem solving. The model was also used as part of frameworks for assessing driver stress (Desmond & Matthews, 2009; Kontogiannis, 2006), reckless driving (Taubman-Ben-Ari et al., 2004) and individual differences in driving errors and violations (Westerman & Haigney, 2000). As such, its utility within the context of driving has been established, and is likely to be applicable to this research.

There were, however, some general limitations to the stress and coping model (Lazarus & Folkman, 1984) in that much of the research utilised self-report data collection methods, which have been criticised (af Wahlberg, 2010) for susceptibility to social desirability effects. Further, it has been argued that the model often used between subject designs which failed to properly account for idiosyncratic fluctuations (Tennen, Affleck, Armeli, & Carney, 2000) Lastly, Coyne and Racioppo (2000) claimed that the models were too general, circular, and confounded. However, the transactional model of stress and coping has the capacity to provide links between the attitudes (i.e. beliefs) of individuals, the circumstances surrounding an event, and reported behavioural response. Further, the

limitations around the use of self-report and descriptive research may be mitigated in an appropriately designed study.

Other Psychological Research on Emergency Vehicle Encounters

In addition to the general theories, two psychological studies have been conducted on emergency vehicle encounters from motorists' perspective in an atheoretical approach. Saunders and Gough (2003) undertook a survey of 200 United Kingdom residents (three quarters of whom were drivers) regarding their interactions with ambulances and other emergency vehicles. Nearly all (91%) participants felt they acted in a controlled manner during interactions with emergency vehicles; however, 9% reportedly did not act in a controlled manner. Further to that, 28% of respondents were not confident of being able to detect an emergency vehicle, approximately 15% reported failing to notice an emergency vehicle's warning lights, approximately 10% reported failing to hear the sirens; and a further 15% reported failing to notice both lights and sirens. In considering their driving responses, 61% reported they were required to change their driving to accommodate the vehicle; this included lane changes and other manoeuvres like reversing. Overall, whilst the majority of participants (73%) considered responding to an emergency vehicle to be a simple manoeuvre, 32% perceived the encounter to be demanding or stressful (Saunders & Gough, 2003); which was supportive of the validity of approaching this phenomenon from a psychological perspective.

A qualitative exploratory study conducted by the current author (Grant, 2010) involved interviewing 11 motorists who regularly drove on Western Australian roads. Participants were asked to elaborate on their experiences of emergency vehicles encounters, and the study found that participants' responses to emergency vehicles related to perceptions of emergency services, safety, lawfulness, and legitimacy. Participants who expressed more positive views on emergency vehicles and services also indicated a willingness to give way

(Grant, 2010). However, the more positive views related to a greater likelihood of risk-taking or committing unlawful acts in order to give way. In contrast, individuals expressing negative views on the legitimacy and lawfulness of emergency vehicles and services also indicated a decreased willingness to take risks or break the law in order to give way. Notably, participants varied in their capacity to detect emergency vehicles at a distance or not until close by, and whilst the former afforded individuals more time to respond, it did not necessarily result in more effective responding. Overall, resultant analyses indicated congruency between the phenomenon of encountering emergency vehicles and Lazarus and Folkman's (1984) model of stress and coping as discussed previously.

Summary

The existing body of research has identified there is a need for emergency vehicles to undertake emergency driving in response to life threatening incidents. However, in doing so, they create a greater risk for emergency vehicles occupants and other motorists. The research on emergency vehicle design considerations and technological solutions has the capacity to facilitate more effective passage of emergency vehicles by increasing the motorists' detection of them. However, preliminary studies into the role of the motorist suggest that inappropriate responding is not related to detection alone.

The existing research into the motorist's role in emergency vehicle encounters suggests that factors other than detection also influence motorists' responses to emergency vehicles, and these may be explored from a psychological perspective. However, the scope of that research was not sufficient to fully understand the phenomenon, nor did it provide results that were generalisable to the broader population. As such, a larger study incorporating a quantitative assessment is required to further understand the psychological factors associated with responding to emergency vehicles and allow for generalisation of findings to the broader motoring community. However, there was no existing measure that could be used to

undertake the assessment. Therefore, the development of a scale to identify and measure those factors associated with emergency vehicle encounters was required to address this lack of knowledge on the role of the motorist. This has been addressed in the current project.

CHAPTER THREE: Research Methodology

Building upon the identified need to develop a scale that assesses the psychological factors involved with motorists' responses to emergency vehicles, this chapter discusses the integrated, construct validity method of scale development that was used. This method first incorporates a substantive validity phase, which reviews the literature from which the scale items are drawn. It then includes a structural validity phase, which involves the repeated administration and testing of the scale to reduce the number of items, determine its underlying structure, establish internal consistency, homogeneity, temporal validity, and the potential effect of social desirability bias. In the final external validity phase, the scale is administered in conjunction with similar, related, or unrelated scales, to assess its convergent and divergent validity, and orient it within the existing body of knowledge.

The preceding chapter identified a problem existed with motorists' responses to emergency vehicles. It highlighted that existing literature had considered a number of factors associated with emergency vehicles, such as detection, response times and technological enhancements, but little research had considered the role of other motorists during encounters. The two exploratory studies identified that there were psychological factors involved in the encounters that warranted further investigation on a larger scale. However, there was no measure identified as being suitable to undertake the required quantitative investigation. As such, a scale needed to be developed. This chapter discusses the methodology used for developing the Responding to Emergency Vehicles Scale (REVS) and explains why a construct validity approach (Simms & Watson, 2007) was chosen.

Scale Development

Developing a scale capable of assessing the factors associated with responding to emergency vehicles required the use of a well-established scale development method. For this scale, a construct validity approach (Simms & Watson, 2007) was chosen as it is a method that encompasses multiple validity assessments. Based on the work of Cronbach and Meehl (1955) and Loevinger (1957) the construct validity approach incorporates substantive validity, structural validity and external validity into the phases of scale development. This integrated method is considered to be better than the more traditional methods of rational-theoretical, criterion keying and internal consistency (Simms, 2008; Simms & Watson, 2007). Scale construction using a rational theoretical method involves item selection based upon the researcher's own theoretical understanding of the target construct and is considered to produce scales with poor discriminant validity (i.e. they were not conceptually different from scales that should have been unrelated) (Simms & Watson, 2007). Criterion-keyed method of scale development method generally produces measures intended to discriminate between individuals, which was not the intent of the REVS. Finally, internal consistency methods,

which are an integration of techniques, are capable of producing homogenous scales with good discriminant validity; however, they require understanding of the underlying theory to interpret the factors and give meaning to the scale (Simms & Watson, 2007). Where the traditional methods of scale construction each address some components of validity, the construct validity approach (Simms & Watson, 2007) incorporates all types of validity relevant to the target construct. This includes face validity, internal consistency and homogeneity, temporal validity, convergent and discriminant validity, and criterion related validity.

Specific Phases of Development of the REVS

The construct validity approach to scale development involved three steps: describing the theoretical model, building a measure based upon the constructs identified within the theoretical model, and conducting empirical assessments of data collected by the measure to determine the relationships between the construct and the items with the measure (Cronbach & Meehl, 1955; Simms & Watson, 2007). These steps formed the basis of the scale development phases; the substantive validity phase, structural validity phase and an external validity phase (Loevinger, 1957). The substantive validity phase included identifying the need for the scale, defining the constructs, and developing the initial, theoretically-informed pool of items. The structural validity phase involved the administration of the preliminary scale to a random representative sample. Subsequent psychometric evaluations determined the underlying structure of the scale, internal consistency, and homogeneity. The final external validity phase assessed the convergent, divergent, discriminant and criterion related validities (Simms, 2008).

Substantive validity phase.

Prior to the development of any new scale, the construct validity approach provided that it was appropriate to determine whether there was a need for a new scale (Simms &

Watson, 2007). To do this, a review of the literature is recommended. This review is also intended to identify previous attempts to conceptualise and measure the target construct, determine the need for a new scale, and identify the aspects that made up the target construct. In addition to this, the review determined related constructs, alternative constructs and potential difficulties (Simms & Watson, 2007).

The review of literature pertaining to motorists' encounters with emergency vehicles (chapter two) confirmed the need for a scale to assist in identifying and measuring factors associated with such encounters. However, it also identified there was insufficient literature to provide the constructs necessary to create the initial pool of items. To supplement the literature, an additional qualitative exploration was undertaken with motorists and emergency service drivers (chapter four), which identified several themes associated with the phenomenon of encountering emergency vehicles. As a result, the constructs identified through the literature review and qualitative study formed the basis of the initial pool of items.

Pool of items developed.

The principal goal of developing the scale items was to create a pool that encompassed all potentially relevant aspects of the target construct (as reported in chapter five). To do this, the item pool needed to be over inclusive (DeVellis, 2012; Fowler Jr, 2014; Simms & Watson, 2007) with multiple items for the individual constructs, and items for seemingly unrelated constructs (Simms & Watson, 2007). As the scale developed, the additional items and unrelated constructs could be retained or discarded on the basis of their relevance to, and representativeness of, the final construct (Haynes, Richard, & Kubany, 1995), but their earlier inclusion avoided the creation of artificial boundaries (DeVellis, 2012; Dillman, 2007) and ultimately increased the reliability of the final measure (Cronbach, 1951;

DeVellis, 2003). Overall, adherence to these item development guidelines facilitated the measure's content validity.

In addition to the number of items in the initial pool, wording was an important consideration for preliminary scale development. The items in the pool needed to be clear and understandable (Simms & Watson, 2007). The scale construction literature was consistent in stressing the importance of developing an appropriate pool and the consequences of failing to adequately address the task (de Leeuw, Hox, & Dillman, 2012a; DeVellis, 2012; Dillman, 2007; Fowler Jr, 2014). The scale development literature was also consistent in its guidance on item wording, length, clarity, and representativeness (DeVellis, 2012; Dillman, 2007; Fowler Jr, 2009, 2014).

Survey design.

Concurrent to the development of the items, was determining the method of survey dissemination, as this influenced the item and response formats. For the REVS, an internet based method was chosen, in preference to mail out, face to face or telephone methods (as reported in chapter five). An internet survey was considered preferable as it allowed for participant anonymity compared with face to face surveys, provided more flexible question presentation methods than mail out surveys, and was more cost effective than either the mail out or telephone surveys (de Leeuw, 2012). However, in selecting this method, the researcher was mindful of its potential for increasing non-response rate, and challenges with accessing participants (de Leeuw, 2012). To address these problems, additional media, such as mail outs, were used to distribute the survey invitations care was taken(de Leeuw & Hox, 2012) and techniques were used to encourage participation.

The selection of an internet based survey was also consistent with the style of questioning chosen for the research. Items were predominately presented as closed questions with categorical responses (Fowler Jr, 2009) or a Likert type scale (DeVellis, 2012; Likert,

1932). Some free text responses were incorporated but care was taken to limit their number and thus avoid fatiguing respondents.

Pilot testing for face validity.

Once the pool of items was developed and placed into online survey medium, it required piloting. To do this, consistent with a recommendation by Simms and Watson (2007), a small convenience sample was used (chapter five). The piloting assisted in identifying problems such as confusing instructions, and incorrectly functioning items. It also facilitated assessing face validity, and provided guidance on clarity and conciseness (DeVellis, 2012). This concluded the content validity phase of the development of the REVS.

Structural validity phase.

The structural validity phase encompassed the psychometric evaluation of items to determine the underlying structure of the measure (Simms, 2008; Simms & Watson, 2007). This involved the repeated administration of the REVS to a random representative sample, followed by a statistical evaluation to facilitate a reduction in the number of items, and identify the underlying structure of the REVS (chapters six to eight).

To proceed with this phase, it was necessary to choose an item selection strategy from within the traditional survey methods (Simms & Watson, 2007). The preferred method for this scale was that used within the internal consistency approach (Simms & Watson, 2007). This method used an exploratory factor analysis to identify the factors or components that explained the largest amount of variance (Simms & Watson, 2007). It was the most common form of contemporary scale construction (Clark & Watson, 1995), and was expected to result in the development of an homogenous scale with good discriminant validity (Simms & Watson, 2007). It was also preferable to the rational-theoretical method, which relied on the scale developer's theoretical understanding of the construct to select items, and the criterion-

keyed method, which selected items for their ability to discriminate between groups of individuals, and was not the purpose for the REVS (Simms & Watson, 2007).

The preferred internal-consistency approach to item selection required the collection of data from a large sample that was representative of the target population (Simms & Watson, 2007). An exploratory factor analysis then identified the components that explained the largest amount of variance (Simms & Watson, 2007) and which represented the underlying structure of the target construct (Tabachnik & Fidell, 2007). The type of factor analysis chosen for developing the REVS was exploratory rather than confirmatory, as the intent of the research was to identify the underlying structure of the developing scale for which there was no previously theorised model (Field, 2009).

To facilitate the exploratory testing, Principal Components Analysis (PCA) was chosen in preference to Exploratory Factor Analysis (EFA) (Field, 2009). There had been substantial debate within the literature as to which process was better (Tabachnik & Fidell, 2007). EFA transforms the variables into a mathematical model using estimates of common variance to determine the number of factors that account for the common variance, and its underlying structure. However, PCA uses all variance and transforms the original variables into linear combinations to reduce the variables into a few factors that explain the largest amount of total variance (Tabachnik & Fidell, 2007). Field (2009) considered PCA to be a more psychometrically sound procedure that was less susceptible to extremely high correlations, which may be present in the early phases of scale development (Tabachnik & Fidell, 2007). As such, PCA was preferable for this research. It was noted that PCA was intended to assess whole populations, and the results of a single sample could not be applied to that population. However, generalisation could occur if successive PCA testing on multiple samples within the population produced similar factor structures (Field, 2009). As each refinement of the scale had to be retested to establish its structural validity, the multiple

data collection rounds required to do this would allow the PCA results to be generalisable to the broader Western Australian motoring community.

After choosing the type of factor analysis, it was necessary to determine the number of factors, which would be retained and, as recommended by Stevens (2009), a combination of methods was used to determine the model that provided greatest utility. The four general methods for determining the number of factors were Kaiser's criterion method, a scree test, using statistical significance and retaining as many as would explain a specified amount of variance (Stevens, 2009). The Kaiser method recommended retaining factors with an Eigenvalue of 1.0 or greater and was effective for samples with less than 30 variables and communalities >.70, or sample sizes greater than 250 and communality >.60 (Stevens, 2009). The scree plot method used a graphical representation of the Eigenvalues to determine the point where the values started to level off; retaining all factors prior to that point. Statistical significance of the factors could be used but it was influenced by sample size. Retention of factors above a certain value required an arbitrary decision on the retention level, in this case >.3, consistent with the method employed by Baker and Gringart (2009) and recommended by Kline (2011). The results of each method were examined to determine the model which gave greatest explanation to the data.

Subsequent to the factor analysis, the REVS's internal consistency and homogeneity were assessed to ensure the items' intercorrelations were consistent with the organisation of the target construct (Simms & Watson, 2007). As the goal of each scale is to measure a single construct, it was sought that the items within that scale would be homogenous and internally coherent (Watson, 2006). Internal consistency for the REVS was measured using Cronbach's Alpha; and care was taken in interpreting the results, as the estimations of internal consistency were functions of both the inter-item correlation and the number of scale items.

Homogeneity was assessed through the inspection of total correlation to ensure items had greater correlation within the factors than with items in the other factors.

Other reliability measures.

As recommended by Simms and Watson (2007), other scale reliability aspects were measured at this point, including test-retest reliability and the effects of social desirability on responding (chapter seven). This was consistent with literature specific to driver behaviour surveys which also stressed the need to identify or control for socially desirable responding in self-report measures of driver behaviour (af Wåhlberg, 2010b; Lajunen, Corry, Summala, & Hartley, 1997). To facilitate these assessments, this phase incorporated the administration of a social desirability scale in conjunction with the developing REVS, and included the repeated administration of the test to a group of participants.

External validity phase.

The final phase in developing the REVS was the external validity phase (chapter eight). This assessed the scale's convergent, discriminant and criterion related validities to determine its congruence with the existing body of knowledge (Simms & Watson, 2007). Convergent validity considered the correlation between the REVS and existing measures, whereas discriminant validity looked at the extent to which the REVS was distinct from other measures. Assessing convergent and discriminant validity was undertaken using a multi-trait-multi-method-matrix (MTMM) whereby multiple measures were administered concurrently with the REVS and the results of each were correlated to identify areas of convergence and discrimination. The actual comparison measures used for this were identified in the latter phases of the scale.

The purpose of criterion related validity was to assist in determining the scale's place within the existing body of knowledge and to assess its inferential ability (Simms & Watson, 2007). Evaluating this involved assessing the REVS against relevant non-test variables for

concurrent validity and predictive validity. For concurrent validity, the scale was assessed against criterion evidence collected at the same time, which was non-test variables relevant to the construct (Simms & Watson, 2007). Predictive validity involved assessing the scale against criteria at a future point. This was not incorporated into the current research as it was beyond its scope to undertake such longitudinal testing. However, assessment of the REVS' predictive validity could be undertaken in future. Regardless of the omission of a predictive validity assessment, this phase established the REVS within the existing body of knowledge.

Summary

Building upon the identified need for a scale to assess the psychological factors involved with motorists' responses to emergency vehicles, this chapter discussed the construct validity approach (Simms & Watson, 2007) that was used to develop the REVS. Within this method, a substantive validity phase incorporated a review of literature to establish the need for a scale and identify the underlying constructs. This would be supplemented by a qualitative study, and the items for the Preliminary REVS would be drawn from both. A structural validity phase incorporated repetitive administration and testing of the scale to reduce the number of items, and determine the underlying structure. This also established internal consistency, homogeneity, temporal validity, and the effect of any social desirability bias. The final external validities phase assessed the scale's convergent, discriminant and criterion related validity through its administration in conjunction with other similar or related scales and assessment against criterion evidence collected at the same time. The following chapter reports on the qualitative research, undertaken to supplement existing literature on motorists' encounters with emergency vehicles and identify potential psychological factors involved in such encounters, and specifically with motorists' responses to emergency vehicles.

CHAPTER FOUR: Qualitative Research

This chapter details the qualitative research undertaken with motorists and emergency service personnel to understand the phenomenon of motorists encountering emergency vehicles. It describes the focus groups and interviews conducted with emergency service personnel on their experiences and needs in relation to emergency driving. It then describes the interviews undertaken with motorists on their experiences of encountering emergency vehicles. The resultant data and analysis answered the research question of *What is an effective response to an emergency vehicle?*

The psychological themes identified in the qualitative analysis, combined with the existing literature on emergency vehicles (identified in chapter two), provide the basis for developing the scale items, which were used to identify and measure psychological factors associated with the phenomenon of encountering emergency vehicles and to begin answering the remaining research questions.

The preceding chapters identified that a problem exists with the way motorists respond to emergency vehicles, and that existing literature in the area had placed little focus on the role of the motorist. It also identified that a psychological approach would be useful in understanding the phenomenon, which could be expanded through the development of a scale to conduct a larger investigation. The results of investigations could then be generalised to the broader community of WA drivers. As identified in chapter three, the construct validity approach was the preferred method for developing the scale, however, this required preliminary scale items be drawn from the existing body of knowledge. As there was little research on the role of the motorist, an additional qualitative assessment of the phenomenon was required to provide the psychological themes and subsequent scale items. This chapter details the qualitative studies undertaken with emergency service drivers and other motorists, which explored the phenomenon of motorists' encounters with emergency vehicles.

Theoretical orientation.

The qualitative research reported in this section adopted a phenomenological approach within a constructionist perspective as it sought to understand the meaning given by individuals to their lived experiences of this particular phenomenon, and recognised that reality was a co-construction between the participant and the researcher (Cresswell & Plano Clark, 2011; Langdridge, 2007). Constructionism is based upon the premise that humans interpret their world according to their social and cultural perspectives, and the meaning attributed to that world is constructed rather than merely objective or subjective (Crotty, 2003). From this, individuals comprehend their experiences in a variety of ways. The meaning given to their experiences arises from their interpretation of those experiences. Within the research process, the interpretation of, and meaning given to, the interview data are a co-construction between the researcher and the participant (Charmaz, 2003).

The phenomenological approach sought to understand the human experience associated with the area of research. Within this context, the researcher sought to identify and understand not only the experiences of the emergency service driver and motorists, but also their own preconceptions in order to bracket them and minimise presuppositions (Langdridge, 2007). This was important as the researcher had experience within the field of emergency vehicle driving.

The phenomenological analysis of the data was interpretive, rather than descriptive (Langdridge, 2007; Lopez & Willis, 2004), as previous exploratory research indicated that individuals were potentially unaware of some of the factors influencing their experiences (Grant, 2010). As such, the data analysis sought to identify latent themes and subthemes (Braun & Clarke, 2006) by revealing underlying ideologies rather than superficial meanings (Braun & Clarke, 2006). This style of analysis elicited richer themes than descriptive research would have, and provided a sound basis for the subsequent scale development.

Rigour.

The establishment of rigour within qualitative research involved theoretical rigour, methodological rigour, interpretive rigour, evaluative rigour and triangulation (Liamputtong & Ezzy, 2005). Theoretical rigour was established by ensuring the research strategy was consistent with the research goals. In this case, interpretive phenomenological analysis from a constructionist perspective was used on data obtained through focus groups and individual interviews (Braun & Clarke, 2006). This epistemology and methodology were considered suitable for use in an area with little prior research (Boyatzis, 1998; Braun & Clarke, 2006) as it allowed the data, and its subsequent co-constructed interpretation, to emerge and form the basis of the scale development, rather than attempting to fit the research into an existing theoretical framework.

Methodological rigour was established through careful documentation of the procedures undertaken to ascertain the findings (Liamputtong & Ezzy, 2005). All interviews were audio taped and an abridged transcription was undertaken (this omitted irrelevant conversation, or operationally sensitive materials as agreed with the respective organisations). An audit trail was also established through the use of NVivo and a journal to record procedures undertaken, analyses conducted, decisions made and memos written during the analysis (Charmaz, 2003). The researcher's reactions to the data were recorded during each phase of the collection, transcription, coding, and analysis. These were subsequently reviewed to facilitate the detection and reduction of potential researcher biases.

Interpretative rigour was established when the account accurately represented the data on which it was based (Liamputtong & Ezzy, 2005). To facilitate this, the study was supervised by experienced researchers who provided guidance throughout the data interpretation. Interpretative rigour was further enhanced through the liberal use of direct quotations.

Evaluative rigour was established through the Edith Cowan University Human Research Ethics Committee application process and subsequent approval (Approval Number 7449, dated 16 November 2011). This process incorporated the requirements of the National Statement on Ethical Conduct of Human Research (NHMRC/ARC, 2007), which addresses issues of risk, benefit, consent, data security, and harm to participants. Approval was also obtained from the respective emergency service organisations that participated in the qualitative assessment[1]. The ethics approval was obtained through assurances that the

[1] Western Australia Police research protocols required the submission of a research application and confirmation of university ethics approval. Saint John Ambulance and Department of Fire and Emergency Service provided required managerial or executive level approval to involve staff in research.

research involved no foreseeable harm to participants, offered confidentiality and obtained the informed consent of the participants.

Triangulation involved the use of multiple data sources, methods, and theories (Liamputtong & Ezzy, 2005). The current study employed the use of multiple methods by utilising focus groups, individual interviews, and observation. The resultant analysis was checked with the research supervisors, and key themes were presented to some participants for member checking. Triangulation was also established by using alternate data sources such as legal databases, social network sites and media to establish or enhance matters raised by the participants.

Reflexivity.

At the time, the researcher was a 42-year-old Caucasian female from a middle-class background who has been an operational police officer for 14 years. Five years of her policing was undertaken in regional Western Australia and the remaining time within the Perth metropolitan area. The researcher was experienced in the areas of general duties and traffic policing and had been qualified to drive in all levels of emergency (urgent duty) driving including pursuits for 9 years. Although she had never been involved in a crash resulting from failure to give way to an emergency vehicle, the researcher has personally experienced multiple incidences of motorists responding inappropriately to emergency vehicles. As the data collection and analysis proceeded, the researcher was able to use her understanding of emergency driving to inform the research and explore the views held by other emergency service personnel. Whilst the researcher's emergency service experience was a potential bias, techniques such as member checking and triangulation were incorporated into the analysis to minimise its effects. Member checking included the referral of some interpretations back to participants to ensure consistency with intended meaning. It was also used with emergency service personnel to facilitate development of the desired

response model (as discussed further on). Triangulation involved the use of multiple data sources, such as road traffic legislation and guidelines, census data, and consultation with existing road safety practitioners.

Social Bias.

All emergency service participants were aware that the researcher was a police officer though none were previously known to the researcher. Eleven of the fourteen motorists knew that the researcher was a police officer. As was found in an earlier exploratory research (Grant, 2010), this knowledge did not appear to create a social bias with the participants. Rather, the common employment and shared experiences assisted in developing a rapport with the emergency service participants. The motorists recalled a variety of experiences that could have been construed as ineffective responding or unlawful behaviour, suggesting that social bias had little impact on discussions of emergency vehicle encounters.

Qualitative Exploration with Emergency Service Drivers

Understanding motorists' response to emergency vehicles, with a view to facilitating more effective responding, first required an understanding of the needs of emergency vehicle drivers. The experiences of the researcher and her understanding of the different emergency vehicles, combined with prior research, gave rise to the assumption that the needs of emergency vehicle drivers would vary for each emergency service and type of vehicle. Therefore, this study was undertaken to understand what the emergency vehicle drivers required from motorists in order to move quickly through traffic.

Participants.

Participants in this stage were emergency service drivers, employed by Western Australia's three main emergency response services: the Fire and Rescue Service (FRS) component of the Department of Fire and Emergency Services (DFES); St John Ambulance (SJA) who provide emergency medical response; and Western Australia Police (WA Police).

Agreement was initially sought from the respective services to participate in a combined services focus group, however, difficulties in coordinating availability resulted in two separate focus groups (one with WA Police personnel and one with SJA personnel), and a separate interview with the FRS driver training coordinator. The focus groups endeavoured to include a recommended minimum of five participants (Krueger & Casey, 2009), however, operational necessity resulted in each group having three participants. All focus group and interview participants were current or past operational[2] members of their respective organisations who had work in metropolitan and regional locations, and were experienced in driving their organisation's vehicles under emergency conditions. The participants had been canvassed by their respective organisations and all volunteered to participate in the focus group/interview. A table of participants' demographic information is provided in Appendix A

Materials.

An information letter (Appendix B) was used to provide information about the research, and contact details for the principal researcher, supervisors, and an independent ethics consultant. A written consent form (Appendix C) was used to record the participants' consent to their involvement in the research. This form covered the current qualitative research (this chapter) and their subsequent participation in the piloting of the survey (chapter five). An audio recorder was used to record the focus groups and a journal was completed after the focus groups and interview.

Procedure.

After receiving ethics approval from the Edith Cowan University Human Research Ethics Committee and the respective emergency service organisations as previously

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[2] The participants were currently, or had previously, undertaken the duties of an ambulance officer/paramedic, fire fighter or frontline police officer.

described, the focus groups/interview were conducted at the respective organisations' premises. After introductions, the interviewer provided a detailed explanation of the purpose of the research and participants were advised on issues of confidentiality, non-disclosure of identifying information, audio recording, data storage, and the voluntary nature of their participation. The participants were also provided with the information letter (Appendix B) reiterating the details provided by the interviewer, and written consent was obtained prior to commencement (Appendix C). Demographic information was collected either during or after the focus group/interview (Appendix D). At the commencement of the interviews, and as appropriate during the discussions, the researcher shared some of her experiences with the participants. This assisted in establishing rapport and facilitated a more relaxed dialogue. An audio recorder was used to record the focus groups and notes were made during and after the focus groups and interview. Where possible, the participants were offered refreshments but no other incentive was provided. No ethical questions or challenges arose from the qualitative explorative study and no contact was made with the Independent Ethics Consultant.

Data analysis.

Upon completion of the focus groups, the principal researcher undertook an abridged transcription. By that, only pertinent sections of the recording were transcribed, and other areas were omitted such as the introduction, unrelated conversation and operationally sensitive information as agreed with the respective organisations (Krueger & Casey, 2009). The abridged transcript was then read in conjunction with the recording to ensure accuracy and orient the researcher within the data (Braun & Clarke, 2006). The transcript was augmented by the interviewer's notes that were taken at the time and shortly thereafter.

An interpretive style of phenomenological analysis was then undertaken, as outlined by Langdridge (2007). Existing road safety messages and legislation applicable to emergency

vehicles were also reviewed in conjunction with the analysis. A summary of analysis was forwarded to participants for member checking. This analysis included the acknowledgement that the current road safety message was not consistent with the identified needs of the emergency service driver. Discussions then took place between the group members on a better response from motorists which resulted in the development of an alternative road safety message as discussed below.

Results.

The participants were encouraged to discuss their experiences of driving vehicles under emergency conditions and the type of responses they encountered from motorists. Participants revealed an expectation that, during almost every emergency drive, there would be at least one motorist responding in a way that was "*questionable*" or "*downright dangerous*". This included stopping unexpectedly in front of an emergency vehicle, and proceeding through an intersection into the pathway of an emergency vehicle. Problems with intersections were particularly notable in circumstances where the emergency vehicle driver had stopped prior to entering the intersection as per their organisational policy. One participant also recalled an incident involving a motorist approaching head-on to a large emergency vehicle. The motorist did not appear to notice the vehicle until they were in very close proximity.

Views on other motorists.

During discussions, participants made suggestions as to why some motorists would have difficulty responding appropriately to an emergency vehicle. These included the belief that motorists "*see the lights and the noise and stuff and they just panic*", and that "*they just don't know what to do*". Some participants noted that some motorists who drove adversely around emergency vehicles appeared to be from ethnically diverse backgrounds. They speculated that the inappropriate responses may have arisen from their lack of understanding

of the requirements of driving on Western Australian roads because they had not learnt to drive in Western Australia. Their perception that other road users lacked awareness was consistent with findings from other research (Gormley et al., 2008; Walsh, Hannigan, & Fuller, 2010) on the experiences of emergency service drivers.

At times during the discussions, participants indicated frustration or incredulity towards the actions of some motorists. This appeared to arise, in part, from the acknowledgement that it was not possible for the emergency service driver to drive in a manner that would negate all dangers arising from motorists' unpredictable manoeuvres. This reinforced the earlier conclusion that research focusing on emergency vehicle design, training and policy was not sufficient to address the problem.

Response required from motorists

Participants were also encouraged to discuss how they drove emergency vehicles, and the response they wanted from the motorists. Consistent with expectations, the three main emergency services varied both in their emergency driving practices relative to the type of vehicle they were driving, and in the driving guidelines and policies of their respective organisations. Discussions of driving scenarios across the three services centred predominately on travelling in a straight line and intersections controlled by a traffic control light (TCL).

Fire and Rescue Service

When travelling in a straight light line and attempting to pass motorists moving in the same direction as the emergency vehicle, FRS aimed to remain on the correct (left) side of the carriageway, just left of centre. To facilitate this, they preferred motorists to move left or, if unable to do so, move right onto the median strip. Whilst not preferable, motorists could slow down if unable to move over as FRS vehicles had enhanced braking systems, which allowed their vehicle to be stopped quickly. When negotiating intersections, particularly

those controlled by TCL, FRS endeavoured to use turning lanes to move around any stationary traffic. If the TCL was red and FRS were unable to use a turning lane to move past stationary vehicles, they did not want motorists to proceed completely through the intersection. However, if safe to do so, they preferred motorists move carefully across the continuous white line and tuck in front of other stationary traffic.

St John Ambulance

Participants in the SJA focus group explained that ambulances had to be driven differently to other vehicles. They were tall, top heavy vehicles, which amplified movement, making them hard to manoeuvre through traffic. Unlike the FRS vehicles, they were difficult to stop quickly. Driving an ambulance was also made more challenging because of the activities of other paramedics inside the ambulance. When en route to hospital, a paramedic was often in the rear of the vehicle whilst working on a patient. In doing so, they may not have been wearing a seatbelt. As such, the driver needed to operate the vehicle in a way that minimised rapid movement and provided a safe environment for their patient, their colleague, themselves, and other motorists.

In order to drive an ambulance as safely as possible, SJA participants indicated a preference for driving in the outside lane (lane nearest to the centre of the carriageway). This was done to minimise the need to change lanes. "*…we really don't like changing lanes especially if we've got someone in the back because any movement is obviously amplified when you've got a big tall thing that's waving around*". When negotiating their way past traffic, SJA preferred to remain on the correct side of the carriageway, however, they would cross over the centre line or median strip and drive contra flow if necessary. This manoeuvre was readily undertaken to clear congested areas such as intersections controlled by TCLs.

In order to accommodate their preferred driving style, the SJA participants wanted motorists to move left. Unlike FRS, they did not want motorists to move right onto the

median strip as it potentially blocked their option of driving contra flow. If the motorist was unable to move left straight away, they felt it was important that the motorist be told to continue in the flow of traffic until they could move over. "*If anything, keep going on with the traffic. Go with the flow"*. Motorists who slowed down or stopped in front of ambulances were likely to create dangerous situations due to the difficulties associated with stopping an ambulance quickly.

In discussing their requirements from motorists, SJA specifically acknowledged the importance of cooperation. The motorist not only needed to cooperate with the ambulance, they needed to cooperate with other motorists as well. By this, motorists who were in the left-hand lane (already there or after having moved over) needed to allow other motorists to move left as well. With this, participants discussed the importance of encouraging motorists to cooperate when providing instruction on responding to emergency vehicles.

Western Australia Police

WA Police participants discussed their emergency driving in terms of responding to requests for assistance and apprehending motorists (excluding pursuits). They acknowledged their dual purpose could be ambiguous, as motorists would need to determine whether police were trying to stop their vehicle or move past their vehicle. To counter this ambiguity WA Police participants recommended that motorists move left in all instances. "*Police would say move left and if a police car wants you he will follow you. If he doesn't then he will get past you*". The WA Police participants strongly discouraged motorists from moving right as they considered it to be very dangerous for motorists to stop on the right-hand side of the carriageway, particularly on freeways.

In situations where motorists were stationary at a red TCL and an emergency vehicle was endeavouring to get through traffic, participants acknowledged that there may be occasions where it was safe for motorists to manoeuvre their vehicle in front of other

stationary vehicles. However, it was not considered appropriate to encourage motorists to do this in any circumstances. The preferred response from motorists was to remain stationary and allow emergency vehicles to move around them.

In addition to the data elicited through the WA Police focus group, the principal researcher's own training and experiences could add that WA Police did not have a specific policy for overtaking other motorists, e.g., remain right or left of the traffic flow. Whilst more recent training has urged WA Police emergency service drivers to remain right or the body of traffic (and not contra flow), this practice has not necessarily been adopted throughout the agency. Additionally, police vehicles were generally similar to standard passenger size vehicles; smaller than both ambulances and most DFES vehicles. As such, WA Police drivers tended to make use of their greater manoeuvrability by weaving through the traffic, left or right, to negotiate their way through.

Legislation and guidelines instructing motorists to give way

Legislation governing responses to emergency vehicles required motorists to "make every reasonable effort to give a clear and uninterrupted passage" (r.60 RTC, 2000) to emergency vehicles. However, it did not specify how this should be achieved. The interpretation of how this should occur was provided by the road safety guidelines and communicated through mediums such as the learner driver literature (Department of Transport, 2013) and Department of Transport media releases (Le Messurier, 2015). The guidelines currently provided to motorists are as follows:

> Do not panic; check where the emergency vehicle is coming from and give way to it; move as far as to the left of the road if you can; and if you cannot move left, slow down or stop. Let the emergency vehicle drive around you. (Department of Transport, 2013, p. 94)

Analysis of these guidelines indicated that they did not address the needs of all emergency vehicles. As such, they required amendment in order to facilitate more effective responding.

Discussions then ensued between the principal researcher and the emergency service participants by telephone and email over a period of weeks, which resulted in identifying a model of response from motorists that would best meet the needs of the three respective services. To facilitate ease of communication of this *effective response*, it was written in the same format as the existing road safety literature that communicated the Current Response Model (CRM) for emergency vehicle encounters. This new road safety message was assigned the title of Desired Response Model (DRM). The resultant DRM guided motorists when confronted with an emergency vehicle to:

- Move as far to the left as possible
- If you cannot move left, continue in the flow of traffic until you can.
- Allow other vehicles to move left also.
- Don't go through a red light. Stay where you are and allow the emergency vehicle to move around you.
- If the emergency vehicle is a police vehicle, it will follow you if it wants you to stop.

The DRM and CRM were consistent in their message for motorists to move left, however they differed substantially in their instructions for situations where motorists were unable to move. The CRM created a dangerous situation for emergency vehicles, particularly ambulances, by encouraging the motorist to slow down or stop in front of emergency vehicles. The DRM recommended motorists continue until they could move left and encouraged the cooperation between motorists, as recognised by the SJA participants. It also clarified the appropriate actions at red TCLs as required by WA Police.

Whilst it could be argued that a singular response model to all emergency vehicles was not best practice for the individual organisations and their differing vehicles, it did acknowledge that all emergency vehicles operated within the same legal parameters and that the legislation pertaining to motorists was a single provision encompassing their response to

all. Further, the single response model it was consistent with the CRM in that it provided one overarching guideline to motorists and avoided the complexity that would arise from having to first identify the type of emergency vehicle, before endeavouring to execute the required response.

In addition to establishing the DRM, the data from the emergency service drivers provided guidance to the researcher when interviewing the motorists and later during the development of the survey. The emergency service drivers' perceptions of why motorists failed to respond were addressed during the interviews with motorists to explore whether beliefs such as lack of knowledge potentially undermined motorists' ability to respond effectively. The DRM was also used to assess motorists' instinctive responses to emergency vehicles relative to the ideal response rather than the CRM.

Qualitative Exploration with Western Australian Drivers into the Phenomenon of Encountering Emergency Vehicles

Upon completion of the qualitative assessment of emergency service drivers, a series of individual interviews were conducted with Western Australian motorists. This was undertaken to expand upon the results of the previous exploratory study on motorists' perceptions of emergency vehicle encounters (Grant, 2010) and identify psychological themes associated with emergency vehicle encounters. The resultant analysis formed the basis for developing the scale to assess motorists on a larger scale.

Participants.

Participants were recruited through university lectures and the researcher's own social network, which resulted in seven males (18 to 85 years) and seven females (19 to 79 years), as listed in Appendix A. One male and one female were drawn from each of the age ranges of 18 to 20 years, 21 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, 60 to 74 years, and 75 years and over who regularly drove on roads within Western Australia. Participants

had held a driver's licence for six months to 68 years. . Purposive sampling was used, from which there was no expectation of generalisation (Cresswell, 2007). The number of participants was considered suitable for the phenomenological study in that it facilitated a breadth and depth of data that allowed for saturation..

At the time of being interviewed, six participants reported having a parent, partner, or sibling currently, or previously, involved in an emergency service. Past and present members of the emergency services were excluded from this section of the research but family members of emergency service personnel were allowed. Family members had been excluded in previous research (Grant, 2010), but were able to participate in this section for two reasons. Firstly, the intent of this section was to maximise variation within the perspectives. Family members' experiences, whilst influenced by their associations, were both diverse and valid. Secondly, as reported in 2014-2015 annual reports (DFES, 2015; St John Ambulance, 2015; WA Police, 2015), there were 44,577 current emergency service members (operational, support and volunteer). Allowing an estimated four immediate family members per person (i.e. parents, siblings, partners, children), potentially 6.88% of the state's population was related to a currently serving emergency service member (ABS, 2014). Excluding family members from the survey group would have failed to account for this proportion of the population, the contribution of which was particularly relevant to the current research.

Materials.

An interview schedule (Appendix E) was used. It contained a series of open ended questions and prompts (Cresswell, 2007). The schedule ensured that the interview covered all aspects of theory identified in the previous research, and other theoretical areas that were considered to be potentially relevant to the phenomenon of encountering an emergency vehicle. To assess motorist's responses relative to the DRM, a series of driving scenarios and multiple-choice responses were developed for use during the interviews (Appendix F). The

possible responses to the scenarios were drawn from the emergency service focus groups, previous exploratory study (Grant, 2010) and the researcher's own experiences of emergency driving. The scenarios were checked by emergency service drivers and other road safety practitioners to establish their face validity prior to being used in the interviews.

A letter (Appendix G) was used to provide information about the research, and contact details for the principal researcher, supervisors, and independent ethics consultant. A written consent form (Appendix H) was used to record the participants' consent to their involvement in the research. This form covered the current qualitative research (this chapter) and their subsequent participation in the piloting of the survey (chapter five). A demographic data collection sheet (Appendix I) was used to collect participant information and an audio recorder was used to record the interview.

Procedure.

After receiving ethics approval from the Edith Cowan University Human Research Ethics Committee (Approval Number 7449 dated 16 November 2011), the principal researcher conducted all interviews. The interviews took place from January to April 2013 at locations agreed to by both the participant and interviewer. These included the participants' home, and the Edith Cowan University library. The locations were chosen on the basis that they provided safety, comfort, privacy, and facilitated the operating of an audio recording device.

After introductions were made, the interviewer provided an explanation of the purpose of the research and the participant was advised on issues of confidentiality, non-disclosure of identifying information, audio recording, data storage, and the voluntary nature of participation in the interview. The participant was provided with the information letter, which reiterated the details provided by the interviewer (Appendix G) and written consent

was obtained from the participant prior to commencement of the interview (Appendix H). Demographic data were collected using a questionnaire (Appendix I).

The interviews were conversational and used the interview schedule to guide the process as necessary (Appendix E). The schedule was also used to assist the researcher in encouraging the participant to reflect on various aspects of their experiences with emergency vehicles. The audio recorder was used to record the interviews, thus capturing full dialogue for later transcription (Liamputtong & Ezzy, 2005). This left the interviewer free to make ancillary notes and facilitate the flow of the interview.

To enhance rapport and flow of the interview, collect richer data, and facilitate a positive experience for the interviewee, strategies were used such as active listening, paraphrasing and clarification (Egan, 2007). Wherever possible the interviewer faced the interviewee squarely; assumed an open position; leant toward the interviewee; maintained appropriate eye contact; and maintained a relaxed manner (Egan, 2007).

The interview durations ranged between 15 minutes and 78 minutes, with an average duration of 36 minutes. Some participants were provided refreshment before or after the interview as suited, but no other incentive was given. Every effort was made to encourage participants to articulate freely on their experiences (Langdridge, 2007).

Data analysis.

At the completion of each interview, the audio recording was transferred to a qualitative analysis program (NVivo) and transcribed by the principal researcher. Abridged transcriptions were completed, in that only pertinent sections were transcribed and unrelated conversation was omitted (Krueger & Casey, 2009). The transcriptions were read in conjunction with the recordings to ensure their accuracy and orient the researcher within the data (Braun & Clarke, 2006). Comparisons of the transcripts were made to observe potential social bias arising due to participant's knowledge, or lack of knowledge of the researcher's

policing background. An interpretive style of phenomenological analysis, as outlined by Langdridge (2007), was undertaken within NVivo using an open coding technique. That involved each piece of data being coded without reference to set themes or prior coding. The codes were then reviewed and grouped, resulting in themes representative of all participants' views on the phenomenon of responding to an emergency vehicle. Results from the earlier exploratory study (Grant, 2010) were then incorporated to provide a sufficiently diverse range of perspectives from which the central phenomenon emerged (Cresswell & Plano Clark, 2011).

Organisation, analysis and coding of the data were aided using NVivo, a journal, mapping on computer and white board (Braun & Clarke, 2006), and memo writing (Charmaz, 2003). Whilst some review of literature was conducted to facilitate sensitisation to existing theories, the analysis was predominantly inductive, in that the themes were driven by the data rather than by existing theory (Boyatzis, 1998; Braun & Clarke, 2006). Additionally, the themes identified in the data were not primarily based on their frequency or prevalence within the data but for relevance to participants.

Themes and subthemes were reviewed to ensure internal homogeneity and external heterogeneity (Braun & Clarke, 2006). Internal homogeneity required that the grouped data be combined meaningfully. External heterogeneity required that the themes be sufficiently distinct from each other. Whilst every effort was made to provide a rich description of the entire data collected, as befitting an under researched area (Braun & Clarke, 2006), data regarding vehicle design were omitted as they added little to the understanding of the psychological issues surrounding giving way to emergency vehicles.

At this point, the "story" of the data and the themes were identified (Braun & Clarke, 2006). The data were reread against the themes, to ensure their fit and to identify data not previously included in the themes.

Results.

The data collection and analysis resulted in a set of psychological themes pertaining to the phenomenon of motorists' responding to emergency vehicles. The themes that emerged from the data are presented in Table 1 and each will be reviewed in turn, with illustrative participants' quotes. The participants will be referred to by their pseudonyms as provided in Appendix A.

Table 1:

Themes and Sub-Themes

The detection and appraisal of emergency vehicle encounters
The attitudes and beliefs influencing the appraisal of the emergency vehicle encounter
Beliefs about self
Beliefs about others
Commitments
Beliefs about the emergency services and vehicles
Beliefs about the law, risk, and safety
Punishment
Other factors that influence the appraisal of the emergency vehicle encounter
How and when the emergency vehicle is detected
The importance placed on responding to the emergency vehicle
Associations with emergency services
The effect of predictability and ambiguity
Tuition on responding to emergency vehicles
Responding to an emergency vehicle
Behavioural response to the emergency vehicle
Affective response to the emergency vehicle

Detection and appraisal of emergency vehicle encounters.

Participants reported the phenomenon of encountering an emergency vehicle to be an arousing experience that commenced with the detection of emergency vehicles. Whether the detection was audio or visual, it prompted the participant to evaluate the situation. This

evaluation included the time available to undertake a driving response, the response options available within the road layout, and the participants' ability and willingness to undertake a driving response. For some, the evaluation also included attempts to predict the actions of emergency vehicles, or those of other motorists on the road. The evaluation was influenced by the beliefs and attitudes of the participant, the time available to conduct the appraisal, the importance they placed upon responding in a certain manner, prior associations with emergency vehicles and services, and the individual's understanding of what constituted an effective response and which vehicles were emergency vehicles. The following sections discuss the themes that emerged from the analysis and their relationship with existing psychological theories.

Appraisal informed by attitudes and beliefs.

Throughout the discussions, participants expressed a variety of attitudes and beliefs surrounding emergency vehicle encounters. These included beliefs about their ability as a motorist, other road users, the emergency service vehicles and personnel, and beliefs about the laws and risks associated with emergency driving. The attitudes and beliefs varied considerably where some were elaborately detailed, using descriptive language, physical gestures, and other affective indicators; others were shorter, more generalised, or succinct. The attitudes and beliefs also varied in terms of being positive or negative towards the emergency services. Overall, the attitudes and beliefs could be grouped as beliefs about themselves, beliefs about others, beliefs about the emergency service and emergency vehicles, and beliefs about the law.

Believes about self.

Participants were encouraged to discuss how they perceived themselves as drivers and their ability to provide an effective driving response during emergency vehicle encounters. Most participants considered themselves to be good drivers, describing themselves as *aware,*

pretty good, *capable*, *competent, reasonable*, *safe*, *cautious,* and *patient.* Some considered themselves to be better than the average driver, whilst others stated that they were the same as "*every other idiot*" out there, "*hav[ing] bad days as well as everyone else*". Few participants acknowledged having adverse habits such as being "*easily distracted, inattentive"* or *"... a bit too fast…. a bit of a bully*".

Participants indicated their beliefs in their ability as motorists were based upon the number of years they had been driving, their crash involvement, and any history of traffic offences[3] or absence thereof. Notably, their discussions suggested they did not view their adverse driving incidents as being indicative of their overall ability. By way of example, James (28) admitted to exceeding the speed limit, but also considered himself to be a patient driver; *"I've had speeding tickets but I'm in no real hurry",* and Marie (19) was "*...safe but I do have a tendency to accelerate fast and go around corners a little too fast…just pushing that boundary a little bit".* Other participants, who considered themselves to be good drivers, became aggravated with other drivers. Irrespective of their beliefs in their general driving ability, all participants indicated a belief in their ability to respond appropriately to emergency vehicles, describing themselves as confident and competent. This was regardless of whether they reported incidents of having failed to detect emergency vehicles until the last moment, or needing to undertake hasty responses such as driving onto a median strip.

The participants' positive assessment of their driving ability was consistent with prevailing literature on the capacity for motorists to assess their own driving. Groeger and colleagues (Groeger & Brown, 1989; Groeger & Grande, 1996) found that motorists tended to make positive assessments of their own driving, using their driving history as justification,

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[3] 'Traffic offences' does not refer to the general lawfulness of their driving, rather to any infringements or convictions the participant may have received as a result of their driving.

which was consistent with the current participants. However, Groeger and colleagues (Groeger & Brown, 1989; Groeger & Grande, 1996) also found that self-assessments of driving ability were inconsistent with the motorists' actual ability.

Such inaccurate positive assessments of driving ability may be the result of participants employing impression management (lying) or through a genuine, but inaccurate belief in their own ability (self-deception) (Lajunen & Summala, 2003). However, as participants in the current research appeared to be forthcoming with details of adverse events, it suggested that the positive assessments were more likely the result of self-deception (Lajunen & Summala, 2003). However, irrespective of motivation, their belief in their ability ought to facilitate non-threatening appraisal of emergency vehicle encounters through their perceived ability to cope with this potentially stressful event, but it may not necessarily facilitate a more effective driving response.

Beliefs about others.

When discussing emergency vehicle encounters, participants often spoke of other motorists' responses to emergency vehicles, and the general driving ability of those drivers. Comments were frequently negative, such as *"plain ignorant and don't care", "do stupid things",* and *"not paying attention to what's going on around them"*. Participants also recounted specific emergency vehicle encounters, during which, they questioned the actions of other motorists, and speculated why the other motorist had not responded appropriately. Joan recalled an incident where *"this car pulled out as the ambulance was coming through…they obviously hadn't heard the siren or anything",* and Nigel recalled an incident where a vehicle did not respond at all; *"he's got enough room, why doesn't he move or something like that. But then again… he could be … unsure of what to do. He might be scared"*. Some participants assumed other motorists had skill deficits such as underuse of side and rear-view mirrors, or had an expectation that the other motorists would hit them as

they attempted to move out of the way of an emergency vehicle. Few participants considered other motorists to be comparable to themselves, and those that did made comments such as "*everybody makes a mad dash*", "*everybody gets surprised*" and "*I'm the same as every other idiot out there*", suggesting they saw themselves as similar to other motorists. However, in general, the inference towards other motorists was that they were less competent or capable than the participant; *"I know what I'm doing, why don't you*".

The observations about other motorists were consistent with research that found drivers generally estimated the ability of other drivers to be less than their own (Groeger & Brown, 1989; Horrey, Lesch, Mitsopoulos-Rubens, & Lee, 2015; Sundström, 2008). However, the implication of this belief related to the cooperation between motorists that was necessary for driving, and specifically during emergency vehicle encounters. In general, driving requires motorists to cooperate with one another to facilitate the safe passage of all. Cooperation on this level is usually the result of reciprocity (Rumble, Van Lange, & Parks, 2010) where drivers cooperate with other drivers, and receive cooperation in return. The belief that other drivers are uncooperative, may impact on the level of cooperation motorists might provide one another during emergency vehicle encounters. Whilst the primary vehicle needing the cooperation is the emergency vehicle, the emergency service drivers themselves (refer to earlier section) recognise that motorists also need to cooperate with one another in order to move out of the way of the emergency vehicle.

Commitments.

The concept of commitments had emerged during the exploratory research (Grant, 2010) and was consistent with Lazarus and Folkman's (1984) transactional model of stress and coping. In that model, the things an individual felt strongly about, and were important to them (i.e. their commitments), influenced the importance they placed on events associated with those commitments, and the stressfulness that might arise from that. Their commitments

motivated them to respond in a certain way, and influenced their sensitivity to cues associated with those commitments.

In the current study, some participants reported a variety of attitudes, beliefs and behaviours that indicated the existence of a commitment associated with the emergency vehicle, emergency service, or their personnel. Most participants indicated some prior interaction with emergency services, either through knowing an emergency service person or having used an emergency service for them self or someone close to them. Some of the participants reported thinking of those personnel or incidents when sighting particular emergency vehicles. Other participants, whilst not acknowledging a preference for any particular emergency service had, during general discussion on emergency vehicles, continually referred to the vehicles as coming from the service they had an association with. Lastly, some motorists reported observing more emergency vehicles from a service they were associated with than any other. Overall, these discussions suggested some participants were biased towards a particular emergency service and assigned greater importance or commitment towards particular emergency service/s.

Beliefs about emergency service and emergency vehicles.

The earlier exploratory research (Grant, 2010) indicated participants held beliefs about emergency service personnel, vehicles, and purpose, which had the potential to influence their appraisal of emergency vehicle encounters. To expand on this, participants in the current research were encouraged to discuss these topics, commencing with their understanding of the purpose of the emergency services and the kind of incidents they were likely to be responding to when undertaking emergency driving.

In addressing these topics, participants freely demonstrated their understanding of the incidents the various emergency vehicles might respond to. Ambulances were consistently recognised as responding to life threatening medical events, such as "*somebody's having a*

heart attack or a car crash", "*someone dying in the back [and] they've got to get to hospital*", and "*you know ... life or death"*. Fire service vehicles were seen as attending fires, but only one participant acknowledged that they might be attending a different emergency, such as a motor vehicle crash "*somewhere where they have to get jaws of life*". In contrast, there was great variety in the incidents police might respond to. Participants suggested police would be responding to crimes such as armed robberies, chasing stolen cars, attending "*something very dangerous*", or using their lights and sirens to stop motorists for traffic matters.

In discussing the police role of stopping motorists, some participants commented on police pursuing other vehicles. Notably though, there was significant media coverage of a fatal crash around the time of the interviews, where a police vehicle chasing a stolen vehicle had crashed into another vehicle, killing the driver (Knowles et al., 2012). When discussing the police pursuits, there was variation amongst the participants about whether they thought pursuits were appropriate, and assessment of appropriateness appeared to be associated with the purpose of the pursuit. Participants were generally against police pursuing stolen motor vehicles:

> *I don't see any reason why they should be chasing stolen cars. Most people know where they end up. They know where it's been stolen from. ... So what's the point of chasing something that's going to turn up? If it's insured they'll cover it through insurance… (Brad, 50 years)*

It was, however, acknowledged that circumstances were sometimes more complex than just stolen property and "*you don't know what's precipitated that chase*". It was also recognised that it was not as simple as not pursuing fleeing motorists and that the likelihood of being pursued by police was potentially a deterrent to others. As James (28) pointed out, "*if police didn't chase someone who's done something wrong, everyone would do something wrong*".

During the discussion on reasons for emergency driving, some of the older participants recalled stories of times when the fire service used to drive around with their lights and sirens as a training exercise, rather than attending an emergency. It was their

recollection that the fire service was endeavouring to train both their drivers and other motorists; familiarising motorists with the need to respond to emergency vehicles, but doing so in a situation where an adverse response from other motorists would not affect attendance at an emergency. This was such as familiar concept for Keith (73) that when he now encountered a fire service vehicle undertaking emergency driving, his first thought was that the vehicle was on a training run and not responding to an emergency:

> *"I think of them mainly as doing their job and getting used to their surrounding, because quite often ... you hear them and you'll see them and everything stops. They're sort of doing their training. That's the thing I get from fire engines."*

It was notable that the fire service vehicles had ceased the practice of using lights and sirens for training some time around the 1990s, yet the perception of that being their purpose remained, particularly for the participants over 60 years of age, suggesting there may be a cohort effect.

The effect of training on participants' perceptions of emergency driving was consistent with the reported experiences of some emergency service personnel. During the earlier focus groups, an emergency service participant recalled experiencing adverse responses from members of the public when they were operating in areas frequented by police undertaking emergency service driver training[4]. The emergency service driver concluded that the over use of lights and sirens in those areas, and possibly with the motorist's understanding that it was for training purposes, had undermined the public's response to other vehicles undertaking emergency driving. This public perception may have arisen from the belief that emergency driving for a reason other than an emergency (i.e. for

[4] The road traffic legislation was changed in 2010, authorising police to undertake emergency driver training on public roads, where this had not been previously allowed. Now, other motorists are required to give way to the training vehicles as they would for any other emergency vehicle operating lights and sirens.

training), was not a legitimate purpose. This lack of legitimacy might undermine motorists' willingness to comply with the law (Tyler, 1990, 2006), such as the requirement of giving way to emergency vehicles Additionally, the continued exposure to emergency driving had the potential to exacerbate the negative affect from the earlier encounters with emergency services undertaking training (Bornstein, 1989; Craver-Lemley & Bornstein, 2006).

The discussions of the reasons for undertaking emergency driving also reflected issues of legitimacy and risks associated with emergency driving. Participants indicated that some reasons for undertaking emergency driving were more legitimate than others and, in some cases, became a balance between the lifesaving importance of the emergency being attended, and the level of risk that was warranted in such circumstances. A greater risk to life was seen to warrant the emergency service driver taking greater risks to get through the traffic and to the emergency. However, participants did acknowledge that they could not assess the relative risk and importance as they were unlikely to know what the emergency vehicle was responding to.

To mitigate this lack of knowledge, some participants stated they trusted that emergency service personnel would only undertake emergency driving for legitimate reasons. They expressed the view that motorists needed to rely on the judgement of emergency service personnel as to the appropriateness of emergency driving. It was further suggested that it was inappropriate for motorists to try and make any judgements at the time of the emergency vehicle encounters:

> *"I rely on the fact that if they're activated, it's for a very good reason and it's not up to me to judge where they're going and what they're doing, just get out the way. Otherwise I sit there '*some [person's] overdosed, I'm not going to get out of the way'. *I'm not about to apply moral judgements to the end results"* (Martine, 38 years*)*

In discussing the legitimacy of specific emergency services undertaking emergency driving, police were the only service to receive adverse comments; other services were not questioned. Keith (73) suggested police might use sirens under non-emergency conditions "*if*

they're in a hurry to get somewhere … [and] … want to speed past you", whilst Martine (38) hoped their purpose was legitimate, "*I trust that they've made that determination and they really.... They haven't activated it to go to Maccas quickly or anything like that*". Brad (50), having grown up with stories of police playing in their cars, questioned the fallibility and hypocrisy of some police officers; "*sometimes you have to question as to whether* [the lights and sirens are] *actually on for a legitimate reason or if they just want to have morning tea, just to clear a set of traffic lights*".

In exploring their beliefs surrounding emergency vehicles, participants also expressed beliefs about the emergency service personnel operating the vehicle. They expected the emergency service driver would act in a way that made the situation safe for everybody. Although there was the potential that the driver *"might get a little hyped up*", participants generally trusted the emergency service driver would know what to do and exercise their duty of care. Contrary to the participants' views on other motorists, the emergency service drivers were generally attributed with skills greater than those of the participant. It was expected the emergency service driver would find a passage through the traffic, irrespective of other motorists; they would "*always* [have] *a way of going around*".

Some participants went on to discuss the training of the emergency service drivers and there was an expectation that they would "*do driving tests regularly, to make sure they still have good response times, and* [be] *able to handle idiots on the road that pull out in front of them suddenly because they have the wrong idea*" (Marie, 19). Thus, the participants were assured of the skill of the emergency service personnel by the belief that they were appropriately trained. Additionally, held the belief that emergency drivers' competency would be monitored by the respective services.

Overall, participants' beliefs surrounding emergency vehicles, emergency services and their personnel indicated that the purpose of emergency driving and perceived legitimacy

of that purpose were important facets of emergency vehicle encounters. The legitimacy of the encounters, derived from the purpose of the emergency driving and perceived appropriateness of that purpose, underpinned their willingness to voluntarily comply with the lawful requirement to give way (Murphy et al., 2008; Tyler, 1990, 2006). Their beliefs informed their appraisal of emergency vehicle encounters and their perceived stressfulness, and stronger beliefs or commitments placed greater importance on responding appropriately (Folkman et al., 2004; Lazarus, 2000; Lazarus & Folkman, 1984).

Beliefs about the law, lawfulness, punishment, appropriateness of risk and safety.

Research has demonstrated an individual's perception of the legitimacy of a law can influence their willingness to comply with that law (Tyler, 1990, 2006, 2012). This legitimacy relates not only to the law itself, but to the organisation associated with making or enforcing that law. When the law and the organisation are perceived to be legitimate, people are more likely to voluntarily comply with that law. The preceding section discussed the participants' views on emergency services, personnel, and emergency driving, suggesting that participants were generally accepting of emergency driving if they perceived the reason for undertaking the driving to be legitimate. Expanding upon that finding and earlier research (Grant, 2010) this section further explored the participants' views on the laws surrounding emergency vehicle encounters. This was particularly in respect to motorists' actions, the actions of the emergency vehicles, and the concept of punishment for noncompliance with emergency vehicles.

Participants were encouraged to discuss the actions of the emergency vehicles whilst operating lights and sirens, and the types of driving manoeuvres the emergency vehicles undertook. In general, most participants expressed the view that the emergency vehicles could do whatever was necessary to move through traffic when responding to an emergency, coupled with the provision that they did so safely:

> *"They're allowed to do whatever they deem safe to get to the place of where they need to … I don't think there's any boundaries, providing it's not harming anyone else in the community"* (Nigel, 38)

This balance of risk and safety, relative to purpose of emergency driving was linked to the belief that emergency driving situations needed to be safe for everyone:

> *"They've got to make it so that it's safe for everybody and especially the drivers in the emergency vehicles… they can't be transporting someone in an ambulance and turn the vehicle over"* (Joan, 65)

In situations involving a response to a greater emergency, it was expected that emergency vehicles would take greater risks to get through the traffic:

> *"if an ambulance has got someone who's in a life and death situation I suppose they in turn will take a little bit more risk than what they normally would… it depends on the circumstances…how important is it?"* (Keith, 73)

This concept of increased risk, relative to the severity of the emergency, was expressed by one participant as a hierarchy of needs *"I guess there's a hierarchy of you know, if this happens then that can happen"*. Overall, most participants felt the emergency service driver could undertake whatever driving manoeuvre they considered appropriate to the emergency, provided they ensured the situation was safe for everyone and did not create unnecessary risk.

In exploring risk, safety and lawfulness, participants were also encouraged to discuss their own actions during emergency encounters; what they were prepared to do, and their understanding of what they were lawfully allowed to do. There was great variety in the actions they were prepared to undertake during emergency vehicle encounters, which differed from what could be considered normal driving. Some participants readily reported driving up kerbs and onto median strips to move out of the way of an emergency vehicle, whilst others stated that they would not be prepared to do drive in such manner. Some indicated a willingness to break the road rules "*a little bit*", including exceeding the speed limit until they could change lanes. Some participants reported feeling obligated to break the law to give way to an emergency vehicle whilst others expressed the view that they had to adhere to road

rules irrespective of the presence of emergency vehicles; that driving contrary to the rules would be unlawful, even under those circumstances.

Encountering emergency vehicles at intersections controlled by traffic lights was a situation that elicited a great variety of responses. Completely contravening red traffic lights was recognised as being unlawful by all but Brad (50). He recalled an incident where he proceeded through an intersection whilst the light was red in order to give way to an emergency vehicle; believing he was excused under the circumstances. Other participants considered that crossing the white line and "*tucking in front*" of other traffic, without fully entering the intersection, was a safe action; "*I have pulled forward of the lights to the left, as long as no one coming and it's safe"* (James, 28). This was not necessarily seen as a lawful action, rather one that ought to be excused under the circumstances. Notably, one participant indicated they felt compelled to contravene a red traffic light to give way to an emergency vehicle:

> *"you feel pressured that you have to go through red lights and all that kind of stuff, because if you're sitting at a red light and* [the emergency vehicle's] *right* [behind you]*, well you feel pressured; you got to move".* (Luke, 18)

Similar to discussions surrounding the actions of emergency vehicles, participants indicated their potential actions were guided by the risk of the manoeuvre relative to the perceived severity of the emergency. By that, they indicated a preparedness to accept a greater level of personal risk in accord with perceived severity of an emergency, so that emergency vehicles could do whatever was necessary to facilitate their passage. This willingness to comply with emergency vehicles, despite not necessarily knowing the nature of the emergency, reinforced the perception that emergency services and emergency service drivers were generally seen as legitimate (Tyler, 1990, 2006, 2012).

Punishment.

Participants were encouraged to consider the concept of punishment for drivers who failed to respond in a manner that facilitated the passage of emergency vehicles. Most participants considered that motorists should be punished for failing to give way to emergency vehicles, particularly where they perceived the driver's disruptive actions to be deliberate or avoidable: *"if it's possible for them to get out of the way, if they're just slowing down because there's an emergency car behind them. I mean that's not the right thing to do"* (Luke, 18). Situations considered to be deliberate obstructions included "*hoon drivers*" taunting emergency vehicles, taking advantage of the clear passage made for emergency vehicles and having room to move but failing to do so, *"If they can clearly see it and hear it and they've got the room to move and they're purposefully not moving then yeah I think that's a terrible thing to do"* (Meagan, 22). Only one participant considered punishment to be inappropriate, explaining that giving way ought to be a moral, rather than legal, issue.

Some participants also provided examples of situations where they felt punishment was not appropriate, and there was significant crossover between these situations and punishable offences. Situations where punishment was not appropriate included the inability to move due to traffic volume, failure to move through uncertainty or lack of knowledge, motorists driving normally but obstructing an emergency vehicle in the process, and failure to give way through inattention. The distinction between these punishable and unpunishable circumstances was based upon whether the motorist's action was intentional or accidental. However, as Nigel (38) observed; *"how do you determine …what's intentional, what's not? How do you … draw that line?"*.

Irrespective of their views on punishable circumstances, participants generally expressed the belief that punishment was unlikely to be given to motorists who failed to give way to an emergency vehicle. As James (28) stated; *"Should they be fined? Yes. Do you*

think it's likely? No because there'll be no reporting of it.", and Kevin (73) commented, "*if a policeman or an ambulance or a fire truck are in a hurry, they're not going to write down every rego of the person in front of them that's in the way. It's just impractical*". It was considered that it would be too difficult for emergency service workers to record the incident whilst trying to undertake emergency driving or some other activity inside the vehicle such as treating a patient. As Keith (73) further commented, *"you're not exactly going to pull over and write the guy a ticket".* It was also observed that if there was an attempt to apply a punishment, some motorists would "*wheedle their way out of it*" and avoid punishment by making up excuses for their actions such as "*oh I couldn't hear it*" and "*oh I didn't see it*". Generally, the belief was that punishment was appropriate in some circumstances but unlikely to be applied.

As Tyler (1990, 2006, 2012) asserted, for a punishment to be effective it needs to be either so severe that it is a deterrent, or to have a high likelihood of being applied. The analysis suggested that if participants complied with the law requiring them to give way to emergency vehicles, the action was unlikely to have been undertaken for the purpose of avoiding punishment as it was not seen as being likely to be applied, or severe enough to warrant avoidance (Tyler, 1990, 2006, 2012). Therefore, participants' willingness to comply with the laws associated with emergency vehicles was more likely to arise from some other motivations, such as a prosocial intention to cooperate with emergency vehicles (Biel et al., 2012).

Overall, the participants' beliefs about themselves, other motorists, the emergency service and their personnel, and issues of risk law and safety support the notion that they believe themselves to be capable drivers and able to respond effectively to an emergency vehicle. However, other drivers were perceived as less capable, thus undermining the cooperation required during emergency vehicle encounters. Whilst the participants could not

know the nature of the emergency, they understood that some situations required more urgency than others. They perceived ambulances and fire service vehicles to be legitimate though there was some uncertainty surrounding police activities and using lights and sirens for training purposes. Finally, they generally perceived the laws surrounding emergency vehicles to be legitimate, though the low likelihood of positive enforcement being applied rendered them ineffective as a motivation for obeying the law.

Other factors influence the encounter.

In addition to the beliefs about themselves, other motorists, the emergency service, and the law pertaining to emergency vehicles, participants indicated that other psychological factors might be associated with the phenomenon of encountering an emergency vehicle. These included the process of detecting an emergency vehicle, their motivation for responding to an emergency vehicle, the effects of predictability and ambiguity, their prior associations with emergency services, and their tuition on responding to emergency vehicles and driving in general. These factors are discussed in turn.

How and when emergency vehicles were detected.

Encounters with emergency vehicles commenced with the detection of a vehicle using audio visual cues. These included the vehicles' emergency warning lights, siren, and livery. They also included other cues, not directly associated with emergency vehicles, such as the actions of other motorists. Stephanie (52) recalled *"I'd noticed ... that cars ahead of me were actually moving over. I was thinking what the hell's going on, and then realised there was something going on in the mirror*". The type of cue detected varied between individuals and situations, and their subsequent action depended on whether the participant was able to sight the emergency vehicle, or could only hear it.

For some participants, their first indication of the presence of an emergency vehicle was the auditory cue from the siren. Hearing this sound prompted participants to undertake

other actions that assisted in identifying the location of the vehicle. Participants would visually scan their environment in an effort to sight the vehicle. Some participants also listened to the siren, to determine the direction the emergency vehicle was coming from; "*trying to find out where he is, which way he's coming from*". To further assist in locating the emergency vehicle, some participants undertook preliminary behavioural responses such as lowering the volume of their music, opening the car window, and slowing down. As a consequence of the actions undertaken in response to the siren, they would either locate the emergency vehicle or not, and their subsequent appraisal and actions depended on whether or not they sighted the emergency vehicle.

Notably, the auditory detection of the emergency vehicle occurred over varying distances, which appeared to be influenced by factors such as situational awareness and in-car noise levels. Notwithstanding siren activation in close proximity to the participant, some reported not detecting the emergency vehicle until it was nearby. These participants admitted to having been either distracted at the time, or tending to play loud music in their vehicle; *"couple of times I'm like oh! ... The music thing you know ... music and your mind's not at it"* and *"Music's up too loud. So, I'm away with it you know*". Conversely, other participants reported observing the emergency vehicle whilst it was still a distance away and this appeared to be associated with their reported tendency to monitor their environment and use their rear-view mirrors. However, whether close or far away, the distance at which the vehicle was detected influenced the next stage of the encounter.

The distance between the participant and the emergency vehicle when detected determined the amount of time available to appraise the situation and execute a driving response if required. More time between detecting the emergency vehicle and needing to respond allowed for more elaborate appraisals and seemingly deliberate responses. However, this was not necessarily associated with more effective responding. One participant reported

a tendency to detect emergency vehicles whilst at a distance, however, they also recounted situations where they deliberately remained in the right-hand lane, requiring the ambulance to go around them. This was not undertaken with the intention of hindering the ambulance; rather because of their belief that the appropriate response was to remain where they were and let the emergency vehicle go around them. Their discussions consistently indicated an intention to facilitate the passage of emergency vehicles, and their belief that they had responded appropriately during the encounter. However, considering the DRM, the participant was likely to have created an undesirable situation for the ambulance driver. Having to change lanes to negotiate around the participant's vehicle created an unsafe situation for the ambulance and its occupants.

By comparison, participants who reported having less time between detection and needing to respond to emergency vehicles, indicated shorter appraisals of the circumstances and more reliance on seemingly hastier, or instinctive responses. One participant from the earlier study (Grant, 2010) reported a dislike of police and a corresponding intention to not give way to police vehicles. This participant also reported a preference for playing loud music that incorporated sirens and other alternative sounds into the tracks. Consequently, they reported situations where they did not detect the emergency sirens until the vehicles were near, and were therefore surprised by the emergency vehicles. Despite their intention to not move, they reported undertaking the seemingly instinctive responses of moving left, which resulted in giving way.

Whilst detection itself was outside the scope of this research, the time between detection of an emergency vehicle and response was a prominent theme for participants. More time available to respond allowed for greater appraisal and more deliberate responding, whilst less time was associated with shorter appraisals and hastier, instinctive responding. However, more deliberate responding was not necessarily more effective. The effectiveness

of the response appeared to be associated with, not what the driver intended to do, or the time in which they could do it, but whether the driver knew what an effective response was.

The importance of giving way to an emergency vehicle.

When discussing emergency vehicle encounters, participants also commented on why they gave way and the importance they placed upon doing so. Participants generally explained that it was their "*duty as a citizen*" and "*a moral thing*". It was "*one of your responsibilities*" and something they were supposed to do as a member of the community; "*you [want] to help … you feel part of it … like you've done something for the community*" (Nigel, 38). Few participants indicated that their actions were motivated by any form of legal obligation, further reinforcing the earlier findings (Grant, 2010) that giving way to an emergency vehicle was an internally motivated behaviour.

In addition to their reasons for responding, participants indicated that a level of importance was attached to acting appropriately during these encounters. This concept was further explored within the context of likely consequences of delaying an emergency vehicle as it stood to reason that perceived outcome would influence the importance of acting. Within this, some participants imagined dire consequences if the emergency vehicle was delayed, such as *"they won't get to the emergency in time and someone could die",* Marie (19)*,* whilst others merely considered that the emergency vehicle would have to wait, resulting in a longer response time.

The affective responses of the participant, other motorists and emergency service drivers were also discussed relative to the idea of delaying an emergency vehicle. One participant spoke of the "*ill feeling*" they experienced over a potential delay to an emergency vehicle. Others empathised with motorists that were delaying the emergency vehicle through their inability to move out of the way, and another perceived that the emergency vehicle driver would get angry. Notably, the participants' reported affective response appeared to be

reduced when other vehicles (potentially blocking the emergency vehicle) were involved. Conversely, some participants did not indicate any affective response to emergency vehicle encounters.

Overall, the importance participants placed on giving way to emergency vehicles, and their corresponding reaction to the idea of delaying it, suggested they were motivated to give way. This, combined with their views on punishment, reinforced the understanding that their actions were motivated by voluntary compliance with the emergency vehicle and an intention to behave prosocially (Penner et al., 2005).

The importance attributed to the emergency service encounter and the perceived consequences of delay suggested that participants would generally be motivated to respond in a way they considered effective. However, the belief that the emergency service vehicle would always get through potentially undermined the importance of responding appropriately for the participant. This belief suggested that an effective response from participants or other motorists was not necessary for the emergency vehicle to move through traffic.

Associations with emergency services.

Throughout the interviews, participants reported varying prior association with emergency services. Whilst some had no reported association, others knew individuals who were past or present member of an emergency service, and some had used an emergency service for themselves or for someone else. These prior associations appeared to influence the language used by participants during the interviews. When they discussed emergency vehicles generally, some participants defaulted to referring to the vehicles as being from the service they had most experience with. For example, Martine (38), whose partner was a serving police officer, frequently referred to emergency vehicles as police vehicles and another, Stephanie (52), discussed fire service vehicles, as her husband had served in the volunteer fire service years earlier. Joan (65), who had recently been transported to hospital

by an ambulance, generally talked of ambulances when discussing emergency vehicles. Notably, these participants did not appear to be aware of their greater reference to one emergency service over others, however some, such as Stephanie (52), were aware of it influencing their propensity for noticing more vehicles belonging to the service they were associated with than other services; "*So I do see a lot of those fire trucks, and I guess they're something I do notice more because I guess he was in [the volunteer fire brigade] but yeah those are the things I get to see a lot more of".*

Overall, the participants' prior associations with emergency services appeared to create some sort of preference for the emergency service/s they had previous exposure to. Whether this was associated with a significant life event, or some other encounter which fostered a sense of debt or gratitude, it appeared to have a priming effect (Bornstein, 1989; Moreland & Topolinski, 2010; Zajonc, 1968). Their experiences created a familiarity, possibly associated with some form of positive affect, that potentially assisting retrieval of information about that service This theme was consistent with earlier findings (Grant, 2010) where prior exposure to an emergency service influenced motorists' awareness of, and sensitivity towards, emergency vehicles during subsequent encounters.

Predictability and ambiguity associated with the encounter.

Emergency vehicle encounters are inherently ambiguous in that motorists may struggle to identify the type or direction of the emergency vehicle from hearing the siren, are unlikely to know the purpose for the emergency driving, do not know which direction the emergency vehicle intends to go, nor what actions other motorists will take. This ambiguity appeared to impact on the experience for some participants in previous studies, and prior research had found that it could increase the perceived stressfulness of an event (Folkman et al., 2004; Lazarus, 2000; Lazarus & Folkman, 1984). As such, predictability and ambiguity were further explored in the current research.

In the current research, participants generally expressed the view that it was not possible to predict when or where they might encounter emergency vehicles, and thus, were seemingly unaffected by this issue. However, they varied in the reported effect of ambiguity. Some appeared unaffected by the ambiguity of the events, such as expressing their lack of interest in the emergency vehicle's purpose. Other participants sought to mitigate the ambiguity by attributing their own interpretation to situations that were seemingly ambiguous.

In circumstances where participants were unable to sight the emergency vehicle, and therefore could not know its location, they gave their own interpretation to the situation. Some expressed the belief that if they could hear an emergency vehicle but not see it, then it was not near them, so they would continue to drive normally, "*can't find it, it's not an issue because it's obviously on that street or the next street*" (Brad, 50). However, others such as Meagan (22) did not interpret the situation in the same way and assumed the emergency vehicle was still nearby. As a result, she reported feeling uneasy and driving more vigilantly, "*Sort of uneasy ... you've gotta be more alert when you're driving. You don't know if it's going to come through the traffic lights or whatever*". Similarly, some participants would not risk the unseen emergency vehicle being nearby and would wait until it came into sight or they could no longer hear the siren, such as Luke (18) "*I just waited ... I didn't know where the sirens were coming from*". This was consistent with the earlier research (Grant, 2010) where one participant reported waiting for extended periods for emergency vehicles to appear and perceived annoyance of other motorists in their vicinity.

Participants also attributed their own interpretation to the various warning devices available to emergency vehicles (i.e. emergency lights, siren, horn, headlights). More specifically, the different signals were perceived to infer varying levels or urgency and different purposes. Whether an emergency vehicle was using a siren, was interpreted as more

or less urgent, as was the type of siren used, where some participants felt that only using lights meant the matter was less urgent. The addition of the siren inferred greater urgency for the emergency vehicle; for police it also inferred a different purpose. The use of alternative siren noises, such as the *"brrp, brrp"* emitted by the FRS vehicles, was interpreted as an expression of greater urgency. Joan (65) said, *"They go 'brrp brrp' on their horns and you know damn well they're in a hurry"*. Intermittent light and siren use indicated that the emergency vehicle merely wished to get through traffic or congestion rather than attend an emergency. To some participants, turning a siren off indicated the emergency vehicle was undertaking training rather than responding to an actual emergency. Some participants also noted that emergency vehicles wanting to gain the attention of vehicles travelling in front them would sound their regular horns and flash their headlights.

The interpretations given to the various warning signals appeared to help participants make sense of emergency vehicle encounters. They aided their understanding of the situation, reduced the associated ambiguity, and potentially decreased the perceived stressfulness of the encounter (Lazarus & Folkman, 1984). However, some of the meanings given to the ambiguous signals were potentially inaccurate. An example of this would be the use of lights only being interpreted as a less urgent situation. Ambulances may use lights only to transport cardiac patients as the use of a siren may increase the patient's distress-a situation that is likely to be more urgent rather than less. Police may opt for lights only to facilitate a more tactical approach to a serious situation. As such, some of the participants' interpretations were problematic as they diminished the importance or perceived legitimacy of the emergency driving. In turn, the reduced legitimacy or importance potentially influenced the rights afforded to emergency vehicles by the participants.

Tuition on driving a motor vehicle and responding to emergency vehicles.

In the earlier focus groups and interview, emergency service drivers had expressed a view that drivers who obtained their licence in other countries were less skilled at responding to emergency vehicles. Additionally, although unsupported by the existing literature (Mulvihill, Senserrick, & Haworth, 2006), there was a perception that formal driving tuition produced more skilled motorists (e.g. Lime Driving School, 2014; NRMA, 2011). These ideas were explored with the motorists and participants were encouraged to talk about their experience of learning how to drive a motor vehicle. They were also asked about their experience of learning how to respond to emergency vehicles as lack of formal tuition around emergency vehicles had arisen in the previous research (Grant, 2010). Consistent with earlier findings, participants reported learning to drive in a variety of ways: through driving schools, parents, partners, other family members and friends. Throughout their discussions, no one recalled receiving formal instruction on responding to emergency vehicles, which was consistent with previous research (Grant, 2010), where the only participant who recalled receiving formal instruction was one who learnt to drive in the United Kingdom.

In speculating how they might have learnt about responding to emergency vehicles, participants offered a variety of sources. Some indicated their understanding was acquired through observational learning from parents and close associates. It was also suggested that instruction must have been included in the learner driver information; James (28) said, "*I would have thought that would be something that we all get told, umm you should be able to know that to have your driver's licence*". One participant suggested it should be a matter of common sense rather than formal learning; the driver should instinctively know how to respond appropriately. Conversely, other participants suggested it was inappropriate to assume that people would know the correct way to respond.

In exploring the level of knowledge surrounding emergency vehicles, participants were asked about the types of vehicles that could be emergency vehicles, and how they recognised them on the roads. All participants recognised ambulances and fire service vehicles as emergency vehicles. Most identified police vehicles, with some detailing the different types available such as "*plain clothes*" (passenger vehicle with no external markings or lights), "*paddy wagon"* (marked utility vehicle with security cage or pod on the back) or "*patrol car"* (marked passenger vehicle with overt police markings and lights). One participant was uncertain whether police vehicles were emergency vehicles, and some included other vehicles as emergency vehicles (e.g. Western Power who provide an electricity transmission and distribution network throughout Western Australia). However, this was dependent upon the participants' association with that emergency service.

The themes elicited from participants' data on their tuition and knowledge were compared with the learner driver literature and theory testing to determine whether they were consistent with the contemporary learner driver practices. A review of the practice material, intended to mirror the learner driver theory test, revealed that two (0.61%) of the 330 quiz questions (11 practices quizzes containing 30 questions) (Department of Transport, 2010b) were related to emergency vehicles. The learner driver handbook, which provides practical interpretation and driving legislation as well as techniques for novice drivers, contained 126 pages of information (Department of Transport, 2010a, 2013), of which, half a page (0.40%) was dedicated to identifying and responding to emergency vehicles. This included drawings of a marked police sedan, an ambulance, and a fire engine. The accompanying words indicated that emergency vehicles were "police cars, fire engines, ambulances, and vehicles used to convey blood or other supplies for a person urgently requiring treatment" (Department of Transport, 2013, p. 95). Whilst this definition was consistent with that provided in the legislation (Regulation 3 RTC, 2000), it failed to acknowledge that other

vehicles could also be designated as emergency vehicles. To further explore which vehicles were designated as emergency vehicles, the Western Australia Department of Transport was approached for a list of authorised vehicles, however, this was not publicly available (N. Avervuj, personal communication, November 2011). This lack of publicly available information meant drivers needed to use other methods to identify vehicles they were required to give way to.

Overall, it was identified that participants had little formal tuition on responding to emergency vehicles, and needed to rely on other methods of learning such as observation. This absence of formal tuition, was reflected in the minimal information provided in the driver training literature, and lack of assistance to motorists to know which vehicles they were required to respond to. As such, whilst a participant might intend to respond in a way that facilitated the passage of an emergency vehicle, they may not know what an appropriate response was, nor that the vehicle was one they needed to give way to.

In summary, whilst detection itself was outside the scope of the current research, the time relative to the need to respond influenced participants' appraisal and driving response. Additionally, participants' prior associations with emergency services affected their sensitivity to those services. The importance placed on responding to emergency vehicles also influenced perceived stressfulness of encounters. Whilst the lack of predictability did not appear to impact the encounters, the inherent ambiguity resulted in some participants creating their own interpretation of events. Some interpretations were inaccurate and potentially undermined the perceived legitimacy and importance of an encounter. Finally, consistent with Grant (2010), there was little formal tuition on responding to emergency vehicles, which undermined the effectiveness of some participants' responses, despite their intention to cooperate and facilitate the passage of emergency vehicles.

Responding to emergency vehicles.

After detecting an emergency vehicle and conducting an appraisal that was informed by their attitudes, beliefs and other factors, participants determined whether they needed to respond to the vehicle, and how they could or should respond. These responses could be behavioural or affective. By that, participants generally undertook some form of driving manoeuvre, if necessary. They may also have experienced an affective response, such as a feeling or emotion, or undertaking some activity that was indicative of a defence mechanism being employed.

Affective response

Encountering an emergency vehicle was reported as having an arousing effect on most participants as indicated through raised voices, colourful language, and physical responses such as sitting up, widening their eyes, and looking around. This affective response varied substantially where some participants indicated feeling anxious after detecting an emergency vehicle, such as:

> *"...tend to sort of panic. Like freeze up first of all. Where's it coming from? ... generally my first thing is sort of you know I just hate it! I think dear god I don't want to be that person who has to go out into a red light or you know ... I freak out!"* (Martine, 38)

Others reported feelings of fright, disorientation, panic, and increased vigilance and tension, whilst some reported experiencing little affective response. These responses could infer a wake effect (Albertsson & Bylund, 2010; Clawson et al., 2014; Sundström & Albertsson, 2012) whereby the participant was affected by the mere presence of the emergency vehicle.

Participants reported some affective responses that specifically related to police vehicles and their dual purpose for undertaking emergency driving. They discussed the uncertainty around whether they were trying to get to an emergency or apprehend the participant or some other motorist. Meagan (22) stated, "*They come up behind you really fast. ... Every time that happens I think they're trying to pull me over even though I'm not*

doing anything wrong." The presence of the police vehicle prompted participants to question their own driving, although this concern was generally allayed when the police vehicle continued past them *"…they just went straight past me and I was like phew! Not that they were going to pull me over for any reason but that's just what you think … that startles you a bit."* (Meagan, 22).

The participants' affective responses to emergency vehicle encounters also related to whether they could respond in the way they preferred. This was clearly explained by one participant in the previous research (Grant, 2010) who planned to not give way to police. Due to their lack of early detection they were frequently surprised by the proximity of the emergency vehicle and instinctively moved over. Consequently, they reported feelings of anger during these encounters, which seemed to arise from the inconsistency between their preferred and actual response.

Some participants also indicated the potential employment of defensive mechanisms as a result of emergency vehicle encounters. Notably, the participants who indicated the use of potential defensive mechanisms all reported some sort of adverse prior encounter or association with emergency vehicles. One participant, who was taught that fire service vehicles would act aggressively in an emergency by breaking into vehicles and pushing them out of the way to get through traffic or access hydrants, would avoid talking about Fire and Rescue vehicles unless explicitly prompted. Another participant, who had a close relative in the police, and reported experiencing high levels of anxiety, claimed to never see police undertake emergency driving. This was inconsistent with other participants whose association with an emergency service appeared to increase their detection/recollection of vehicle associated with the respective service. A participant, who had an adverse experience with emergency vehicles at a serious car crash, reported undertaking evasive driving manoeuvres to change direction and avoid the risk of seeing another crash or some other

emergency situation. Finally, as previously discussed, the participant who expressed negative views on police would become angry with policing when they gave way to them.

Driving response.

Participants reported undertaking a variety of driving behaviours in response to emergency vehicles and this was dependent upon the circumstances of each encounter, their intended driving response, and time available to appraise the situation and determine their preferred response. Participants were consistent with Emergency Service drivers in the type of driving situations they discussed: areas controlled by Traffic Control Lights (TCLs) and straight roads where the emergency vehicle approached from behind. However, within these situations, there was substantial variety in how the emergency vehicle was reportedly driven and how the participant responded. This was consistent with the focus group discussions with emergency service personnel, where the respective services reported different methods of driving through the intersections controlled with TCLs, and that these situations were seen as especially problematic to negotiate safely. It was also consistent with emergency vehicle crash research that found a greater likelihood for emergency vehicle crashes to occur at these locations (e.g., Custalow & Gravitz, 2004; Drucker et al., 2013).

The participants' responses during these encounters included some of them entering the intersection in some way. They would move their vehicle into the area forward of the white line, but clear of the traffic that might cross in front of them; "*Don't go right through the lights but go past the white line."* Whilst this was acknowledged as potentially unlawful, it was considered justified by participants if it stopped the emergency vehicle from being trapped. James (28) said, *"I don't know if you're allowed to but I have pulled forward of the lights to the left, as long as no one coming and it's safe, I will move out of their way …[but] there's only so far you can crawl forward".* Only one participant expressed the belief that they were lawfully permitted to move through the intersection against a red TCL; *"I'm*

allowed to as long as I'm getting out of his way". Some participants considered this to be an action that they might choose to undertake *"haven't been in a situation like that but I would imagine that [my response] would be try to [tuck in front]",* whilst others felt they might be compelled to do it *"when I am front of the line … I do have to contravene the red light",* and *"you feel pressured that you have to go through red lights"*.

Concern was expressed in the previous section about motorists' actions at red TCLs, particularly by police. Whilst it was desired that motorists undertake every reasonable action to give way to emergency vehicles, police were adamant that drivers should not contravene a red TCL in any circumstance (i.e. should not cross the solid white line). Although there was opportunity for motorists to cross the white line and move in front of other stationary vehicles without getting in the way of oncoming traffic, the judgment call for this manoeuvre was considered too complex to include within a road safety message. However, contrary to the concerns raised by the police around communicating this action, the participants' responses suggested they were capable of making that judgement and understood the need to exercise caution when doing so.

In exhibiting both behavioural and affective responses to emergency vehicle encounters, the participants' reactions were consistent with coping as depicted within the transaction model of stress and coping (Folkman et al., 2004; Lazarus, 2000; Lazarus & Folkman, 1984). In this model, coping with a stressful encounter involved an affective response and a cognitive response. The reported emotions and employment of avoidance techniques indicated mechanisms to reduce the stressfulness of the encounter, and rationalise the driving behaviours that could or should have been undertaken (i.e. anger at responding in a way which was not intended, feeling of anxiousness at being unable to respond). However, the overarching outcome of the reported responses was that, despite any perceived stressfulness associated with the encounter, participants thought they were capable of

undertaking driving manoeuvres in response to emergency vehicles. Thus stressfulness, whilst affecting their appraising and coping, did not inhibit their driving response.

Discussion.

Overall, the study undertaken with the emergency services drivers had identified situations with motorists responding ineffectively to emergency vehicles. It also identified the varying methods of driving undertaken by the services, relative to their vehicle requirements and standardised practices, and the responses required from other motorists to facilitate their passage. Comparison of the required responses to the Current Response Model, as communicated through road safety guidelines, revealed an inconsistency between what was currently being asked of motorists and what was needed by the emergency services. The emergency service personnel then assisted in the development of a model of response that would best fit the needs of all services: the Desired Response Model. The resultant data and DRM was used to inform the subsequent study undertaken with motorists.

The interviews with motorists and analysis of the resultant data identified that their appraisal, attitudes and beliefs surrounding emergency vehicles were associated with the experience of encountering one. These included their beliefs about themselves and other motorists, beliefs about the emergency services and their personnel, and beliefs about law, risk, safety, and punishment. Other factors associated with emergency vehicle encounters included when and how motorists detected an emergency vehicle, the level of importance they placed on responding, their prior associations with emergency services, the effect of ambiguity, and how they learnt to drive and respond to emergency vehicles. These factors, combined to inform their appraisal of the emergency vehicle encounters and their ability to respond to emergency vehicles, and the resultant affective response.

Thus, the qualitative research on the phenomenon of motorists' encounters with emergency vehicles and findings from the emergency service personnel, combined with the

existing literature to provide themes from which the survey items could be drawn. The following chapter reports on the development of the survey items, relative to the prevailing scale development literature, and the subsequent piloting, which resulted in the creation of the preliminary Responding to Emergency Vehicles Scale (REVS).

CHAPTER FIVE: Developing the Preliminary REVS

This chapter details the processes undertaken to develop the Preliminary REVS, based on the prevailing scale development literature discussed in chapter three. After drawing the preliminary scale items from the existing literature, supplemented by the qualitative research discussed in chapter four, it details the pilot testing that was undertaken to establish the REVS' face validity.

The review of existing literature surrounding emergency vehicle encounters (chapter two) identified the need for a scale to investigate motorists' responses, and the construct validity approach was determined to be suitable for developing the scale (chapter three). However, the existing literature did not provide sufficient basis for scale items, so an additional qualitative study was undertaken with motorists and emergency service drivers to expand the theoretical understanding (chapter four). This study identified several psychological themes associated with motorists' encountering emergency vehicles and, combined with the existing literature, was sufficient to facilitate the development of a pool of items to form the preliminary scale.

This chapter reports on the development of those scale items in accordance with the prevailing scale development literature. It explains the style of survey that was chosen, the rationale for the item wording and response formats, restrictions on the number of items and visual presentation. It then reports on the piloting of the survey with the participants from the preceding qualitative study, which facilitated a review of grammar, clarity, and relevance of items to the central construct. Overall, the processes reported in this chapter resulted in the development of the Preliminary Responding to Emergency Vehicles Scale (REVS), and the establishment of its face validity. The chapter also reports on the concurrent development of items to assess motorists' responses during emergency vehicle encounters relative to the Desired Response Model identified in chapter four.

Style of Survey

Developing the pool of items to be used in the Preliminary REVS involved taking the constructs identified through the literature and qualitative research, and writing multiple items for each one. The items aimed to assess each individual construct and, ultimately, assess the target construct of responding to emergency vehicles. The way in which the items could be written was dependent upon the medium used to deliver the survey. For this scale, an internet

based medium was chosen (de Leeuw et al., 2012a) and facilitated by the Qualtrics (2013) survey development tool.

The internet method is considered preferable for this research, compared to other methods such as face to face interviews, telephone surveys, and mail outs (de Leeuw, 2012; de Leeuw & Hox, 2012). An internet survey allows for participant anonymity compared with face to face surveys, provides more flexible question presentation methods than mail out surveys, and is more cost effective than mail out or telephone surveys (de Leeuw, 2012). Qualtrics (2013) internet based surveys also allows for participant anonymity, which has been found to be important for driving surveys, as it increases response rates and reduces the effects of socially desirability on responding (Darby, Murray, & Raeside, 2009; Lajunen & Özkan, 2011; Lajunen & Summala, 2003). It was, however, noted that internet based surveys have been criticised for their higher non-completion rate and difficulty in accessing participants (Manzo & Burke, 2012). To counter this, multiple media were used to distribute the survey (e.g. email, social media, flyers, and presentations during lectures) and lottery style incentives were used to encourage participation and completion.

Item Wording and Response Format

To begin developing individual items, techniques were used, such as DeVellis's (2012) recommendation of thinking creatively about the target construct, and other surveys were reviewed to provide an indication of contemporary phrasing and terminology (Fowler Jr, 2014). In particular, traffic related surveys such as Driver Behavior Survey (Clapp et al., 2011), and the Unsafe Driving Behaviours Questionnaire (Schulman Ronca & Bucuvalas Inc, 1998) were perused. Due to potential cultural variances in terminology (i.e. lorry or truck), particular attention was paid to surveys administered in Australia such as Australian Propensity for Angry Driving Scale (Leal & Pachana, 2008, 2009) and the Driver Behavior Inventory (Hartley & El Hassani, 1994).

The resultant items were written using clear, unambiguous speech (DeVellis, 2012) suitable for Australian participants. Some of the items were designed to check the participants' knowledge or perception of particular constructs and others were declarative statements that were sufficiently polarised to elicit a response (DeVellis, 2012; Fowler Jr, 2014). The wording of each item strived to minimise any perceptions of judgement, to encourage accurate responding and avoid eliciting socially desirable responses (DeVellis, 2012).

Care was taken to ensure items did not assume knowledge and to avoid language that was overly technical or legalistic (DeVellis, 2012; Fowler Jr, 2014). Items and response sets were generally developed to ensuring they incorporated everyday language, but were also appropriate for participants with an understanding of emergency vehicle related legislation[5]. To facilitate this, the items were developed in consultation with academic staff, peers, and road safety practitioners. Where agreement could not be reached on items such as response sets or terminology (i.e. are traffic lights yellow, amber or orange), social media was used to seek feedback and consensus.

As the survey was internet based, the literature provided further guidance on the style and number of items, response format, and the overall presentation (de Leeuw et al., 2012a). The style of item wording recommended for this survey was predominately closed questions with categorical response sets (Fowler Jr, 2009). As such, items were written as declarative statements and the response sets were presented in a Likert type scale (DeVellis, 2012; Likert,

[5] E.g. By legal definition (RTC, 2000), ambulances and fire brigade vehicles are only emergency vehicles when responding to an emergency, however, motorists are likely to consider that these vehicles are always emergency vehicles. Participants were therefore asked which vehicles MAY be emergency vehicles, to accommodate the differing levels of knowledge.

1932) where the participant indicated their level of agreement to the statements. Alternatively, items intended to check knowledge or understanding were written as questions, with a response set specific to that item.

The items using Likert (1932) type response sets employed a six-point scale. This was preferable to a seven point scale as it eliminated the possibility of a neutral central response, and provided for greater reliability (Brill, 2008). Dependent upon the context, the answers were either strongly disagree to strongly agree, never to always, and very unlikely to highly likely. Response sets for knowledge or perception items included terminology drawn from the qualitative study, existing literature, and researcher's own understanding of emergency vehicles. The responses were designed to be mutually exclusive, but allowed for multiple responses where appropriate (i.e. what colour flashing lights can emergency vehicles display?).

Not all items in the preliminary scale were suited to pre-determined response sets as they would either be too large or artificially restrictive, free text response formats were used for these items. This included items asking where the participant learnt to drive. A free text field was provided to allow participants to specify an alternate country. It was anticipated that the majority of participants would have learnt to drive in Australia and few participants would need to list an alternative country, therefore including a list of countries would be more time consuming than coding the free text responses. Free text entry was also provided so that participants could specify alternate emergency services (other than police, fire, or ambulance). This recognised that there were other services that participants might class as emergency services but avoided tainting responses by providing a potentially limiting list of emergency services, or alerting the participant to the existence of other services that they may not have been aware of.

A free text response field was also provided for participants to identify their primary motor vehicle's make and model. Discussions with peers and road safety practitioners had determined that establishing suitable categories for vehicle type was a problem for traffic related research. Vehicle licensing categories, such as station sedan and panel van, were unsuitable as they were not commonly used terms. There were potential inconsistencies between participants' understanding of the terms, and the actual classification, and a risk that participants would not be able to accurately categorise their vehicle. A free text response field allowed participants to indicate the vehicle make and model. This was then manually coded by the principal researcher and independently reviewed by subject matter experts to determine whether suitable categories could be identified. The utility of this item and response option were reviewed in the following phase.

Desired response model items.

One of the aims of this research was to identify the factors that facilitated or inhibited motorist's responses to emergency vehicles. To do this, the results from the final scale needed to be compared to the participants' driving behaviours during emergency vehicle encounters. Therefore, the data collection needed to include an assessment of driving behaviour by way of self-report. Whilst it was acknowledged that self-report was not best measure of actual driving behaviour (af Wåhlberg, 2010b), resource and logistical constraints did not allow for alternative assessment methods such as simulation or observation. However, care was taken with the design and administration of the items and overall scale to ensure they identified and/or minimised the concerns raised by af Wåhlberg (2010b).

In developing the self-report driving behaviour items, it was important to consider that the qualitative research, undertaken with emergency services personnel, identified that the existing road safety message for motorists (Department of Transport, 2013) requested a response that was inconsistent with the needs of emergency service drivers. In particular,

motorists were instructed to slow down or stop if unable to move left. This created a dangerous situation; emergency service drivers had identified that motorists needed to continue, at least at the same speed, until they were able to move over. Thus, the items included in this measure needed to reflect the response desired by the emergency service personnel; the Desired Response Model (DRM).

Seven driving scenarios were drawn from the data in chapter four, which covered a range of potential encounters. These included an emergency vehicle approaching from behind or in front, encounters at traffic lights, and situations where the motorist would be unable to move left straight away. Each scenario was given two potential driving responses: one consistent to the DRM, and one contrary to the DRM. The participant used a Likert (1932) type scale to identify how likely they would be to undertake each response. To facilitate the later comparison with the main scale, the responses were given a score from one to six, with six being the preferred response. A sum of the measure could be calculated as a score out of 84. Higher scores indicated more effecting responding, according to the desired response model.

Number of Items

Prevailing survey development literature (DeVellis, 2012; Dillman, 2007; Fowler Jr, 2014; Simms & Watson, 2007) was consistent in its assertion that the initial pool of items be sufficiently broad as to cover all potentially relevant concepts, and include some seemingly unrelated constructs. However, an excessively long internet survey could result in fatigue and non-completion. By way of guidance, Czaja and Blair (2005) recommended that participants should be able to complete the survey within 10 to 15 minutes. Additionally, the internet survey's similarity to mail surveys made Dillman's (1978) recommendation of no more than 125 items an appropriate guide as well. On that basis, the preliminary survey was restricted

to 83 items plus driving and demographic questions, and pilot testing was used to obtain an estimate of completion time.

Visual Presentation

An online survey tool (Qualtrics, 2013) was used to create the internet based survey. This program allowed for all facets of the survey to be developed within a pre-existing survey framework. Instructions for the completion of the survey were included at the beginning and throughout the survey where appropriate. The introduction page outlined the purpose of the scale, and assured participants of anonymity and confidentiality in order to increase participation and reduce the potential for socially desirable responding (Darby et al., 2009; Lajunen & Özkan, 2011; Lajunen & Summala, 2003). A 12 point Arial font was used, with bold emphasis on the items to distinguish them from response sets, and facilitate easier reading (Dillman, 2007). Graphics were avoided to ensure the survey was not overly cumbersome to download (Lozar Manfreda & Vehovar, 2012) and could be accessed from desktop, laptop and mobile devices.

The Qualtrics software incorporated controls to address problems such as missing data, presentation of unnecessary information and test order effects. To avoid missing data, all questions required a response before participants could proceed through the survey. The order of item presentation was randomised wherever possible to reduce test order effects. As some items had the potential to influence responses to other items, navigation was limited to moving forward and participants were unable go back and change responses. To ensure that items captured the respondents' full understanding but did not assume knowledge (DeVellis, 2012; Fowler Jr, 2014), some questions employed *skip logic* whereby presentation of a particular question was contingent upon the response to the preceding question (i.e. a response indicating the participant used flashing lights to identify emergency vehicles would prompt the question of "what colour flashing lights?"). This technique also reduced fatigue

by preventing participants from being presented with unnecessary questions (de Leeuw & Hox, 2012).

Finally, the literature recommended avoiding unnecessary words and repetition (de Leeuw, Hox & Dillman 2012b; Dillman, 2007). One way of doing this was to present the questions in block formats. However, this had the potential to influence responses by creating the perception of links between items. To determine whether the individual item or block format was preferable, two formats of the preliminary survey were created. Both formats contained identical items but one presented similar items in blocks (block format), whilst the other presented all items individually (individual format). The two formats were reviewed by the researcher's peers in an attempt to determine the appropriate layout, however, consensus could not be reached as to the preferred format and it was decided to pilot both versions.

Pilot Testing

Once the Preliminary REVS items and DRM questions had been developed and placed into Qualtrics (2103), the construct validity approach to scale development (Simms & Watson, 2007) required the survey to be pilot tested. The purpose of this testing was to assess the face validity of individual items and overall Preliminary REVS. The pilot testing was undertaken with the participants from the preceding qualitative study (chapter four) and, when finished, completed the substantive validity phase.

Participants.

The participants included the seven emergency service personnel and 14 motorists who participated in the interviews and focus groups during the qualitative study. Use of these participants was consistent with Simms and Watson's (2007) recommendations for potential participants. A table of participants is provided in Appendix A.

Materials.

The individual format (Appendix J) and block format (Appendix K) surveys were both used in the pilot study. Both included an introductory page explaining that the participant was being asked to review the Preliminary REVS. Participants were advised they would be asked to comment on the clarity of instructions, item sequence, grammar and ambiguity, whether items made sense, could have more than one interpretation, and whether they appeared relevant to emergency vehicle encounters. The participants were provided with a free text box to provide comments and a sliding scale for each of the items they were asked to report on: clarity, question sequence, grammar, multiple meanings and relevance.

Procedure.

In adopting an abridged version of Dillman's (2007) total design method to facilitate better response rates, participants were given pre-notice of the pilot testing (Appendix L). This notice thanked them for their previous participation and advised they would soon receive a web link to the Preliminary REVS, which they would be asked to review. At this time, it was determined that one participant no longer resided in Australia, one could not participate due to ill health, and two were not contactable. Of the remaining 17 participants, three did not have the capacity to complete the survey online. As a result, the participants were divided into three groups: block format, individual format, and printed version. The printed version was the block format converted to hard copy.

Four days after the initial contact, the pilot survey was forwarded to the participants. One week later, participants were sent a follow up communication (Appendix M) to increase responding (Dillman, 2007). The communication thanked them for their assistance if they had already completed the pilot testing, and requested they complete they survey if they had not already done so. To ensure there were no technical impediments to completing the online

survey, participants were able to log onto the scale multiple times; later screening of demographic data facilitated the identification of duplicate entries.

Results and discussion.

Six participants received the online block format, of which, four completed the testing, one had partially completed, and one did not respond. Three participants received the block format, printed version and all completed the survey. Eight participants received the individual format, of which seven had completed the survey and one did not respond. In total 15 participants completed the pilot test.

In reviewing the results (including the duplicates and incomplete attempts), it was found that the block item layout had more incomplete attempts than the individual item layout, suggesting the individual item layout was easier to use. However, an earlier observation during the peer review suggested that fatigue and distraction had been a concern when completing the individual layout, which arose from the repetitious wording and format. It was therefore decided that a combination of block and individual responses would be used to reduce unnecessary words, yet minimise the risk of biased responding through grouping. Items with repetitious wording were presented in a block format (i.e. Giving way to emergency vehicles makes me feel happy/sad/annoyed), and uniquely worded items were presented as individual items.

The pilot testing also identified some minor errors with items, layout, and presentation. One of the items forced a response where it was not appropriate to do so (What type of emergency service were you or are you in?). Another item had response options for flashing light colours were too similar (amber and yellow). The response set for an item that asked which vehicles could be emergency vehicles, was problematic as it failed to capture the legal provision that some classes of vehicle were only emergency vehicles some of the time. To address this, the response category of ‘unsure’ was replaced with ‘sometimes’ and the

item wording was amended from ‘can be’ to ‘are’ (Thinking about emergency vehicles, which of the following *are* emergency vehicles?). Notably, subsequent administration of the survey resulted in further amendment of this item (as reported in chapter seven).

In considering the responses to individual items, none of the participants indicated any level of agreement with the statement ‘I don’t give way to emergency vehicles’. However, this item had been included for its representation of extreme constructs. Its deletion at this point may have created an artificial boundary within the scale, therefore the item was retained and its utility reassessed at a later point. Finally, the free text fields were reviewed. In particular, the responses of vehicle make and model. Participants had provided sufficiently detailed descriptions of their vehicles to facilitate post hoc transformation into vehicle classes. As such, it was considered appropriate to continue using free text for the preliminary administration.

Summary

Overall, a pool of preliminary survey items was developed from the qualitative research and existing body of knowledge, and in accordance with contemporary scale development literature (Simms, 2008; Simms & Watson, 2007). The items were placed into an online survey tool, Qualtrics (2013), to facilitate its formatting and distribution. The driving scenario questions were also developed to assess reported driving behaviours relative to the desired response model. The Preliminary REVS items were piloted on the researcher’s peers and participants from the preceding qualitative research resulting in the creation of the Preliminary REVS and completion of the substantive validity phase of scale development. The following chapter reports on the administration of the Preliminary REVS to a sample of Western Australian motorists, which formed the commencement of the structural validity phase of scale development (Simms & Watson, 2007).

CHAPTER SIX: Testing the Preliminary REVS

This chapter details the commencement of the structural validity phase of scale development, in which the Preliminary REVS was administered to a sample of Western Australian motorists. Statistical analysis was undertaken on the resultant data to establish the scale's internal consistency, inter-item correlation and to facilitate a reduction in the number of scale items. This resulted in the development of the 45 item Revised REVS.

The preceding chapters reported on the first phase of developing the REVS to facilitate the identification of factors associated with responding to emergency vehicles. Using the existing literature (chapter two) and qualitative research (chapter four), items were developed for the Preliminary REVS and the scale was pilot tested (chapter five), thus establishing the scale's substantive validity. Following the construct validity approach (Simms & Watson, 2007), the next phase was to address the scale's structural validity, whereby the developing measure underwent repeated administrations to Western Australian motorists. These administrations provided data to assess the REVS' internal consistency, inter-item correlation, and to facilitate reduction in the number of scale items. This chapter reports on the first of these administrations.

Participants

Relying on the specifications of Comrey and Lee (1992) and Tabachnik and Fidell (2007), it was reasoned that a minimum 300 motorists, over the age of 18 years, were required to undertake the planned analyses. This sample was initially sought through a random selection of people listed on the Western Australian Electoral Roll. The Western Australian Department of Health, Data Linkage program provided the details of 1500 people, who were enrolled to vote in Western Australia. A mail out was used to contact the prospective participants (as reported below) and this was expected to illicit a response rate of 20.00% (Dillman, 2007), thus providing a sample of 300 participants.

Of the 1500 Western Australian electors contacted, only 35 (2.33%) responded to the survey. One participant was under 18 years of age, and five surveys were incomplete, resulting in 29 data sets suitable for analysis. This represented 1.93% of the 1,500 electors who were contacted; a response rate that was unprecedented in the survey literature. As the data security protocols (described in the methods section below) did not allow for scrutiny of

the mail out process to identify whether an error occurred, and no other explanation was available, this data collection strategy was abandoned.

In order to obtain a sample that was sufficient for planned analyses, a second data collection strategy was undertaken, which targeted Western Australian motorists within the Edith Cowan University student population. At the time, Edith Cowan University had 26,692 enrolled students of which, 61.41% were female, 3.36% came from a non-English speaking background, 1.30% were indigenous, 14.80% came from a lower socio-economic area, and 20.14% came from a regional or remote area. This resulted in an additional 429 responses to the survey of which 24 were ineligible, one was under 18 years, 14 did not drive on Western Australian roads and nine did not agree to the conditions of the survey. A further 83 surveys were incomplete, resulting in 322 additional data sets. The combined data set containing 351 participants was sufficient to undertake the analysis (Comrey & Lee, 1992; Field, 2009; Tabachnik & Fidell, 2007).

Materials

The Preliminary REVS survey was developed using the online survey tool, Qualtrics (2013) (Appendix N). Participants from the Western Australian Electoral Roll were recruited using a postcard invitation (Appendix O), which provided a web address to access the online survey. Participants from Edith Cowan University student population were recruited via an advertisement on the student website (Appendix P) and a flyer handed out at undergraduate lectures (Appendix Q).

To increase the rate of response in the subsequent (Edith Cowan University) sample, a lottery style incentive was offered, giving participants the chance to win one of six $50 fuel vouchers. The fuel voucher incentive was chosen as being something related to driving and emergency vehicle encounters, and potentially attractive to both males and females (Gideon, 2012). The value and quantity offered were consistent with Shine and Dulisse (2012) who

demonstrated that incentives that offered more chances to win smaller amounts were more likely to increase responding, rather than a smaller number of larger incentives. Whilst the offer of an incentive to the second sample created an inconsistency between the two participant sources, this was considered appropriate to assist in eliciting a more effective response rate.

Procedure

After receiving approval from the Edith Cowan University, Human Research Ethics Committee, a random sample of 1500 Western Australian Electoral Roll participants was obtained through the Western Australian Department of Health, Data Linkage program. The Electoral Roll only included Western Australian residents over 18 years of age. Postcards (Appendix O) were forwarded to the potential participants via a secure mailing house, as required by the Data Linkage program's data security protocols. The mail out was scheduled to be received by the participants on a Tuesday which was recommended for increasing response rate (Dillman, 2007). The postcard invited potential participants to complete the online survey and provided opportunity to seek further information prior to accessing the website.

Upon identifying the need for an alternative data source, ethics approval was obtained to recruit participants from the Edith Cowan University student population. An advertisement (Appendix P) was displayed, on the Edith Cowan University student website, inviting participants to the research and providing a hyperlink to the survey. It also advised potential participants of the opportunity to win one of the $50.00 fuel vouchers. In addition to the advertisement, the principal researcher attended two undergraduate lectures, speaking to students about the research and requesting their assistance. A flyer (Appendix Q) was handed out during the lectures, which provided students with the web address for the survey. The research advertisement was also placed on the units' blackboard sites of the lectures that were

attended. Withdrawal of the advertisement was requested once a sufficient sample had been obtained and the survey link was closed as soon as the advertisement was withdrawn.

Upon accessing the survey, participants were taken directly to the Qualtrics (2013) survey. The first page of the online survey (Appendix N) provided further information on the survey, and their agreement to the conditions was required for the participant to continue. The participant was then presented with screening questions for age and driving habits, and needed to indicate they were over 18 years of age and drove on Western Australian roads to proceed. Screening and demographic items appeared in set order at the beginning and end of the survey, and the driving scenario questions were presented in one randomised block towards the end of the survey. The Preliminary REVS items were presented in random order as determined by Qualtrics (2013), to minimise the possibility of order effects. At the conclusion of the survey, participants were invited to provide contact details to enter the lottery to win one of the fuel vouchers. Upon completion of the data collection period, the data were downloaded into IBM statistical software package, SPSS 22. The details provided for the lottery were separated from the data sets and the draw was conducted by an independent Edith Cowan University staff member.

Analysis

The combined data sets were reviewed for accuracy and omissions and it was found that 18 items were missing one to six responses from each. This had occurred as a result of not forcing a response within Qualtrics (2013) for some questions. The missing responses constituted less than 5% of the data set, hence the responses were retained and the missing items were replaced with the variable mean (Tabachnik & Fidell, 2007). Negative items were reverse scored and minor scoring errors were corrected (i.e. incorrect value allocated by Qualtrics).

A review of participants revealed demographics as provided in Table 2 from which it could be ascertained that the majority of participants drove almost daily on metropolitan roads, obtained their licence in Western Australia, and had never been a member of an emergency service.

Table 2

Participants for Assessment of Preliminary REVS

	Male	Female	Unspecified
Electoral Roll Sample	13 (44.83%)	16 (55.18%)	
Range	33 to 80 years (M=51.85, SD=15.49)	26 to 72 years (M=45.94, SD=12.11)	
ECU Sample	93 (28.88%)	228 (70.81%)	1
Range	15 to 68 years (M=31.46, SD=11.22)	18 to 74 years (M=30.31, SD=10.79)	18 years
Driving Experience	Less than 1 year to 70 years (M=12.96 years, SD=12.29).		
Road Type	Urban roads	269	(76.64%)
	Rural roads	26	(7.41%)
	Both rural and urban roads	56	(15.95%)
Driving Frequency	Drove daily or nearly every day	313	(89.17%)
Vehicle Type	Passenger (small/medium, large or 4-wheel-drive passenger)	310	(88.32%)
Crash Involvement	No crash involvement	153	(43.59%)
	Crash within previous year	24	(6.84%)
	Within previous 5 years	73	(20.80%)
	Within previous 10 years	48	(13.68%)
	Over 10 years	53	(15.10%)
First Obtained Driver's Licence	Western Australia	283	(80.63%)
	Another state or territory	31	(8.83%)
	Overseas	37	(10.54%)
Driving Tuition	Driving instructor	94	(26.78%)
	Family member	91	(25.93%)
	Other sources	7	(1.99%)
	Multiple sources	159	(45.30%)
Association with Emergency Services	Current member	40	(11.40%)
	Past member	30	(8.55%)
	No membership	281	(80.06%)
	No association (with emergency services)	118	(33.62%)

Freeform responses involving the make and model of the participants' primary motor vehicle were analysed. In consultation with experienced traffic policing and road safety practitioners, the reported motor vehicle details were reviewed and subsequently grouped into nine categories based upon the vehicles' size, and manner in which they were likely to be

driven. The resultant classifications were: small/medium passenger vehicle, large passenger vehicle, four-wheel drive passenger vehicle, commercial/utility (two-wheel drive), commercial/utility (four-wheel drive), motorcycle, moped/scooter, truck/bus and unclassified. Finally, items relating to driving scenarios were converted to a composite score out of 84.

Factor analysis.

Principal components analysis (PCA) was to be conducted on the eighty three variables using the 351 included cases. However, prior to conducting this analysis, consideration was given to the data's compliance with the assumptions of normality, linearity and for the presence of outliers (Tabachnik & Fidell, 2007). Normality was assessed by the examination of the distributions for skewness and kurtosis. Some variables were found to be skewed (negatively and positively), and some exhibited non-normal distributions. It was acknowledged that the violation of this assumption may have limited the analysis by lowering the correlations. Linearity could be viewed through pairwise scatterplots, however, this was impractical as it would involve over 3,000 scatterplots. It was accepted that the skewness of some factors would result in violations of linearity; however, no transformation was undertaken at this time, because data reflected actual views and beliefs and that it was more important to be true to the concept.

To identify multivariate outliers, Mahalanobis distance was calculated. This revealed that 26 (7.47%) of the 351 cases had a score greater than the critical x^2 value of 124.84, which was set for 83 variables at .001 level. As this represented more than 5% of the total cases, they were removed. Mahalanobis distance was calculated again for the remaining cases and it was found that 6 (2.15%) cases were greater than the cut off score. As this was less than 5% of the cases, they were not removed.

PCA was then undertaken with the data from the remaining 325 cases. To determine the number of factors that would provide greatest explanation, a combination of methods were considered (Stevens, 2009). Using Kaiser's criterion method, an eigenvalue of 1.0 could be used to determine the number of factors, however, this was not suitable for this analysis as there were more than 30 variables (Stevens, 2009) and it resulted in a 32 factor model. Alternatively, the eigenvalues were placed in the scree plot and perused to ascertain the appropriate number of factors (Figure 1). The scree plot suggested that a six or seven factor model would be appropriate to explain the variables.

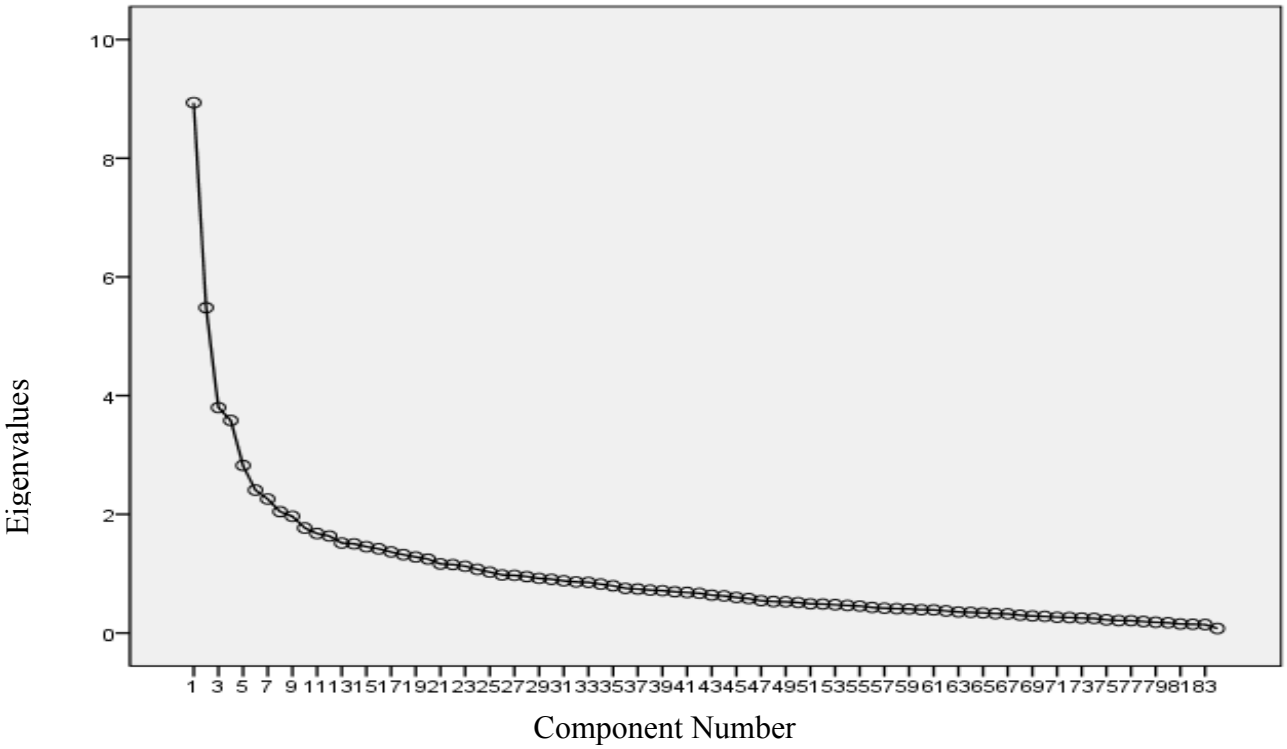


Figure 3 - Eigenvalues Scree Plot for the 83 items

The PCA was run with seven factors and a variable retention level set at .3. A variety of orthogonal rotation methods were used (varimax, equimax and quartimax) as it was theorised the factors were uncorrelated (Kline, 2011). It was found that quartimax produced the model that gave greatest explanation and clarity to the variables. The individual items within that model were then inspected and items that appeared unclear to participants ("I like to know where the emergency is going"), elicited inconsistent responses ("My safety is more

important than getting out of the way of the emergency vehicle") or failed to map onto any of the factors, were removed. This resulted in 49 items remaining across the seven factors. Internal consistency was calculated for the overall 49 item scale and it was found to be α = .75, with subscale calculations as provided in Table 3, with labels as described.

Table 3

Cronbach's Alpha scores for Overall Preliminary REVS and Subscales

Factor	α	Factor α if low item removed	Overall α if low item removed
Overall Scale	.75		.76
Factor I - Attitudes, Thoughts and Beliefs About Emergency Vehicles	.74		
Factor II - The Experience of Encountering an Emergency Vehicle	.78	.82	.76
Factor III - Other Road Users	.77		
Factor IV - Reasons for Responding to Emergency Vehicles	.69	.70	.75
Factor V - Association with Emergency Services	.81		
Factor VI - Feelings About Responding to Emergency Vehicles	.67	.73	.75
Factor VII - Rules Surrounding Emergency Vehicles	.70		

A review of individual items within the subscales revealed three items of note; "Emergency vehicles do not affect me" (Factor II), "A small delay won't make any difference" (Factor IV) and "Responding to an emergency vehicle makes me feel sad" (Factor VI). These items exhibited a low correlation within their subscales and their removal increased the internal consistency of the subscales and overall scale as indicated in Table 3. As such, the items were removed from the scale. Within the remaining items, factors three and seven exhibited acceptable internal consistency (α =.77 and α =.70), but the individual items exhibited a low correlation to the overall scale. Removal of the factors was considered at that point, however, the items in these factors were believed to be conceptually important to the central construct. As such, the items were retained at that time.

The PCA (quartimax rotation) was run again with seven factors and a variable retention level of .3 (Kline, 2011). It was found that one item ("Sometimes I follow

emergency vehicles to see where they are going") did not load significantly on any of the factors so it was removed from the scale. The remaining 45 items produced an overall Cronbach Alpha of α=.75. The resultant seven factor model (Table 4) exhibited a Kaiser-Meyer-Olkin (KMO) sampling adequacy of .78, Bartlett's test of sphericity was statistically significant (p = .000), and explained 48.22% of the total variance.

Revised REVS Subscale Interpretation

The statistical analysis and subsequent scale reduction resulted in 45 items within seven factors. Each of these factors was reviewed and found to be conceptually meaningful. The items clustered within the individual factors appeared to relate to the same constructs, and those constructs fell within the overarching construct of responding to emergency vehicles.

Factor I was labelled *Attitudes, Thoughts and Beliefs* as the 13 items measured a variety of positive and negative attitudes or beliefs about emergency vehicles. Factor II was labelled *The Experience of Encountering and Emergency Vehicle*. The six items in this factor measured the participants' assessment of emergency vehicle encounters and their ability to cope. Factor III was labelled O*ther Road Users* as these seven items measured participants' attitudes and beliefs about other motorists. Factor IV was labelled *Reasons for Responding* as these seven items measured the potential reasons an individual could have for giving way to an emergency vehicle. The four items in Factor V assessed the participants, past use of, and association with emergency services; this was labelled *Association with Emergency Services*. Factor VI was labelled *Feelings about Responding* as the five items in this factor assessed the affective response to an emergency vehicle encounter. The three items in Factor VII measured participants' attitudes and beliefs towards the laws relating to emergency driving. This factor was labelled *Rules Surrounding Emergency Vehicles*.

Table 4

Factor Loadings for PCA with Quartimax Rotation of the Preliminary REVS

Item	Factor						
	I	II	III	IV	V	VI	VII
*EVs use their lights and siren too much	**.71**						
*Sometimes, EVs use their lights and siren just to get through traffic...	**.64**						
Emergency service drivers act safely …	**.58**						
*Emergency driving creates an unacceptable risk to road users	**.55**						
It does not matter where the EV is going…it must be important	**.51**						
Emergency services drivers are properly trained …	**.48**						
*An EV is not in a hurry if … not sounding a siren	**.45**						
If a driver has the room to move … they should be punished	**.43**		-.40				
I could never imagine the EV crew doing the wrong thing	**.41**						
*If I hear a siren but cannot see the EV, then it must not be near me	**.41**						
I always respond appropriately to an EV	**.39**	.31					
*Some reasons … are more important than others	**.33**						
Drivers should get punished for failing to give way to an EV	**.38**		-.48				
*Encountering EVs is stressful		**.79**					
Responding to EVs is challenging		**.76**					
*Responding to EVs is difficult		**.76**					
I feel confident in my ability to respond to EVs		**.70**					
*Responding to an EV makes me feel Anxious		**.66**					
If I hear a siren but cannot find the EV I get concerned		**.53**					
*Other drivers do not pay attention			**.78**				
*Other drivers do stupid things			**.75**				
*Other drivers do not know what to do around EVs			**.72**				
*Other drivers do not drive as well as me			**.65**				
Other drivers are generally good drivers			**.60**				
I am just like every other driver on the road			**.46**				
*Other drivers make me impatient			**.45**				
I give way to EVs because it is my civic duty				**.75**			
I give way to EVs because it is the right thing to do				**.71**			
I give way to EVs because it is common courtesy				**.69**			
*I give way to EVs because it is what I am expected to do				**.59**			
*I don't give way to EVs				**.48**			
It is important for drivers to give way to EVs	.33			**.45**			
Someone's life may be at risk if the EV is delayed	.37			**.40**			
When I see an EV, it makes me think … for someone else					**.85**		
When I see an EV, it makes me think … for myself					**.82**		
When I see an EV, it makes me think about my own experiences …					**.80**		
When I see an EV, it makes me think … person that I know					**.73**		
Responding to an EV makes me feel Happy						**.68**	
Responding to an EV makes me feel Relieved						**.66**	
*Responding to an EV makes me feel Annoyed	.38					**.66**	
*Responding to an EV makes me feel Angry	.34					**.66**	
*Responding to an EV makes me feel Frustrated	.34	.30				**.63**	
*I am allowed to break the road rules to get out of the way of an EV							**.86**
*I am prepared to break the road rules to get out of the way of an EV							**.81**
EVs are allowed to break the road rules …							**.49**

Note. * denotes an item with reverse scoring. Factor loadings <.3 were suppressed.

Discussion

The survey administration and analysis reported in this chapter formed the commencement of the structural validity phase of scale development (Simms & Watson, 2007). Its purpose was to test the Preliminary REVS on a sample of Western Australian motorists. The factor analysis and associated correlations established the scale's structure, internal consistency, inter-item correlation and reduced the number of variables, resulting in a Revised REVS with 45 items. The seven factor model of the Revised REVS represented constructs relating to the experience of responding to an emergency vehicle. Whilst some of the items exhibited low correlation to the model, they were retained as being potentially meaningful to the overall construct, and it was yet to be determined whether the Final REVS would be an overall scale or a set of meaningful subscales.

At this stage, no decision was made with regards to scoring (i.e. whether the scale would be scored overall, or as individual factors). Similarly, the demographic variables, such as emergency service membership, age, gender and driving experience, remained untested.

The 45 item Revised REVS was larger than recommended by the scale development literature (Dillman, 2007). As such, it required further testing and reduction. The altered structure also required testing to establish its structural validity. The following chapter reports on the continuation of the structural validity phase, whereby the Revised REVS was administered to another sample of Western Australian motorists, in conjunction with an assessment of the presence of socially desirable responding, to screen for potential bias.

CHAPTER SEVEN: Testing the Refined REVS with Social Desirability Assessment

This chapter reports on the continuation of the structural validity phase of scale development. In this section, the Revised REVS was administered to another sample of participants, who were representative of Western Australian motorists, to facilitate further reduction of the number of items in the scale. A social desirability scale was also administered to identify and potentially remove items to which participants provided a biased response because of socially desirable responding. During this section of the research, the Revised REVS was also administered on two consecutive occasions to a smaller sample of Western Australian motorists to assess the scale's temporal validity.

The preceding chapter reported on the commencement of the structural validity phase of scale development through the administration and testing of the Preliminary REVS. This resulted in the development of a 45 item Revised REVS. As the scale had been altered from its original form, and still contained more items than recommended (Dillman, 2007), it needed to be tested again on another sample (Simms & Watson, 2007). Therefore, the Revised REVS was administered to another sample of Western Australian motorists and psychometric testing was undertaken to determine the underlying structure of the scale, assess internal consistency, correlations, and facilitate further reduction in the number of items (Simms, 2008; Simms & Watson, 2007).

Principal Components Analysis (PCA) was used to undertake the analysis. Whilst it could be argued that the creation of a model in the preceding chapter warranted the use of a confirmatory factor analysis, this was an intentional replication of the analysis reported in chapter six. This ensured that artificial limitations were not created through a failure to explore alternative factor models. Additionally, as discussed in chapter three, PCA was intended to assess a population; successive testing on multiple samples, producing similar results was required to produce a result that could be generalised to the broader population (Field, 2009).

Other reliability measures

In addition to conducting factor analysis and scale reduction on the Revised REVS, Simms and Watson (2007) recommended that other aspects of reliability be assessed at this point. This included test-retest reliability, and assessing potentially confounding elements such as the effects of socially desirable responding. The inclusion of these additional assessments was consistent with driving behaviour scale development literature, which emphasised the need to demonstrate the measure's consistency over time (Lajunen & Özkan, 2011; Özkan, Lajunen, & Summala, 2006). It also supported an assessment of the impact of

socially desirable responding, often evident in self-report measures (af Wåhlberg, 2010a; Lajunen, Corry, et al., 1997), as further discussed below.

Socially desirable responding.

Socially desirable responding is described as answering questions in a way that makes the respondent look good by presenting an image that portrays them in the best possible light (af Wåhlberg, 2010a). Studies assessing socially desirable responding have identified that it is comprised of two main factors: self-deception and impression management. Self-deception is an unintentional behaviour whereby individuals respond in a way they believe to be true, yet is positively biased (Lajunen & Özkan, 2011), such as overstating their driving ability. Impression management is an intentional behaviour whereby the individual respond in a way that provides a more favourable self-description (i.e. they lie) (Lajunen & Özkan, 2011).

The effect of socially desirable responding has been an important consideration for self- report data collection methods, particularly within the context of driver behaviour research. When using self-report methods to assess driver behaviour, some researchers have assumed that participants' responses reflected their perceived reality (Lajunen & Özkan, 2011) however, this may not have been the case. By way of example, if a respondent was asked about driving in excess of the speed limit (i.e. speeding) and indicated they did not speed, they may in fact not speed when driving, or they may be lying in order to present a more socially desirable image.

af Wåhlberg (2010b) frequently expressed concern about the effects of social desirability bias on self-report methods for assessing driver behaviour. This was particularly the case when self-report was used for both the dependent and independent variables (i.e. having crashed a vehicle and the factors contributing to that crash). He asserted that this common method of data collection would produce an artefactual variance. Whilst his

concerns were predominately aimed at crash involvement, they had been shown to be applicable to other driving behaviours (af Wåhlberg, 2010b).

Reports on driving behaviour surveys have often acknowledged the potential for social desirability bias, but have varied in their treatment of it. Some acknowledged its potential impact on their research but did not attempt to control for it (Brown & Cotton, 2003; Gras, Cunill, Sullman, Planes, & Font-Mayolas, 2007; Palat & Delhomme, 2012; Rajalin & Summala, 1997). Others noted their failure to assess the effects of socially desirable responding as a limitation of their study (Fedele, Lefler, Hartung, & Canu, 2012; Lajunen & Parker, 2001) or a threat to validity (Nathanail & Adamos, 2013; Sarma, Carey, Kervick, & Bimpeh, 2013). Conversely, Fleiter, Lennon, and Watson (2010) argued against the need to control for the effects of socially desirable responding, maintaining that researchers should instead consider what motivated the biased responding. Irrespective of their treatment of it, all were consistent in acknowledging it as a consideration for driver behaviour research and it seemed evident that robust research should actively address this.

Research that has addressed social desirability bias has provided several recommendations for doing so. As an extreme some researchers recommend that driver behaviour studies stop using self-report measures and find an alternative data collection method (af Wåhlberg, 2010b; Lajunen & Özkan, 2011). Whilst, in an ideal research world, evidence of driving behaviours would be collected in as natural an environment as possible (i.e., through direct observation), this is not practical for some driving behaviours as attempting to recreate some driving situations would be both risky and resource intensive. Additionally, overt observation of a behaviour could itself alter the behaviour it sought to assess. It is therefore understandable that researchers continue to use self-report measures.

To address concerns over the reliability of self-report measures, researchers have adopted varying techniques to minimise, or control for, the effects of socially desirable

responding. af Wåhlberg (2010b) also recommended using external data sources wherever possible, such as independently reported crash statistics. Peer (2010) recommends designing questionnaires so that the items were neutrally worded. Others (Darby et al., 2009; Lajunen & Özkan, 2011; Lajunen & Summala, 2003) recommended adopting data collection methods that allowed individuals to respond to surveys in private, with assurances of anonymity and confidentiality (Møller & Haustein, 2014). Alternatively, it was recommended that a social desirability assessment be incorporated into the testing, and used to either screen or control for social desirability bias in responding (af Wåhlberg, 2010b; Lajunen & Parker, 2001). The current research design already incorporated the recommendations for wording, privacy, and anonymity, but would further assess social desirability bias through the inclusion of an appropriate measure.

Several measures have been developed to assist in identifying and assessing social desirability bias in responding. Jackson and Helmes (Helmes & Jackson, 1977; Jackson, 1999; Jackson & Helmes, 1979) developed the Personality Research Scale, which contained a subscale for identifying social desirability (Form E). Paulhus (1991) developed the Balanced Inventory of Desirable Responding (BIDR), which incorporated subscales identifying impression management and self-deception. However, Lajunen, Corry, et al. (1997) developed the Driver Social Desirability Scale (DSDS) that was specifically designed for use with driver behaviour measures.

The DSDS (Lajunen, Corry, et al., 1997) was created in 1997 in a similar vein to the BIDR (Paulhus, 1991). It incorporated items that represented extremely moral driving behaviours (in this case driving related behaviours) and formed two subscales: Driver Impression Management (DIM), and Driver Self Deception (DSD). Testing of the DSDS found the DIM subscale was negatively correlated with items that had a negative connotation, such as self-report accidents, punishments, overtaking, speeding and driving aggression

(Lajunen, Corry, et al., 1997). This suggested that drivers who were inclined to employ impression management were more likely to under report adverse behaviours. Conversely, the DSD subscale was found to correlate positively with drivers' sense of control in traffic (Lajunen & Özkan, 2011), consistent with the tendency for individuals to overestimate their driving ability (Groeger & Brown, 1989; Groeger & Grande, 1996).

Since its development, the DSDS has been used in driver behaviour studies to identify or control for any social desirability bias exhibited by respondents. af Wåhlberg (2010b) used the DSDS to control for the effects of social desirability bias on several existing driver behaviour measures such as the Driver Behaviour Questionnaire (Parker, West, Stradling, & Manstead, 1995), Driving Anger Scale (Deffenbacher et al., 1994), and the Driver Behaviour Inventory (Gulian et al., 1989). It was also used to control for social desirability bias when assessing the effects of education programs on young driving offenders (af Wåhlberg, 2010a). Carpentier et al. (2014) used a shortened version of the DSDS to control for social desirability bias when assessing the effects of family climate on risky driving practices. Ledesma, Montes, Poó, and López-Ramón (2015) used it to test their methodological assumption that a self-report measure was suitable for assessing attention-related driving errors. Finally, Di Milia, Wikman, and Smith (2008) used the DSDS in the construct validity phase of their scale development of the revised Preferences Scale of Morningness. Collectively, these studies found the DSDS to be a reliable instrument.

It must, however, be noted that there has been some criticism directed towards the DSDS. de Winter and Dodou (2012) argued that the items of the DSDS were too similar to the driving behaviours they sought to assess, and therefore inconsistent with Paulhus's (1991) underlying principle, that the control of impression management should only occur when it was "conceptually independent of the trait being assessed" (Paulhus, 1991, p. 23). However, Hatfield, Fernandes, Faunce, and Job (2008) countered that social desirability questionnaires

lacked statistical power when not associated with the target behaviour. It was further argued that the items were not moral extremes but rather highly desirable, safe driving behaviours (af Wåhlberg, Dorn, & Kline, 2010; Poó, Taubman-Ben-Ari, Ledesma, & Díaz-Lázaro, 2013). Even Hatfield et al. (2008) and af Wåhlberg et al. (2010) conceded that there may be a group of drivers who drove in accordance with the behaviours described in the items. However, a meta-analysis of 13 studies incorporating components of the DSDS (af Wåhlberg et al., 2010) supported the conclusion that DSDS was effective in identifying a self-report bias. As such, the DSDS was considered suitable for assessing social desirability bias in the Revised REVS.

Materials

This phase of scale development involved the administration of the Revised REVS (Appendix R) in conjunction with the DSDS items (Lajunen, Corry, et al., 1997) using the Qualtrics (2013) online survey tool. Participants were recruited from the Edith Cowan University student population using an advertisement on the student internet page (Appendix Q). To increase the rate of response a lottery style incentive of four $50.00 fuel vouchers was offered, as described in chapter six.

Driver Social Desirability Scale.

The DSDS incorporated 12 statements divided into two subscales, Driver Impression Management (DIM) and Driver Self-Deception (DSD) scale. The items were:

Driver Impression Management (DIM).

DIM1. I have never exceeded the speed limit
DIM2. I have never wanted to drive very fast
DIM3. I have never driven through a traffic light when it has just been turning red.
DIM4. I always obey traffic rules, even if I'm unlikely to be caught.
DIM5. If there was no police control, I would still obey the speed limits
DIM6. I have never exceeded speed limit or crossed a solid white line in the centre of the road when overtaking
DIM7. I always keep sufficient distance from the car in front of my car

Driver self-deception (DSD).

DSD1. I always know what to do in traffic situations

DSD2. I never regret my decisions in traffic

DSD3. I don't care what other drivers think of me

DSD4. I always am sure how to act in traffic situations

DSD5. I always remain calm and rational in traffic.

Participants were required to indicate their level of agreement with the items by responding on a six point Likert (1932) type scale from not true at all to very true. Consistent with previous administrations of the survey (e.g. af Wåhlberg, 2010b; Carpentier et al., 2014), the number of points on the DSDS could vary from five to seven in order to blend with the instrument it was assessing. For this administration, a six point Likert (1932) response format of strongly disagree (1) to strongly agree (6) was used, consistent with the response formats in the Revised REVS. The final scores for the DSDS were the sum of each subscale (af Wåhlberg et al., 2010) whereby possible scores for the DIM and DSD ranged from seven to 42, and five to 30 respectively.

Participants

To conduct the testing and refinement, Western Australian motorists were recruited from the Edith Cowan University student population. Of the 459 motorists who responded to the survey, 17 were ineligible to complete the survey; eight did not agree to conditions of the survey, three were under 18 years of age, five did not drive on Western Australian roads, and one had not driven in the past year. An additional 73 surveys were incomplete, resulting in a sample of 369 data sets, which was sufficient to undertake the planned analyses (Comrey & Lee, 1992; Field, 2009; Tabachnik & Fidell, 2007). Notably participants were drawn from the same population as used in Chapter 6, and due to the anonymity provided to respondents, it was not possible to determine whether participants in this chapter also completed the earlier survey. However, the two surveys were seven months apart and fell in different school years and semesters.

Procedure

An advertisement (Appendix Q) was displayed on the Edith Cowan University student website, inviting students to participate in the research, and provided a hyperlink to the Revised REVS. The advertisement was withdrawn after a sufficient sample had been obtained and the survey link was closed.

Upon accessing the link, participants were taken directly to the Revised REVS within Qualtrics survey tool. The first page provided further information on the survey, and their agreement to the conditions was sought before they could continue. After completing screening questions for age and driving habits, participants proceeded through the survey if they responded that they were 18 years of age or older and drove on Western Australian roads. Screening and demographic items appeared in set order at the beginning and end of the survey, and the driving scenario questions were presented in one randomised block towards the end of the survey. To minimise the possibility of test order effect, the DSDS items and Revised REVS items were mixed together and presented in random order as determined by Qualtrics (2013). At the conclusion of the survey, participants were given the opportunity to volunteer a contact number or email for inclusion in the draw for one of four $50 fuel vouchers. Data were migrated into SPSS 22, and the lottery was conducted.

Analysis

A review of participants revealed demographics as provided in Table 5 from which it could be ascertained that the majority of participants drove almost daily on metropolitan roads, obtained their licence in Western Australia, and had never been a member of an emergency service.

Table 5

Participants for Assessment of Revised REVS

Participant Demographics	Male	Female
	102 (27.64%)	267 (72.36%)
Range	18 to 67 years	18 to 75 years
	M=30.26, *SD*=11.35)	*M*=28.65, *SD*=10.05.
Driving Experience	Less than 1 year to 50 years (*M*=10.51, *SD*=10.25)	
Road Type	Urban roads	283 (76.69%),
	Rural roads	28 (7.59%)
	Both rural and urban roads	58 (15.72%)
Driving Frequency	Drove daily or nearly every day	324 (87.80%)
Crash Involvement	No crash involvement	189 (51.22%)
	Crash within previous year	20 (5.42%)
	Within previous 5 years	67 (18.16%)
	Within previous 10 years	47 (12.74%)
	Over 10 years	46 (12.47%)
First Obtained Driver's Licence	Western Australia	307 (83.20%)
	Another state or territory	28 (7.58%)
	Overseas	34 (9.21%)
Driving Tuition	Driving instructor	147 (39.84%)
	Family member	144 (39.02%)
	Other sources	11 (2.98%)
	Multiple sources	67 (18.16%)
Association with Emergency Services	Current member	33 (8.94%)
	Past member	11 (2.98%)
	Multiple associations	23 (6.23%)
	No membership	302 (81.84%)
	No association	105 (28.46%)

Principal components analysis.

In accordance with the construct validity approach to scale development (Simms & Watson, 2007), the purpose of the analysis was to identify the underlying factor structure and facilitate a reduction in the number of variables. As previously discussed, Principal Components Analysis (PCA) was conducted on the 45 scale items. Prior to undertaking any analysis, the data were then screened for errors, omissions and compliance with the assumptions of normality, linearity and for outliers (Tabachnik & Fidell, 2007). Distributions of the variables were examined for skewness and kurtosis. Some were found to be skewed (negatively and positively), and some exhibited non-normal distributions, however, no

transformation or deletion was undertaken at this time and it was acknowledged that the violation of this assumption may limit the analysis by lowering the correlations. Whilst linearity could be viewed through pairwise scatterplots, this was impractical as it would involve over 3,000 scatterplots. As such, it was accepted that the skewness of some factors would result in violations of linearity; however, no transformation was undertaken at that time, because data reflected actual views and beliefs and that it was more important to be true to the concept.

To identify multivariate outliers, Mahalanobis distance was calculated. This revealed that 20 (5.32%) of the cases had a score greater than the critical x^2 value of 78.75, which was set for 45 variables at .001 level. As this represented more than 5% of the total cases, they were removed from further analysis. Mahalanobis distance was recalculated with the remaining cases and it was found that 10 (2.81%) were greater than the cut off score. As this represented less than 5% of the remaining 356 cases, they were not removed, and the number of remaining cases was sufficient for the planned analyses (Tabachnick & Fidell, 2007)

PCA was calculated on the 45 variables with the remaining 356 cases, and a combination of Kaiser's criterion method and scree plot were used to determine the number of factors that would provide greatest utility (Stevens, 2009). The eigenvalues, as presented in the scree plot (Figure 2), were perused to determine the appropriate number of factors. Using an eigenvalue of 1.0 to determine the number of factors was not suitable for this analysis as there were more than 30 variables (Stevens, 2009) and it resulted in a 12 factor model. However, inspection of the scree plot suggested that a seven factor model would again be appropriate to explain the variables.

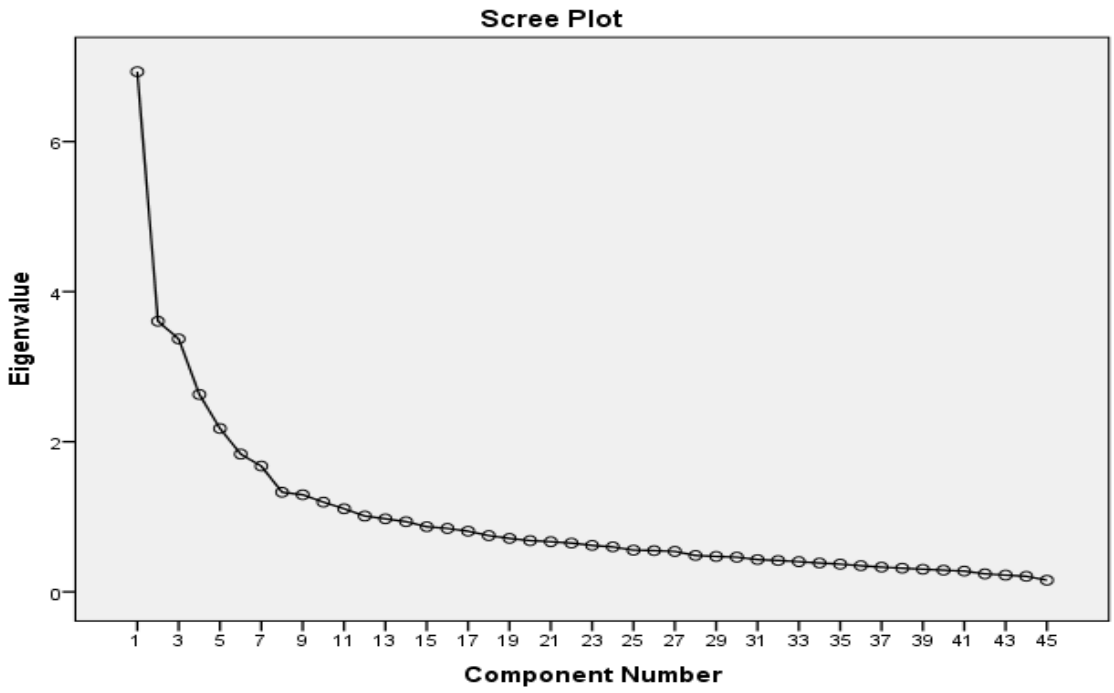


Figure 4 - Eigenvalues Scree Plot for the 45 Variables of the Revised REVS

The PCA was then run with seven factors and a variable retention level set at .3. A variety of orthogonal rotation methods were used (varimax, equimax and quartimax) as it was theorised the factors were uncorrelated (Kline, 2011; Tabachnick & Fidell, 2014). It was found that quartimax again produced the model that gave greatest explanation and clarification to the variables. Individual items within the factor structure were perused and items that appeared unclear to participants ("Responding to emergency vehicles is challenging"), elicited inconsistent responses or failed to map onto any of the factors (i.e. "I give way to emergency vehicles because I'm expected to") were removed. After removal, 42 variables remained in the seven factors. The internal consistency for the scale was found to be $\alpha = .79$, with subscale calculations as provided in Table 6

Table 6

Cronbach Alpha Scores for Overall Revised REVS and Subscales

Factor	α	Factor α if low item removed	Overall α if low item removed
Overall Scale	.79		
Factor I – Negative Attitudes, Thoughts and Beliefs about EVs	.79	.76	.79
Factor II – The Experience of Encountering an EV	.81	.85	.79
Factor III – Beliefs about Other Drivers	.76	-	.81
Factor IV – Association with Emergency Services	.83	-	-
Factor V – Reasons for responding to EV, and Positive Feelings about Responding, and Beliefs about Punishment and Other Drivers	.74	-	-
Factor VI – Positive Attitudes, Thoughts and Beliefs about Emergency Vehicles	.70	-	-
Factor VII – Beliefs about Lawfulness	.09	-	.80

A review of correlations for the individual items revealed that Factor I had one item ("If I hear a siren but cannot see the emergency vehicle, then it must not be near me") with a low item total correlation (α =.12) and the factor (α =.26). Its removal would maintain the overall reliability (α =.79). Factor II also had one item ("If I hear a siren but cannot find the emergency vehicle I get concerned") with a low item total correlation (α =.12) and the factor (α =.15). Its removal would have maintained the overall reliability (α =.79) and increase Factor II reliability (α =.85). All of the items in Factor III demonstrated a moderate to low item total correlation (α =.00 to .257). Whilst the factor demonstrated good internal reliability (α =.76), its removal would have increased the overall reliability (α =.81). Finally, the three items in Factor VII all demonstrated a low correlation to the overall model and the factor itself had a low internal consistency. Removal of this factor would have increased the overall reliability (α =.80).

After removal of the items and factors discussed above, PCA was run again on the remaining 30 items with 5 factors, however the resultant structure was problematic. As the scree plot suggested that a six or seven factor might also be suited, this was tried. The three

factor structures were reviewed and it was determined that the five items relating to feelings about emergency vehicle encounters (i.e. Responding to emergency vehicles makes me feel happy/angry/frustrated/annoyed/relieved) did not map consistently. As a result, the items were removed and the analyses run again. This resulted in a five factor model (Table 7) that exhibited a Kaiser-Meyer-Olkin (KMO) sampling adequacy of .813, Bartlett's test of sphericity was statistically significant (p = .000) and explained 53.84% of the total variance. This scale delivered an overall reliability of α =.81, which was satisfactory at that stage.

Table 7

Factor Loadings for PCA with Quartimax Rotation of Revised REVS

	Factor				
REVS Item	I	II	III	IV	V
I give way to EVs because it is the right thing to do	**.76**				
I give way to EVs because it is my civic duty	**.73**				
Someone's life may be at risk if the EV is delayed	**.59**				
It is important for drivers to give way to EVs	**.57**				
I give way to EVs because it is common courtesy	**.54**				
I always respond appropriately to an EV	**.54**	.38			
It does not matter where the EV is going… it must be important	**.52**		.47		
*I don't give way to EVs	**.45**				
*Responding to an EV is stressful		**.88**			
*Responding to an EV makes me feel anxious		**.88**			
*Responding to an EV is difficult		**.80**			
I feel confident in my ability to respond to EVs		**.70**			
*Sometimes, EVs use their lights and siren just to get through traffic…			**.76**		
*EVs use their lights and siren too much			**.71**		
*Emergency driving creates an unacceptable risk to road users			**.58**		
*An EV is not in a hurry if it is flashing its lights but [no] siren			**.52**		
EV drivers act safely when driving with lights and siren	.378		**.50**		
EV drivers are properly trained to drive with lights and siren			**.42**		
I could never imagine the EV crew doing the wrong thing			**.31**		
When I see an EV… own experiences with an ES				**.86**	
When I see an EV, it makes me think … used that ES for myself				**.84**	
When I see an EV, it makes me think … used that ES for someone else				**.84**	
When I see an EV, it makes me think about an ES person that I know				**.68**	
If a driver has the room to move … they should be punished					**.88**
Drivers should get punished for failing to give way to an EV					**.87**

Note: * Item is reverse scored. Boldface factor loadings indicate inclusion within the factor.

Comparison with preliminary REVS data.

To verify the utility of the factor structure from the Revised REVS, the data from the Preliminary REVS were reviewed. The PCA was run on the Preliminary REVS data set using the same 25 item variable set. This produced a five factor structure (Table 8), which exhibited a KMO measure of sampling adequacy of .78, Bartlett's test of sphericity was statistically significant (p = .000), and it explained 51.99% of the variance.

Table 8

Factor Loadings for Preliminary REVS Items Based on Revised REVS Variables

	Factor				
	I	II	III	IV	V
EVs use their lights and siren too much	**.70**				
Sometimes, EVs use their lights and siren just to get through traffic…	**705**				
ES drivers act safely when driving with lights and siren	**.66**				
ES drivers are properly trained to drive with lights and siren	**.56**				
It does not matter where the EV is going … must be important (**)	**.54**	.35			
Emergency driving creates an unacceptable risk to road users	**.54**				
I could never imagine the EV crew doing the wrong thing	**.49**				
An EV is not in a hurry if it is flashing its lights but not sounding a siren	**.47**				
I give way to EVs because it is my civic duty		**.78**			
I give way to EVs because it is the right thing to do		**.71**			
I give way to EVs because it is common courtesy		**.65**			
It is important for drivers to give way to EVs		**.53**			
I don't give way to EVs		**.48**			
Someone's life may be at risk if the EV is delayed	.31	**.45**			
Encountering EVs is stressful			**.81**		
I feel confident in my ability to respond to EVs			**.75**		
Responding to EVs is difficult			**.74**		
Responding to an EV makes me feel Anxious			**.74**		
I always respond appropriately to an EV (**)	.35		**.38**		
When I see an EV, it makes me think … used that ES for someone else				**.86**	
When I see an EV, it makes me think … used that ES for myself				**.83**	
When I see an EV, it makes me think … own experiences with an ES				**.81**	
When I see an EV, it makes me think about an ES person that I know				**.72**	
If a driver has the room to move out … they should be punished					**.85**
Drivers should get punished for failing to give way to an EV					**.85**

Note: * Item is reverse scored. Boldface factor loadings indicate inclusion within the factor.
**Item appears in different factors to the Revised REVS as reported in table 7

This resulted in a factor structure that was very similar to the Revised REVS structure. Two items varied between the two data sets. One item ("It does not matter where the EV is going, if it

is using lights and sirens it must be important") moved from *Factor II - The Experience of Encountering an Emergency Vehicle* to *Attitudes, Thoughts and Beliefs* to *Factor I - Reasons for Responding*. Another item ("I always respond appropriately to emergency vehicles") moved from *Factor I - Reasons for Responding* to *Factor II - The Experience of Encountering an Emergency Vehicle*.

Socially Desirable Responding Assessment

The data from the DSDS items were then reviewed. The overall DSDS scale exhibited a Cronbach Alpha of .78 with the DIM and DSD subscales exhibiting good internal consistency ($\alpha = .80$ and $\alpha = .68$ respectively). This was consistent with other applications of the scale (af Wåhlberg et al., 2010; Carpentier et al., 2014; Lajunen, Karola, & Summala, 1997). The DSDS subscales were compared to the REVS items by calculating the Pearson correlation as presented in Table 9. An item would be considered to indicate social desirability bias if it exhibited a correlation greater than .3. None of the REVS items exhibited a strong correlation with the DIM subscale, with an average correlation of .07, and range of -.07 to .20. The REVS items demonstrated greater correlation with the DSD, with an average correlation of .16 and range .01 to .47.

One REVS item in *Reasons for Responding* ("I always respond appropriately to an EV") exhibited a moderate positive correlation (.34) with DSD, which exhibited a shared correlation of 11.56%. This was consistent with the item's development in that it was initially intended to represent the potential use of defence mechanisms by the individual, and defence mechanisms ought to correlate with self-deception, as they were subconsciously undertaken.

All REVS items in *Experience of Encountering an Emergency Vehicle* exhibited a moderate to strong correlation with the DSD subscale (.36 to .47), which exhibited a shared correlation of 12.96% to 22.09% respectively. These REVS items collectively represented

individuals' perceptions of self- mastery relative to EV encounters. This was consistent with previous driver behaviour research that found individuals often overestimated their driving ability (Groeger & Brown, 1989). Overall, the REVS items that demonstrated potential for social desirability bias all related to individuals' perceptions of emergency vehicle encounters and their ability to response. As such, they were not conceptually independent of self-deception and, according to Paulhus (1991) should not be controlled.

Table 9

Revised REVS items and DSDS Subscale Correlations

	Pearson Correlation		
	DSD	DIM	Mean (SD)
Reasons for Responding			
I give way to EVs because it is the right thing to do	.09	.15**	5.66 (0.51)
I give way to EVs because it is my civic duty	.14*	.15**	5.33 (0.78)
Someone's life may be at risk if the EV is delayed	.02	.10*	5.75 (0.48)
It is important for drivers to give way to EVs	.01	.04	5.81 (0.43)
I give way to EVs because it is common courtesy	.12*	.15**	5.27 (0.99)
I always respond appropriately to an EV	.34**	.19**	5.17 (0.76)
It does not matter where the EV is going…must be important	.10	.16**	5.53 (0.62)
I don't give way to EVs	.02	-.02	5.84 (0.41)
The experience of encountering an EV			
Responding to an EVs is stressful	.40**	-.04	3.63 (1.34)
Responding to an EV makes me feel anxious	.39**	-.07	3.65 (1.45)
Responding to EVs is difficult	.36**	-.06	3.91 (1.22)
I feel confident in my ability to respond to EVs	.47**	.02	4.85 (0.96)
Attitudes, Thoughts and Beliefs			
Sometimes, EVs use their lights and siren just to get through …	.11*	.12*	4.80 (1.20)
EVs use their lights and siren too much	.04	.05	5.20 (0.77)
Emergency driving creates an unacceptable risk to road users	.06	-.05	4.94 (0.99)
An EV is not in a hurry if it is flashing its lights but [no] siren	.01	-.00	4.78 (1.12)
ES drivers act safely when driving with lights and siren	.22**	.14**	4.98 (0.83)
ESs drivers are properly trained to drive with lights and siren	.13*	.05	5.31 (0.83)
I could never imagine the EV crew doing the wrong thing	.13*	.20**	4.03 (1.26)
Association with Emergency Services			
When I see an EV, it makes me think … own experiences …	.11*	.11*	2.73 (1.53)
When I see an EV, it makes me think … ES person that I know	.16**	.08	2.56 (1.45)
When I see an EV, it makes me think …used … for myself	.08	.09	2.11 (1.30)
When I see an EV, it makes me think … used … for someone else	.08	.13*	2.40 (1.39)
Beliefs about Punishment			
If a driver has the room to move out … they should be punished	.08	.07	4.73 (1.02)
Drivers should get punished for failing to give way to an EV	.20**	.09	4.67 (1.19)

* denotes significant to 0.05, ** denotes significant to 0.01

Final REVS Subscales

The preceding analysis and scale reduction resulted in the Final REVS, which incorporated five subscales that were conceptually meaningful. The items clustered within each subscale appeared to relate to the same constructs, and those constructs fell within the overarching construct of responding to emergency vehicles.

Factor I - Reasons for responding.

The eight items comprising this factor measure the reasons that an individual might have for giving way to an emergency vehicle. The items reflect individuals' motivations and the importance they place on responding. As such, they are consistent with the concept of prosocial intentions (Penner et al., 2005) whereby they intend to respond in a way that facilitates the passage of the emergency vehicles as demonstrated through the perceived importance of doing so, and the consequences they attribute to failing to do so (i.e. someone's life may be at risk). A high score on this factor indicates a prosocial intention or motivation to facilitate the passage of emergency vehicles. A low score in this factor reflects a lack of motivation to respond to emergency vehicles and a low intention to cooperate.

Factor II - Attitudes, thoughts and beliefs.

The eight items in this factor represent an array of attitudes towards, and beliefs about, emergency vehicles and emergency services, which potentially influence participants' interpretations and response to emergency vehicle encounters. They provide a lens through which the participant appraises the encounter (Folkman et al., 2004; Lazarus, 2000; Lazarus & Folkman, 1984), in terms of the urgency of the event, the legitimacy of the reason for undertaking the emergency driving and of the service associated with the vehicle. The perceived legitimacy influences participants' willingness to comply with the laws associated with responding to the emergency service (Tyler, 2004, 2006, 2012) and how important it is for motorists to respond to emergency vehicles. A high score on this factor reflects that

respondents' attitudes, thoughts or beliefs surrounding emergency vehicles were positive. Conversely, a low score indicates they hold negative beliefs about emergency vehicles.

Factor III - The experience of encountering and EV.

The four items in this factor measure the participants' assessment of the stressfulness of emergency vehicle encounters and their ability to cope. This is associated with the appraisal process undertaken in the transactional model of stress and coping where the participant determines whether the situation is benign, challenging or stressful (Folkman et al., 2004; Lazarus, 2000; Lazarus & Folkman, 1984). The perception of their competency or self-mastery to respond effectively to the situation reflects a facet of the concurrent appraisal process during which the participant considers the coping strategies available to them to respond in an encounter (Folkman & Lazarus, 1988; Folkman & Moskowitz, 2000; Glanz & Schwartz, 2008; Lazarus & Folkman, 1984; McHaffie, 1992). The item is reverse scored, so a lower score on this factor indicates that the respondent perceives the encounter to be a stressful event and/or was uncertain of motorists' ability to respond effectively. A higher score indicates the respondent does not perceive the encounter to be difficult or stressful and they are confident of their ability to respond effectively.

Factor IV - Association with emergency services.

The four items in this factor assess the effects of any associations that participants have with emergency services through past use of the service, association with a service member, or through their own membership in an emergency service. Responses to this factor highlight the effect of priming or exposure to the emergency vehicles, which potentially influence how quickly they perceive the emergency vehicle (Bornstein, 1989; Zajonc, 2001) and their affective response to the encounter. A higher score on this factor indicates a greater influence of prior associations upon the encounters.

Factor V - Beliefs about punishment.

This factor contains two items that measure the participants' views on punishment for drivers who failed to give way to an emergency vehicle. These items reflect their views on the appropriateness of punishment for drivers, which potentially reflect their views on perceived legitimacy of the law (Tyler, 2006) and of the associated emergency service. A higher score on this factor indicates the respondents' belief that punishment is appropriate for drivers who fail to respond appropriately to an emergency vehicle.

Temporal validity assessment

The final evaluation undertaken during this administration of the Revised REVS was an assessment of its temporal validity. To facilitate this, a convenience sample was sought from within the student population at Edith Cowan University by canvassing a fourth year psychology class and higher degree by research students. This resulted in 31 Western Australian motorists completing the Revised REVS. A four-week period was allowed to lapse then left before the participants were canvassed again. This was considered sufficient to minimise the risk of actual changes in skill or ability, yet minimise effects from the earlier testing. The subsequent canvas of the participants resulted in 20 students completing the survey a second time. This sample size was limited by the low response rate but considered sufficient for the assessment.

Analysis.

To facilitate the comparison, the individual factor scores were summed for each participant and administration. Correlational analyses and paired-samples t-tests were then conducted to compare the factors scores from the first and second administrations of the REVS. This revealed no significant differences between the scores, with the results as presented in Table 10. It was therefore concluded the scale had demonstrated good temporal reliability.

Table 10

Correlations and Paired Sample T-tests of Factor Scores in the First and Second Administrations of the Revised REVS

Factor	Test One		Test Two		Correlation		t	Sig.
	M	SD	M	SD	Pearson R	Sig		
Reasons for Responding	38.85	1.90	38.60	2.42	.74	.00	.69	.50
Attitudes, Thoughts and Beliefs	13.45	4.05	13.55	4.16	.80	.00	-.27	.79
The Experience of Encountering an EV	39.30	5.67	39.20	4.44	.92	.00	.15	.88
Prior Exposure	9.65	5.43	9.95	5.40	.83	.00	-.43	.68
Beliefs about Punishment	8.95	2.28	8.95	2.14	.85	.00	.00	1.00

Summary

This chapter reported on the second administration of the developing REVS. The administration and subsequent testing resulted in the reduction of the scale to the Final REVS containing 25 items and five factors. The Driver Social Desirability Scale was also administered in conjunction with the Revised REVS to assess the items for their susceptibility to socially desirable responding. It revealed that there were no significant correlations between the DSDS and the scale items, other than those that could be expected because of the nature of the items. Finally, the Revised REVS was administered to a sample of motorists, on two separate occasions to assess temporal validity and it was found that the items remained strongly correlated (.75 to .92), with no significant difference, confirming that the REVS had good temporal validity. The following chapter reports on the administration of the Final REVS to assess its revised structure, and the concurrent administration of other scales and items to assess its convergent validity, discriminant validity, and concurrent validity.

CHAPTER EIGHT: Testing the Final REVS with Comparable Scales

This chapter details the completion of the structural validity phase of scale development through the testing of the Final REVS on a sample of motorists drawn from the broader Western Australian community. It also reports on the final external validity phase whereby the REVS was assessed against other variables for concurrent validity. It was also assessed against other scales, administered in conjunction with the Final REVS, to assess convergent and discriminant validity.

The preceding chapters reported on the successive testing and refinement of the REVS, which resulted in the development of the Final REVS. This chapter reports on the administration of the Final REVS, which concluded the substantive validity phase. It also reports on the third phase of scale development, which assessed the scale's external validity. In this phase, convergent, discriminant and concurrent validities were assessed. The administration of the Final REVS occurred concurrently with other measures, intended to assess the convergent and divergent validity. Lastly, concurrent validity assessments were undertaken to orient the scale within the existing body of knowledge.

Participants

Participants for this administration were recruited throughout the Western Australian community using flyers, emails and social media messages disseminated through community boards, interest groups, electronic notice boards and social media. This resulted in 556 respondents of whom six did not agree to the conditions of the survey, five were under 18 years, 12 reported that they did not drive on Western Australian roads, 13 had not driven in the last year, and 77 did not complete the REVS survey component. The remaining 443 data sets were suitable for analysis, which was sufficient to undertake the planned assessments. Notably some participants were drawn from the same population as used in Chapters 6 and 7, and due to the anonymity provided to respondents, it was not possible to determine whether participants in this chapter also completed the earlier surveys. However, this survey was administered four months after the second survey and all three survey took place in semesters.

Materials

Participants were recruited using flyers (Appendix Q), emails (Appendix S), social media posts (Appendix T) and online advertisements (Appendix P). The flyers and electronic messages invited participation in the research, provided either a hyperlink or shortened URL to the Qualtrics (2013) based survey with concurrent assessments of Prosocial Driving Scale

(Spolander, 1983), Driving Skills Inventory (Lajunen, Corry, Summala, & Hartley, 1998), Skepticism in Advertising (Obermiller & Spangenberg, 1998) and Attitudes Towards Older Workers Scale (Gringart, Helmes, & Speelman, 2013) (Appendix U), and provided contact details for the principal researcher should they wish for further information prior to accessing the survey. The communications also advised the participant of the opportunity to win one of six $50 fuel vouchers.

Procedure

The participants were recruited using the marketing materials described in the preceding section. The materials were circulated for one month, or until a minimum 300 responses were obtained, after which the advertisements were withdrawn and the survey link was closed.

Upon accessing the survey link, participants were taken directly to the Qualtrics survey. The first page provided further information on the survey, and their agreement to the conditions was sought before they could continue. After completing screening questions for age and driving habits, participants who were over 18 and drove on Western Australian roads proceeded through the survey. The screening and demographic items appeared in set order at the beginning and end of the survey, and the driving scenario questions were presented in one block towards the end of the survey. At the completion of the collection period, the data were migrated into IBM statistical software package, SPSS 22. The details provided for the lottery were separated from the data sets and the draw was conducted using an independent Edith Cowan University staff member.

Analysis

A review of participants revealed demographics, as provided in Table 11, from which, it could be ascertained that, consistent with the previous samples, the majority of participants drove almost daily on metropolitan roads, obtained their motor driver's licence in Western

Australia, and had never been a member of an emergency service. Prior to any further analyses, the data were reviewed for accuracy and omissions, the driving scenarios were converted to a composite score out of 84, and concurrent measures were summed in accordance with their literature.

Table 11

Participants for Assessment of Final REVS

Participant Demographics	Male	Female	Unspecified
	147 (33.18%)	295 (66.59%)	1
Range	18 to 79 years	18 to 83 years	18 years
	M=35.17, *SD*=15.22	*M*=33.47, *SD*=12.28	
Driving Experience	Less than 1 year to 62 years, (*M*=15.88 years, *SD*=13.22)		
Road Type	Urban roads	298	(72.86%)
	Rural roads	54	(13.20%)
	Both rural and urban roads	57	(13.94%)
Driving Frequency	Drove daily or nearly every day	373	(91.20%)
Crash Involvement	No crash involvement	172	(38.83%)
	Crash within previous year	41	(9.26%)
	Within previous 5 years	82	(18.51%)
	Within previous 10 years	46	(10.38%)
	Over 10 years	102	(23.02%)
First Obtained Driver's Licence	Western Australia	362	(81.72%)
	Another state or territory	33	(7.45%)
	Overseas	48	(11.25%)
Driving Tuition	Driving instructor	197	(44.47%)
	Family member	166	(37.47%)
	Other sources	15	(3.39%)
	Multiple sources	65	(14.67%)
Association with Emergency Services	Current member	54	(12.19%)
	Past member	35	(7.90%)
	Multiple associations	21	(4.74%)
	No membership	333	(75.17%)
	No association with ES	98	(23.96%)

Exploratory Factor Analysis.

Consistent with the analyses conducted on the previous chapters, Principal Components Analysis was undertaken to assess the underlying factor structure. This was used in preference to a confirmatory factor analysis as it was an intentional replication of the

previous analyses and ensured that artificial limitations were not created through a failure to explore alternative factor models (Field, 2009).

Prior to undertaking the analysis, the data were screened for compliance with the assumptions of normality, linearity and for outliers (Tabachnik & Fidell, 2007). Distributions of the variables were examined for skewness and kurtosis. Some were found to be skewed (negatively and positively) and some exhibited non-normal distribution, however, no transformation or deletion was undertaken at this time. It was acknowledged that the violation of this assumption may limit the analysis by lowering the correlations. Whilst linearity could be viewed through pairwise scatterplots, this was impractical. It was accepted that the skewness of some factors would result in violations of linearity; however, no transformation was undertaken, because data reflected actual views and beliefs and that it remained more important to be true to the concept.

The identification of multivariate outliers was done through the calculation of Mahalanobis distance. This revealed that 34 (7.67%) of the cases had a score greater than the critical x2 value of 52.62, which was set for 25 variables at .001 level. As this represented more than 5% of the total cases, they were removed from further analysis. Mahalanobis distance was recalculated with the remaining cases and it was found that 20 (4.89%) were greater than the cut off score. As this represented less than 5% of the remaining 409 cases, they were not removed.

Principal Components Analysis.

PCA was calculated on the 25 variables with the remaining 409 cases. To determine the number of factors that would provide greatest utility, a combination of Kaiser's criterion method and scree plot was used (Stevens, 2009). Using an eigenvalue of 1.0 (Stevens, 2009) to determine the number of factors suggested a 7 factor model, whilst a review of the scree plot (Figure 3) suggested a three factor model. To assess which model was most suitable, a

seven factor model was first calculated and found to contain three factors of two to three variables. A three factor model incorporated 16 variables within the first factor. Four, five and six factor models were then calculated to determine which model gave the best interpretation of the data. After reviewing the respective factors and their component variables, it was determined that a five factor model again provided best representation of the data.

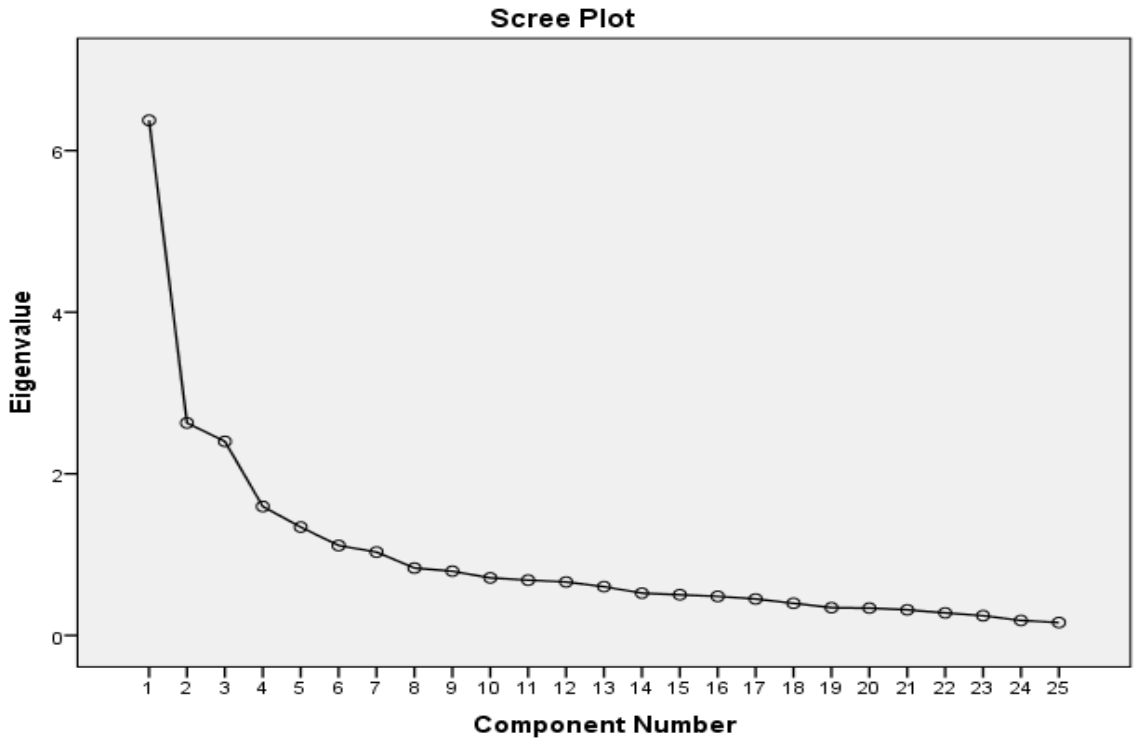


Figure 3 - Eigenvalues Scree Plot for the 25 Variables of the Final REVS

The PCA was then run again with five factors and a variable retention level set at .3. A variety of orthogonal rotation methods were used (varimax, equimax and quartimax) as it was theorised the factors were uncorrelated (Kline, 2011). It was found that quartimax again produced the model that gave greatest explanation and clarification to the variables. The resultant model (Table 12) exhibited a Kaiser-Meyer-Olkin (KMO) sampling adequacy of .841, Bartlett's test of sphericity was statistically significant (p = .000), and the model explained 57.37% of the total variance.

Table 12

Factor Loadings for PCA with Quartimax Rotation of Final REVS Items

	Component				
	1	2	3	4	5
3 I give way to EVs because it is the right thing to do	**.81**				
1 It is important for drivers to give way to EVs	**.76**				
2 Someone's life may be at risk if the EV is delayed	**.73**				
7*I don't give way to EVs	**.56**	.31			
6 I always respond appropriately to an EV	**.56**			.42	
4 It does not matter where the EV is going… it must be important	**.50**	.38			
8 I give way to EVs because it is my civic duty	**.46**	.37			
5*EVs use their lights and siren too much		**.73**			
20*Sometimes, EVs use their lights & siren just to get through traffic		**.73**			
14*Emergency driving creates an unacceptable risk to road users		**.68**			
10 Emergency service drivers act safely when driving …	.38	**.65**			
9 Emergency services drivers are properly trained …	.41	**.50**			
22 I could never imagine the EV crew doing the wrong thing		**.48**			
17*An EV is not in a hurry if … not sounding a siren		**.40**			
12 I give way to EVs because it is common courtesy					
26 When I see an EV, it makes me think … used … for someone else			**.87**		
31 When I see an EV, it makes me think ... own experiences …			**.87**		
24 When I see an EV, it makes me think … used … for myself			**.85**		
28 When I see an EV, it makes me think … person that I know			**.73**		
25*Encountering EVs is stressful				**.90**	
29*Responding to an EV makes me feel anxious				**.89**	
21*Responding to EVs is difficult				**.70**	
11 I feel confident in my ability to respond to EVs	.40			**.66**	
15 If a driver has the room to move … they should be punished					**.83**
18 Drivers should get punished for failing to give way to an EV	.31				**.81**

Note: * Item is reverse scored. Boldface factor loadings indicate inclusion within the factor.

As indicated in Table 12, the Final REVS data set produced the same factor set at the Revised REVS data set, with the exception of one item in factor I ("I give way to emergency vehicles because it is common courtesy"). This item failed to produce a loading on any factor that was greater than .3. However, by comparison, it produced factor loadings of .54 and .65 in the principal components analyses for the Preliminary REVS and Revised REVS data sets respectively. A review of the data from the three sets was undertaken for that variable (Table 13), but other than the potential influence of zero participants selecting strongly disagree in

the final REVS, it did not identify why the variable did not load onto the factors as it had previously. However, it was retained due to the variable's utility in the previous models.

Table 13

Comparison of Item 'I give way to emergency vehicles because it is common courtesy' Within the Three Data Sets

	Preliminary REVS Data		Revised REVS Data		Final REVS Data	
Mean	5.37		5.27		5.42	
Std. Deviation	.99		.99		.92	
Minimum	1		1		2	
Maximum	6		6		6	
Response Frequency	N	%	N	%	N	%
• Strongly Disagree	3	0.92	1	0.28	0	0.00
• Disagree	9	2.77	14	3.93	13	3.18
• Somewhat Disagree	6	1.85	5	1.40	5	1.22
• Somewhat Agree	20	6.15	29	8.15	31	7.58
• Agree	95	29.23	125	35.11	110	26.89
• Strongly Agree	192	59.08	182	51.12	250	61.12

To assess the Final REVS' internal consistency, Cronbach's alpha scores were calculated for the overall scale and individual factors. The REVS demonstrated satisfactory internal consistency with α=.83 and the subscales ranged from α=.71 to α=.89 (Table 14).

Table 14

Cronbach's Alpha Scores for Final REVS and Subscales

Scale – Subscale (number of items)	α
REVS (25 items)	.83
Reasons for responding to emergency vehicles (7 items)	.71
Attitudes and beliefs about emergency vehicle (8 items)	.74
The experience of encountering an emergency vehicle (4 items)	.83
Associations with emergency services (4 items)	.86
Beliefs about punishment (2 items)	.89

With the completion of these analyses, the structural validity of the REVS has been established. The final phase in the scale development was then the establishment of its external validity (Simms & Watson, 2007). This incorporated an assessment of the REVS'

convergent validity, discriminant validity and concurrent validity to determine its congruence with the existing body of knowledge and to give support to its inferential ability (Simms & Watson, 2007).

Scoring of the factors and overall scale.

The five factors within the REVS were each conceptually meaningful and collectively assessed the phenomenon of encountering an emergency vehicle. To reflect this, each factor was scored as a sum of its variables and all the factors were summed to form an overall score for the REVS.

Factor I – Reasons for Responding to an emergency vehicle provided a score ranging from seven to 42. A high score on this factor indicated a prosocial intention or motivation to facilitate the passage of emergency vehicles. A low score in this factor reflected a lack of motivation to respond to emergency vehicles and a lack of cooperation. Item 7 (I don't give way to emergency vehicles) was scored in reverse to reflect the lack of prosocial intention.

Factor II – Attitudes, thoughts and beliefs associated with emergency vehicles. The sum of this eight item factor produced a score ranging from eight to 48. A high score on this factor reflected that respondents' attitudes, thoughts or beliefs surrounding emergency vehicles were positive. Conversely, a low score indicated they held negative or inaccurate beliefs about emergency vehicles. Items 5, 14, 17 and 20 (Emergency vehicles use their lights and sirens too much/Emergency driving creates an unacceptable risk to road users; An emergency vehicle is not in a hurry if it is flashing its lights but not using its siren; Sometimes emergency vehicles use their lights and sirens to move through traffic, they're not going to an emergency) were scored in reverse to reflect the negative or inaccurate attitude, thought or belief.

Factor III – Association with emergency services resulted in a sum of scores ranging from four to 24. All items represented the influence of prior associations with emergency

services that might occur when encountering emergency vehicles. A higher score on this factor indicated a greater influence of prior associations upon the encounters.

Factor IV - The experience of encountering an emergency vehicle factor produced a score ranging from four to 24. A lower score on this factor indicated that the respondent perceived the encounter to be a stressful event and/or were uncertain of motorists' ability to respond effectively. A higher score indicated the respondent did not perceive the encounter to be difficult or stressful and they were confident of their ability to respond effectively. Within this factor, items 21, 25 and 29 (Responding to emergency vehicles is difficult; Responding to emergency vehicles is stressful; Responding to emergency vehicles makes me feel anxious) were reversed scored, and reflect negative perceptions given to the encounter and their ability to respond effectively.

Factor V – Beliefs about punishment provided a score ranging from two to 12. A higher score on this factor indicated the respondents' belief that punishment was appropriate for drivers who failed to respond appropriately to an emergency vehicle.

Convergent and Discriminant Validity

Assessment of the REVS' convergent and discriminant validity was undertaken using a multi-trait-multi-method-matrix (Simms & Watson, 2007). This involved the administration of the REVS in conjunction with multiple measures that were either conceptually related, or unrelated, to the REVS. The results of each scale were then correlated to identify areas of convergence and divergence.

Participants.

The participants for this procedure were those reported in Chapter Eight. Of the 409 participants that were available for the preceding analysis, 347 had completed the Prosocial Driving Scale, 351 completed the Driving Skills Inventory, 342 completed the Skepticism

towards advertising and 315 completed the Attitude Towards Older Worker Scale. In total, 295 participants completed the REVS and all four of the comparative scales.

Materials.

To undertake the convergent and discriminant validity assessment, two scales were chosen that were considered to be related to the REVS and two were chosen that were considered to be unrelated to the REVS.

Convergent scales.

A review of the existing literature surrounding driving behaviour revealed numerous scales that measured various attitudes and behaviours related to driving. Whilst the REVS contained driving scenario questions that assessed driving behaviours relative to the Desired Response Model, its primary intention was to identify the psychological constructs associated with responding to emergency vehicles. Therefore, the selection of the related scales was based upon the underpinning psychological processes they were assessing. The processes identified in the REVS were prosocial intentions, attitudes, prior exposure, legitimacy of the law, stress related appraisals and perceptions of competency. Based on these constructs as they had emerged from the preliminary and revised testing of the REVS, the Prosocial Driving Scale (PDS) (Harris et al., 2014; Houston, Harris, & Norman, 2003), and the Australian version of the Driving Skills Inventory (DSI) (Lajunen et al., 1998) were chosen to assess concurrent validity.

The PDS is a subscale within the Prosocial and Aggressive Driving Inventory (Harris et al., 2014), developed to balance the predominately negative focus of driving scales. As its name suggests, it specifically considers motorists' prosocial behaviours and focuses on effective driving that assists motorists to drive safely and cooperate with others. This focus was considered to be consistent with the REVS, particularly the factor relating to why motorists responded to emergency vehicles.

Based on the premise that driving is a product of the driver's capacity to drive and how they chose to drive, the DSI (Lajunen & Summala, 1995) assesses the technical and defensive driving skills, which underpin driving capacity. The DSI assesses these skills relative to the driver's behaviour. Similarly, the REVS assesses the driver's capacity to drive effectively and their belief in their own ability. As such, the DSI was considered suitable for assessing the REVS' convergent validity.

Other scales were considered for comparison with REVS but found to be less suitable than the DSI and PDS. Some scales, such as Driving Behaviour Questionnaire (Parker et al., 1995), Driving Anger Scale (Deffenbacher et al., 1994), Driving Vengeance Questionnaire (Wiesenthal, Hennessy, & Gibson, 2000), Propensity for Angry Driving Scale (PADS) (DePasquale et al., 2001) and Australian PADS (Leal & Pachana, 2008), were specific to aggressive driving behaviours. The Driving Cognitions Questionnaire (Ehlers et al., 2007) assesses the fear of driving, whilst the Driver Behaviour Scale (Clapp et al., 2011) assesses anxious drivers. These scales were not selected as the factors they assess were not identified as factors associated with responding to emergency vehicles.

Prosocial Driving Scale.

The PDS (Harris et al., 2014) (Appendix V) is a subscale within the Prosocial and Aggressive Driving Inventory (PADI) that was created to expand on existing scales. The focus of these existing scales had been factors associated with risky or adverse driving, such as aggression, anger, vengeance distraction, stress anxiety and risk taking. Whilst they were useful, their predominately negative focus failed to consider more effective behaviours that assisted motorists to drive safely and avoid crashing.

The PADI builds upon the framework of the Aggressive Driving Behaviour Scale (Houston et al., 2003) by adopting its definition for aggressive driving as being "a pattern of unsafe driving behaviour that puts the driver and others at risk" (Houston et al., 2003, p. 270).

It then defines prosocial driving as a "manner of driving that ensured the safety of the motorist, passengers and other road users, and promoted cooperation with the driving environment" (Harris et al., 2014, p. 2). Using these definitions, the PADI incorporates two subscales being Prosocial Driving Scale (PDS) and Aggressive Driving Scale (ADS). These contain items which measure the frequency of aggressive or prosocial driving behaviours. Whilst the PADI does not explore the motivations and intentions behind the behaviours, the PDS is consistent with the REVS in that it seeks to measure factors associated with effective responding/driving.

The PDS contains 17 items covering a range of situations that require motorists to behave prosocially in order to drive safely and facilitate traffic flow (Harris et al., 2014). The items are declarative statements and a six point Likert (1932) type scale (*never* to *always*) is used to record responses. Participants are asked to indicate how often they engaged in each of the prosocial driving behaviours. The PDS is also suitable for the medium used to deliver the REVS as it has been assessed in multiple mediums and found suitable for electronic administration (Harris et al., 2014).

Driving Skills Inventory.

Driving is considered to be a combination of the driver's skill or capacity to drive, and the driver's style (how they chose to drive) (Elander, West, & French, 1993). Driving skill includes motor skills, defensive skills, and information processing skills. To assess these skills, Spolander (1983) created the Driving Skills Inventory (DSI). The DSI was initially a self-report measure whereby motorists compared their skills to others, however, this was changed to a general assessment of their own skill when subsequent research found that motorists frequently overestimated their driving ability relative to other drivers (Groeger & Brown, 1989; Groeger & Grande, 1996). Subsequent refining of the instrument resulted in the development of the 29 item Driving Skill Inventory (Lajunen & Summala, 1995).

The DSI was considered suitable for assessing the REVS' concurrent validity as it has been used in a variety of cultural settings (Özkan, Lajunen, Chliaoutakis, Parker, & Summala, 2006; Warner, Ozkan, Lajunen, & Tzamaloukas, 2013). It was translated into a number of languages (Bener, Razzak, Crundall, & Allen, 2014; Martinussen, Møller, & Prato, 2014) and items had been added or removed in accordance with their relevance to the culture or environment. Within Australia, Lajunen et al. (1998) developed a 28 item scale by omitting an item that related to vehicle safety in colder climates.

Generally, the DSI's focus on assessment of driving skills relative to reported behaviour makes it suitable for undertaking convergent validity assessment of the REVS. The Australian version of the DSI (Appendix W) includes a variety of driving situations and the motorist is asked to report on a five point Likert (1932) type scale how well they perform in those situations. The response sets range from *well below average* (0) to *well above average* (4). The scale could be separated into subscales for Perceptual-Motor skills and safety skills, or calculated as a total sum of scale, with scores ranging from zero to 112.

Divergent scales

The discriminant validity of the REVS was assessed through the concurrent administration of two scales that were considered to be theoretically unrelated to the REVS. The scales chosen for this assessment were the Skepticism in Advertising (SKEP) (Obermiller & Spangenberg, 1998) and the Attitudes towards Older Workers (AOWS) (Gringart et al., 2013).

Skepticism in Advertising (SKEP).

The SKEP (Appendix X) is a nine item scale that assesses attitudes towards advertising (Obermiller & Spangenberg, 1998). It is scored with a five point Likert (1932) type scale ranging from *strongly agree* to *strongly disagree*. The items are presented in a

predetermined order as guided by the literature (Obermiller & Spangenberg, 1998, 2000) and total score for the scale is calculated as a sum of the individual items, ranging from 9 to 45.

Attitudes towards Older Workers Scale (AOWS).

The AOWS (Appendix Y) was developed to assess attitudes towards older workers. It contains 28 declarative statements about the characteristics of older workers, compared with younger workers. Participants are asked to indicate their views on these characteristics by using a seven point Likert (1932) type response set ranging from negative to positive (i.e. *far less* to *far more*, and *not at all* to *certainly).* The overall score for the scale is calculated as a sum of the individual items, and the score ranges from 28 to 196 (Gringart et al., 2013).

Procedure.

The convergent and divergent scales were administered in conjunction with Final REVS reported in chapter eight. After the participants had completed the REVS and Desired Response Model questions, they were asked to complete the two convergent and two divergent scales. Qualtrics randomised the scale sets so that the participant would have either received the divergent scales first, or the convergent scales first. The two scales within the groups were then presented randomly, thus maximising the likelihood of an even distribution of participants should they become fatigued and quit prior to completing all scales.

Analysis.

The sum of scale for each convergent and divergent scale was calculated in accordance with their associated literature, and compared with the overall sum of scale of the REVS. The Pearson correlation coefficients for the scales (Table 15) revealed a small to negligible, yet significant, correlation between the REVS and the two convergent scales (PDS .218 p=.000 and DSI .321, p=.000) demonstrating a shared variance of 4.75% and 10.30% respectively. The divergent scale SKEP was not significantly correlated with the REVS (.097, p=.075) and share variance of

0.94%. The AOWS demonstrated a small, yet significant correlation (.116, p=.039) and a shared variance of 1.35%. The statistical significance of such low correlations is due the relatively large sample.

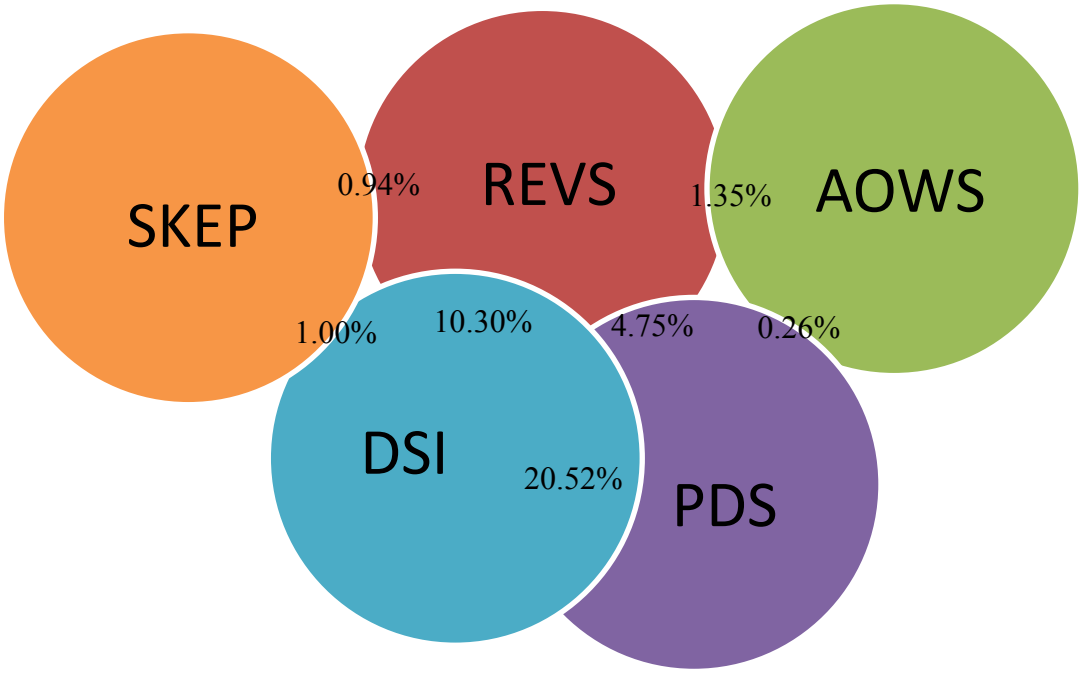
Table 15

Pearson Correlation Coefficients for Convergent and Divergent Scales and REVS

	N*	Pearson R	Sig.
Divergent Scales			
Skepticism in Advertising Scale (SKEP)	342	.097	.075
Attitudes towards Older Workers Scale (AOWS)	315	.116*	.039
Convergent Scales			
Prosocial Driving Scale (PDS)	347	.218**	.000
Driving Skills Inventory (DSI)	351	.321**	.000

* Calculated using data sets that had completed the individual scales

Most of the correlations, as shown in Figure 4, were as expected, although relatively small. However, the small but significant correlation between the AOWS and the REVS prompted further scrutiny. To further assess the differences between the correlations, a test was undertaken to determine their equality (Lee & Preacher, 2013). The correlation coefficients were calculated again using the participants who had completed all convergent and discriminant scales. The differences between the correlation coefficients computed for each of the scales relative to the REVS, were converted to z scores, and a calculator was used to compute an asymptotic z-test. The results and their significance are shown in Table 16



Note: Explained variance only shown for R^2>0.2%

Figure 4 - Venn Diagram Depicting Shared Explained Variance (R2)

Table 16

Comparison of Pearson Correlation Coefficients for Convergent and Divergent Scales

	Pearson R*	SKEP Z score (sig)	AOWS Z score (sig)	PDS Z score (sig)	DSI Z score (sig)
Skepticism in Advertising Scale (SKEP)	.046		-0.90 (.37)	-2.09 (.04)	-3.93 (.00)
Attitudes towards Older Workers Scale (AOWS)	.120	-0.90 (.37)		-1.19 (.24)	-3.01 (.00)
Prosocial Driving Scale (PDS)	.216	-2.09 (.04)	-1.19 (.24)		-1.81 (.07)
Driving Skills Inventory (DSI)	.356	-3.93 (.00)	-3.01 (.00)	-1.81 (.07)	

* Calculated using the 295 data sets that had completed all scales

This calculation revealed the DSI was significantly different from both divergent scales (SKEP and AOWS). The SKEP was significantly different from both convergent scales (PDS and DSI). The AOWS was significantly different to the DSI, but not the PDS.

This association between the PDS and AOWS was similar to the association between the AOWS and the REVS, suggesting that there was an unanticipated effect from the social values orientation of the scales. Thus, allowing for the effect of this common focus, the results of the divergent scales were very low as expected. Additionally, the small yet statistically significant associations between the convergent scales and the REVS (Figure 4) indicated that the REVS scale was consistent with other driving scales, yet conceptually different, supporting the need for the new scale.

Criterion Related Validity

The final assessment in the establishment of the REVS was an assessment of its criterion related validity. This involved the assessment of the scale against non-test variables that were relevant to the construct (Simms & Watson, 2007). Whilst criterion related validity could incorporate concurrent validity and predictive validity (Lajunen & Özkan, 2011), only concurrent validity was assessed at this time. Predictive validity requires assessment of the scale against criterion collected in the future. As such, it was beyond the scope of the current research.

Concurrent measures.

Assessment of the REVS' concurrent validity was undertaken by testing the scale against variables collected at the same time as the REVS data. These variables were items considered to be related to the overall construct of responding to emergency vehicles and they included individuals' perceptions of emergency services, their reported prior associations with emergency services, their understanding of what vehicles could be emergency vehicles and how they identified emergency vehicles. The purpose of establishing the scale's criterion related validity was to assist in determining its place within the existing body of knowledge and to give support to its inferential ability (Simms & Watson, 2007). Whilst assessments of

predictive validity were omitted from this phase, the concurrent validity assessments were sufficient to establish the REVS within the existing body of knowledge.

Associations with emergency services (REVS-Associations).

Prior association with emergency service was identified as a factor related to the phenomenon of responding to emergency vehicles. This included knowing someone in an emergency service, being associated with an emergency service or having used an emergency service in some way. During the administration of the REVS, motorists were asked to report on their involvement with an emergency service. The associations with emergency services, and recalling those associations when encountering an emergency vehicle, was theorised as being related to motorists' reports of knowing emergency service personnel or having been a member of an emergency service organisation.

Independent sample t-tests were calculated to compare individuals who had a prior association with an emergency service to individuals who did not. An independent samples t-test was conducted to compare REVS-Associations for individuals who reported being associated with an emergency service person (Associated) to individuals who did not report an association to an emergency service (Not associated). There was a significant difference in the scores for Associated (M= 10.99, SD=4.87) and Not Associated (M= 7.78, SD=3.95) conditions; t(1088)=-10.28, p=.000.

A similar result was found when considering individuals' own membership in an emergency service. An independent samples t-test was conducted to compare the *REVS-Associations* score for individuals who were members of an emergency service (Member) and individuals who were not a members of an emergency service (Non-member). There was a significant difference between the score for Member (M= 12.78, SD=4.97) and Non-member (M= 9.37, SD=4.55) conditions; t(1088)=-9.95, p=.000. Overall, individuals who reported an association with an emergency service (personnel or use of service) also reported thinking of

their association more than individuals who did not report an association with an emergency service.

The experience of encountering and emergency vehicle (REVS-Experience).

Evaluations of the experience of encountering an emergency vehicle and perceptions of self-mastery combined to be a factor associated with the phenomenon of encountering an emergency vehicle. Both mere exposure effect (Bornstein, 1989; Moreland & Topolinski, 2010; Zajonc, 1968) and the model of stress and coping (Lazarus & Folkman, 1984) purported that prior exposure to a stimuli influenced subsequent exposure to the stimuli through cognitive processing and affective appraisal. Exposure creates a familiarity that increases cognitive processing speed and is associated with more positive affect. It also reduces the novelty of the situation, thus increasing likelihood of a more positive appraisal as to its stressfulness and motorists' ability to respond appropriately. As such, motorists with greater prior exposure to emergency services, through their own membership or knowing a member, ought to score higher on the *REVS-Experience* factor than motorists who do not report a prior association with an emergency service. This was assessed by determining whether being associated with an emergency service was significantly different experience in any way, or whether knowing someone associated with an emergency service was significantly different.

An independent samples t-test was conducted to compare *REVS-Experience* for participants who reported an association with emergency service personnel (Associated) to participants who did not report an association with emergency service personnel (Not Associated). There was a significant difference in the scores for Associated (M= 17.15, SD=3.95) and Not Associated (M= 15.86, SD=4.09) conditions; t(1088)=-10.28, p=.000. An independent samples t-test was also conducted to compare *REVS-Experience* for participants who were a member of an emergency service (Member) and participants who had never been

a member of an emergency service (Non-member). There was a significant difference in the scores for Member (M= 18.66, SD=3.58) and Non-member (M= 16.28, SD=3.99) conditions; t(1088)=-8.26, p=.000. In both cases, participants who reported an association with an emergency service, through their own membership or by knowing a member, also reported a more positive experience and assessment of self-mastery when encountering an emergency vehicle.

It was theorised that motorists' involvement in motor vehicle crashes could influence their appraisal of a situation and their ability to cope. As such, the varying crash involvement is likely to exhibit a different *REVS-Experience* score, and the greater time since the crash should result in a higher *REVS-Experience* score. To assess this, a one way ANOVA was conducted to assess whether the different crash groups (never, less than one year, within five years, within 10 years, and over 10 years) differed in their *REVS-Experience*.

There was homogeneity of variances as assessed by Levene's test of equality of variances (p = .132). The *REVS-Experience* was found to be significantly different for the differing levels of crash involvement (F(4, 1089) = 8.342, p = .000). Figure 5 confirms that participants with more recent crash involvement rate the experience lower than participants whose crash involvement was longer ago. Post hoc analysis using Tukey's HSD tests showed that the statistically significant differences were found between participants who have never been involved in a crash (M=16.12, SD=4.01) and both participants who had been in a crash within the previous 10 years (M=17.57, SD=3.60), and over 10 years (M=17.87, SD=3.89).

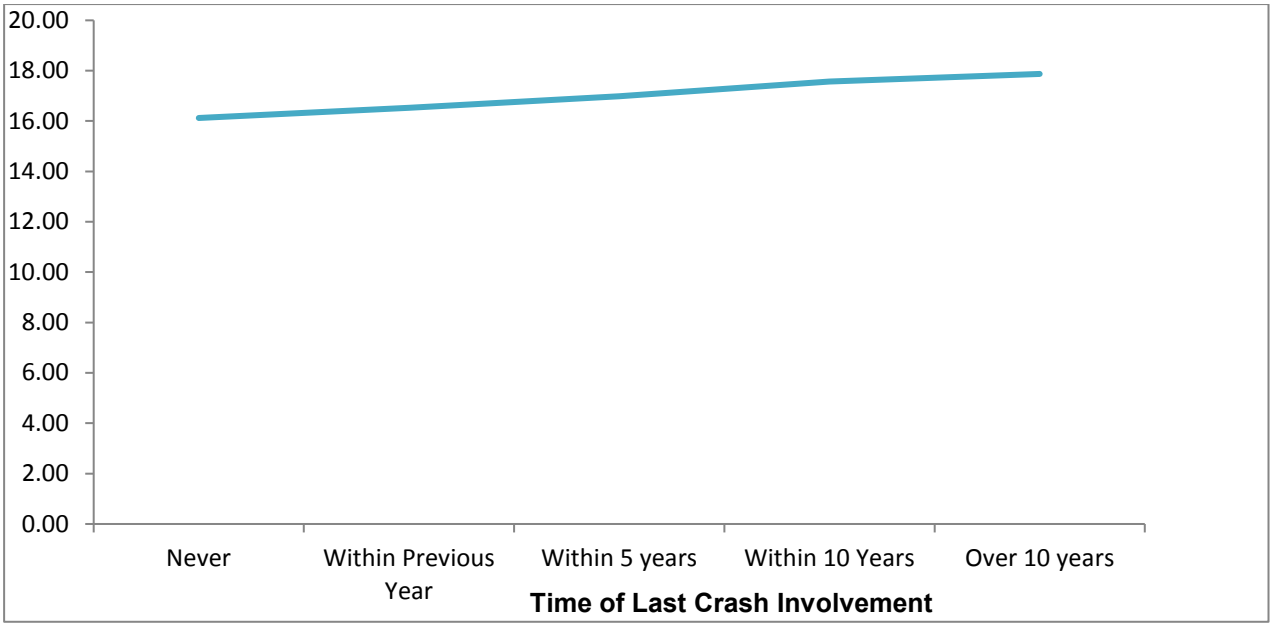


Figure 5 - The Experience of Encountering and Emergency Vehicle by Category of Crash Involvement

Reasons for responding to an emergency vehicle (REVS-Reasons).

Participants' reasons for responding to an emergency vehicle were found to be a factor associated with the phenomenon of encountering an emergency vehicle. They reflected motorists' prosocial intentions and the importance placed upon cooperating with emergency vehicles. Individuals' willingness to cooperate has been found to be an important factor for why people obey the law, and to organisations associated with the law, in that the organisations needed to be perceived to be legitimate in order to elicit cooperation. As such, participants' experiences with emergency services ought to be related to their prosocial intentions regarding emergency vehicles; the more positive the experience of the emergency service, the more likely the motorist will report an intention to cooperate. During the surveys, participants were asked to rate the prior experiences with emergency services, and these ratings should be positively associated with their intention to respond to emergency vehicles (*REVS-Reasons*).

REVS-Reasons scores ranged from 31 to 48 and only participants who reported a prior exposure were included in this assessment. Participants varied in their prior exposure to emergency services with 947 reporting experiences with police, 683 reporting prior experiences with fire services, and 870 reporting experiences with ambulance services. The relationship between *REVS-Reasons* and the experience scored was assessed by calculating and observing the Pearson correlation coefficients. This revealed a low, yet significant correlation with Police (.172, p=.000), Fire Service (.222, p=.000) and Ambulance (.223, p=.000) demonstrating a shared variance of 2.96%, 4.93% and 4.97% respectively. The below figures confirm the linear nature of the relationship for the emergency services (figure 6)

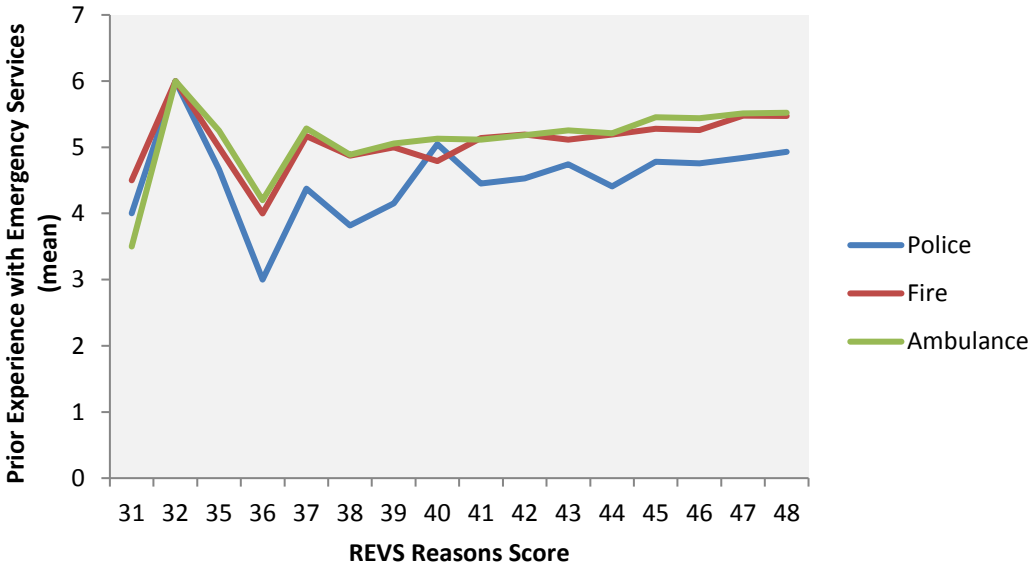


Figure 6 - The Relationship between Reported Experiences with Emergency Services and Reasons for Responding to an Emergency Vehicle

Attitudes, thoughts and beliefs surrounding emergency services (REVS-Attitudes).

Participants' attitudes and beliefs were found to be a factor associated with the phenomenon of responding to an emergency vehicle. Participants reported a range of beliefs about the emergency service, emergency vehicle, and the driver of the emergency vehicle.

Participants were asked to rate their experiences with emergency services (Police, Fire, Ambulance) and it was reasoned that their experiences ought to correlate with *REVS-Attitudes* score; more positive experiences ought to result in a higher score.

REVS-Attitudes scores ranged from 17 to 42 and participants varied in their prior exposure to emergency services with 947 reporting experiences with police, 683 reporting prior experiences with fire services, and 870 reporting experiences with ambulance services. The Pearson correlation coefficients were calculated to observe the relationship between *REVS-Attitudes* and the experience rating for Police, Fire and Ambulance. It revealed a small, yet significant, correlation between REVS-Attitudes and experience ratings for Police (.238 p=.000), Fire (.265 p=.000) and Ambulance (.243, p=.000) demonstrating a shared variance of 5.67%, 7.02% and 5.90% respectively. This indicated that motorists with more positive experiences of the three main emergency services reported more positive, attitudes and beliefs towards emergency services, emergency vehicles and their drivers. The below figures confirm the linear nature of the relationship for the emergency services (figure 7).

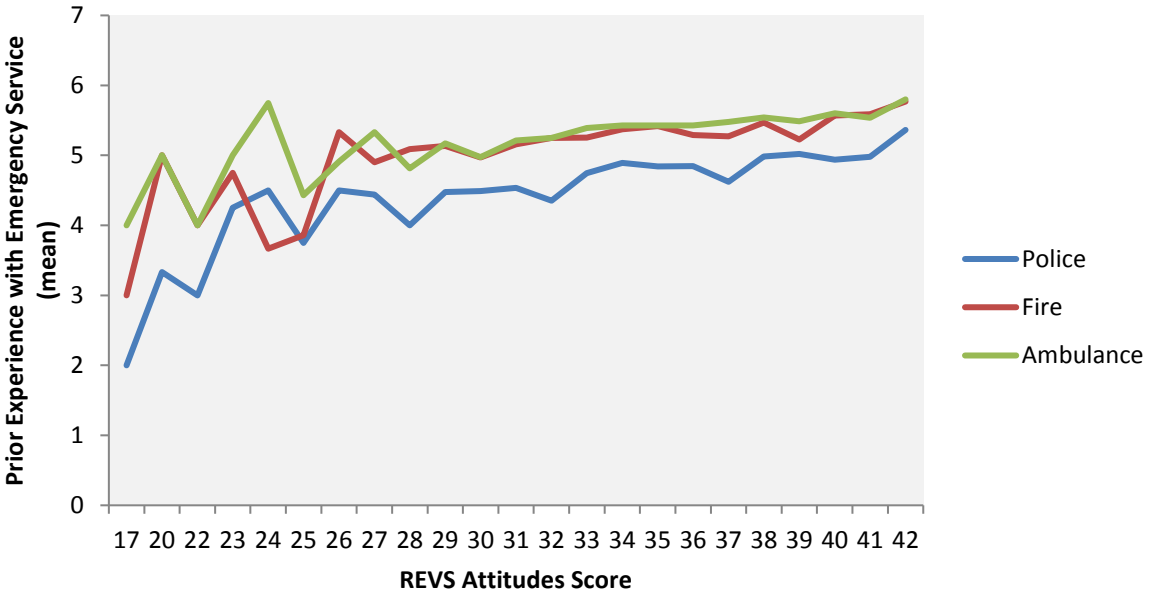


Figure 7 - The Relationship between Reported Experiences with Emergency Services and Attitudes, Thoughts and Beliefs surrounding Emergency Services

Beliefs about punishment (REVS-Punishment).

Participants' beliefs on the appropriateness of punishment for failing to respond appropriately to emergency vehicles (*REVS-Punishment*) was found to be a factor associated with the phenomenon of encountering an emergency vehicle. As discussed in the Reasons for Responding (*REVS-Reasons*), legitimacy of the law and the organisation associated with it was a factor when considering why people cooperated with the law. On this basis, the score for *REVS-Punishment* should have been associated with participants' perceptions of the emergency services; more positive perceptions should have correlated with greater belief in the appropriateness of punishment.

REVS-Punishment scores ranged from 2 to 12 and only participants who had reported a prior exposure were included in this assessment. Participants varied in their prior exposure to emergency services with 947 reporting experiences with police, 683 reporting prior experiences with fire services, and 870 reporting experiences with ambulance services. The Pearson correlation coefficients were calculated to determine the relationship between *REVS-Punishment* and the experience rating for Police, Fire and Ambulance. It revealed a negligible, yet significant, correlation between REVS-Attitudes and experience ratings for Police (.067 p=.039), Fire (.084 p=.028) and Ambulance (.104, p=.002) demonstrating a shared variance of 0.45%, 0.71% and 1.09% respectively. As such there was little relationship between beliefs about punishment and the reported experiences with the emergency services. Figure 8 further demonstrates the interaction between the two.

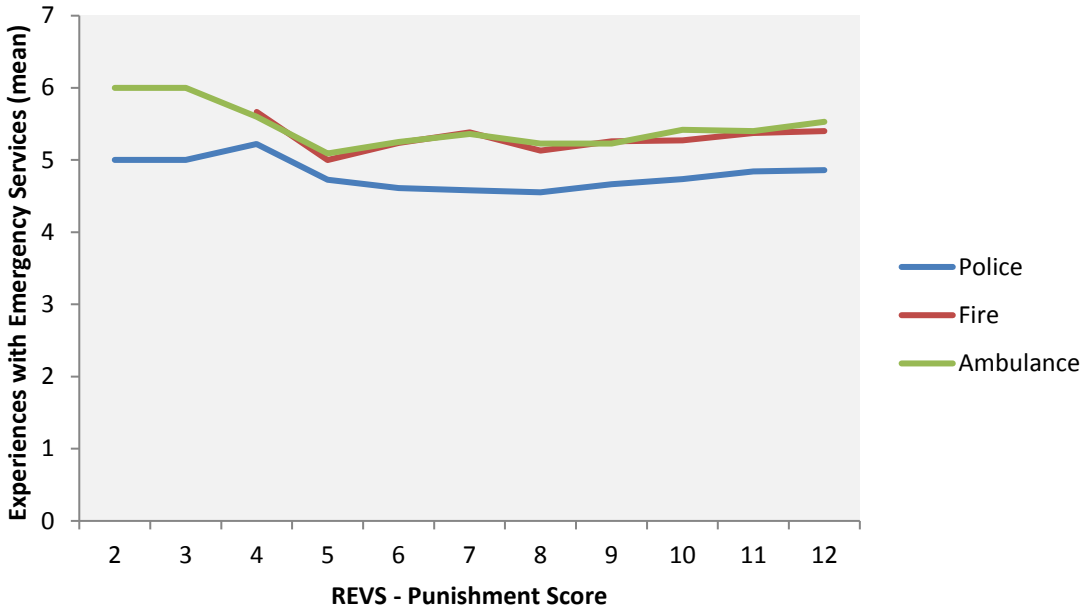


Figure 8 –The Relationship between Reported Experiences with Emergency Services and Beliefs about Punishment

Summary

This chapter reported on the third administration of the REVS, which resulted in the completion of the structural validity phase. It also reported on the final external validity phase in the development of the REVS as required by the construct validity approach to scale development (Simms & Watson, 2007). The scale was administered concurrently with two scales considered to be theoretically related to the REVS and two scales considered to be unrelated to the REVS. The two related scales; Prosocial Driving Scale (PDS) and the Driving Skills Inventory (DSI) were found to have a low but significant correlation with the REVS. The unrelated Skepticism in Advertising (SKEP) demonstrated no significant correlation with the REVS, whilst the unrelated Attitude towards Older Workers Scale (AOWS) demonstrated a small, yet significant correlation with the REVS. Further analysis suggested this correlation arose from the AOWS and REVS both having a social value orientation. As such, after allowing for the effect of this common orientation, the results of the divergent scales were very low and sufficiently distinct from scales that were unrelated to

the central construct. The small yet statistically significant associations found between the REVS and the convergent scales indicated that the REVS scale was consistent with other driving scales, yet sufficiently conceptually different to support the need for the new scale.

The criterion related validity of the REVS was established by assessing the scale against other, non-test variables. This established correlations between motorists' associations with emergency services (through membership in an emergency service or knowing an emergency service member) and the factors of REVS-Associations and REVS-Experience. Both factors demonstrated a significant association whereby motorists who were associated with emergency services scored higher than motorists who had no association with an emergency service. This also established a statistically significant correlation between participants' perceptions of the emergency services and the factors of *REVS-Reasons* and *REVS-Attitudes* and *REVS-Punishment*. Participants who reported more positive perceptions of the emergency services also reported more positive attitudes and beliefs and placed greater importance on responding appropriately to an emergency vehicle.

Overall, the REVS was established as a valid scale for assessing psychological factors associated with motorists responding to emergency vehicles as sufficiently associated with related items as to establish itself within the existing body of knowledge. The following chapter assesses the correlation between the REVS and its subscales, reported driving responses to emergency vehicles and demographic factors.

CHAPTER NINE:Discussion – Answering the Research Questions

In this chapter, the data collected with the REVS and ancillary questions, are used to answer the following research questions:

* What is an effective response to an emergency vehicle?
* What are the psychological processes involved with motorists' responses after detecting an emergency vehicle?
* What psychological factors facilitate or hinder Western Australian motorists' effective responding to an emergency vehicle?
* What other factors are associated with Western Australian motorists responding to emergency vehicles?

This research explored the phenomenon of motorists encountering emergency vehicles, with an overall aim of understanding why some motorists respond effectively whilst others do not. Building upon an earlier exploratory research (Grant, 2010) that indicated a utility in understanding the psychological processes involved with encounters, the Responding to Emergency Vehicles Scale (REVS) was developed to facilitate the identification of the human factors involved in a larger, generalisable sample. The preceding chapters reported on the development of the REVS using Simms and Watsons' (2007) construct validity approach. Through successive administration of the scale, 1089 data sets were obtained. This chapter seeks to use that data, to answer the following research questions:

What is an effective response to an emergency vehicle?

What are the psychological processes involved with motorists' responses after detecting an emergency vehicle?

What psychological factors facilitate or hinder Western Australian motorists' effective responding to an emergency vehicle?

What other factors are associated with Western Australian motorists responding to an emergency vehicle?

What is an Effective Response to an Emergency Vehicle?

To understand the factors that assist motorists to respond effectively to emergency vehicles, it was first necessary to identify what an effective response is. The data collection and analyses undertaken with the emergency service drivers (Chapter four) identified that an effective response was one where motorists behaved predictably and allowed emergency vehicles to continue on their preferred path to manoeuvre around the bulk of the traffic. It was also a response that minimised the need for emergency vehicles to undertake rapid or evasive movements such as braking or changing lanes quickly.

In comparing the needs of the three main emergency services to the Current Response Model (CRM) for responding to emergency vehicles (Department of Transport, 2013) it was identified that the CRM (as discussed in chapter four) was not consistent with the needs of the emergency service driver and would likely result in emergency vehicles needing to brake and/or take other evasive action.

Whilst the requirements of the emergency service drivers were clear, developing a response model to suit all circumstances was made more complex by the different driving methods for the various emergency vehicles. At this point it was acknowledged that motorists would be assisted by the emergency services adopting a more consistent emergency driving style. However, this would require procedural or policy change within the respective organisations, and effecting such change was beyond the scope of the current research. As such, the DRM was developed on the assumption that emergency vehicles would generally keep to the right of the body of traffic allowing motorists to move to the left.

On this basis, the DRM provides that, upon identifying the presence of an emergency vehicle, the motorist should move as far left as possible. This includes doing so for approaching emergency vehicles, as it allows the emergency vehicle to drive contraflow if required. Once the motorist moves left, they need to allow other motorists to move left as well. If the motorist is unable to move left, they could continue in the flow of traffic until they can move; the motorist should not slow down or stop in front of emergency vehicles. When faced with a red traffic control light, the motorist should not enter the intersection in any way as this created an unacceptable risk. They are to remain stationary and allow emergency vehicles to find a path around them. Finally, to address the ambiguity surrounding the intention of police vehicles, if the emergency vehicles are police vehicles, the motorists should move left as far as possible. The police vehicles will follow the motorists if

they want them to stop. Thus, the road safety message for this Desired Response Model (DRM) would be, upon detection of an emergency vehicle:

- Move as far to the left as possible
- If you cannot move left, continue in the flow of traffic until you can.
- Allow other vehicles to move left also.
- Do not go through a red light. Stay where you are and allow the emergency vehicle to move around you.
- If the emergency vehicle is a police vehicle, it will follow you if it wants you to stop.

This model focuses on the driving behaviours required of the motorist when encountering an emergency vehicle. It replaces the recommendation of "slow down or stop", with continuing, thus removing the need for emergency vehicles to negotiate around drivers. It encourages cooperation with other motorists (allow other vehicles to move left also) and addresses some of the ambiguity arising from the previous model (traffic control lights and the dual purpose of police vehicles).

Overall, the qualitative research with emergency service drivers indicated that the CRM did not facilitate the most effective response to an emergency vehicle encounter. It identified that an effective response when encountering an emergency vehicle is one which is consistent with the DRM. Thus, the research answered the question of *What is an effective response to an emergency vehicle?*

Assessment of effective responding.

The DRM represented the optimum model of response for motorists encountering the three main Western Australian emergency services. This model formed the basis for the driving behaviour questions included with the REVS. The scenarios were drawn from the types of encounters mentioned during the focus groups and motorist interviews. The responses to the driving scenario questions were used to create two scores. One score was

comprised of responses that were consistent with the CRM as communicated to motorists through the road safety literature (Department of Transport, 2013). The second score comprised driving responses that were consistent with the DRM. Thus, this sought to provide a measurement of how consistent participants' driving responses were with the DRM, without having been trained to drive in that manner, as well as assess how closely they adhered to the CRM.

Seven driving scenarios were used to assess reported driving behaviour. Each scenario contained two possible driving responses; one that was considered to be safe or to assist the passage of emergency vehicles, and one that was considered unsafe or likely to hinder the passage of emergency vehicles. Answers were provided on a Likert (1932) type scale of how likely the participant was to undertake the manoeuvres. The determination of whether a driving response was a safe or effective manoeuvre was based upon whether it was consistent with the DRM. The individual responses were scored from one to six and contrary items were scored in reverse relative to the model (DRM or CRM) it was being applied to. The DRM Score was obtained by summing the responses for answers that were consistent with the DRM. The CRM Score was obtained by summing answers that were consistent with the CRM. Both produced a score ranging from seven to 42. A higher score indicated reported driving behaviour that was consistent with that model (either DRM or CRM). The scores for the individual questions are presented in Table 17.

Scores on the CRM ranged from seven to 42 with a mean of 30.35 (*SD*=5.02) and a mode of 32 (N=100, 9.17%). Scores on the DRM ranged from 10 to 42, with a mean of 31.86 (*SD*=4.86) and a mode of 33 (N=104, 9.54%). There was a very strong and significant correlation (r=.90) between the responses attributed to the two models as some driving responses were consistent across both models, e.g., 'keep/move left' and obey the road rules. A paired samples t-test was conducted to determine whether there was any statistically

significant difference between the participants' DRM scores and participants' CRM scores. It determined that there was a significant difference between the scores for CRM and DRM at $t(1089)=22.489$, $p=.000$.

Table 17

Driving Behaviour Items and Composite Scores

Driving Scenario and Response Items	Mean	(SD)
S1 You are driving in the left hand lane on a busy road and there is an EV approaching you from behind. You will:		
Move left	4.37	(1.76)
*Move right	3.95	(1.95)
S2 You are stationary at a red traffic light and an EV is approaching you from behind. You will:		
*Enter the intersection	4.16	(1.68)
Remain out of the intersection	4.38	(1.58)
S3 You are at a set of traffic lights that have just turned green when you hear an EV siren but cannot see the vehicle. You will		
*Proceed through the intersection	3.90	(1.62)
Remain stationary	4.04	(1.63)
S4 You are driving in the right hand lane on a busy road and there is an EV approaching you from behind. You will		
Move left	5.34	(1.21)
*Move right	4.41	(1.85)
S5 An EV is coming towards you from the opposite direction. You will		
Move left	4.23	(1.74)
*Continue where you are	3.68	(1.85)
S6 An EV is approaching you from behind and you cannot move over. You will		
Continue driving until you can move over	4.92	(1.19)
**Speed up or slow down	3.59	(1.65)
S7 The EV approaching you from behind is a police vehicle. You will		
*Pull over in case they want you to stop	3.95	(1.72)
Move left to see if it follows you	4.59	(1.46)
Sum of Current Response Model Responses (CRM)	**30.35**	**(5.02)**
Sum of Desired Response Model Responses (DRM)	**31.86**	**(4.86)**
Sum of all responses (TOTAL)	**59.50**	**(9.15)**

* Item is reverse scored when included in the TOTAL.
** Item is reverse scored when included in the TOTAL but not when included in the CRM.

A mean difference of 1.51 in favour of the DRM indicated that respondents adhered more to the DRM than the CRM. It was arguable that, if motorists were trained in accordance with the CRM, their reported driving behaviour would score higher on that model than the DRM.

However, the statistically significantly higher DRM score suggests that motorists have not been trained to respond to emergency vehicles in accordance with the current road safety guidelines (i.e. the CRM).

What are the Psychological Processes Involved with Motorists' Responses after Detecting an Emergency Vehicle?

The qualitative research with Western Australian motorists, as reported in chapter four, identified several psychological themes associated with responding to emergency vehicles. These themes were incorporated into a scale to assess motorists during the preliminary design of the REVS (chapter five). Subsequent testing and refinement of the REVS (chapters six to eight) was undertaken on three separate samples of Western Australian motorists. Using principal components analysis (PCA), the scale was reduced to 25 variables within five psychological factors involved in the phenomenon of responding to an emergency vehicle. However, PCA is a method that is intended for use on an entire population, rather than a sample of that population (Field, 2009; Tabachnick & Fidell, 2007). To generalise the results from a sample of the population, repeated analyses are required of multiple samples from that population.

This research involved repeated analyses of samples of Western Australian drivers. Table 18 provides a review of the demographic data for each sample to ensure the samples were consistent with that requirement and the various recruitment methods did not result in different samples. Whilst the samples were drawn from the same population, to further ensure the results of the scale could be generalised, the data sets were combined for a final analysis. The PCA was calculated using the combined data set, with five factors, quartimax rotation, and a variable retention level set at .3.

Table 18

Comparison of Participants in Each Sample

		Preliminary REVS Data		Revised REVS Data		Final REVS Data	
Total participants		325		356		409	
Age	M (SD)	32.13	(12.22)	29.22	(10.56)	33.74	(13.26)
	Range	18 to 80		18 to 75		18 to 83	
No years driving	M (SD)	13.09	(12.43)	11.14	(10.25)	15.64	(13.17)
	Range	0 to 70		0 to 50		0 to 62	
		N	**%**	**N**	**%**	**N**	**%**
Gender	Male	99	(30.46)	95	(26.69)	134	(32.76)
	Female	225	(69.23)	261	(73.31)	275	(67.24)
	Other	1	(0.31)				
Drive daily or nearly every day		288	(88.62)	314	(88.20)	373	(91.20)
Drive a passenger vehicle (small, medium or large passenger, 4WD passenger)		287	(88.31)	315	(88.48)	382	(93.40)
Type of roads	Urban	248	(76.30)	272	(76.40)	298	(72.86)
	Rural	24	(7.40)	27	(7.58)	54	(13.20)
	Both	53	(16.30)	57	(16.01)	57	(13.94)
Driver's licence	Western Australia	264	(81.23)	298	(83.71)	335	(81.91)
	Interstate	44	(13.54)	26	(7.30)	28	(6.85)
	Overseas	17	(5.23)	32	(8.99)	46	(11.25)
Crash History	Never	47	(14.46)	45	(12.64)	96	(23.47)
	Less than 1 year	142	(43.69)	182	(51.12)	158	(38.63)
	1 to 5 years	21	(6.46)	20	(5.62)	38	(9.29)
	5 to 10 years	70	(21.54)	65	(18.26)	77	(18.83)
	Over 10 years	45	(13.85)	44	(12.36)	40	(9.78)
Emergency Service Membership	Never	260	(80.00)	282	(79.21)	314	(76.77)
	Current paid member	15	(4.62)	20	(5.62)	28	(6.85)
	Current volunteer	14	(4.31)	22	(6.18)	22	(5.38)
	Past association	31	(9.54)	19	(5.34)	31	(7.58)
	Multiple associations	5	(1.54)	13	(3.65)	14	(3.42)
Preferred music volume	M (SD)	53.11	(16.90)	55.15	(17.13)	53.11	(16.80)
	Range	0 to 90		0 to 100		0 to 100	
Experiences with police	M (SD)	4.69	(1.09)	4.66	(1.05)	4.83	(1.04)
	Range	1 to 6		1 to 6		1 to 6	
Experiences with Fire and Rescue	M (SD)	5.19	(0.91)	5.36	(0.75)	5.34	(0.75)
	Range	1 to 6		1 to 6		1 to 6	
Experiences with Ambulances	M (SD)	5.36	(0.83)	5.40	(0.68)	5.37	(0.80)
	Range	1 to 6		3 to 6		1 to 6	

The resultant model (Table 19) exhibited a KMO sampling adequacy of .85, Bartlett's test of sphericity was statistically significant (p = .000), and it explained 53.93% of the total variance. The model replicated that produced in the preceding analyses, including the item "I

give way to emergency vehicles because it is common courtesy" in within the Reasons for Responding. The scale demonstrated satisfactory internal consistency (α= .83), and the subscales resulted in a Cronbach's Alpha ranging between .71 and .85.

Table 19

Factor Loadings for PCA with Quartimax Rotation for Combined Data Sets

	Factor					M (SD)	
	I	II	III	IV	V		
I give way to EVs because it is the right thing to do	**.76**					5.79	(.45)
I give way to EVs because it is my civic duty	**.69**					5.43	(.79)
It is important for drivers to give way to EVs	**.64**					5.89	(.33)
Someone's life may be at risk if the EV is delayed	**.63**					5.82	(.41)
It does not matter where the EV is going… must be important	**.56**			.37		5.61	(.59)
I always respond appropriately to an EV	**.52**	.39				5.32	(.75)
I give way to EVs because it is common courtesy	**.50**					5.36	(.97)
*I don't give way to EVs	**.47**					5.87	(.38)
*Encountering EVs is stressful		**.87**				3.73	(1.33)
*Responding to an EV makes me feel Anxious		**.84**				3.91	(1.43)
*Responding to EVs is difficult		**.74**				4.10	(1.24)
I feel confident in my ability to respond to EVs	.32	**.71**				5.05	(.91)
When I see an EV ... think … used … for someone else			**.86**			2.56	(1.45)
When I see an EV, it makes me think … own experiences …			**.85**			2.65	(1.50)
When I see an EV, it makes me think … used … myself			**.84**			2.33	(1.43)
When I see an EV, it makes me think … person that I know			**.72**			2.57	(1.48)
*Sometimes, EVs use their lights & siren [non-emergency]				**.75**		4.93	(1.12)
*EVs use their lights and siren too much				**.72**		5.21	(.80)
*Emergency driving creates an unacceptable risk …				**.59**		5.04	(.97)
Emergency service drivers act safely when driving …	.41			**.57**		5.12	(.81)
Emergency services drivers are properly trained …	.31			**.48**		5.35	(.80)
*An EV is not in a hurry if … not sounding a siren				**.47**		4.75	(1.19)
I could never imagine the EV crew doing the wrong thing				**.42**		4.19	(1.21)
If a driver has the room to move … they should be punished					**.87**	4.85	(1.02)
Drivers should get punished for failing to give way to an EV					**.85**	4.71	(1.11)
Explained Variance	22.36	10.42	9.37	6.19	5.59		
Mean	45.09	16.79	10.10	34.60	9.56		
Standard Deviation	2.93	4.02	4.85	4.22	1.98		
Cronbach's Alpha	.73	.83	.85	.71	.84		

Correlation between factors	I Reasons				
II Experience	.257**				
III Association	.159**	.120**			
IV Beliefs	.490**	.242**	.140**		
V Punishment	.324**	.183**	.203**	.288**	

Note: * Item is reverse scored. Boldface factor loading indicates inclusion within the factor.

The five psychological factors associated with responding to emergency vehicles.

The final 25 variables model incorporated five psychological factors associated with responding to emergency vehicles. These factors were:

- Factor I - Reasons for responding to emergency vehicles
- Factor II - The experience of encountering an emergency vehicle
- Factor III - Associations with emergency services
- Factor IV - Attitudes and beliefs about emergency vehicles
- Factor V - Beliefs about punishment

Factor I - Reasons for responding to emergency vehicles.

This factor incorporates eight items relating to motorists' prosocial intentions towards emergency vehicles. They include a mixture of positively and negatively worded items about the drivers' reasons for giving way such as it being a civic duty, the right thing to do, and common courtesy. The factor also incorporates beliefs about the importance of responding appropriately and the consequences if emergency vehicles were delayed.

The factor is scored by summing the subscale, which provides a potential score of eight to 48. A higher score indicates a greater willingness to behave prosocially and facilitate the passage of emergency vehicles. A lower score indicates less prosocial intentions and an unwillingness to give way to an emergency vehicle. Participant scores for this factor range from 31 to 48 with a mean score of 45.09 (SD=2.93). However, the mode is 48 as achieved by 270 (24.77%) participants as shown in Figure 9, indicating that participants hold strong prosocial intentions towards emergency vehicles.

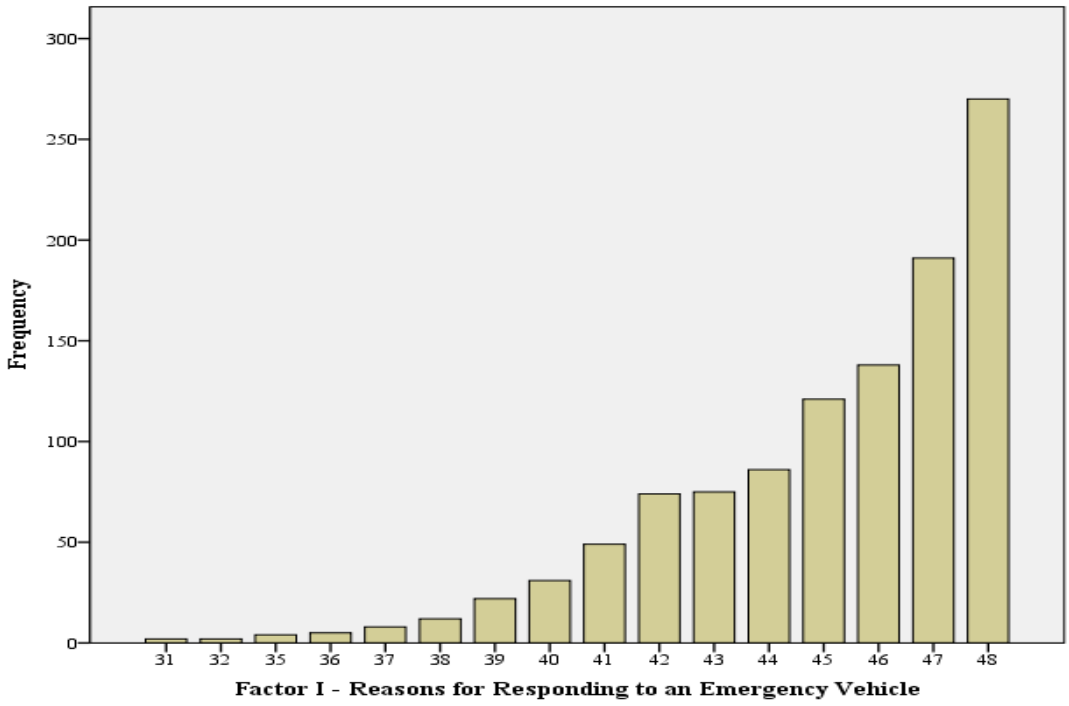


Figure 9- Participant Scores for Factor I

Prosocial behaviour underpins the effective functioning of a society (Biel et al., 2012), and an intention (i.e. motivation) to behave prosocially can facilitate the type of cooperation required for motorists to facilitate the passage of an emergency vehicle. The prosocial intentions indicated in this factor are also consistent with the theory of planned behaviour. In this context, an individual's intentions, combined with their self-efficacy and belief in their ability to control their behaviour, can influence their actual behaviour (Ajzen, 1991; Terry & O'Leary, 1995). The results of this factor suggest there is utility in, and legitimacy of, the legislation pertaining to emergency vehicles. As most participants indicated that it is appropriate and important to facilitate the passage of the emergency vehicles, then legislation that supports this ought to be perceived as legitimate (Tyler, 1990, 2006, 2012).

Factor II - The experience of encountering an emergency vehicle.

This factor incorporates four items relating to individuals' appraisal of emergency vehicle encounters, and their ability to respond the way they saw fit. It includes a mixture of

positively and negatively worded items as to whether they consider it to be stressful or difficult. They also report on feelings of anxiousness associated with the encounter and their overall confidence in their ability to respond appropriately during the encounter.

The factor is scored by summing the subscale, which provides a potential score of 4 to 24. The items were reversed scored, therefore a higher score is associated with a more positive experience that is not perceived as stressful on beyond the participants' ability to cope with. A lower score indicates a more stressful experience, in which the participant is not confident of their ability to cope. Participant scores for this factor range from 4 to 24 with a mean score of 16.79 (*SD*=4.02) and a mode of 14 as achieved by 105 (9.63%) participants. As shown in Figure 10, the majority of participants perceive emergency vehicle encounters as positive experiences. Although they report being aroused by the encounters, they are not negatively stressful experiences.

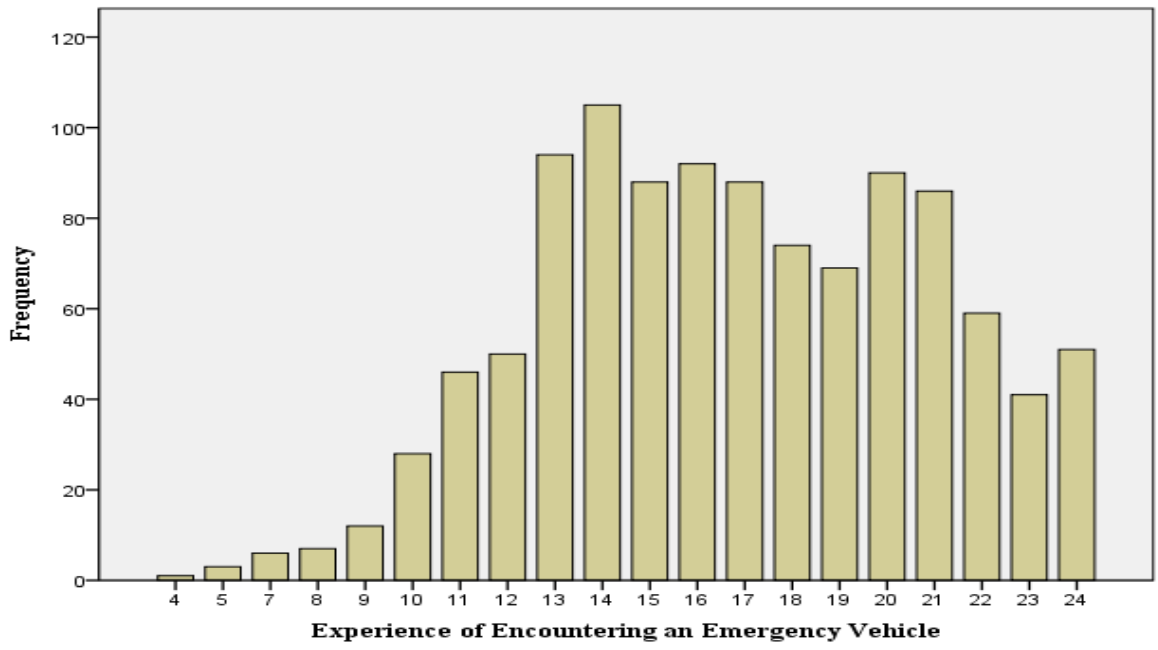


Figure 10- Participant Scores for Factor II

The items in this factor are consistent with the appraisal process within the transactional model of stress and coping and perceptions of self-mastery (Coyne & Racioppo,

2000; Folkman et al., 2004; Lazarus & Folkman, 1984). An individual's appraisal of an encounter as being stressful, challenging or benign is associated with their perceived competency and ability to cope in the situation (i.e. their ability to respond). Their belief in their own ability (i.e. self-mastery) decreases the likelihood of the encounter being appraised as stressful or difficult, whereas a belief they are unable to cope increases the stressfulness of the experience. Consistent with the model of stress and coping (Lazarus & Folkman, 1984), perusal of the individual items within the factor revealed a moderate correlation (r=.72) between reported stressfulness and feelings of anxiety

Factor III – Prior associations with emergency services.

The four items in this factor relate to the impact of the motorist's prior experiences with the emergency service on their subsequent encounters. These include recalling experiences of being personally involved with an emergency service, having used the service for themselves or someone else, and knowing someone who is a member of an emergency service. The factor is scored by summing the subscale and scores range from 4 to 24. A higher score indicates a greater or more complex recollection of prior associations during subsequent encounters. Notably, respondents varied considerably in their reported recollection of prior associations during emergency vehicle encounters with scores ranging from 4 to 24. Whilst the mean score for this factor was 10.10 (*SD*=4.85), the mode was 4 (N=163, 14.95%), as shown in Figure 11. This indicated that most participants had little prior association with emergency services, and/or their prior associations were not overtly recalled during emergency vehicle encounters.

This factor endeavours to capture the effect of prior exposure to emergency vehicles and services, which may be informed by theories of mere exposure effect and priming (Bornstein, 1989; Moreland & Topolinski, 2010; Zajonc, 1968). Prior exposure to an emergency vehicle or service potentially creates a familiarity that assists retrieval of

information about the emergency service, and thus increases positive affect associated with the service. However, if the earlier encounter is negative or adverse in some way then subsequent exposure will likely increase the negative affect (Griffiths & Mitchell, 2008). This factor is consistent with earlier findings (Grant, 2010) that motorists who do have prior exposure to an emergency service may experience an increased awareness of, and sensitivity towards, emergency vehicles during subsequent encounters.

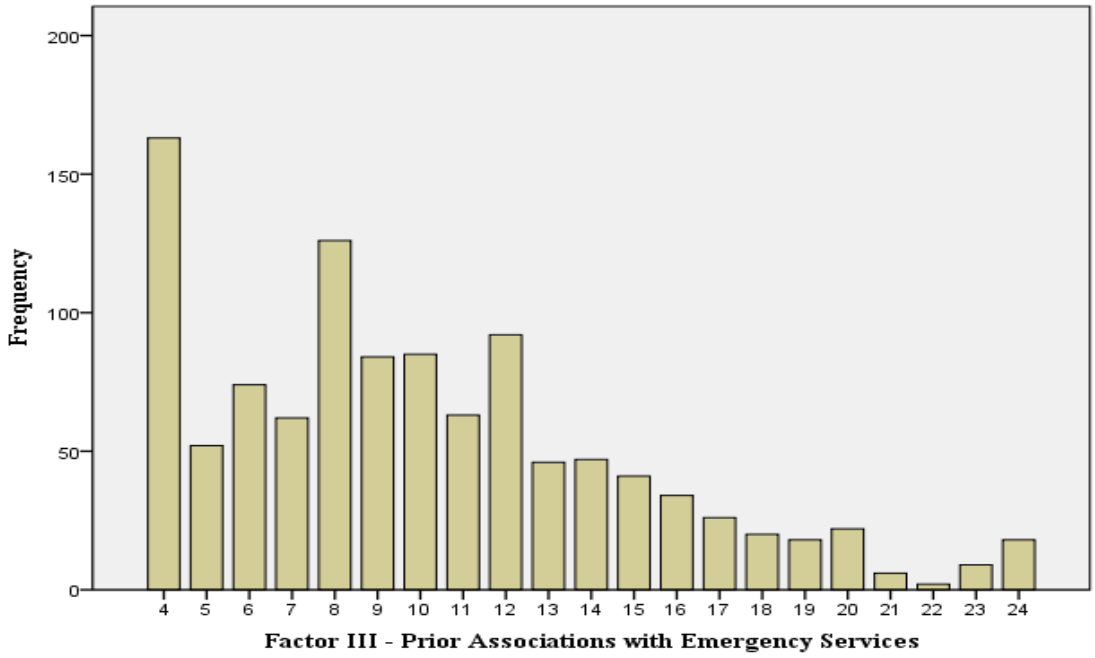


Figure 11- Participant Scores for Factor III

Factor IV - Attitudes and beliefs about emergency vehicles.

This factor incorporates seven items and assesses motorists' beliefs surrounding emergency vehicles and emergency services. It includes a mixture of positively and negatively worded items about the abilities of emergency vehicle drivers, the appropriateness of their actions and the use of emergency warning devices. The factor is scored by summing the subscale, which provides a potential score of seven to 42. A higher score indicates attitudes and beliefs that are favourable towards emergency vehicles, whereas a lower score indicates more negative attitudes and beliefs towards to emergency vehicle. Participant

scores for this factor range from 17 to 42 with a mean score of 34.60 (*SD*=4.22) and a mode of 35 as achieved by 106 (9.72%). As shown in Figure 12, the majority of participants hold positive attitudes and beliefs about emergency vehicles and emergency services.

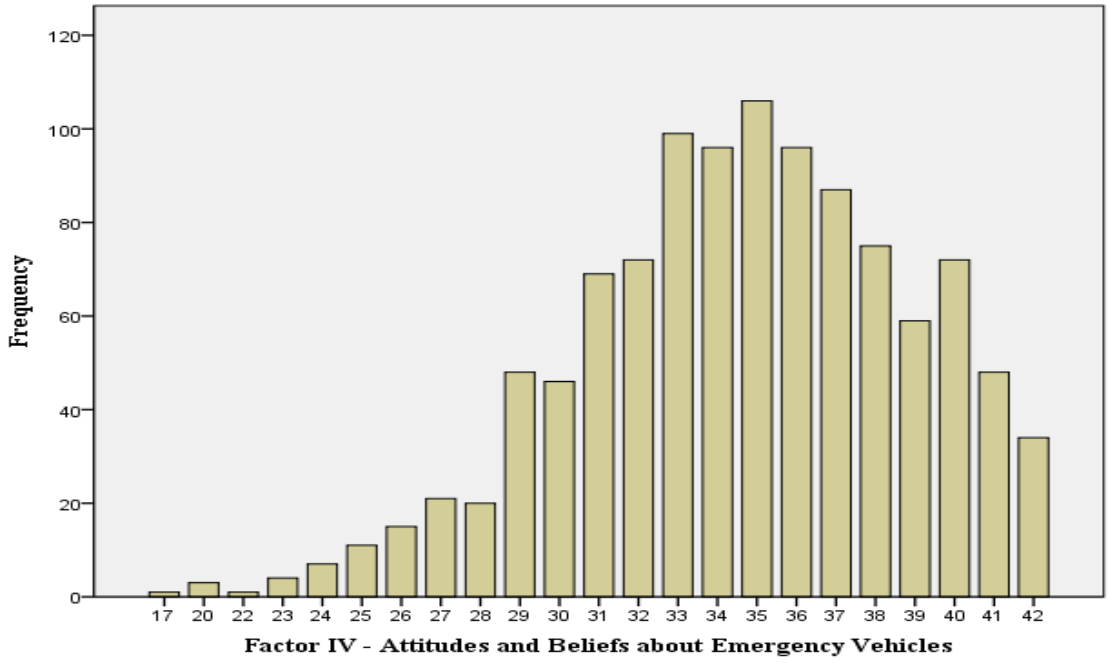


Figure 12- Participant Scores for Factor IV

The attitudes and beliefs held by the motorist have the potential to impact their response to emergency vehicles, in that they are found to be associated with an individual's behaviour and perception of a situation. In Lazarus and Folkman's (1984) transactional model of stress and coping, beliefs (and commitments) underpin an individual's appraisal of a situation. Stronger beliefs potentially increase the stressfulness of a situation in that a positive outcome is afforded greater importance. Conversely, more negative beliefs potentially reduce the importance of a positive outcome, particularly when they encompass a perception that the actions of the emergency service driver or the use of the emergency warning devices are not for legitimate purposes (Murphy et al., 2008; Tyler, 1990, 2006).

Factor V - Beliefs about punishment.

This factor contains two items associated with beliefs about punishment of motorists who do not respond appropriately to emergency vehicles. The items indicate whether

participants believe punishment is appropriate for motorists who failed to give way, particularly in situations where they have room to move but fail to do so. This factor is scored by summing the subscale, which provides a potential score of two to 12. A higher score indicates a greater belief in the appropriateness of punishment, whereas a lower score indicates a belief that punishment is not appropriate. Participant scores range from two to 12 with a mean score of 9.56 (*SD*=1.98) and a mode of 10, achieved by 273 (25.05%) participants, as shown in Figure 13. This indicates that the majority of participants believe that punishment is appropriate for motorists who fail to give way to emergency vehicles.

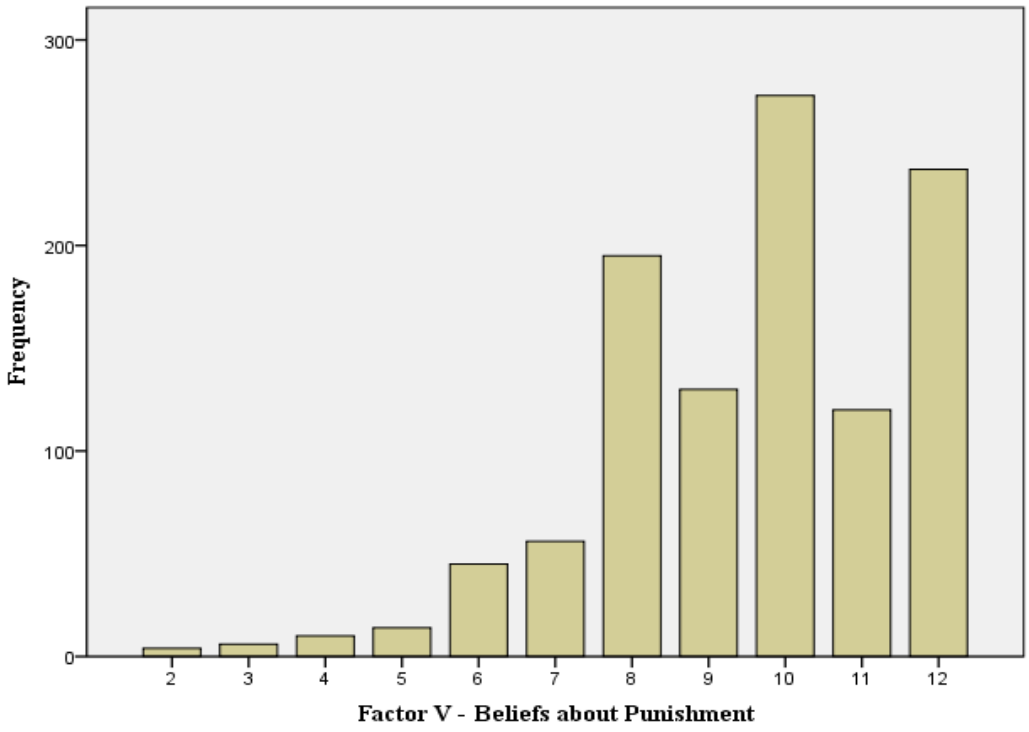


Figure 13- Participant Scores for Factor V

This factor is important when considering why people obeyed the law. According to Tyler (1990, 2006), people obey the law either because they choose to (voluntary compliance) or are compelled to. For voluntary compliance to occur, the organisation making the law, and the law itself, needs to be perceived as fair and/or legitimate. The scores within this factor (*M*=9.56, *SD*=1.98) demonstrate that there is a perceived legitimacy of the laws associated

with motorists' actions around emergency vehicle, which is an important component of the overall construct of responding to emergency vehicles.

Overall, the development and administration of the REVS on samples of Western Australian motorists identified five psychological factors associated with the phenomenon of responding to emergency vehicle. As such, the answer to the question of, '*what psychological processes are involved with responding to emergency vehicles?'* was their reasons for responding; the experience of encountering and emergency vehicle, their prior associations with emergency vehicles, attitudes and beliefs about emergency vehicles, and beliefs about punishment.

What Psychological Factors are Associated with Effective Responding to an Emergency Vehicle?

The DRM was developed as an optimum model of response for motorists encountering the three main Western Australian emergency services. This model formed the basis for the driving behaviour questions, which were used to assess reported driving behaviour relative to the CRM, as provided in the road safety guidelines (Department of Transport, 2013), and their adherence to the desired response model (DRM) irrespective of its communication to them.

Five psychological factors associated with responding to an emergency vehicle were identified as a result of the development and administration of the REVS. These were compared with reported driving behaviours when encountering emergency vehicles to determine the relationship. The DRM and CRM Scores were compared with the REVS total scores and the scores for each of the psychological factors as shown in Table 20. All factors exhibited a low correlation with the two driving scores. The correlations were significant, however, this was due to the large sample size.

Table 20

Pearson Correlation between DRM and CRM and REVS Total and Factors

	DRM Scores	CRM Scores
REVS Total	.204**	.194**
Reasons for Responding to an Emergency Vehicle (REASONS)	.134**	.152**
Experience of Encountering an Emergency Vehicle (EXPERIENCE)	.155**	.131**
Prior Associations with Emergency Services (ASSOCIATIONS)	.113**	.114**
Attitudes and Beliefs about Emergency Vehicles (BELIEFS)	.130**	.111**
Beliefs about Punishment (PUNISHMENT)	.093**	.097**

** Correlation is significant at the 0.01 level

To further explore the relationship between the reported driving behaviour and psychological factors, multiple regressions were conducted to see if the psychological factors could predict reported driving behaviour relative to the CRM and DRM. Using the enter method, it showed that the factors did explain a significant amount of variance in the CRM *($F(5,1084) = 9.07$, $p < .000$, $R^2 = .04$, $R^2_{Adjusted} = .05$).* The analysis demonstrated that BELIEFS did not significantly predict CRM scores *(Beta = .03, t(1089) = 0.68, ns),* nor did PUNISHMENT *(Beta = .07, t(1089) = 0.82, ns).* However, REASONS did significantly predict CRM scores *(Beta = .17, t(1089) = 2.74, p < .01),* as did ASSOCIATIONS *(Beta = .08, t(1089) = 2.60, p < .01)* and EXPERIENCE *(Beta = .11, t(1089) = 2.74, p < .01).*

Again using the enter method, analysis demonstrated that the factors explained a significant amount of variance in the DRM *($F(5,1084) = 9.86$, $p < .000$, $R^2 = .04$, $R^2_{Adjusted} = .04$).* The analysis showed that REASONS did not significantly predict DRM scores *(Beta = .10, t(1089) = 1.65, ns),* and nor did BELIEFS *(Beta = .06, t(1089) = 1.63, ns),* or PUNISHMENT *(Beta = .05, t(1089) = 0.02, ns).* However, ASSOCIATIONS significantly predicted DRM scores *(Beta = .08, t(1089) = 2.54, p < .05),* as did EXPERIENCE *(Beta = .14, t(1089) = 3.64, p < .01).*

The results demonstrate that psychological factors of ASSOCIATIONS EXPERIENCE and REASONS were associated with the reported driving behaviour associated with responding to emergency vehicles. Participants intended to act prosocially

and facilitate the passage of emergency vehicles. They appraised the encounters to be arousing but not so stressful that they are unable to cope and respond in a way they believe to be appropriate. Finally, their recollections of prior associations potentially increase their recognition of the vehicle. Overall, the factors play a significant role in motorists encountering an emergency vehicle. However, they are not a meaningful predictor of reported driving behaviour, explaining only 4 to 5% of the reported driving behaviours. As such, the research identified the psychological factors associated with the phenomenon of encountering an emergency vehicle, but offered little by way of predictive value, suggesting other factors were involved.

Demographic Factors Associated with Responding to an Emergency Vehicle

In endeavouring to understand what other factors were associated with effective responding to emergency vehicles, the demographic information obtained during the survey administration was compared against the psychological factors and reported driving behaviour scores (CRM and DRM). Using a Bonferroni adjusted alpha level of .007 (.05/7), this comparison sought to determine what other factors might be significant to participants' experience of responding to an emergency vehicle. Analysis of the demographic information also served to examine some of the assumptions expressed by participants during the earlier qualitative research (see chapter four – beliefs about others). Prior to the performing this series of analyses, the data were checked for compliance with assumptions of normality, linearity and homogeneity of variance (Tabachnick & Fidell, 2007, 2014). There were some violations of homogeneity of variance as assessed by Levene's test of equality of variances. These were as reported within the respective factor results below. Whilst violation of homogeneity of variances may have reduced the statistical significance of a result, the sample size in this study made it robust against this violation (Sheng, 2008). As such, the violations

were acknowledged but no transformations were undertaken, because the data reflected actual views and beliefs and that it remained more important to be true to the concept.

Gender.

An independent samples t-test was conducted for the 328 males and 761 females to compare *REVS* factors, the CRM and the DRM. The scores were as presented in Table 21. With a Bonferroni adjusted alpha level of .007 (.05/7), only the EXPERIENCE score was found to be statistically significantly different whereby males scored higher than females. This indicates that males found encountering an emergency vehicle to be a more positive experience than females, and that females were more likely to appraise the encounter as stressful. However, this differing appraisal did not affect their reported driving response to an encounter.

Table 21

Independent Sample t-tests comparing REVS and Driving Scores by Gender

	Male M (SD)	Female M (SD)	t	df	Sig. (2-tailed)
REASONS*	44.79 (3.11)	45.23 (2.84)	-2.18	572.186	.03
BELIEFS*	34.34 (4.42)	34.72 (4.12)	-1.35	582.835	.18
ASSOCIATIONS*	10.70 (5.16)	9.84 (4.69)	2.61	570.170	.01
EXPERIENCE	18.67 (3.62)	15.99 (3.92)	10.56	1087	.00**
PUNISHMENT	9.79 (2.04)	98.47 (1.94)	2.51	1087	.01
DRM	32.47 (4.68)	31.60 (4.91)	2.70	1087	.01
CRM	30.81 (4.93)	30.16 (5.05)	1.96	1087	.05

* Equal variances not assumed as Levene's Test of Equality of Variance $p<.05$
** denotes significance after Bonferroni adjustment of $p < .007$

Driving frequency.

A one way ANOVA was conducted to determine whether the different reported driving frequencies were associated with different scores for REVS factors, the CRM and the DRM. Participants were asked to report on whether they drove daily, nearly every day, a few times a week, a few times per month, or a few times per year. There was homogeneity of variances with the driving frequency groups, as assessed by Levene's test of equality of

variances for all except EXPERIENCE. With a Bonferroni adjusted alpha level of .007 (.05/7), statistically significant differences were found for REASONS and EXPERIENCE as shown in Table 22, but not for the CRM or the DRM.

Post hoc analysis using Tukey's HSD tests, showed that the statistically significant difference for REASONS was between participants who reported driving daily (M=45.34, SD=2.82) and participants who reported driving a few times per week (M=44.26, SD=3.17). The statistically significant difference found for EXPERIENCE was between participants who reported driving daily (M=17.41, SD=4.00) and participants who reported driving a few times per month (M=14.56, SD=5.03), or nearly every day (M=15.82, SD=3.83). Overall, scores for REASONS and EXPERIENCE increased with driving frequency, as shown in Figure 14. This indicated that greater driving frequency was associated with a greater willingness to behave prosocially and the perception of the encounter as being a less stressful experience. However, there was no statistically significant difference in their reported driving relative to the CRM or the DRM.

Table 22

Levene Statistic and ANOVA Results for REVS Factors and Driving Models by Driving Frequency

	df	Levene Statistic	F	Sig.
REASONS	4,1085	3.23*	4.46	.00**
BELIEFS	4,1085	1.12	2.60	.04
ASSOCIATIONS	4,1085	1.99	3.07	.02
EXPERIENCE	4,1085	1.64	10.79	.00**
PUNISHMENT	4,1085	1.18	2.72	.03
DRM	4,1085	.22	1.84	.12
CRM	4,1085	.65	1.77	.13

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

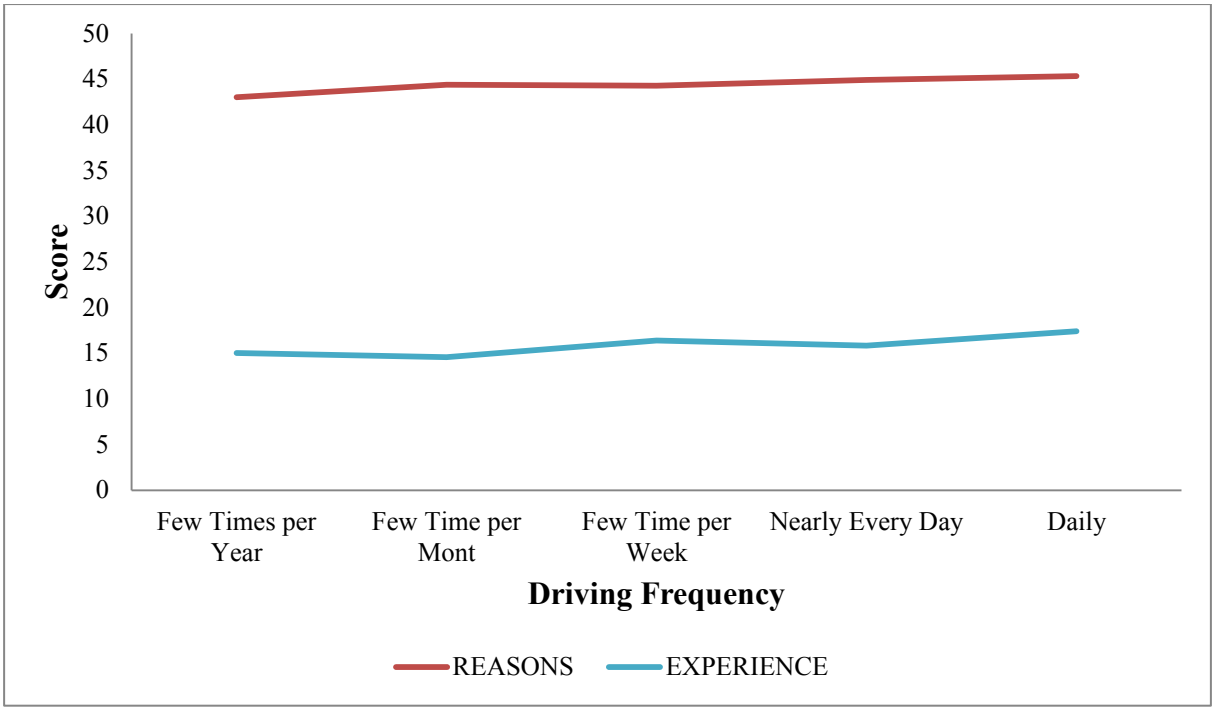


Figure 14 - REASONS and EXPERIENCE Factor Scores by Driving Frequency

Distance travelled per year.

A one way ANOVA was conducted to determine whether annual driving distances were associated with different scores for REVS factors, the CRM and the DRM. Participants reported their annual driving distances in increments of 5,000 kilometres from less than 5,000 kilometres per year to over 25,000 kilometres per year. Homogeneity of variances with the distance groups was assessed by Levene's test of equality of variances, and it was found that REASONS violated this assumption, as shown in Table 23. With a Bonferroni adjusted alpha level of .007 (.05/7), statistically significant differences were found for REASONS and BELIEFS, and for the CRM and DRM.

Table 23

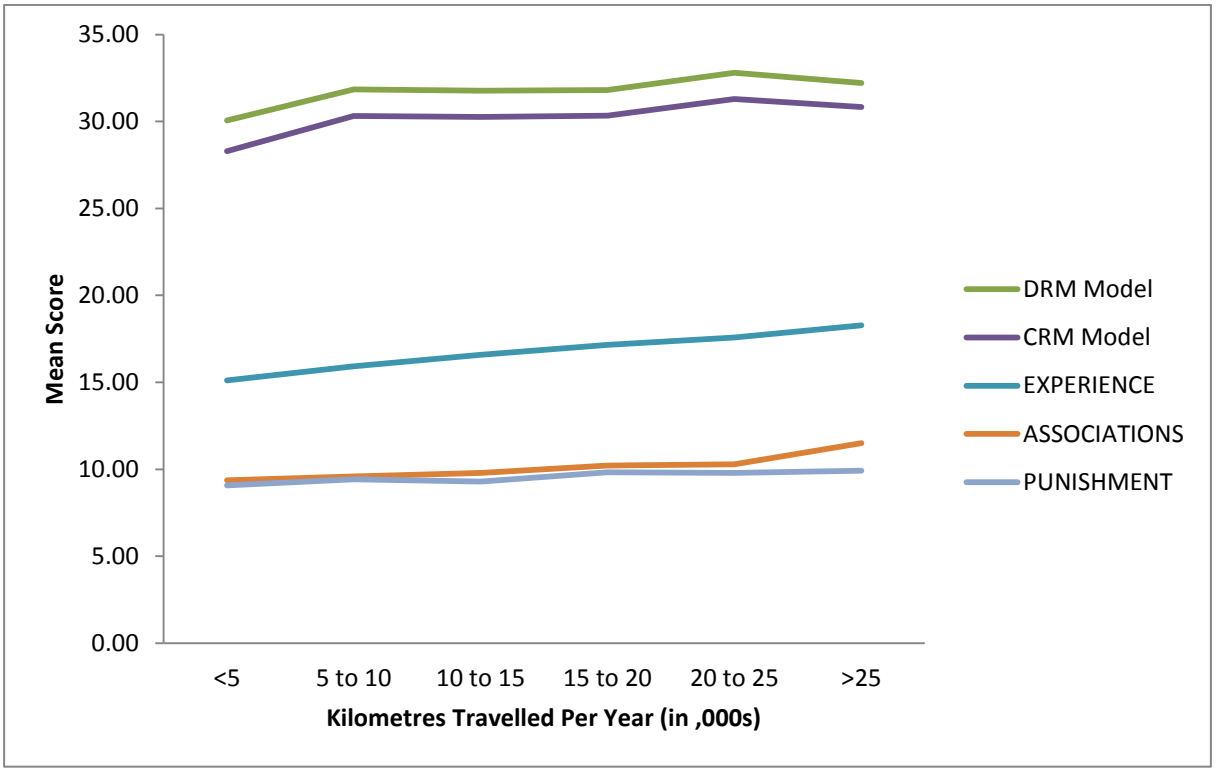
Levene Statistic and ANOVA Results for REVS factors, and Driving Models by Kilometres Travelled per Year

	df	Levene Statistic	F	Sig.
REASONS	5, 1084	2.26*	2.90	.01
BELIEFS	5, 1084	.59	2.28	.04
ASSOCIATIONS	5, 1084	1.73	3.94	.00**
EXPERIENCE	5, 1084	.60	11.31	.00**
PUNISHMENT	5, 1084	1.42	4.34	.00**
DRM	5, 1084	1.06	3.17	.01
CRM	5, 1084	.43	3.69	.00**

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD tests showed that the statistically significant difference for ASSOCIATIONS was found between participants who reported driving in excess of 25,000 kilometres per year (M=11.50, SD=5.32) and participants who drove less than 5,000 kilometres per year (M=9.37, SD=5.22), participants who drove 5,000 to 10,000 kilometres per year (M=9.58, SD=4.53), and participants who drove 10,000 to 15,000 kilometres per year (M=9.80, SD=4.53). The statistically significant difference for EXPERIENCE was found between participants who reported driving less than 5,000 kilometres per year (M=15.11, SD= 3.78) or 5,000 to 10,000 kilometres per year (M=15.92, SD=3.92) and all the other distance groups. It was also found between participants who drove 10,000 to 15,000 kilometres per year (M=16.59, SD=3.88) and participants who drove more than 25,000 kilometres per year (M=18.27, SD=3.91). The statistically significant differences for PUNISHMENT were found between participants who reported driving in excess of 25,000 kilometres per year (M=9.92, SD=2.08) and participants who drove less than 5,000 kilometres per year (M=9.08, SD=2.01). It was also found between participants who drove 15,000 to 20,000 kilometres per year (M=9.84, SD=1.95) and participants who drove 10,000 to 15,000 kilometres per year (M=9.30, SD=1.98). The statistically significant differences for DRM were found between participants who reported driving less than 5,000 kilometres per year (M=30.05, SD=4.82) and both participants who reported driving 20,000 to 25,000 kilometres per year (M=32.80, SD=4.61), and participants who reported driving over 25,000 kilometres per year (M=32.22, SD=5.31). The statistically significant differences for CRM were found between participants who reported driving less than 5,000 kilometres per year (M=28.29, SD=4.94) and all other reported driving levels. Figure 15 illustrates to score for the different groups.

Figure 15 - DRM, CRM and Significant REVS Factor Scores by Distance Travelled Per Year



In all instances, the group travelling less than 5,000 per year reported the lowest score of all the groups. Of those scores, ASSOCIATIONS, EXPERIENCE, PUNISHMENT, DRM and CRM were found to be statistically significantly different to at least one other score. Similarly, the participants who reported driving in excess of 25,000 kilometres per year reported a statistically significant difference from at least one other group. For all REVS factors, they recorded the highest mean score. However, it was the 20,000 to 25,000 kilometres per year group that scored the highest mean score on the DRM and CRM. The significant scores suggest that participants who drive greater distances are more likely to report a more positive intention towards facilitating emergency vehicles, more positive beliefs surrounding emergency vehicles, higher recollection of prior associations with emergency services. They are also less likely to appraise the encounter as a negatively stressful event, and have a greater belief in the appropriateness of punishment for failing to give way. Conversely, participants who report driving few kilometres are more likely to report

encounters as stressful, hold less positive views about the emergency services, punishment, and the importance of facilitating their passage, and are less likely to recall prior associations with emergency vehicles.

Crash involvement.

A one way ANOVA was conducted to determine whether the differing recency of crash involvement was associated with different scores for REVS factors, the CRM and the DRM. Participants reported having been involved in a traffic crash within the previous 12 months, within the last five years, within the last 10 years, over 10 years, or never. There was homogeneity of variances with the crash groups, as assessed by Levene's test of equality of variances for REASONS, ASSOCIATIONS, and EXPERIENCE and the two driving models (DRM and CRM), but not BELIEFS, and PUNISHMENT as shown in Table 24. With a Bonferroni adjusted alpha level of .007 (.05/7), statistically significant differences were found for BELIEFS, EXPERIENCE, and for the CRM and the DRM.

Table 24

Levene Statistic and ANOVA Results for REVS factors, and Driving Models by Crash Involvement

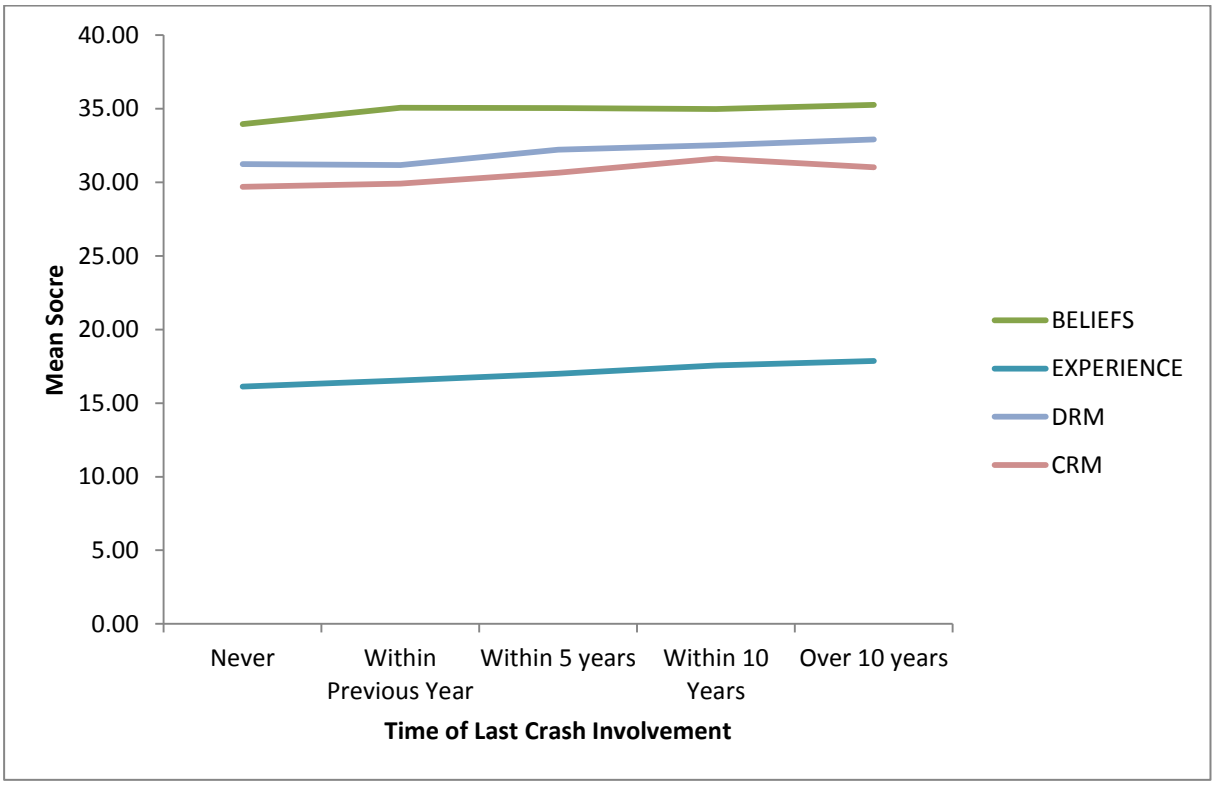
	df	Levene Statistic	F	Sig.
REASONS	4,1085	1.35	1.82	.12
BELIEFS	4,1085	3.60*	5.15	.00**
ASSOCIATIONS	4,1085	0.27	.70	.59
EXPERIENCE	4,1085	1.77	8.34	.00**
PUNISHMENT	4,1085	3.72*	1.37	.24
DRM	4,1085	0.71	5.55	.00**
CRM l	4,1085	0.58	5.40	.00**

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD tests, showed that the statistically significant differences for BELIEFS were found between participants who had never been involved in a crash (M=33.95, SD=4.20) and both participants who had been in a crash in within the

previous five years (*M*=35.06, *SD*=4.34), and over 10 years (*M*=35.26, *SD*=4.25). The statistically significant differences for EXPERIENCE were found between participants who have never been involved in a crash (*M*=16.12, *SD*=4.01) and participants who had been in a crash within the previous 10 years (*M*=17.57, *SD*=3.60), and over 10 years (*M*=17.87, *SD*=3.89). The statistically significant differences for the DRM were found between participants who have never been involved in a crash (*M*=31.23, *SD*=4.99) and participants who had been involved in a crash over 10 years (*M*=32.91, *SD*=4.70). The statistically significant differences for the CRM were found between participants who had never been involved in a crash (*M*=29.69, *SD*=5.11) and participants who had been in a crash in within the previous 10 years (*M*=31.61, *SD*=4.56), and over 10 years (*M*=31.03, *SD*=4.96). Figure 16 illustrates to comparative mean scores for the significant differences.

Figure 16 - Mean Scores for Beliefs, Experience, DRM and CRM by Time since Last Crash Involvement



It is notable that in all circumstances where statistically significant differences were found, the scores for the participants who had never been involved in a crash were significantly

lower than some of the other crash groups. This suggests that motorists who have never been involved in a motor vehicle crash are less likely to respond effectively to an emergency vehicle, are more likely to appraise the experience as negatively stressful, and have less positive attitudes and beliefs associated with emergency vehicles. It suggests that crash involvement, whilst likely to be a stressful experience, may have resulted in some sort of positive encounter with emergency services, thus reducing the stressfulness of encountering emergency vehicles.

Type of vehicle driven.

A one way ANOVA was conducted to determine whether the type of vehicle driven was associated with different scores for the REVS factors, the CRM and the DRM. There was homogeneity of variances with vehicle groups, as assessed by Levene's test of equality of variances for all except EXPERIENCE as shown in Table 25. With a Bonferroni adjusted alpha level of .007 (.05/7), the EXPERIENCE scores were found to be statistically significantly different for the different vehicle types as shown in Table 25.

Table 25

Levene Statistic and ANOVA Results for REVS factors, and Driving Models by Vehicle Category

	df	Levene Statistic	F	Sig.
REASONS	8, 1081	1.19	1.12	.35
BELIEFS	8, 1081	1.24	1.41	.19
ASSOCIATIONS	8, 1081	1.07	2.25	.02
EXPERIENCE	8, 1081	1.96*	7.01	.00**
PUNISHMENT	8, 1081	1.28	0.51	.85
DRM	8, 1081	1.16	1.69	.10
CRM	8, 1081	.88	1.56	.13

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD tests, showed that the statistically significant differences for EXPERIENCE were found between participants who reported driving a small

or medium passenger vehicle (*M*=16.22, *SD*=4.05) and participants who drove a large passenger vehicle (*M*=17.61, *SD*=3.81), when compared with participants who drove a 4WD passenger vehicle (*M*=17.64, *SD*=3.56), participants who drove a 4WD Commercial vehicle (*M*=19.12, *SD*=3.87), and participants who rode a motor cycle (*M*=19.87, *SD*=3.07). Table 26 provides the different mean scores for the groups that underpin the statistically significant differences. Participants who drove a small or medium passenger vehicle were more likely to report experience as negatively stressful events.

Table 26

Mean (SD) for EXPERIENCE by Vehicle Type

Vehicle Type	N	M (SD)
Small or Medium Passenger	692	16.22 (4.05)
Large Passenger	127	17.61 (3.81)
4WD Passenger	165	17.64 (3.55)
Commercial/Ute 2WD	34	16.76 (4.64)
Commercial/Ute 4WD	33	19.12 (3.87)
Motorcycle	15	19.87 (3.07)
Moped/Scooter	2	17.00 (5.66)
Truck/Bus	2	24.00 (0.00)
Unclassified	20	17.60 (3.18)

Type of roads driven on.

A one way ANOVA was conducted to determine whether the type of roads participants commonly drove on were associated with different scores for the REVS factors, the CRM and the DRM. Eight hundred and eighteen participants reported driving on urban roads, 105 participants drove on rural roads and 167 drove on a combination of urban and rural roads. As there were unequal numbers of cases across cells, and because it was assumed that differences in cell sizes reflected real processes in the populations sampled, the regression approach was utilised in SPSS. That is, each cell mean was given equal weight regardless of its sample size and each main effect and interaction was assessed after

adjustments were made for all other main effects and interactions. Multivariate test results were assessed using Pillai's criterion, which is both conservative and robust against unequal cells (Tabachnick & Fidell, 2007). There was homogeneity of variances with vehicle groups, as assessed by Levene's test of equality of variances for all except PUNISHMENT as shown in Table 27, however the test would still be robust due to the large sample size. With a Bonferroni adjusted alpha level of .007 (.05/7), the ASSOCIATIONS and EXPERIENCE scores were found to be significantly different for the different road types as shown in Table 27.

Table 27

Levene Statistic and ANOVA Results for REVS factors, and Driving Models by Type of Road

	df	Levene Statistic	F	Sig.
REASONS	2, 1087	1.48	1.51	.22
BELIEFS	2, 1087	.189	.89	.41
ASSOCIATIONS	2, 1087	2.22	13.27	.00**
EXPERIENCE	2, 1087	.370	9.11	.00**
PUNISHMENT	2, 1087	4.02*	2.17	.12
DRM	2, 1087	.62	2.05	.13
CRM	2, 1087	.30	1.81	.16

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD test, showed that the statistically significant differences for ASSOCIATIONS and EXPERIENCE were found between participants who reported driving on predominately urban roads and participants who drove on rural roads, or on a combination of roads. Table 28 provides the mean scores for each group. In each circumstance, participants who reported driving on predominately urban roads scored lowest. Their encounters with emergency vehicles were less likely to involve a recollection of previous use or association with emergency services, but were more likely to be perceived as stressful. However, there was no significant difference between their reported driving behaviours.

Table 28

Mean (SD) for Significant REVS Factors by Road Driven on

	Road Type		
	Urban	Both	Rural
	M (SD)	M (SD)	M (SD)
N	818	167	105
ASSOCIATIONS	9.67 (4.70)	11.26 (5.26)	11.60 (4.78)
EXPERIENCE	16.51 (4.00)	17.44 (4.05)	18.00 (3.90)

Where participants obtained their driver's licence

MYTH: People who did not learn to drive in Australia do not know how to respond effectively to an emergency vehicle.

During the qualitative research (chapter four) some emergency service drivers and motorists expressed the view that motorists who obtained their drivers' licence in another country did not know how to drive on Western Australian roads. In particular, they did not know how to respond effectively to emergency vehicles. To test this belief, a one way ANOVA was conducted to determine whether the state or country where the participants obtained their driver's licence was associated with different scores for the REVS factors, the CRM and the DRM. Whilst most participants (897) reported obtaining their driver's licence in Western Australia, 82 reported obtaining their licence in another state or territory within Australia, and 111 reported obtaining their driver's licence in another country. There was homogeneity of variances for where they learnt to drive, as assessed by Levene's test of equality of variances shown in Table 29. With a Bonferroni adjusted alpha level of .007 (.05/7), only EXPERIENCE was found to be statistically significantly different as shown in Table 29 below.

Table 29

Levene Statistic and ANOVA Results for REVS Factors, and Driving Models by Location Where Driver's Licence was Obtained

	df	Levene Statistic	F	Sig.
REASONS	3,1086	1.75	.79	.50
BELIEFS	3,1086	1.11	.90	.44
ASSOCIATIONS	3,1086	.83	.96	.41
EXPERIENCE	3,1086	2.75*	6.41	.00**
PUNISHMENT	3,1086	2.85*	.44	.72
DRM_MODEL	3,1086	1.33	.53	.66
CRM_MODEL	3,1086	.88	.24	.87

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD tests, showed that the statistically significant differences for EXPERIENCE were found between participants who obtained their driver's licence in Western Australia (M=16.55, SD=4.08) and participants who obtained their driver's licence in another state or territory with Australia (M=18.09, SD=3.56), and participants who obtained their driver's licence in another country (M=17.89, SD=3.75). Participants who learnt to drive in Western Australia were more likely to appraise an emergency vehicle encounter as stressful.

This demonstrates that, whilst there is a perception that motorists who learnt to drive in another country are less able to drive effectively on Australian roads, and therefore less able to respond effectively to an emergency vehicle, the results do not support this. There was no statistically significant difference between their reported driving behaviours relative to the CRM or to the DRM. It also reinforces the likelihood that Western Australian motorists are unlikely to have received sufficient formal training on responding to emergency vehicles.

How participants learnt to drive.

MYTH: People who were taught to drive by driving instructors are better drivers and, therefore, more effective at responding to emergency vehicles.

Although unsupported by recent research around novice drivers (Mulvihill et al., 2006), there is a perception that being taught to drive by a driving instructor is more effective than being taught by family or friends (e.g. Lime Driving School, 2014; NRMA, 2011). To assess this perception, a one way ANOVA was conducted to determine whether scores for the REVS factors, the CRM and the DRM, were associated with who taught the participant to drive. Four hundred and nine participants reported being taught to drive by a driving instructor, 377 were taught by a family member, 26 received some other form of instruction (e.g. friend, learnt to drive at work), and 272 reported having a variety of instruction methods. There was homogeneity of variances with vehicle groups, as assessed by Levene's test of equality of variances for all as shown in Table 30. With a Bonferroni adjusted alpha level of .007 (.05/7), there were no statistically significantly differences found for any of the REVS factors or driving models as shown in Table 30.

Table 30

Levene Statistic and ANOVA Results for REVS Factors and Driving Models by Where the Participant Obtained Their Driver's Licence

	df	Levene Statistic	F	Sig.
REASONS	3, 1086	2.20	2.52	.06
BELIEFS	3, 1086	0.27	0.08	.97
ASSOCIATIONS	3, 1086	0.60	1.91	.13
EXPERIENCE	3, 1086	2.25	1.06	.36
PUNISHMENT	3, 1086	0.30	0.86	.46
DRM	3, 1086	0.73	1.48	.22
CRM	3, 1086	0.36	0.92	.43

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

As such, the belief that formal instruction through a qualified instructor is better than being taught by family or some other person is not supported by the results. How participants learnt to drive does not influence their reported driving behaviours during emergency vehicle encounters. Furthermore, the lack of significance for the CRM also suggests that responding to an emergency vehicle is not sufficiently taught to motorists through formal instruction any more than it is taught through less formal methods of instruction.

Emergency service membership.

An independent samples t-test was conducted to determine whether the participants' involvement in an emergency service was associated with different scores for the REVS factors, the CRM and the DRM. Whilst the majority of participants (N=856, 78.53%) had never been involved with an emergency service, 234 (21.47%) participants reported some form of membership with an emergency service (i.e. past or present membership as a volunteer or paid member). With a Bonferroni adjusted alpha level of .007 (.05/7), ASSOCIATIONS, EXPERIENCE, and PUNISHMENT were found to be statistically significantly different as shown in Table 31.

Table 31

Independent Sample t-tests comparing REVS and Driving Scores for Emergency Service Membership

	No Membership M(SD)	Membership M (SD)	t	df	Sig. (2-tailed)
REASONS	45.03 (2.94)	45.33 (2.91)	-1.41	1088	.16
BELIEFS	34.41 (4.27)	35.27 (4.00)	-2.76	1088	.01
ASSOCIATIONS	9.37 (4.55)	12.78 (4.97)	-9.95	1088	.00*
EXPERIENCE	16.28 (3.99)	18.66 (3.58)	-8.26	1088	.00*
PUNISHMENT	9.41 (1.96)	10.12 (1.92)	-4.97	1088	.00*
DRM	31.66 (4.84)	32.60 (4.86)	-2.64	1088	.01
CRM	30.16 (4.99)	31.08 (5.06)	-2.51	1088	.01

* denotes significance after Bonferroni adjustment of $p < .007$

The difference within the REVS factors demonstrated that emergency service members experienced greater recollection of emergency service associations when encountering emergency vehicles, which would be expected of a member of an emergency service. They also appraised the encounters as less stressful, and had a greater belief in the appropriateness of punishment for failing to give way to an emergency vehicle. However, despite the difference in psychological factors, there were no significant differences in their reported driving behaviour relative to the CRM and DRM. Whilst it might be expected that an emergency service member would instinctively respond in the desirable manner, the differences in driving styles between the services render it unlikely that a member of one service would be cognisant of the needs of all services.

To further assess the relationship between emergency service membership and reported driving behaviours, the participants were grouped into the type of service they were a member of (past or present). The groups included police (N=35), fire service (N=46), ambulance (N=98), other (N=23), multiple (N=32), and no emergency service membership (N=856). *Other membership* included participants who considered themselves to be a member of an emergency service that was neither police, fire nor ambulance. This included organisations such as mine site emergency response and the defence force. As these participants perceived themselves to be a member of an emergency service, they were treated as such, irrespective of any legal or other definition that might be attributed to their respective organisations. The *multiple membership* category was attributed to participants who reported a membership with more than one service, or having held multiple roles (i.e. voluntary and paid) within one service.

A one way ANOVA was conducted to determine whether scores for the CRM, DRM and individual driving scenarios were associated with type of emergency service membership. Homogeneity of variances with the emergency services groups was assessed by Levene's test

of equality of variances as shown in Table 32 below, and six of the individual driving scenarios were found to violate the assumption. With a Bonferroni adjusted alpha level of .003 (.05/16), two of the driving scenarios were found to be statistically significantly different between the groups.

Post hoc analysis using Tukey's HSD tests, showed that the statistically significant differences for the Driving Scenario of '*You are driving in the right hand lane on a busy road and there is an EV approaching you from behind. You will move right'*, were found between multiple emergency service associations (*M*=3.13, *SD*=2.23) and participants with police (*M*=4.89, *SD*=1.76) or ambulance membership (*M*=4.35, *SD*=1.99), and even participants with no membership (*M*=4.45, *SD*=1.80) as shown in Table 33 below. This result indicates that participants with multiple memberships are more likely to consider moving right than any

Table 32

Levene Statistic and ANOVA Results for Driving Models and Individual Driving Scenarios by Type of Emergency Service Membership

	df	Levene Statistic	F	Sig.
DRM Model	5,1084	0.14	3.18	.01
CRM Model	5,1084	0.27	2.41	.03
In left hand lane – EV Behind - Move left	5,1084	1.49	1.55	.17
In left hand lane – EV Behind - Move right	5,1084	2.46*	1.76	.12
At Red TCL – EV Behind - Enter the intersection	5,1084	2.99*	1.47	.20
At Red TCL – EV Behind - Remain out of the intersection	5,1084	1.54	1.19	.31
At TCL Can't see EV-Proceed through the intersection	5,1084	1.56	1.24	.29
At TCL Can't see EV-Remain stationary	5,1084	2.12	2.04	.07
In right hand lane (EV behind)-Move left	5,1084	4.07*	2.30	.04
In right hand lane (EV behind)-Move right	5,1084	3.82*	3.73	.00**
EV Approach from opposite direction-Move left	5,1084	3.55*	2.10	.06
EV Approach from opposite direction-Continue where you are	5,1084	2.61*	3.18	.01
Can't move over -Continue driving	5,1084	1.48	3.71	.00**
Can't move over-Speed up or slow down	5,1084	1.17	1.13	.34
Police-Pull over in case they want you to stop	5,1084	1.30	1.23	.29
Police-Move left and see if it follows you	5,1084	1.10	.65	.66

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .003$

other group; an action that is contrary to both the CRM and the DRM. However, the varied composition of the multiple membership group made it difficult to further interpret the result. Police membership resulted in the highest score, which may be reflective of their enforcement of keep left as a component of other road rules.

Statistically significant differences for the driving scenario of, '*An emergency vehicle is coming towards you from the opposite direction. You will continue driving where you are*', were found between participants with multiple emergency service membership (M=2.81, SD=1.75) and participants with ambulance (M=3.98, SD=1.94) or other membership (M=4.57, SD=1.34). The higher score from the participants with ambulance membership may arise from the propensity for Western Australian ambulance drivers to drive contra flow to clear congested traffic. This action requires the ambulance to drive on the 'wrong' side of the road, and vehicles on that side to move to their left to facilitate their passage. The varied composition of the multiple membership group, and other membership group, make it difficult to further interpret the significance of their results.

Table 33

Mean (SD) for Significant Driving Scores and Scenarios by Emergency Service Membership

	None M (SD)	Police M (SD)	Fire M (SD)	Amb. M (SD)	Other M (SD)	Multiple M (SD)
Number of participants	856	35	46	98	23	32
In right hand lane (EV behind)-Move right	4.45	4.89	4.30	4.35	4.48	3.13
	(1.80)	(1.76)	(2.02)	(1.99)	(1.86)	(2.23)
EV Approach from opposite direction-Continue where you are	3.68	3.46	3.52	3.98	4.57	2.81
	(1.85)	(1.79)	(1.76)	(1.94)	(1.34)	(1.75)

Overall the results suggest that whilst there was no statistically significant difference between members of an emergency service and participants who had never been a member of an emergency service, there were significant differences found for the individual services. Whilst some of the differences were difficult to interpret because of the 'multiple' category

that was used, others could be attributed to the individual driving style, needs and roles of the respective services.

Association with emergency service personnel.

A one way ANOVA was conducted to determine whether participants' associations with emergency service personnel were related to scores for the REVS factors, the CRM and the DRM. In total 787 participants indicated an association with one or more members of an emergency service; more than three times the number of participants who were members themselves. Of the participants who were associated with emergency service personnel, 487 (44.68%) reported an association with member/s of one emergency service and 300 (27.52%) reported an association with members from multiple services. There was homogeneity of variances with the association groups, as assessed by Levene's test of equality of variances for all except ASSOCIATIONS as shown in Table 34 below. With a Bonferroni adjusted alpha level of .007 (.05/7), the difference in associations with emergency service personnel was found to be associated with statistically significant differences for all scores, except REASONS.

Table 34

Levene Statistic and ANOVA Results for REVS Factors and Driving Models by Association with Emergency Service Personnel

	df	Levene Statistic	F	Sig.
REASONS	2, 1087	.81	3.43	.03
BELIEFS	2, 1087	1.64	11.09	.00**
ASSOCIATIONS	2, 1087	12.12*	72.53	.00**
EXPERIENCE	2, 1087	1.74	12.81	.00**
PUNISHMENT	2, 1087	1.63	11.43	.00**
DRM	2, 1087	1.10	14.42	.00**
CRM	2, 1087	.44	10.63	.00**

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD tests showed that the statistically significant difference in in BELIEFS was found between no association and both single association and multiple associations. The statistically significant difference in ASSOCIATIONS was found between all groups. The statistically significant difference in EXPERIENCE was found between no association and both single association and multiple associations. The statistically significant difference in PUNISHMENT was found between no association and both single association and multiple associations. The statistically significant difference in DRM was found between multiple associations and single or no association. The statistically significant difference in CRM was found between no association and multiple associations between multiple associations and single or no association. Table 35 provides the mean scores for each group.

Table 35

Mean (SD) for Significant REVS Factors and Driving Scores by Emergency Service Association

	No Association M (SD)	Single Association M (SD)	Multiple Association M (SD)
Number of Participants	303	487	300
BELIEFS	33.64 (4.41)	34.88 (4.00)	35.09 (4.24)
ASSOCIATIONS	7.78 (3.95)	10.23 (4.52)	12.24 (5.16)
EXPERIENCE	15.86 (4.09)	16.97 (3.83)	17.45 (4.12)
PUNISHMENT	9.16 (2.03)	9.59 (1.90)	9.92 (1.97)
DRM	31.44 (4.46)	31.34 (4.98)	33.13 (4.82)
CRM	30.23 (4.73)	29.76 (5.12)	31.44 (4.99)

In all of the REVS factors bar REASONS, the participants who reported multiple associations achieved a higher score than the single associations, and the participants who reported a single association achieved a higher score than those with no association to an emergency service member. The more complex the association with emergency services, the greater the intention to act appropriately towards emergency vehicles, the more positive

beliefs in emergency services, greater impact of prior associations during encounters, more positive experience associated with the encounter and a greater belief in the appropriateness of punishment. In addition to the psychological factors associated with encountering an emergency vehicle, participants with multiple associations reported greater adherence to the current model of response, and a greater indication of driving in a manner consistent with the DRM. When compared with the statistically significant differences found for emergency service membership, this suggests that an association with emergency service personnel has more effect on the psychological factors and reported driving behaviour than emergency service membership alone.

Age.

MYTH: Younger drivers are better than older drivers.

As part of the demographic data collection, participants were asked to provide their age in years. Respondents ranged from 18 to 83 years with a mean age of 31.78 (*SD*=12.26). Their reported age was correlated with the psychological factors and reported driving behaviours as shown in Table 36. Statistically significant correlations were found for DRM, CRM and EXPERIENCE.

Table 36

Pearson Correlation for REVS Factors and Driving Models by Age

	Age	Significance
REASONS	.105	.315
BELIEFS	.131	.545
ASSOCIATIONS	-.021	.186
EXPERIENCE	.202	.037
PUNISHMENT	.096	.065
DRM	.097	.000
CRM	.068	.001

However, the significance of the correlations was attributable to the size of the sample, and the actual correlations were very low. Therefore, to further interpret the relationship between age, reported driving behaviours and psychological factors, participants were grouped into age categories to facilitate additional analysis. The age categories used were those previously used for selecting motorists for individual interviews in chapter four (i.e. 18 to 20 years, 21 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, 60 to 74 years, and 75 years and over).

A one way ANOVA was then conducted to determine whether the different age groups were associated with different scores for the REVS factors, the CRM and the DRM. There was homogeneity of variances with vehicle groups, as assessed by Levene's test of equality of variances for all except ASSOCIATIONS, DRM scores and CRM scores as shown in Table 37. With a Bonferroni adjusted alpha level of .007 (.05/7), BELIEFS, PUNISHMENT and both driving scores were found to be significantly different for the different age groups as shown in Table 37.

Table 37

Levene Statistic and ANOVA Results for REVS Factors and Driving Models by Age

	df	Levene Statistic	F	Sig.
REASONS	6,1083	1.180	2.312	.03
BELIEFS	6,1083	.832	3.671	.00**
ASSOCIATIONS	6,1083	1.468	.302	.94
EXPERIENCE	6,1083	2.242*	11.644	.00**
PUNISHMENT	6,1083	1.983	2.768	.01
DRM	6,1083	4.296*	4.782	.00**
CRM	6,1083	3.886*	3.498	.00**

* denotes Levene's test of equality of variances significant at $p < .05$
** denotes significance after Bonferroni adjustment of $p < .007$

Post hoc analysis using Tukey's HSD tests, showed that the statistically significant difference for BELIEFS were found between the 18 to 20 years group (M=33.77, SD=4.37) and the 30 to 39 years group (M=35.05, SD=4.23) and 50 to 59 years group (M=36.06,

SD=3.96). The statistically significant difference for EXPERIENCE was found between the 18 to 20 years group (*M*=14.96, *SD*=3.77) and all groups under 75 years of age. It was also found between the 21 to 29 years group (*M*=16.58, *SD*=4.23) and the 50 to 59 years group (*M*=18.06, *SD*=3.78). The statistically significant differences for DRM were found between the 18 to 20 years group (*M*=30.97, *SD*=4.62) and both the 40 to 49 years group (*M*=32.76, *SD*=4.64) and the 50 to 59 years group (*M*=33.46, *SD*=4.74). A statistically significantly difference was also found between the 21 to 29 years group (*M*=31.50, *SD*=5.23) and the 50 to 59 years group (*M*=33.46, *SD*=4.74). The statistically significant difference for CRM was found between the 18 to 20 years group (*M*=29.50, *SD*=4.87) and the 40 to 49 years group (*M*=31.29, *SD*=4.67). Figure 17 provides a graphical representation of the mean scores.

Figure 17 - Mean Scores of REVS Factors and Driving Models by Age Group

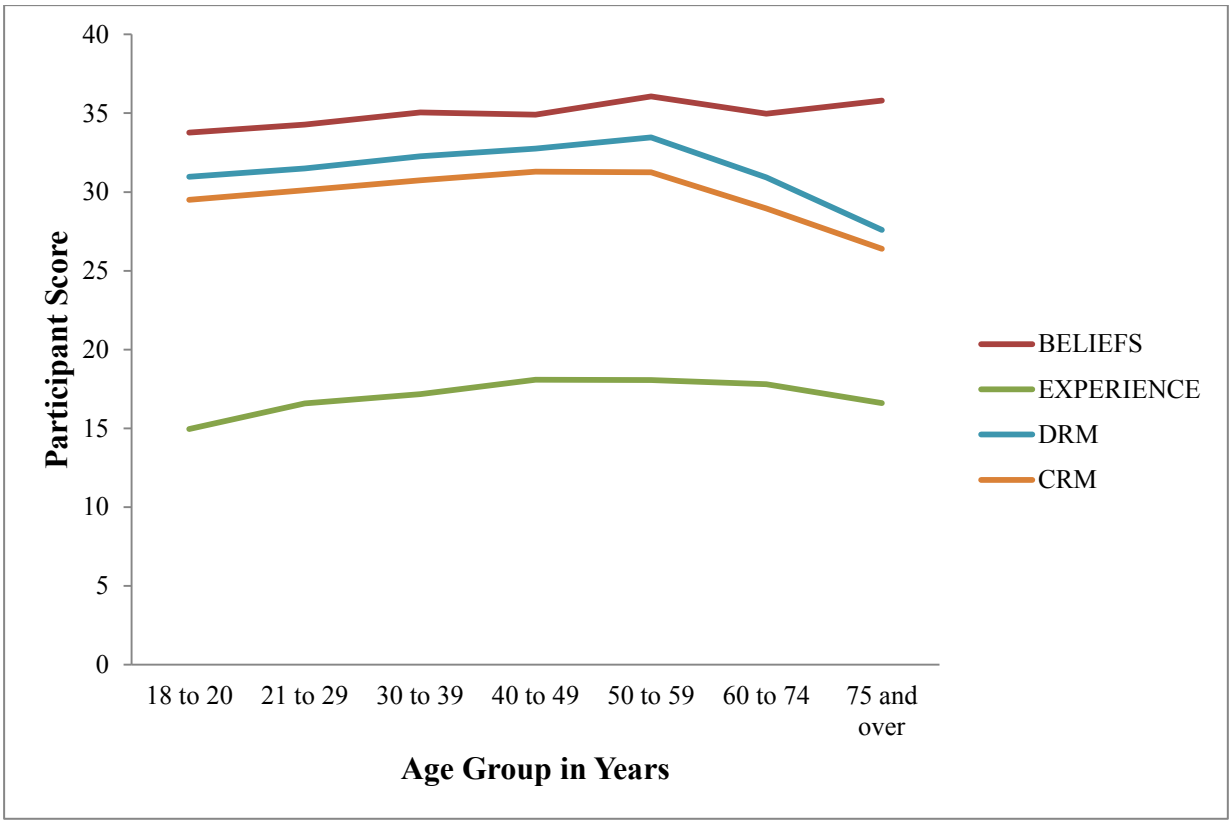


Figure 17 illustrates that the scores for BELIEFS, EXPERIENCE and driving models increased with age, up to 40 to 49 years or 50 to 59 years before they started to decline.

However, there was no significant difference in the scores for the older age groups (60 to 74 year and 75 years and over) relative to the middle groups who had the highest scores. Controlling for age resulted in

From the results, it can be seen that the belief that younger drivers are better than older drivers is not supported. Rather, younger drivers (18 to 20 years) find emergency vehicle encounters more stressful, are less supportive of punishment for failing to give way, and report less positive beliefs about emergency services. In addition to this, 18 to 20 year old participants reported driving behaviours that were less consistent with either the CRM or DRM, and were less likely to facilitate the passage of emergency vehicles. This may be indicative of a cohort effect, or a lack of training and/or experience.

Summary of demographic factors.

Statistically significant differences in participants' reported driving relative to the driving response models were found with crash involvement, driving distances, age groups and emergency service associations. Participants who drove less than 5,000 kilometres per year, participants in the 18 to 20 year age group, and participants who had never been involved in a motor vehicle crash all reported less effective responding to emergency vehicles, relative to both the CRM and the DRM. More than just belonging to an emergency service, participants who were associated with an emergency service, either their own membership or by knowing someone, reported more effective responses to emergency vehicles, relative to both the CRM and the DRM. No other factors resulted in statistically significant differences in reported driving behaviours.

The psychological factor most associated with the demographic factors involved in responding to emergency vehicles was EXPERIENCE; how the participant appraised the stressfulness of the encounters and their capacity to respond effectively. There were significant effects within all demographic variables, apart from how participants learnt to

drive. Females, participants who drove less than 5,000 kilometres per year, participants in the 18 to 20 year age group, participants with no crash involvement, urban drivers, and participants with no association to an emergency service, were all more likely to appraise the experience as arousing or stressful. Where the participant obtained their driver's licence, and how they were instructed were the only demographic factors to significantly impact on EXPERIENCE. By that, participants who obtained their licence in Western Australia were more likely to appraise the experience as arousing or stressful, suggesting that perceived stressfulness and capacity to respond may arise from the opportunity to practice responding and subsequently acquire the appropriate skills.

The lack of variance in the DRM and CRM scores suggested that the motorists had not received sufficient formal training on how to respond to an emergency vehicle, irrespective of where they obtained their licence and how they were instructed. To further explore training and knowledge surrounding emergency vehicle encounters, participants were asked a series of knowledge-based questions. The results of these questions are reported and discussed next.

Knowledge of Emergency Vehicles

Concurrent to the administration of the REVS items, participants were presented with questions that assessed their knowledge surrounding the identification of emergency vehicles. As previously discussed, the legislation explicitly states that Police, Fire Brigade, Ambulance, and vehicles conveying blood and other urgent medical supplies, were emergency vehicles (RTC, 2000). It also provides that other vehicles could be authorised by the Chief Executive Officer of the Department of Transport as emergency vehicles. However, there is no publicly available list of duly authorised vehicles. For these vehicles to identify themselves to other motorists as emergency vehicles, they are required to display a flashing red and blue light or sound an alarm (r.280, RTC, 2000). As such, participants were provided with a list of

vehicles and asked to specify whether the vehicles could be emergency vehicles. Their responses were as shown in Table 38.

Table 38

Participants Responses on Vehicles that could be Emergency Vehicles

Vehicle Type	% of Participants who indicated this could be an emergency vehicle
Ambulance*	1090 (100.00%)
Fire brigade vehicle*	1087 (99.72%)
Police – marked vehicle*	1086 (99.63%)
Police – motorcycle*	1067 (97.89%)
Police – unmarked vehicle*	994 (91.19%)
SES vehicle*	885 (81.19%)
Blood and/or medical supply transfer vehicle*	711 (65.23%)
Western Power (electricity service) vehicle*	624 (57.25%)
Main Roads vehicle*	366 (33.58%)
Tow Truck	259 (23.76%)
Road works vehicle	220 (20.18%)
Fisheries Department	137 (12.57%)

* Denotes vehicle that can be an emergency vehicle

Participants readily identified Police, Fire Brigade and Ambulance vehicles as emergency vehicles, particularly when they were overtly marked (i.e. not a plain vehicle). This was consistent with the reinforcement given through traditional learner driver literature (Department of Transport, 2013), and their explicit inclusion in the legislated definition (RTA,1974). However, the legal definition also included blood and/or medical supply transfer vehicles, but this was only recognised as an emergency vehicle by 711 (65.23%) participants, suggesting the legislated definition may not be known to all motorists. The reduced recognition of unmarked police vehicles (that have no livery and only display red/blue flashing lights when driving under emergency conditions), and lack of recognition for Western Power vehicles (an authorised vehicle belonging to the state electricity service, which displays red flashing lights) also suggests that relying on the presence of an emergency

light or siren may not be sufficient for participants to identify the vehicle as an emergency vehicle either; particularly when participants include vehicles that do not have red or blue lights such as tow trucks (amber), roadwork's vehicles (amber) and fisheries vehicles (magenta).

To further explore recognition of emergency vehicles, participants were given a list of options and asked to select of methods they used to identify emergency vehicles; their results were as provided in Table 39. 'Other' methods for identifying emergency vehicles included vehicle aerials (type and number), the way the vehicle was driven (i.e. urgently), specific wording or chequered patterns, the colour of the vehicle, the actions of other vehicles towards that vehicle, reflective markings, the size and type of vehicle and the uniforms worn by the occupants of the vehicle.

Table 39

Participants' methods for Identifying Emergency Vehicles

Method of Identification	N	% of Total Participants
Accessible by Dialling 000	362	33.21
Organisational Markings on Vehicle	808	74.13
Flashing Lights	1056	96.89
Emergency Siren	1042	95.60
Other method	35	3.21

Participants who indicated the use of emergency lights were asked to indicate the colour of the lights for emergency vehicles. Whilst nearly all participants included red (N=1040, 98.48%) and blue (N=1039, 98.39%) as emergency light colours, 424 (40.15%) also included orange/amber warning lights, 128 (12.12%) included green lights and 68 (6.44%) included magenta lights. The inclusion of amber (a warning light only) as an emergency light colour was consistent with the inclusion of tow trucks and road works vehicles as emergency vehicles. However, motorists who were motivated by prosocial ideals may give way to these

vehicles even if they were not required to do so, and giving way to non-emergency vehicles would be less problematic than not giving way to emergency vehicles.

Overall, the results regarding recognition of emergency vehicles suggested that some participants were not able to correctly identify some emergency vehicles. The earlier discussion highlighted that people are prepared to respond appropriately to emergency vehicles. They have strong prosocial intentions towards emergency vehicles and, whilst perceiving the situation as arousing, it is not so stressful that it would undermine their capacity to respond. However, these factors are hindered by their inability to identify which vehicles they need to give way to.

Do the Reported Driving Behaviours Indicate Areas in Need of Training?

In conjunction with the REVS, participants were presented with seven driving scenarios. Each driving scenario presented two driving responses and participants were asked to indicate how likely they were to undertake either of the actions. The driving scenarios were drawn from incidents that were mentioned by emergency service participants (chapter four). The responses to the scenarios were based upon the CRM, as provided by the road safety literature (Department of Transport, 2013), and the DRM that arose from earlier qualitative research (Chapter Four). The responses congruent with each of the models were summed to provide an indication of driving behaviour relative to those models in the preceding section. The responses to the individual scenarios also facilitated an identification of areas where motorists responded effectively or adversely.

Driving scenarios that provided an obvious correct driving response elicited a high mean score. For example, when driving in the right hand lane with an emergency vehicle approaching from behind, 1000 (91.74%) participants indicated they would move left. However, when the motorist was already in the left hand lane, 436 (40.00%) indicated they were likely to move right, suggesting that in addition to a compulsion to move left, there was

also a compulsion to move over. In a situation where a motorist was unable to change lanes, the responses were mixed between changing speed (N=586, 53.76%) in accordance with the CRM, or continuing at the same speed (N=564, 51.74%), consistent with the DRM

Mean scores for the driving scenarios involving TCL also indicated an area of ambiguity. For both the CRM and the DRM, motorists are prohibited from contravening the red traffic light, irrespective of it being explicitly stated in the model. However, 379 (34.77%) participants indicated they would be prepared to enter the intersection despite the red light. Overall, the responses demonstrated that many participants were not driving in accordance with the CRM, reinforcing the conclusion that they did not receive sufficient formal training to respond appropriately to an emergency vehicle.

Summary

This chapter used the data collected during the development of the REVS to answer the research questions that sought to understand the phenomenon of motorists encountering emergency vehicles. What is an effective response to an emergency vehicle? What psychological processes are involved with motorists' responses after detecting an emergency vehicle? What psychological factors are associated with effective responding to an emergency vehicle? What other factors are associated with effective responding to an emergency vehicle? By answering these questions, the research sought to understand why problems occurred with some motorists' responses, so that appropriate strategies could be proposed to facilitate more effective responding.

The research identified that the psychological factors associated with emergency vehicle encounters were the motorists' prosocial motivations for responding to emergency vehicles, their perception of the stressfulness of the experience and their ability to cope, the effect of their prior associations with emergency vehicles and services, their attitudes and beliefs about emergency vehicles and their beliefs about punishment. However, when

attempting to associate these factors with reported driving behaviours around emergency vehicles, it was found that, although the factors played a significant role in the encounters, they offered little in the way of predicting effective or ineffective responding.

Other factors were explored in an attempt to identify relationships to reported driving behaviours around emergency vehicles. Some significant associations were found with younger drivers (18 to 20 years), motorists who did not drive very far (less than 5,000 kilometres per year) or drove large distances (over 25,000 kilometres per year), motorists who were associated with emergency service personnel, and motorists who had never been involved in a motor vehicle crash. An exploration of participant knowledge of emergency vehicles and appropriate responses revealed that there were some difficulties with identifying which vehicles were emergency vehicles, and what the appropriate response during an encounter actually was. As such, the results suggested that the problem with emergency vehicle encounters was lack of knowledge and practice in responding effectively. This was reinforced when considering where a motorist learnt to drive, and how they were instructed. Presumably, if a Western Australian motorist had been taught to respond to emergency vehicles, they would have reported more effective driving behaviours, but this was not the case. If formal instruction from a driving instructor had incorporated training on responding to emergency vehicle encounters, participants receiving such instruction would have reported more effective driving behaviours; however, this was not the case either.

Whilst the psychological factors offered little in predictive value for reported driving behaviours, they were able provide an understanding of participants' ability to be trained to respond more effectively to emergency vehicles. Results for *Factor I – Reasons for Responding to Emergency Vehicles* indicated most participants held very strong prosocial intentions towards emergency vehicles. Participants wanted to respond in a way that facilitated the passage of emergency vehicles and were cognisant of the potential

consequences (i.e. loss of life) for failing to do so. As such, the inappropriate responses around emergency vehicles were unlikely to arise from an unwillingness to assist emergency vehicles, and more likely to arise from a lack of knowledge of how to assist emergency vehicles. They had good intentions but lack knowledge and skill

The results for *Factor II – The Experience of Encountering an Emergency Vehicle*, indicate that the experience of encountering an emergency vehicle, whilst arousing, was not perceived as a negatively stressful event. Nor was it judged to be beyond the participants' abilities. The transactional model of stress provides that this type of assessment of an event would actually support their participant ability to cope with the event (Lazarus & Folkman, 1984). Coping, within this context, is both cognitive and behavioural; the behaviour being the required driving response (Folkman et al., 2004). This again supports the assertion that an inappropriate driving response during an emergency vehicle encounter is more like to arise from a lack of procedural knowledge rather than an inability to carry out the required response, were it known to the participant.

The results for *Factor III – Prior Associations with Emergency Vehicles* indicate that the effect of prior exposure to emergency vehicles was significant, yet comparatively low. Research has demonstrated that previous exposure to a stimulus can result in priming, thus making subsequent exposure to that, and potentially related stimuli, more salient (Bornstein, 1989; Moreland & Topolinski, 2010; Zajonc, 1968). As such, previous exposure to an emergency vehicle through use, membership or some other reason, may result in the participant being primed to detect vehicles from that emergency service, and potentially other similar emergency vehicles. Research has also indicated that earlier detection of an emergency vehicle may facilitate more effective responding (Lenne et al., 2008). As such, prior exposure may facilitate a more effective response. However, whilst this priming may have resulted in earlier detection, the significant yet low effect for this factor suggests that

priming alone does not facilitate more effective responding. It may be that, whilst participants are ready to respond more quickly, the participants still lack the knowledge of how to respond effectively.

The results of *Factor IV – Attitudes and Beliefs about Emergency Vehicles*, indicate that participants generally hold positive views about emergency vehicles and the associated services. Concurrent to this, *Factor V – Beliefs about Punishment* indicates that participants believe there should be a punishment for drivers who fail to give way to an emergency vehicle. Within the context of why people obey the law, it has been shown that the public are more likely to voluntarily comply with a law when they perceive it to be legitimate. This legitimacy relates to the law itself, and to the organisations creating and enforcing the law. The participants' positive beliefs surrounding emergency vehicles and punishment suggest that they view the law relating to the passage of emergency vehicles it as legitimate. As such, their behaviour is likely to reflect compliance with those laws. Therefore, inappropriate behaviour is more likely to arise from a lack of knowledge as to the correct response. The provision of training on the correct procedure, if provided in a way that maintains the perceived legitimacy of the emergency vehicles and associated laws, should result in more effective responding during emergency vehicle encounters.

Notably, whilst the motorists' behaviours were assessed relative to the CRM, this was not the response needed to facilitate the passage of the emergency service. The qualitative exploration with emergency service drivers indicated that there was a more desirable model of response that facilitates the passage of the emergency services by assisting to provide them clear passage, whilst maintaining a safe driving environment. As such, whilst the results indicate the participants would be receptive to appropriate training on responding to emergency vehicles, the training needs to be based on the DRM for that response to be

effective and accommodate the needs of each of the services, namely fire, police and ambulance.

Concurrent to the adoption of a more desirable model of response, the emergency services could assist motorists by providing a more consistent style of emergency driving. This can be accomplished by standardising the emergency driving so that emergency vehicles endeavour to remain to the right of the body of traffic, allowing motorists to remain left of the emergency vehicle. By adopting this standardised method of emergency driving, amending the road safety model to reflect the DRM, the motorist, who wants to do the right thing, is more likely to be receptive to training and to adopt a driving style that facilitates the passage of emergency vehicles.

CHAPTER TEN: Conclusion

Summary of Key Findings

The current research involved a series of progressive studies as presented in the preceding nine chapters. Subsequent to the introduction in chapter one, chapter two provided a review of the existing body of knowledge on the motorists' role during emergency driving, the main driver behaviour models that have informed driver behaviour research, and the psychological theories that may have further informed our understanding of emergency vehicle encounters. The review identified that there was a need to undertake emergency driving, however, doing so created greater risks for emergency vehicles and other motorists. Research on vehicle design and technological systems could facilitate more effective detection of emergency vehicles, but preliminary studies into the role of the motorist suggested that the problem was not solely one of detection. The existing research into motorists' role in emergency vehicle encounters suggested there were psychological factors associated with the encounters, however, the scope of that research was not sufficient to fully understand the phenomenon, nor provide for generalisation of findings to the broader population. As such, the literature review determined that a larger, quantitative assessment was required to understand the psychological factors associated with responding and allow for generalisation of findings to the broader motoring community. The literature review also revealed that an existing measure could not be used to facilitate the assessment as the lack of a universally accepted model or theory meant that it was not possible to identify the one best suited to this research at this stage. As such, the research incorporated the development of a scale to identify and measure the psychological factors associated with motorists encountering emergency vehicles.

Upon establishing the need for a scale to identify the psychological factors associated with responding to emergency vehicles, chapter three outlined the phases of the construct

validity approach to scale development (Simms & Watson, 2007) that were used to develop the scale. This approach incorporated substantive validity, structural validity and external validity phases, which resulted in the development of a robust scale. In selecting this method, relative to the previous literature review (chapter two), it was determined that there was insufficient literature from which scale items could be developed, and an additional qualitative study was needed to supplement the knowledge base.

Chapter four reported upon the qualitative study that was undertaken with emergency service drivers and other motorists, to explore the phenomenon of responding to emergency vehicles. The emergency service drivers first provided an understanding of their experiences of other motorists when they were undertaking emergency driving, which expanded upon the researcher's own experiences to ensure the phenomenon was considered from a broader perspective. The results from emergency service drivers provided a lens through which the other motorists could be viewed. It also identified that the current road safety guidelines, which act as an interpretation of the legislative requirements for motorists, were not consistent with the needs of the emergency drivers. It concluded that a holistic solution would also require amendment of these guidelines.

The qualitative study also identified several psychological themes around the phenomenon of encountering emergency vehicles. It found that their attitudes and beliefs surrounding emergency vehicles were associated with the experience of encountering one. These included their beliefs about themselves and other motorists, beliefs about emergency services and their personnel, and beliefs about law, risk, safety and punishment. Other factors associated with emergency vehicle encounters included when and how they detected an emergency vehicle, the level of importance they placed on responding, their prior associations with emergency services, the effect of ambiguity, and how they learnt to drive and respond to emergency vehicles. These factors, combined to inform participants' appraisal of emergency

vehicle encounters and their ability to respond to emergency vehicles, and the resultant affective response. Thus, the qualitative research with emergency service drivers and motorists, combined with existing literature, was sufficient to provide the themes from which survey items could be drawn.

Chapter five reported on the development of the preliminary Responding to Emergency Vehicle Scale (REVS) items from the literature identified in chapter two and the themes derived from the qualitative exploration with emergency service drivers and motorists in chapter four. It also identified the rationale for the style and medium chosen to deliver the survey. The chapter also reported on the piloting of the items resulting in the creation of the Preliminary REVS and completion of the substantive validity phase of scale development.

Chapter six to eight reported on the structural validity phase of scale development, which incorporated repetitive administration and testing of the scale to reduce the number of items, and determine the underlying structure. The scale's structure, internal consistency, inter-item correlations were established, and it was reduced in size. This progressively resulted in a Revised REVS with seven factors and 45 items and the Final REVS containing 25 items and five factors. The absence of social desirability bias was established in chapter seven through the administration of the Driver Social Desirability Scale and good temporal validity was demonstrated through the testing of a sample of motorists on two separate occasions.

The final administration of the REVS was also used to demonstrate the REVS convergent, discriminant and criterion related validity by demonstrating that the REVS scale was consistent with other driving scales, yet sufficiently conceptually different to support the need for the new scale. Overall, the REVS was established as a valid scale for assessing human factors associated with motorists responding to emergency vehicles and was

sufficiently associated with related items as to establish itself within the existing body of knowledge.

Chapter nine used the data collected during the development of the REVS to answer the research questions that sought to understand the phenomenon of motorists encountering emergency vehicles. The research findings were then oriented within the broader body of knowledge on emergency vehicles and driver behaviour. It identified the contribution this research made to understanding the role of the motorist in emergency vehicle encounters and the factors associated with responding.

Significance and Implications for Research and Policy

Theory

There is a significant body of literature that may inform driving behaviours, both generally and relative to certain conditions. Specific models of driving behaviour may be applied to these situations, and any number of psychological theories may also be useful in understanding and explaining the experience and actions of motorists. However, the arbitrary selection of a model or theory, prior to any exploratory research, risks limiting understanding of the phenomenon. By undertaking an exploratory analysis prior to the application of any theory, the current research demonstrated that several overlapping concepts are useful to understand the experiences of the motorist when encountering emergency vehicles. It demonstrated that a synthesis of theories on attitude, stress research, prosocial behaviour, priming and mere exposure effect, are needed to understand the phenomenon of motorists encountering emergency vehicles. It also demonstrated the contribution these theories can make to identifying potential solutions to the problem of inappropriate responding. The psychological factors demonstrated little predictive ability for the reported driving behaviour, nevertheless they did provide an understanding of the participants' ability to be trained to respond more effectively to emergency vehicles. Their strong prosocial intentions indicated

they wanted to respond appropriately to emergency vehicles and were cognisant of the potential consequences for not doing so. The encounter aroused them, but not to the extent they were incapable of responding, and their perception of the stressfulness of the encounter would only be facilitated by appropriate tuition. Their generally positive views about emergency vehicles and the associated services, and beliefs in the appropriateness of punishment further support their willingness to responding appropriately.

Policy

Although the current research was undertaken from a predominately theoretical lens, the applied nature of the phenomenon under scrutiny provided several findings that may be used to inform policy around responding to emergency vehicles.

Change road safety message

The qualitative research with emergency service drivers, as reported in chapter four, highlighted issues around the interpretation of the legislated requirement for motorists to give way to emergency vehicles. The legislation provided that motorists had to make every reasonable effort to give uninterrupted passage to the emergency vehicle (r.60 RTC, 2000). The Road Safety guidelines, as communicated through learner driver literature (Department of Transport, 2013) and media releases (Le Messurier, 2015), provide assistance to motorists in interpreting how best to comply with this requirement. Unfortunately, some of the guidelines are not consistent with the needs of the emergency service drivers. The first guideline of move left is appropriate, but the second component (if you can't move left, slow down or stop and let the emergency vehicle go around you), is more likely to create an unsafe situation for emergency vehicles. As discussed in the preceding chapters, it is the preference of the emergency service drivers that other motorists, who are unable to move over, keep going in traffic until they can, thus reducing the need for the emergency service driver to brake or manoeuvre around the motorist. This is further facilitated by the emergency service

drivers' recommendation that motorists who have moved left, then need to let other motorists in. Finally, the emergency service drivers acknowledged the need to address the ambiguity around police using lights and sirens. Thus, they provide that, if the emergency vehicle is a police vehicle, move left; if the police wish to stop the vehicle, they will follow the motorist. As such, it is recommended that the DRM be reviewed at an executive/policy level and validated with a larger representative sample of emergency service personnel. If found appropriate, road safety guidelines could be amended to reflect the desired model.

Explicit training on responding to emergency vehicles

The preceding chapters demonstrated that motorists received little formal tuition on identifying or responding to emergency vehicles, and had to rely on other methods to obtain the skills and knowledge required to respond effectively. This results in a system where lack of understanding is perpetuated across generations. However, the research also identified that motorists generally want to respond appropriately to emergency vehicles, irrespective of any punitive consequence that may arise from failing to do so. Further, the results obtained on the REVS subscales indicate that motorists are likely to respond well to educational strategies that assist them to learn how to respond effectively. As such, the research concludes that there should be benefit in providing explicit training on responding to emergency vehicles to new and existing drivers. There may be some argument for reinstating the training runs previously undertaken by the Fire Service, though this would need to be balanced with ensuring the practice did not undermine the perceived emergency, and therefore legitimacy, of the emergency driving.

The current training model for new drivers within Western Australia is a graduated licensing system whereby novice drivers are provided the opportunity to undertake classroom learning prior to any practical driving, or complete a theory test. They then must undertake hours of supervised driving over a 12 month period whilst learning and practising driving.

The theoretical component of learning to drive, delivered within the school system, encompasses roadcraft, road rules and safe practices. It is a mixture of lessons, observational learning, and a final theory test. Whilst novice drivers may encounter emergency vehicles during their on-road training, it would be impractical to formally incorporate this in the practical driving component. It would therefore be recommended that training on how to identify and respond to emergency vehicles be embedded in the classroom syllabus, theory test, and final hazard perception test undertaken prior to receiving a drivers' licence. Concurrent to this additional training for novice drivers, it is recommended that some form of public education campaign be undertaken to advise existing motorists of the new guidelines for responding to an emergency vehicle.

Consider consistent policy across emergency services

Whilst not explored in the quantitative component of the research, the qualitative research with emergency service drivers identified that the respective services differed in the way they undertook emergency driving. Whilst relying on the same legislative provisions, their organisational policies, and practices, which guided how they would undertake the driving, were noticeably different. There were variations on whether the emergency vehicles would become stationary or just slow down, prior to entering intersections controlled by traffic lights or stop signs. There were also differences around whether the drivers were likely to drive contra flow or remain solely on the left-hand side of the road. Finally, the services also differed in whether they would endeavour to stay to the right of the traffic or move around the traffic (left or right), dependent upon where the gap was.

Whilst there were indications that this caused motorists some confusion, it was not explicitly explored within the quantitative studies. However, the survey data obtained from emergency personnel indicated even they were not cognisant of the needs of other services that arise from the differing driving styles. Whilst the characteristics of their vehicles

somewhat dictate the driving style of the individual services, there may still be merit in exploring a more unified driving practice. It is therefore recommended that greater collaboration between the respective services on driving practices may facilitate a more standardised, and therefore predictable manner of emergency driving, thus reducing the ambiguity for the motorist around the intention and direction of the emergency vehicles during these encounters.

Methodological considerations

Strengths and limitations.

Establishing access to a random sample of motorists representative of the community was a challenge for the research as there are very few accessible data sets that include a true cross section of this population. The electoral roll, whilst comprehensive because of compulsory enrolment, is limited to motorists who are Australian citizens, and attempts to use this source were rendered inefficient by the restrictions placed on survey dissemination. Additionally, people may elect to be excluded from this public record. The Department of Transport holds a comprehensive list of motorists who hold Western Australian motor driver's licences. This does not capture drivers who hold interstate or international licences, nor is it accessible for research purposes. Motoring groups may provide a sufficiently diverse group of motorists but tend to restrict the use of their membership to their own research. Despite access to appropriate databases, it is the nature of surveys that even those going out to the full population can be skewed in that the participants who elect to complete the survey are self-selected and can exhibit a volunteer bias towards prosocial behaviour. However, Edith Cowan University's student population represents a diverse demographic, as evidence in the second sample (chapter seven) that was drawn solely from the student population. Additionally, the third sample (chapter eight) was sourced from the broader community, and

still provided results that were consistent with the earlier samples, confirming the utility of the sampling sources.

It is also acknowledged that one of the best measurements of driver behaviour is direct observation. Whilst every effort was made to adopt best practices for the current research, establishing driving conditions in which responses to emergency vehicles could be monitored was beyond its limits. In adopting a self-report measure to assess driving, the research design endeavoured to employ every available technique to minimise the risks associated with those measures, including assessment of socially desirable responding, anonymity, and neutrally worded items.

The current research incorporated a sequential mixed methods model with a series of progressive studies. The underpinning literature review considered, not only the existing driver behaviour literature and informing psychological theories, but the broader research around emergency driving and how it might inform the understanding of the motorist. By incorporating the qualitative research with emergency service drivers, it provided a basis through which the assessment of motorists could be tangibly linked to the professionals it seeks to assist.

Construct validity approach to scale development is a rigorous method that results in a defensible survey tool. The repeated administration of the tool during the structural validity phase facilitated the assessment of multiple samples from the target motoring community, necessary for generalising the results of Principal Components Analysis to the population. In addition to the construct validity approach, this research drew on scale development literature to not only inform its validity, but other methodological considerations as well. In doing so it developed a survey tool that employed contemporary design techniques, which was delivered on a medium that provided a low-cost method of accessing a broad cross section of the community.

Professionally, the researcher has been a police officer for 19 years, with experience in general duties and traffic policing, and has been qualified to drive at all levels of emergency driving for the past ten years. Though never involved in a crash whilst undertaking emergency driving, the researcher has experienced motorists drive in the vicinity of emergency vehicles in a manner that puts themselves and others at risk. The experiences of the researcher facilitated the establishment of rapport with the involved emergency service personnel and allowed for a richer understanding of the driving behaviours reported by the motorists. However, policing is by nature a judgemental occupation, which can lend itself to biased interpretations of the behaviours of others. By way of example, prior to conducting previous research (Grant, 2010), the researcher had perceived an element of wilfulness in the behaviour of other motorists, attributing some responses to the perceived legitimacy of emergency services. The aforementioned research identified the belief to be erroneous and illustrated alternate processes involved in motorists' responses. The current research incorporated other emergency service personnel to ensure the experiences informing the research were broader than just the researcher's and more representative of the three main emergency services within Western Australia. The researcher also employed other techniques such as member checking, peer review and verification by experts such as road safety practitioners, to reduce the subjectiveness that might occur.

Future Research

The current research specifically focused on the phenomenon of motorists encountering emergency vehicles, after the vehicle had been detected by the motorist. In doing so, it determined that detection, and the time associated with that and response, was a construct associated with the central phenomenon of emergency vehicle encounters. Other research (Lenne et al., 2008) has demonstrated that increasing opportunities for earlier detection of emergency vehicles, and thus increasing the time available in which to respond,

can positively influence the encounters. This is providing the motorist has sufficient training and/or understanding to know how to respond in a manner that will facilitate the passage of emergency vehicles. It is therefore recommended that subsequent research firstly test the effectiveness of any training that may be implemented to instruct motorists how to respond more effectively to an emergency vehicle. It is also recommended that future research consider the technical solutions that are available to assist motorists in detecting the vehicle, the implementation of which may be informed by the findings within the current research. That, upon detecting emergency vehicles, motorists may be generally aroused by the encounters, but not so stressed as to be unable to respond. It may also be based upon the understanding that motorists generally have good intentions towards the emergency services and want to assist the passage of emergency vehicles. Although they may not understand what driver behaviours are required for a response to be effective, this research has demonstrated that motorists are likely to respond well to training and will, with practice, acquire the necessary skill.

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APPENDICES

APPENDIX A **List of Participants Demographics for Chapters Four and Five**

Alias	Service	Role	Gender	Years in Service
Sam	Fire and Rescue (WA)	Trainer	Male	Over 20 years
Jan	St John Ambulance	Paramedic Trainer	Female	5 to 10 years
Robert	St John Ambulance	Paramedic Trainer	Male	5 to 10 years
Darren	St John Ambulance	Paramedic Trainer	Male	5 to 10 years
Michael	WA Police	Patrol & Inquiry Officer	Male	Over 20 years
Neil	WA Police	Patrol & Inquiry Officer	Male	Less than 5 yrs
Mary	WA Police	Patrol & Inquiry Officer	Female	5 to 10 years

Alias	Age	Gender	Yrs Driving	First Licenced	Crash Involvement
Luke	18	Male	2 years	Western Australia	No
Marie	19	Female	1 ½ years	Western Australia	Yes
Meagan	22	Female	5 years	Western Australia	Yes
James	28	Male	8 years	Western Australia	Yes
Martine	38	Female	21 years	Western Australia	Passenger only
Nigel	38	Male	21 years	Western Australia	Nil
Ella	44	Female	25 years	Western Australia	Nil
Alexander	47	Male	27 years	United Kingdom	Yes
Brad	50	Male	32 years	Western Australia	Yes
Stephanie	52	Female	33 years	New Zealand	Nil
Joan	65	Female	42 years	Western Australia	Yes
Keith	73	Male	55 years	Western Australia	Yes
Doris	79	Female	58 years	Western Australia	Yes
George	83	Male	60 years	Western Australia	Yes

APPENDIX B **Emergency Service Drivers information letter**

Information Letter

Focus Group on Motorists' Responses to EVs

Difficulties can arise from motorists' interactions with EVs and, in some cases, result in crashes and delays to the EV. Previous research has considered areas such as siren, light and vehicle design, and the role of the emergency service personnel but has failed to account for the experiences of the motorists. This research is undertaken to satisfy the requirements for a Doctor of Philosophy, Psychology degree at Edith Cowan University, Joondalup, Western Australia. The aim of the project is to develop a measure of driver responses to EVs.

As a person who is experienced in driving, you can assist by participating in a group discussion. During the focus group, I would like to discuss your experiences, thoughts, and feelings in relation to motorists responding to EVs. This should take approximately one hour.

Later, I will ask you to complete an online survey that will be developed from the information provided by yourself, motorists and experienced drivers. In asking you to complete this survey, we seek your comment on its content, instructions, format, and overall quality. The survey will take up to 20 minutes to complete.

The group discussion will be audio recorded and transcribed upon completion. Any information that has the potential to identify you will be omitted from the transcript and the recording will be deleted. No identifying information will accompany, or form any part of, the final report.

During the research, your contact details, transcript and consent form will be stored by in a secure location. At the completion of the research, all identifying details will be erased or destroyed and the documents will be stored by Edith Cowan University. After five years, all documentation will be destroyed. Results from the study may form the basis of a publishable report.

Participation in this research is voluntary. You can withdraw your consent at any time and any recordings, transcripts, and documents relating to you will be destroyed.

If you have any queries regarding the research or require further information, please contact me, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 6304 2170.

Thank you for your time and participation

Supervisor:	PhD Candidate:	Supervisor:
Dr Eyal Gringart	Pauline Grant	Dr Deirdre Drake
6304 5631	0417 958 375	6304 5020
e.gringart@ecu.edu.au	pgrant0@our.ecu.edu.au	d.drake@ecu.edu.au

School of Psychology and Social Science – January 2013

Edith Cowan University

APPENDIX C **Emergency service drivers consent form**

Informed consent – Focus Group

Motorists' Responses to EVs

In signing this letter of consent, you agree to the following:

- I have been provided with a copy of the information letter, which I have read and understood.
- I have been given the opportunity to ask questions and received satisfactory answers.
- I understand that participation in this project will involve participation in a group discussion that will be audio recorded, and a follow up survey.
- I understand that the information obtained from the group discussion will form the basis for a publishable report.
- I understand that the audio recording will be transcribed after the group discussion and the original recording destroyed.
- I understand that the researcher will secure all documentation relating to myself and my interview whilst the research project is ongoing.
- I understand that, at the completion of the research project, all identifying information will be destroyed, and all transcripts, questionnaires, and consent forms will be stored by Edith Cowan University for a period of five years before being destroyed.
- I understand that I may withdraw permission or cease to participate at any time.

I agree to participate in the project

Participant ……. Date…….

Researcher …….Date…….

APPENDIX D **Emergency service driver demographic data collection form**

Demographics Questionnaire – Focus Group

Name: .....

Male ☐ Female ☐ Age: .....

Occupation: .....

Length of service: .....

Contact phone number: .....

Email address: .....

Mailing address: .....

.....

APPENDIX E **Interview schedule**

Tell me about the last time you encountered an EV?

- What did you do?
- How did you feel (physically/emotionally)?
- You indicated that you felt _____ when you encountered an EV. Can you tell me more about that?

What sorts of things are you legally allowed do to get out of the way of the EV?

What sort of things would you be prepared to do? What wouldn't you be prepared to do?

What sort of things can the EV do to get through traffic?

Should the EV be allowed to break the rules?

Have you ever heard a siren but couldn't work out where it was coming from?

Have you ever been surprised by an EV?

What happens if you don't have enough time to respond?

What is more important, getting out of the way of the EV or obeying the law?"

Do you feel it is important to give way to emergency services? Why? Why not?

What happens if you don't give way to the EV? Can't. Won't. Does it even matter?

Do you think emergency driving poses a risk? Do you think it is worth the risk?

If a crash occurred between an EV and a normal vehicle, who would be at fault? Why?

Do you think people should be punished for not getting out of the way? Is it likely?

You never really know when you are likely to encounter and EV. How do you feel about that?

When you encounter an EV, do you know which way it's going to go? What happens if you can't work it out?

Do you know what the emergency services do?

- When you see them do you wonder what the EVs are doing?

If the EV is a police car, do you worry that they're trying to stop you?

How to you feel about the emergency services? Police? Fire? Ambulance?

Have you or someone close to you, ever needed the assistance of the emergency services?

- Do EVs remind you of that?

Do you know someone who is an emergency service worker? Do EVs make you think of them?

How did you learn to drive?

How did you learn about EVs?

What sort of driver do you consider yourself to be?

How does responding to an EV make you feel?

How confident are you in your ability to respond to an EV?

APPENDIX F **Desired Response Model (DRM) Driving scenarios**

1. You are driving the right hand lane of a highway and an emergency vehicle is approaching from behind in the left hand lane. Which of the following actions are best?

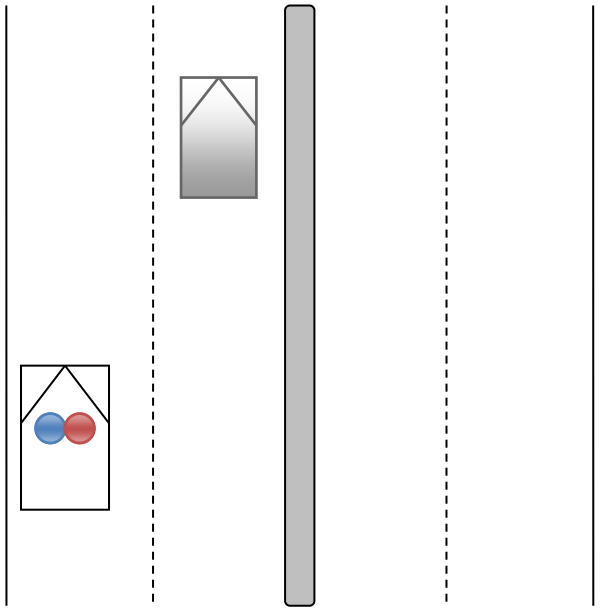
A. Move as far left as possible and continue driving

B. Remain right and continue driving

C. Stop where you are

D. Drive onto the right hand median strip (if available)

E. Move as far left as possible and stop



2. You are stationary at a red traffic light and an emergency vehicle is approaching you from behind. Which of the following are best? (you may choose more than one answer)

A. Move into the intersection

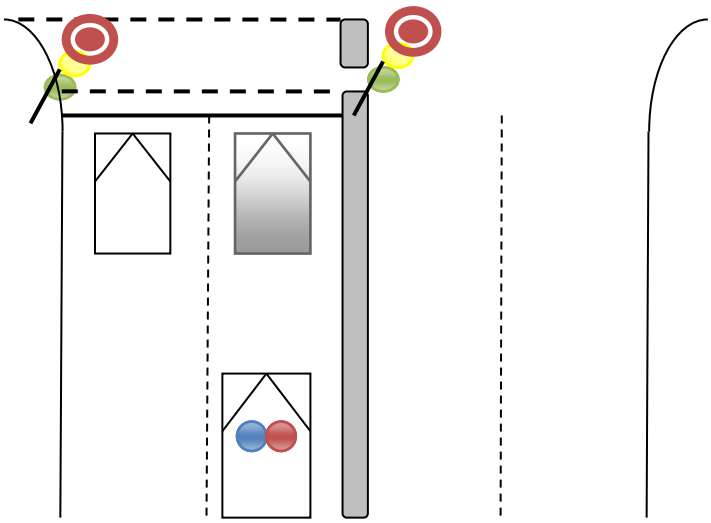
B. Drive through the intersection

C. Move your car as far left as possible

D. Move your car as far right as possible

E. Drive onto the median strip (if available)

F. Remain stationary



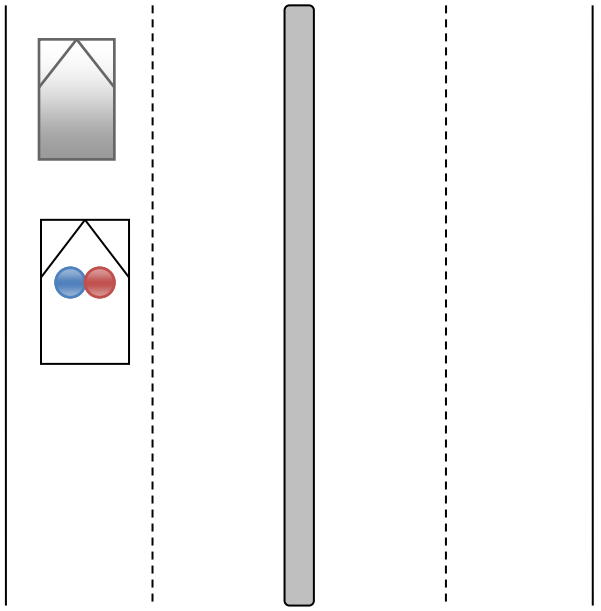
3. You are driving in the left hand lane of a highway and an emergency vehicle is approaching from behind in the left hand lane. Which of the following actions are best? (you may choose more than one answer)

A. Move as far right and continue driving

B. Remain left and continue driving

C. Become stationary where you are

D. Drive onto the left hand verge (if available)

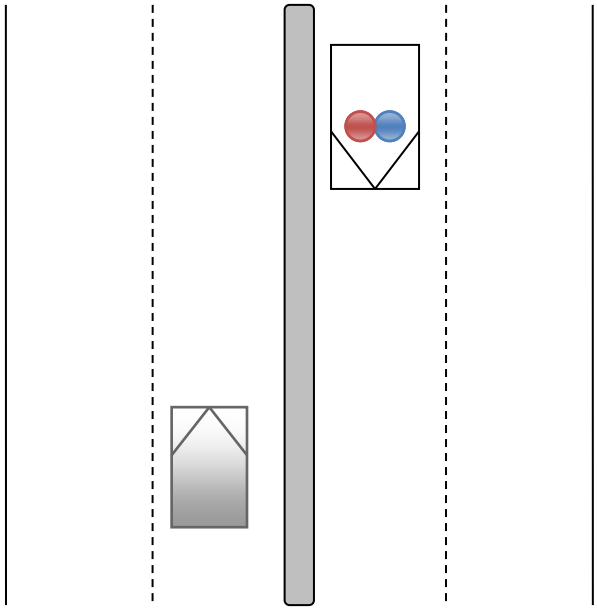


4. If an emergency vehicle is approaching from the opposite direction, you should:

A. Move as far left as possible

B. Move as far right as possible

C. Continue driving where you are



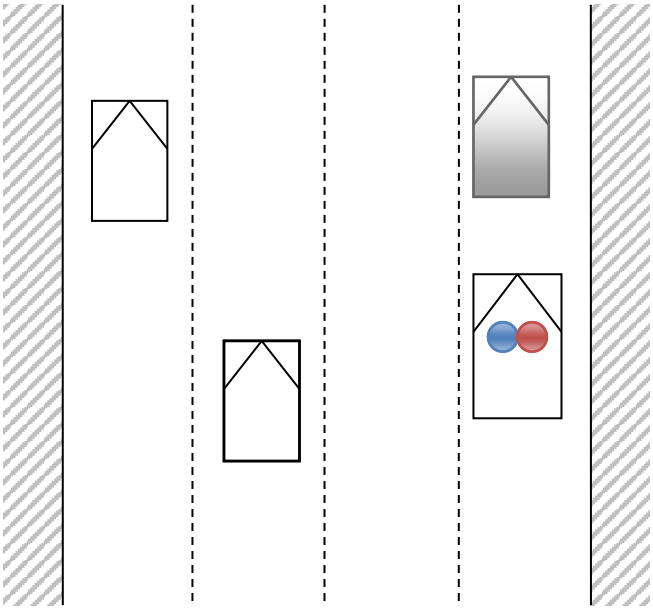
5. You are travelling in the right hand lane of the freeway when an emergency vehicle approaches you from behind. Which of the following actions are best? (you may choose more than one answer

A. Move left and continue driving

B. Move into the right emergency lane and continue driving

C. Move into the right emergency lane and become stationary

D. Become stationary where you are



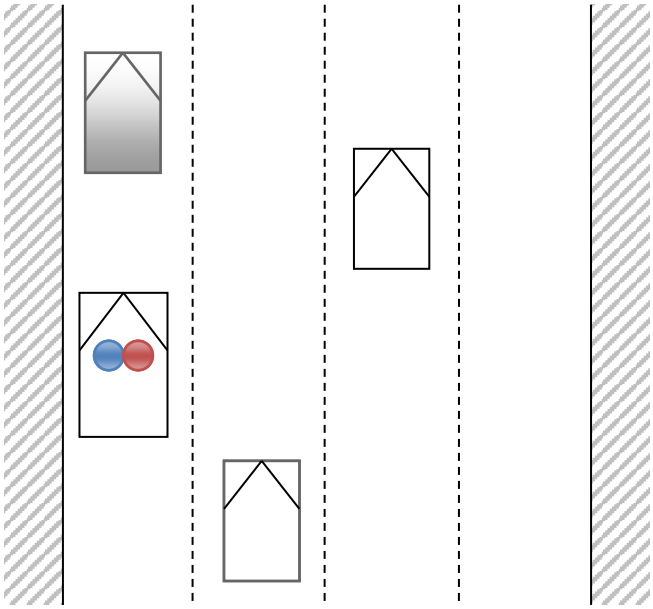
6. You are travelling in the left hand lane of the freeway when an emergency vehicle approaches you from behind. Which of the following actions are best? (you may choose more than one answer)

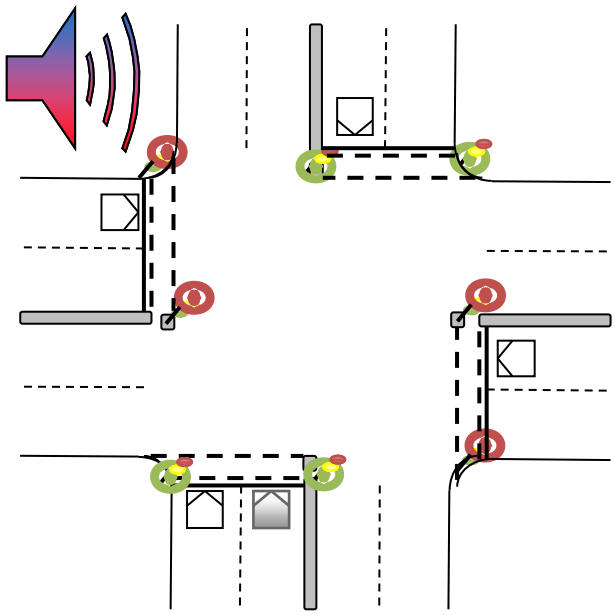
A. Move into the left emergency lane and continue driving

B. Move right and continue driving

C. Move into the left emergency lane and become stationary

D. Become stationary where you are

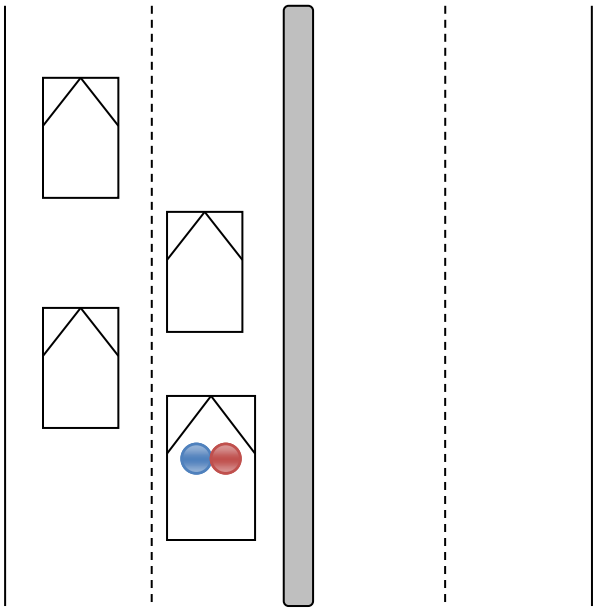




7. You are at a set of traffic lights when you hear an emergency vehicle siren and the light facing you is green. You should:

A. Remain stationary until you sight the vehicle

B. Proceed through the intersection as the vehicle is not there yet.

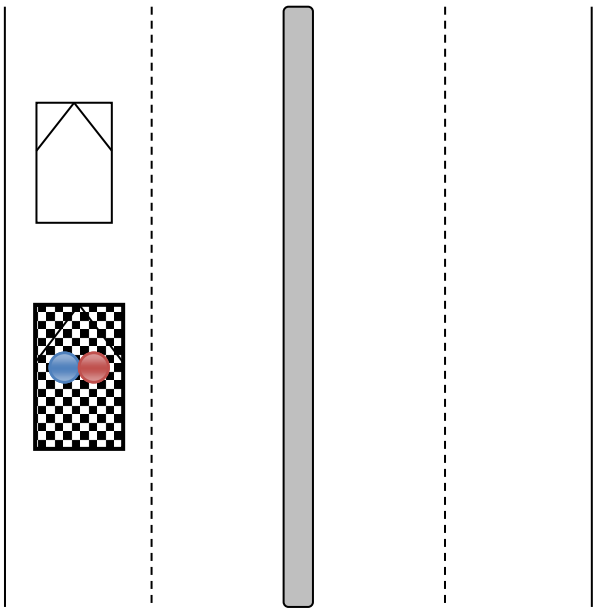


8. An emergency vehicle is approaching from behind and you need to move but are unable to change lanes. You should:

A. Continue driving until you can change lanes

B. Become stationary where you are

C. Speed up until you can change lanes



9. If the emergency vehicle is a police vehicle you should:

A. Become stationary in case they want to stop you

B. Move as far left as possible

C. Continue driving where you are

APPENDIX G **Motorist information letter**

Information Letter

Interview Participants

Motorists' Responses to EVs

Difficulties can arise from motorists' interactions with EVs and, in some cases, result in crashes and delays to the EV. Previous research has considered areas such as siren, light and vehicle design, and the role of the emergency service personnel but has failed to account for the experiences of the motorists. This research is undertaken to satisfy the requirements for a Doctor of Philosophy, Psychology degree at Edith Cowan University, Joondalup, Western Australia. The aim of the project is to develop a measure of driver responses to EVs.

If you drive on Western Australian roads, you can assist by participating in an interview. During the interview, I would like to talk to you about your experiences, thoughts and feelings in relation to responding to an EV. The interview should take approximately one hour.

Later, I will ask you to complete an online survey that will be developed from the information provided by yourself, other motorists and driving experts. In asking you to complete this survey, we seek your comment on its content, instructions, format, and overall quality. The survey should take up to 20 minutes to complete.

The interview will be audio recorded and transcribed by either myself, or a confidential transcription service. Any information that has the potential to identify you will be omitted from the transcript and the recording will be deleted. No identifying information will accompany, or form any part of, the final report.

During the research, your contact details, transcript and consent form will be stored by in a secure location. At the completion of the research, all identifying details will be erased or destroyed and the documents will be stored by Edith Cowan University. After five years, all documentation will be destroyed. Results from the study may form the basis of a publishable report.

Participation in this research is voluntary. You can withdraw your consent at any time and any recordings, transcripts, and documents relating to you will be destroyed.

If you have any queries or require further information, please contact myself, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 6304 2170

Thank you for your time and participation

Supervisor:	**PhD Candidate:**	**Supervisor:**
Dr Eyal Gringart	Pauline Grant	Dr Deirdre Drake
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School of Psychology and Social Science – January 2013

Edith Cowan University

APPENDIX H **Motorist consent form**

Informed consent

Interview Participants

Motorists' Responses to EVs

In signing this letter of consent, you agree to the following:

- I have been provided with a copy of the information letter, which I have read and understood.
- I have been given opportunity to ask questions and received satisfactory answers.
- I understand that participation in this project will involve an interview that will be recorded, using an audio recording device, and a follow up survey.
- I understand that the information obtained from the interview will form the basis for a publishable report.
- I understand that the audio recording will be transcribed after the interview and the original recording destroyed.
- I understand that the researcher will secure all documentation relating to myself and my interview whilst the research project is ongoing.
- I understand that, at the completion of the research project, all identifying information will be destroyed, and all transcripts, questionnaires, and consent forms will be stored by Edith Cowan University for a period of five years before being destroyed.
- I understand that I may withdraw permission or cease to participate at any time.

I agree to participate in the project

Participant ……. Date…….

Researcher ……. Date…….

APPENDIX I **Motorist demographic data sheet**

Demographics Questionnaire – Interview

Name: .....

Male ☐ Female ☐ Age: .....

Occupation: .....

Are you a past or present member of an emergency service? YES / NO

If so, which one? .....

Is this a voluntary position? YES / NO

Country of birth: .....

How long have you been living in Western Australia? .....

How long have you had a driver's licence? .....

Crash Involvement? YES / NO .....

Contact phone number: .....

Email address: .....

Mailing address: .....

.....

_____

APPENDIX J **Piloted survey with individual question format (February 2014)**

PILOT SURVEY

Thank you for agreeing to help me with my research on driver's responses to emergency vehicles.

The following survey contains questions and statements have been drawn from a series of focus groups and interviews that you may have been a part of last year.

I now need you to have a look at the survey. As you work through it, please consider the questions in relation to:

- Did you understand the question?
- Is the question grammatically correct?
- Could the question be interpreted in more than one way?
- Did the survey instructions make sense?
- Did the survey follow in a logical sequence or is it disjointed?

At the end of the survey I will ask you to rate the survey and identify any areas of concern. To help you keep track, I have added numbers to each questions but they may appear out of sequence as the survey will randomise the order that some questions are presented.

AGAIN, THANK YOU SO MUCH FOR YOUR HELP

RESPONDING TO EMERGENCY VEHICLES

THANK YOU for your assistance

Emergency vehicles need your assistance to get through traffic so they can help the community. But sometimes things go wrong, delays occur and lives are put at risk. This survey will help us understand the experience of encountering emergency vehicles from the driver's perspective.

All information provided by you is strictly confidential. Only the researcher and supervisors will have access to it. However, the results of the research, without any identifying information, may be published. This research is undertaken as part of my PhD through Edith Cowan University, Joondalup, Western Australia and participation in this survey is purely voluntary.

If you would like some more information prior to proceeding, please feel free to contact either myself, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 08 6304 2170.

Thank you for your time and participation

INFORMED CONSENT

I understand that:

- ♦ Participation in this project will involve completion of an on-line survey.
- ♦ The information obtained will form the basis for a publishable report.
- ♦ My responses will recorded electronically through the Qualtrics Survey tool.
- ♦ The researcher will secure all information relating to my responses whilst the research project is ongoing.
- ♦ At the completion of the research project, all survey responses will be stored by Edith Cowan University for a period of seven years before being destroyed.
- ♦ I may cease to participate at any time during the on-line survey.

❍ I understand and accept the conditions
❍ I do not accept

Supervisor:	PhD Candidate:	Supervisor:
Dr Eyal Gringart	Pauline Grant	Dr Deirdre Drake
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School of Psychology and Social Science
Edith Cowan University

Q4 INSTRUCTIONS FOR COMPLETING THE SURVEY

Below are a series of questions and statements about emergency vehicle encounters. Each question requires a response, and your progress through the survey is indicated by the bar at the bottom of each page

The answers to most questions are in the form of a scale. To answer these questions, you need to select the answer that reflects your level of agreement. Other questions require a numerical input or a sliding scale, such a such as number of years driving and preferred music level.

You may save a partially completed survey to continue later, but you may only submit one completed survey.

Q5 Are you 18 years of age or over?
- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

Q6 Do you currently live in Western Australia?
- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

Q7 How many years have you been driving? (please enter 0 if less than 12 months)

Q8 Thinking about the past year, how often have you driven a motor vehicle on Western Australian roads?
- ❍ Daily
- ❍ Nearly every day
- ❍ A few times a week
- ❍ A few times a month
- ❍ A few times a year
- ❍ Never

If Never Is Selected, Then Skip To End of Survey

Q9 On average, how many kilometres do you drive each year?
- ❍ less than 5,000 km
- ❍ 5,001 to 10,000 km
- ❍ 10,001 to 15,000 km
- ❍ 15,001 to 20,000 km
- ❍ 20,001 to 25,000 km
- ❍ over 25,000 km

Q10 Thinking about the kinds of roads you drive on, would you say they are:
- ❍ More urban than rural
- ❍ More rural than urban
- ❍ About the same

Q11 What is the make and model of motor vehicle you drive most often?

Q12 What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply)

- ❑ Flashing lights
- ❑ Siren
- ❑ Display the name or markings of their organisation
- ❑ Accessible by dialling 000
- ❑ Other (please specify) _____

Answer If What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply) Flashing lights Is Selected

Q13 What colour flashing lights can emergency vehicles display? (Choose all that apply)

- ❑ Red
- ❑ Blue
- ❑ Orange
- ❑ Green
- ❑ Yellow
- ❑ Magenta

Q14 Thinking about different types of vehicles, which of the following can be emergency vehicles? (Choose all that apply)

	Yes	No	Unsure
Ambulance	❍	❍	❍
Fire brigade vehicle	❍	❍	❍
Tow truck	❍	❍	❍
Marked police vehicle	❍	❍	❍
Unmarked police vehicle	❍	❍	❍
SES vehicle	❍	❍	❍
Blood and/or medical supply transfer vehicle	❍	❍	❍
Western Power vehicle	❍	❍	❍
Fisheries Department vehicle	❍	❍	❍
Main Roads vehicle	❍	❍	❍
Road works vehicle	❍	❍	❍
Police motorcycle	❍	❍	❍

Q15 Thinking about giving way to emergency vehicles, please indicate to what extent you agree with the following statements:

Q16 I give way to emergency vehicles because it is the right thing to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q17 I give way to emergency vehicles because it is my civic duty

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q18 I give way to emergency vehicles because it is common courtesy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q19 I give way to emergency vehicles because it is what I am expected to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q20 I give way to emergency vehicles because I have to

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q21 I don't give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q22 I give way to emergency vehicles because I will get in trouble if I don't

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q23 Responding to emergency vehicles is challenging

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q24 Encountering emergency vehicles is stressful

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q25 Responding to emergency vehicles is difficult

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q26 Emergency vehicle encounters do not affect me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q27 I feel confident in my ability to respond to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q28 A small delay to the emergency vehicle won't make any difference

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q29 Someone's life may be at risk if the emergency vehicle is delayed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q30 It is important for drivers to give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q31 I feel bad if I cannot get out of the way of the emergency vehicle, even though it's not my fault

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q32 When I see an emergency vehicle I worry that they are going to someone I know

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q33 I can predict where the emergency vehicle will go

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q34 If the emergency vehicle needs me to get out of the way, it will be sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q35 An emergency vehicle is not in a hurry if it is flashing its lights but not sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q36 Thinking about other drivers in relation to emergency vehicle encounters, to what extent do you agree with the following statements?

Q37 Other drivers do not pay attention

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q38 Other drivers are generally good drivers

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q39 Other drivers make me impatient

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q40 Other drivers do not drive as well as me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q41 I am just like every other driver on the road

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q42 Other drivers do stupid things

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q43 Other drivers do not know what to do around emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q44 Please indicate to what extent you agree with the following statements

Q45 Emergency vehicles are allowed to break the road rules when operating their flashing lights or siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q46 I am prepared to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q47 I am allowed to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q48 Sometimes, emergency vehicles use their lights and siren just to get through traffic, they are not going to an emergency

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q49 I would feel better about giving way to an emergency vehicle if I knew where they were going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q50 I like to know where the emergency vehicle is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q51 Sometimes I follow the emergency vehicle to see where it is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q52 Emergency vehicles use their lights and siren too much

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q53 It does not matter where the emergency vehicle is going, if it is using lights and siren, it must be important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q54 Some reasons for using lights and siren are more important than others

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q55 It is okay for emergency vehicles to use their lights and siren for training purposes

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q56 My safety is more important than getting out of the way of the emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q57 Emergency driving creates an unacceptable risk to road users

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q58 Emergency service drivers act safely when driving with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q59 Emergency services drivers are properly trained to drive with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q60 Considering the punishment of drivers who do not give way to emergency vehicles, to what extent you agree with the following statements?

Q61 Drivers should get punished for failing to give way to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q62 If a driver has the room to move out of the way but does not, they should be punished

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q63 Drivers should not be punished if they did not hear the emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q64 Drivers do not get punished for failing to give way to an emergency vehicle because it is too hard to catch them

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q65 If a driver breaks the law trying to give way to a police vehicle, the police will stop what they are doing and go after the driver

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q66 How frequently would you expect to encounter emergency vehicles in these situations?
Q67 Driving on the freeway

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q68 Driving on a highway

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q69 Driving on a main road

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q70 Driving on a suburban street

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q71 At a set of traffic lights

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q72 Coming towards me from a side/cross street

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q73 Approaching me from behind

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q74 Driving towards me from the opposite direction

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q75 At a roundabout

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q76 Thinking about emergency vehicles driving with their lights and siren on, how likely are they to do the following maneouvres?

Q77 Drive on the wrong side of the road

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q78 Force motorists out of the way

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q79 Drive through red traffic lights

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q80 Go through stop signs

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q81 Speed

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q82 Drive along the footpath

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q83 Drive along or over the median strip

Very unlikely	Unlikely	Somewhat unlikely	Somewhat likely	Likely	Very Likely
❍	❍	❍	❍	❍	❍

Q84 Thinking about your encounters with emergency vehicles, to what extent to you agree with the following statements?

Q85 If I hear a siren but cannot find the emergency vehicle I get concerned

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q86 If I hear a siren but cannot see the emergency vehicle, then it must not be near me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q87 When I see a police emergency vehicle I worry that they are trying to pull me over

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q88 When I see an emergency vehicle, I worry that they are going to someone I know

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q89 As soon as I detect an emergency vehicle (hear it or see it) I:

Q90 As soon as I detect an emergency vehicle (hear it or see it) I slow down

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q91 As soon as I detect an emergency vehicle (hear it or see it) I move left

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q92 As soon as I detect an emergency vehicle (hear it or see it) I stay where I am

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q93 As soon as I detect an emergency vehicle (hear it or see it) I become stationary

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q94 As soon as I detect an emergency vehicle (hear it or see it) I pull over

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q95 As soon as I detect an emergency vehicle (hear it or see it) I move right

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q96 When I am moving out of the way of an emergency vehicle I prefer to:

- ❍ Move so that other drivers can follow my lead
- ❍ Wait to see where other drivers go, then follow them
- ❍ Not look where the other drivers are going
- ❍ None of the above

Q97 Thinking about responding to emergency vehicles, how often have the following situations occurred?

Q98 The emergency vehicle got close to me before I realised they were there

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q99 I saw the emergency vehicle before I heard the siren

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q100 I heard the emergency vehicle siren before I saw the vehicle

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q101 I had to move before I had chance to think it through

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q102 I got surprised and had to move quickly to get out of the way

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q103 I had time to look around to see where I could go before I moved

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q104 I paid so much attention to the emergency vehicle that I nearly hit something or someone

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q105 I could not move so I drove close to the other car(s) to make them get out of my way

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q106 Continued where I was and made the emergency vehicle go around me

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q107 I moved but ended up in way of the emergency vehicle

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q108 I deviated from my route to get out of the way

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q109 I was so focused on the emergency vehicle that I did not realise I was speeding

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q110 I was worried that other drivers would not let me change lanes

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q111 I had to respond differently to how I generally plan to

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q112 I could not move so I slowed down or stopped to let the vehicle go around me

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q113 I could not move so I kept going with the traffic until I could move

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q114 I moved over but forgot to let other motorists in

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q115 Please indicate to what extent you agree with the following statements

Q116 I do not mind deviating from my route, because the emergency vehicle is more important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q117 I always respond appropriately to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q118 I could never imagine the emergency vehicle crew doing the wrong thing

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q119 The emergency vehicle will always find a way through the traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q120 I will drive in a different direction rather than risk seeing what the emergency vehicle is going to

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q121 Giving way to an emergency vehicle makes me feel happy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q122 Giving way to an emergency vehicle makes me feel relieved

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q123 Giving way to an emergency vehicle makes me feel sad

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q124 Giving way to an emergency vehicle makes me feel angry

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q125 Giving way to an emergency vehicle makes me feel annoyed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q126 Giving way to an emergency vehicle makes me feel anxious

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q127 Giving way to an emergency vehicle does not make me feel anything

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q128 Giving way to an emergency vehicle makes me feel frustrated

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q129 The following questions relate to hypothetical driving scenarios. Imagine you are driving your motor vehicle during emergency vehicle encounters and the actions you would take in each situation. In some situations, you may feel that more than one answer is appropriate. Please select all that apply.

Q130 I am stationary at a red traffic light and an emergency vehicle is approaching me from behind. I will:
- ❑ Move into the intersection
- ❑ Drive through the intersection
- ❑ Move my car as far left as possible
- ❑ Move my car as far right as possible
- ❑ Drive onto the median strip (if available)
- ❑ Remain stationary

Q131 I am at a set of traffic lights that have just turned green when I hear an emergency vehicle siren but cannot see the vehicle. I will:
- ❑ Go quickly through the intersection
- ❑ Proceed normally through the intersection
- ❑ Proceed slowly through the intersection
- ❑ Wait a while, but if I can't see it then it must not be close
- ❑ Wait as long as necessary to see the emergency vehicle or no longer hear the siren

Q132 I am driving in the right hand lane of the freeway and there is an emergency vehicle approaching me from behind. I will:
- ❑ Move left and continue driving
- ❑ Move into the right emergency lane and continue driving
- ❑ Move into the right emergency lane and become stationary
- ❑ Become stationary where I am

Q133 I am driving in the left hand lane of the freeway when an emergency vehicle approaches me from behind. I will:
- ❑ Move into the left emergency lane and continue driving
- ❑ Move right and continue driving
- ❑ Move into the left emergency lane and become stationary
- ❑ Become stationary where I am
- ❑ Continue where I am

Q134 I am driving in the right hand lane of a highway and an emergency vehicle is approaching from behind in the left hand lane. I will:
- ❑ Move as far left as possible and continue driving
- ❑ Remain right and continue driving
- ❑ Become stationary where I am
- ❑ Drive onto the right hand median strip (if available)

Q135 I am driving in the left hand lane of a highway and an emergency vehicle is approaching from behind in the left hand lane. I will:
- ❑ Move right and continue driving
- ❑ Remain left and continue driving
- ❑ Become stationary where I am
- ❑ Drive onto the left hand verge (if available)

Q136 If an emergency vehicle is approaching from the opposite direction, I should:
- ❑ Move as far left as possible
- ❑ Move as far right as possible
- ❑ Continue driving where I am
- ❑ Become stationary

Q137 An emergency vehicle is approaching me from behind and I need to move over but cannot. I will:
- ❑ Continue driving until I can move over
- ❑ Slow down where I am
- ❑ Become stationary where I am
- ❑ Speed up so that I can change lanes

Q138 If the emergency vehicle approaching me is a police vehicle I should:
- ❑ Become stationary in case they want me to stop
- ❑ Move as far left as possible
- ❑ Continue driving where I am

Q139 Are you currently, or have you ever been, a member of an emergency service?
- ❍ Current member
- ❍ Past member
- ❍ I have never been a member

Answer If Are you currently, or have you ever been, a member of an emergency service? I have never been a member Is Not Selected

Q140 What type of emergency service were or are you a member of? (Choose all that apply)

	Paid Member	Volunteer
Fire	❑	❑
Ambulance	❑	❑
Police	❑	❑
Other (please specify)	❑	❑

Q141 Do you know someone that is a past or present member of an emergency service?
- ❍ Yes
- ❍ No
- ❍ Not sure

Answer If Is someone close to you a past or present member of an emergency service? Yes Is Selected

Q142 Which service(s) did they belong to?
- ❑ Police
- ❑ Fire
- ❑ Ambulance
- ❑ Other (please specify) _____

Q143 When I see an emergency vehicle, it makes me think about my own experiences in an emergency service

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q144 When I see an emergency vehicle, it makes me think about an emergency service person that I know

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q145 When I see an emergency vehicle, it makes me think about having used that emergency service for myself

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q146 When I see an emergency vehicle, it makes me think about having used that emergency service for someone else

Never	Rarely	Sometimes	Often	Most of the time	All of the time
❍	❍	❍	❍	❍	❍

Q147 How would you rate your experiences with emergency services and their personnel

_____ Police
_____ Fire
_____ Ambulance
_____ Other (please specify)

Q148 How likely are the following to effect the way you respond to emergency vehicles?

Q149 I would make more effort to give way to emergency vehicles if I knew I was being recorded by onboard video cameras

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q150 I would make more effort to give way to emergency vehicles if the penalty for not doing so was higher.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q151 I would make more effort to give way to emergency vehicles if there were a greater likelihood of being caught for not doing so.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q152 Research has indicated that having early warning of an emergency vehicle being nearby can help drivers respond more effectively. To that effect, technology exists that can allow emergency vehicles to emit a signal when they are operating under lights and siren. Motorists can use a receiver to pick up the signal and be forewarned when the emergency vehicle is nearby. If Western Australia started using this technology, would you purchase an early warning device?

- ❍ Yes
- ❍ No
- ❍ Undecided

Q153 What was your age in years at your last birthday?

Q154 Most of the time, when I drive a motor vehicle, I prefer the music/radio to be:
_____ Preferred level

Q155 Where did you first get your driver's licence?

- ❍ Western Australia
- ❍ South Australia
- ❍ Australian Capital Territory
- ❍ New South Wales
- ❍ Northern Territory
- ❍ Queensland
- ❍ Victoria
- ❍ Another country (please specify) _____

Q156 When you were first learning how to drive a motor vehicle, who taught you?

- ❑ Driving Instructor
- ❑ Family member
- ❑ Friend
- ❑ Partner
- ❑ Work colleague
- ❑ Other (please specify) _____

Q157 How often do you look in your rear view mirror when you are driving?

- ❍ Not very often
- ❍ Every few minutes
- ❍ A couple of times a minute
- ❍ Every 10 - 15 seconds
- ❍ Every few seconds
- ❍ All the time
- ❍ Not sure

Q158 Are you?

- ❍ Male
- ❍ Female
- ❍ Other

Q159 Have you been involved in a motor vehicle crash?
- ❍ Yes
- ❍ No

Answer If Have you been involved in a motor vehicle crash? Yes Is Selected

Q160 How long ago was your last motor vehicle crash?
- ❍ Less than 1 year
- ❍ Within the past 5 years
- ❍ Within the past 10 years
- ❍ Over 10 years

Q161 Thank you for taking the time to review the survey. On a scale of 1 to 10 (1 being low and 10 being high), how would you rate the survey in the following areas?

_____ Clear instructions
_____ Logical question sequence
_____ Grammatically correct
_____ Questions only have one meaning
_____ Questions make sense
_____ Questions appear relevant to emergency vehicle encounters

Q162 Is there any further feedback that you would like to provide?

APPENDIX K **Piloted survey with block question format (February 2014)**

RESPONDING TO EMERGENCY VEHICLES

THANK YOU for your assistance

Emergency vehicles need your assistance to get through traffic so they can help the community. But sometimes things go wrong, delays occur and lives are put at risk. This survey will help us understand the experience of encountering emergency vehicles from the driver's perspective.

All information provided by you is strictly confidential. Only the researcher and supervisors will have access to it. However, the results of the research, without any identifying information, may be published.
This research is undertaken as part of my PhD through Edith Cowan University, Joondalup, Western Australia and participation in this survey is purely voluntary.

If you would like some more information prior to proceeding, please feel free to contact either myself, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 08 6304 2170.

Thank you for your time and participation

INFORMED CONSENT

I understand that:

- ♦ Participation in this project will involve completion of an on-line survey.
- ♦ The information obtained will form the basis for a publishable report.
- ♦ My responses will recorded electronically through the Qualtrics Survey tool.
- ♦ The researcher will secure all information relating to my responses whilst the research project is ongoing.
- ♦ At the completion of the research project, all survey responses will be stored by Edith Cowan University for a period of seven years before being destroyed.
- ♦ I may cease to participate at any time during the on-line survey.

❍ I understand and accept the conditions
❍ I do not accept

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INSTRUCTIONS FOR COMPLETING THE SURVEY

Below are a series of questions and statements about emergency vehicle encounters. Each question requires a response, and your progress through the survey is indicated by the bar at the bottom of each page. The answers to most questions are in the form of a scale. To answer these questions, you need to select the answer that reflects your level of agreement. Other questions require a numerical input or a sliding scale, such as number of years driving and preferred music level. You may save a partially completed survey to continue later, but you may only submit one completed survey.

Are you 18 years of age or over?
- ❍ Yes
- ❍ No

Do you currently live in Western Australia?
- ❍ Yes
- ❍ No

How many years have you been driving? _____

Thinking about the past year, how often have you driven a motor vehicle on Western Australian roads?
- ❍ Daily
- ❍ Nearly every day
- ❍ A few times a week
- ❍ A few times a month
- ❍ A few times a year
- ❍ Never

How many kilometres do you drive each year?
- ❍ less than 5,000 km
- ❍ 5,001 to 10,000 km
- ❍ 10,001 to 15,000 km
- ❍ 15,001 to 20,000 km
- ❍ 20,001 to 25,000 km
- ❍ over 25,000 km

Thinking about the kinds of roads you drive on, would you say they are:
- ❍ More urban than rural
- ❍ More rural than urban
- ❍ About the same

What is the make and model of the motor vehicle do you drive most often?

What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply)

- ❑ Flashing lights
- ❑ Siren
- ❑ Display the name or markings of their organisation
- ❑ Accessible by dialling 000
- ❑ Other (please specify) _____

What colour flashing lights can emergency vehicles display? (Choose all that apply)

- ❑ Red
- ❑ Blue
- ❑ Orange
- ❑ Green
- ❑ Crimson

Thinking about different types of vehicles, which of the following are emergency vehicles? (Choose all that apply)

	Yes	No	Sometimes
Ambulance	❍	❍	❍
Fire brigade vehicle	❍	❍	❍
Tow truck	❍	❍	❍
Marked police vehicle	❍	❍	❍
Unmarked police vehicle	❍	❍	❍
SES vehicle	❍	❍	❍
Blood and/or medical supply transfer vehicle	❍	❍	❍
Western Power vehicle	❍	❍	❍
Fisheries Department vehicle	❍	❍	❍
Main Roads vehicle	❍	❍	❍
Road works vehicle	❍	❍	❍

I give way to emergency vehicles because it is the right thing to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because it is my civic duty

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because it is common courtesy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because it is what I am expected to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because I have to

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I don't give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because I will get in trouble if I don't

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Responding to emergency vehicles is challenging

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Encountering emergency vehicles is stressful

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Responding to emergency vehicles is difficult

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency vehicle encounters do not affect me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I feel confident in my ability to respond to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

A small delay to the emergency vehicle won't make any difference

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Someone's life may be at risk if the emergency vehicle is delayed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

It is important for drivers to give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I feel bad if I cannot get out of the way of the emergency vehicle, even though it's not my fault

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I can predict where the emergency vehicle will go

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If the emergency vehicle needs me to get out of the way, it will be sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

An emergency vehicle is not in a hurry if it is flashing its lights but not sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Thinking about other drivers in relation to emergency vehicle encounters, to what extent do you agree with the following statements?

Other drivers do not pay attention

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers are generally good drivers

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers make me impatient

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers do not drive as well as me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I am just like every other driver on the road

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers do stupid things

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers do not know what to do around emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Please indicate to what extent you agree with the following statements

Emergency vehicles are allowed to break the road rules when operating their flashing lights or siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I am prepared to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I am allowed to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Sometimes, emergency vehicles use their lights and siren just to get through traffic, they are not going to an emergency

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I would feel better about giving way to an emergency vehicle if I knew where they were going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I like to know where the emergency vehicle is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Sometimes I follow the emergency vehicle to see where it is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency vehicles use their lights and siren too much

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

It does not matter where the emergency vehicle is going, if it is using lights and siren, it must be important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Some reasons for using lights and siren are more important than others

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

It is okay for emergency vehicles to use their lights and siren for training purposes

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

My safety is more important than getting out of the way of the emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency driving creates an unacceptable risk to road users

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency service drivers act safely when driving with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency services drivers are properly trained to drive with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Considering the punishment of drivers who do not give way to emergency vehicles, to what extent you agree with the following statements?
Drivers should get punished for failing to give way to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If a driver has the room to move out of the way but does not, they should be punished

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Drivers should not be punished if they did not hear the emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Drivers do not get punished for failing to give way to an emergency vehicle because it is too hard to catch them

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If a driver breaks the law trying to give way to a police vehicle, the police will stop what they are doing and go after the driver

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

How frequently would you expect to encounter emergency vehicles in these situations?

	Never	Rarely	Sometimes	Often	Most of the time	All of the time
Driving on the freeway	❍	❍	❍	❍	❍	❍
Driving on a highway	❍	❍	❍	❍	❍	❍
Driving on a main road	❍	❍	❍	❍	❍	❍
Driving on a suburban street	❍	❍	❍	❍	❍	❍
At a set of traffic lights	❍	❍	❍	❍	❍	❍
At a roundabout	❍	❍	❍	❍	❍	❍
Driving towards me from the opposite direction	❍	❍	❍	❍	❍	❍
Coming towards me from a side/cross street	❍	❍	❍	❍	❍	❍
Approaching me from behind	❍	❍	❍	❍	❍	❍

Thinking about emergency vehicles driving with their lights and siren on, how likely are they to do the following manoeuvres?

	Very Unlikely	Unlikely	Somewhat Unlikely	Somewhat Likely	Likely	Very Likely
Drive on the wrong side of the road	❍	❍	❍	❍	❍	❍
Force motorists out of the way	❍	❍	❍	❍	❍	❍
Drive through red traffic lights	❍	❍	❍	❍	❍	❍
Go through stop signs	❍	❍	❍	❍	❍	❍
Speed	❍	❍	❍	❍	❍	❍
Drive along the footpath	❍	❍	❍	❍	❍	❍
Drive along or over the median strip	❍	❍	❍	❍	❍	❍

Thinking about your encounters with emergency vehicles, to what extent to you agree with the following statements?

If I hear a siren but cannot find the emergency vehicle I get concerned

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If I hear a siren but cannot see the emergency vehicle, then it must not be near me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

When I see a police emergency vehicle I worry that they are trying to pull me over

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

When I see an emergency vehicle, I worry that they are going to someone I know

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

When I first detect an emergency vehicle (hear it or see it) I start to:

	Never	Rarely	Sometimes	Often	Most of the time	Always
Slow down	❍	❍	❍	❍	❍	❍
Move left	❍	❍	❍	❍	❍	❍
Continue where I am	❍	❍	❍	❍	❍	❍
Become stationary where I am	❍	❍	❍	❍	❍	❍
Pull over and stop	❍	❍	❍	❍	❍	❍
Move right	❍	❍	❍	❍	❍	❍

When I am moving out of the way of an emergency vehicle I prefer to:

❍ Move so that other drivers can follow my lead
❍ Wait to see where other drivers go, then follow them
❍ Not look where the other drivers are going
❍ None of the above

Thinking about responding to emergency vehicles, how often have the following situations occurred?

The emergency vehicle got close to me before I realised they were there

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I saw the emergency vehicle before I heard the siren

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I heard the emergency vehicle siren before I saw the vehicle

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I had to move before I had chance to think it through

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I got surprised and had to move quickly to get out of the way

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I had time to look around to see where I could go before I moved

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I paid so much attention to the emergency vehicle that I nearly hit something or someone

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I could not move so I drove close to the other car(s) to make them get out of my way

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Continued where I was and made the emergency vehicle go around me

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I moved but ended up in way of the emergency vehicle

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I deviated from my route to get out of the way

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I was so focused on the emergency vehicle that I did not realise I was speeding

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I was worried that other drivers would not let me change lanes

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I had to respond differently to how I generally plan to

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I could not move so I slowed down or stopped to let the vehicle go around me

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I could not move so I kept going with the traffic until I could move

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I moved over but forgot to let other motorists in

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Please indicate to what extent you agree with the following statements

I do not mind deviating from my route, because the emergency vehicle is more important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I always respond appropriately to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I could never imagine the emergency vehicle crew doing the wrong thing

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

The emergency vehicle will always find a way through the traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I will drive in a different direction rather than risk seeing what the emergency vehicle is going to

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

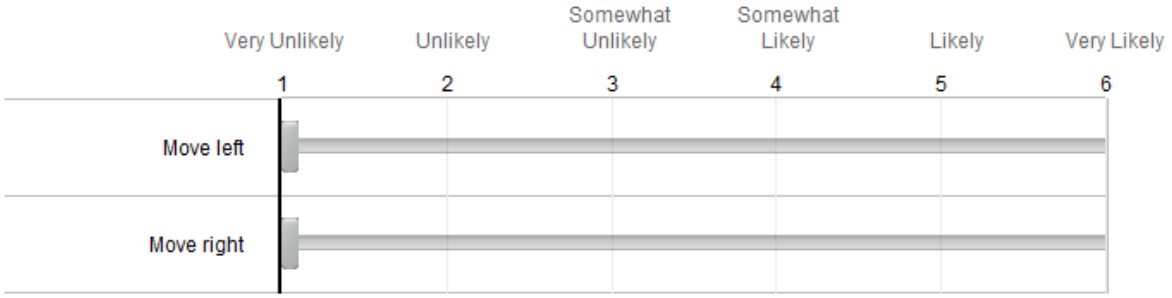
Giving way to an emergency vehicle makes me feel:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Happy	❍	❍	❍	❍	❍	❍
Relieved	❍	❍	❍	❍	❍	❍
Sad	❍	❍	❍	❍	❍	❍
Angry	❍	❍	❍	❍	❍	❍
Frustrated	❍	❍	❍	❍	❍	❍
Annoyed	❍	❍	❍	❍	❍	❍
Anxious	❍	❍	❍	❍	❍	❍
Nothing	❍	❍	❍	❍	❍	❍

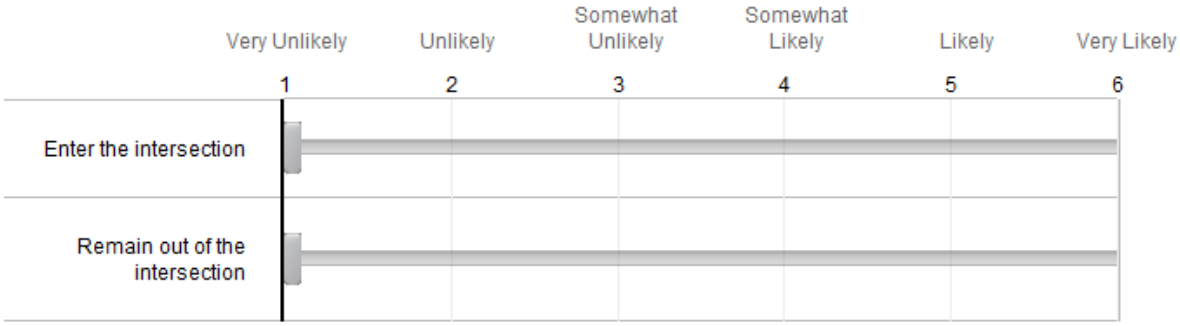
The following questions relate to hypothetical driving scenarios.

Imagine you are driving your motor vehicle during an emergency vehicle encounter. Please indicate how likely you would be to undertake the following responses

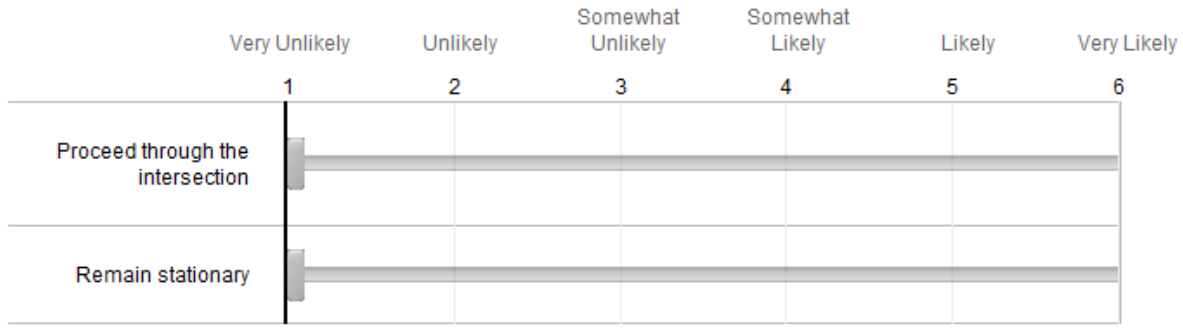
You are driving in the left hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:



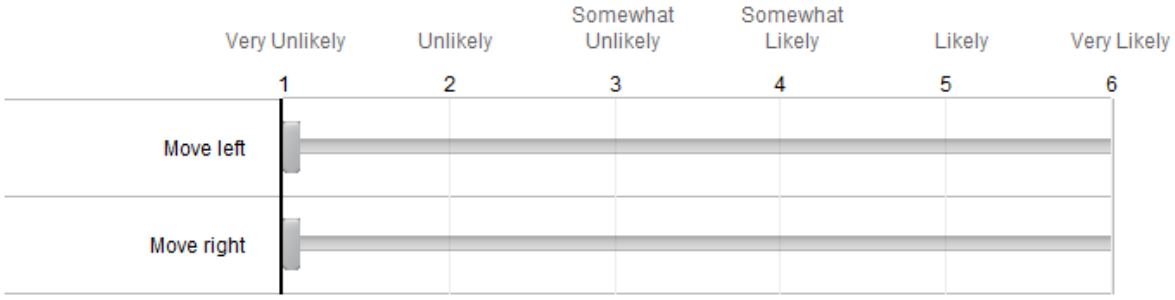
You are stationary at a red traffic light and an emergency vehicle is approaching you from behind. You will:



You are at a set of traffic lights that have just turned green when you hear an emergency vehicle siren but cannot see the vehicle. You will:

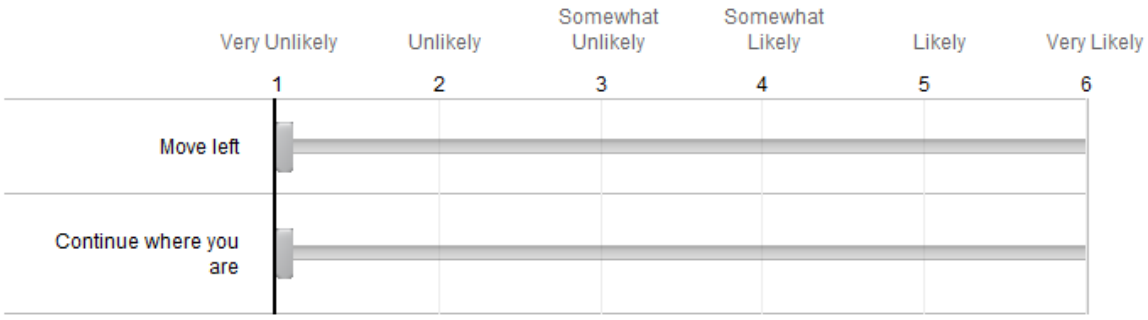


You are driving in the right hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:

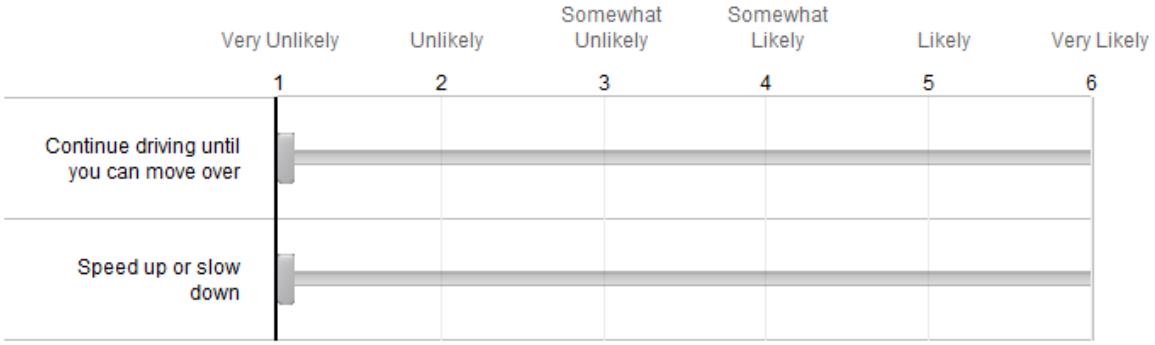


An emergency vehicle is coming towards you from the opposite direction. You will:

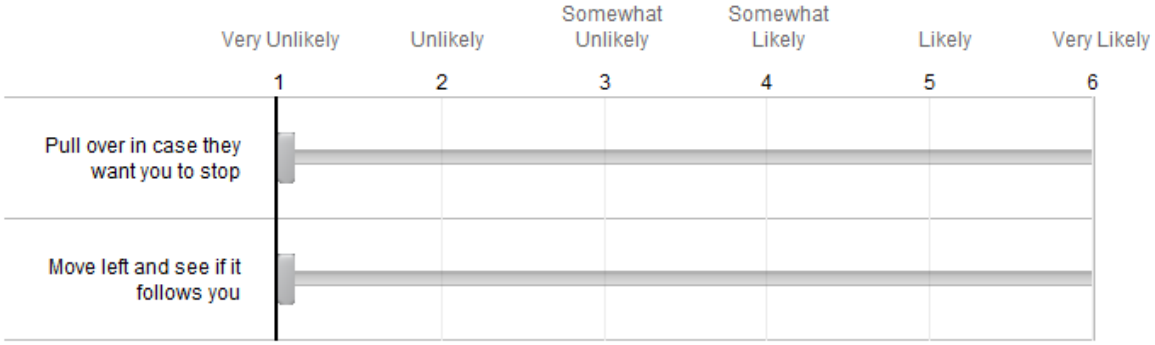
An emergency vehicle is coming towards you from the opposite direction. You will:



An emergency vehicle is approaching you from behind and you cannot move over. You will:



The emergency vehicle approaching you from behind is a police vehicle. You will:



Are you currently, or have you ever been, a member of an emergency service?

- ❑ Current member
- ❑ Past member
- ❑ I have never been a member

IF you are or were a member, which emergency service did you belong to? (Choose all that apply)

	Paid Member	Volunteer
Fire	❑	❑
Ambulance	❑	❑
Police	❑	❑
Other (please specify)	❑	❑

Do you know someone that is a past or present member of an emergency service?

- ❍ Yes
- ❍ No
- ❍ Not sure

If yes, which service(s) did they belong to?

- ❑ Police
- ❑ Fire
- ❑ Ambulance
- ❑ Other (please specify) _____

When I see an emergency vehicle, it makes me think about my own experiences with an emergency service

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

When I see an emergency vehicle, it makes me think about an emergency service person that I know

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

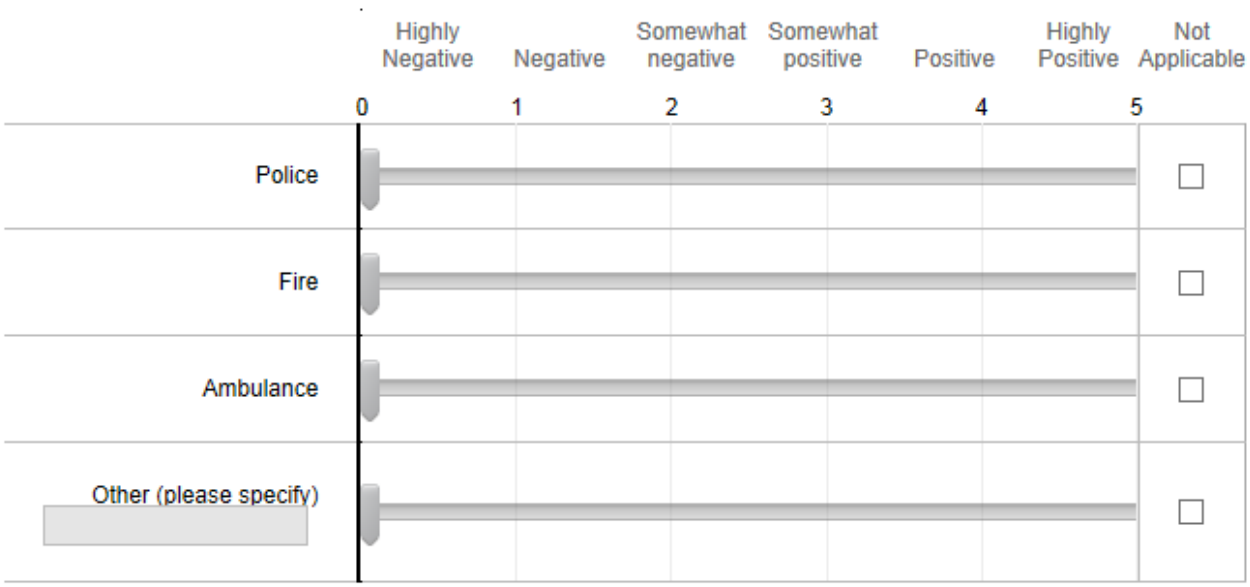
When I see an emergency vehicle, it makes me think about having used that emergency service for myself

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

When I see an emergency vehicle, it makes me think about having used that emergency service for someone else

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

How would you rate your experiences with emergency services and their personnel?



Research has suggested that having early warning of an emergency vehicle being nearby can help drivers respond more effectively. To that effect, technology exists that can allow emergency vehicles to emit a signal when they are operating under lights and siren. Motorists can use a receiver to pick up the signal and be forewarned when the emergency vehicle is nearby. If Western Australia started using this technology, would you purchase an early warning device?

❍ Yes
❍ No
❍ Undecided

How likely are the following to effect the way you respond to emergency vehicles?
I would make more effort to give way to emergency vehicles if I knew I was being recorded by onboard video cameras

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I would make more effort to give way to emergency vehicles if the penalty for not doing so was higher.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I would make more effort to give way to emergency vehicles if there were a greater likelihood of being caught for not doing so.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Where did you first get your driver's licence?
- ❍ Western Australia
- ❍ South Australia
- ❍ Australian Capital Territory
- ❍ New South Wales
- ❍ Northern Territory
- ❍ Queensland
- ❍ Victoria
- ❍ Another country (please specify) _____

When you were first learning how to drive a motor vehicle, who taught you?
- ❑ Driving Instructor
- ❑ Family member
- ❑ Friend
- ❑ Partner
- ❑ Work colleague
- ❑ Other (please specify) _____

Have you been involved in a motor vehicle crash?
- ❍ Yes
- ❍ No

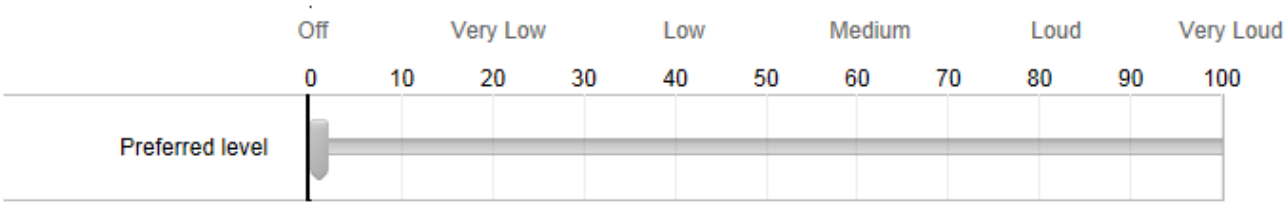
If so, how long ago was your last motor vehicle crash?
- ❍ Less than 1 year
- ❍ Within the past 5 years
- ❍ Within the past 10 years
- ❍ Over 10 years

Are you?
- ❍ Male
- ❍ Female
- ❍ Other

What was your age in years at your last birthday?

How often do you look in your rear view mirror when you are driving?
- ❍ Not very often
- ❍ Every few minutes
- ❍ A couple of times a minute
- ❍ Every 10 - 15 seconds
- ❍ Every few seconds
- ❍ All the time
- ❍ Not sure

What is your preferred music/radio level when driving?



APPENDIX L **Pre-notice to participants of the pilot testing (February 2014)**

Hi [participant name]

Thank you for your previous participation in an interview on motorists' interactions with emergency vehicles.

A few days from now you will receive a link to an online survey based on the serious of interviews and discussion groups that you too part in.

The questionnaire concerns motorists' experiences and responses when encountering emergency vehicles. You input is important as it will allow us to develop a measure of motorist's responses to emergency vehicles that can be used as the basis for future research and intervention.'

Thank you for your time and consideration. It is with your assistance that our research can be successful.

Yours sincerely,

Pauline

Pauline Grant (BA Hons Psych)
PhD Candidate
School of Psychology and Social Science
Edith Cowan University

APPENDIX M **Follow up communication for pilot testing (March 2014)**

Dear [Participant],

Thank you again for participating in the interview regarding motorists' responses to emergency vehicles.

As a result of your participation, could you please complete an online survey that has been developed from the information provided by yourself and others during interviews and discussion groups, as well previously published literature on emergency vehicles.

You will find the survey at https://ecuau.qualtrics.com/SE/?SID=SV_8FX7GunZPAUYb6R . Please check the statements and responses for clarity and ambiguity, and write any recommendations you have in the space provided. There is also a space and the end for any comments or recommendations you wish to make regarding the presentation, instructions or anything else you feel is appropriate. The survey takes up to 20 minutes to complete.

If you wish to contact me, please feel free to do so on 0417 958 375 or p.grant@ecu.edu.au. Alternatively, you can contact my supervisors, as below, or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 6304 2170.

With your assistance, we hope to develop a measure of motorists' responses to emergency vehicles that can be used as the basis for future research and intervention.

Yours sincerely,

Pauline Grant

Thank you for your time and participation

Supervisor:
Dr Eyal Gringart
6304 5631
e.gringart@ecu.edu.au

Supervisor:
Dr Deirdre Drake
6304 5020
d.drake@ecu.edu.au

School of Psychology and Social Science
Edith Cowan University

APPENDIX N **Preliminary REVS (April 2014**

APPENDIX C

RESPONDING TO EMERGENCY VEHICLES

THANK YOU for your assistance

Emergency vehicles need your assistance to get through traffic so they can help the community. But sometimes things go wrong, delays occur and lives are put at risk. This survey will help us understand the experience of encountering emergency vehicles from the driver's perspective.

All information provided by you is strictly confidential. Only the researcher and supervisors will have access to it. However, the results of the research, without any identifying information, may be published.
This research is undertaken as part of my PhD through Edith Cowan University, Joondalup, Western Australia and participation in this survey is purely voluntary.

If you would like some more information prior to proceeding, please feel free to contact either myself, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 08 6304 2170.

Thank you for your time and participation

Supervisor:	PhD Candidate:	Supervisor:
Dr Eyal Gringart	Pauline Grant	Dr Deirdre Drake
6304 5631	0417 958 375	6304 5020
e.gringart@ecu.edu.au	p.grant@ecu.edu.au	d.drake@ecu.edu.au

School of Psychology and Social Science
Edith Cowan University

INFORMED CONSENT

I understand that:

- ♦ Participation in this project will involve completion of an on-line survey.
- ♦ The information obtained will form the basis for a publishable report.
- ♦ My responses will recorded electronically through the Qualtrics Survey tool.
- ♦ The researcher will secure all information relating to my responses whilst the research project is ongoing.
- ♦ At the completion of the research project, all survey responses will be stored by Edith Cowan University for a period of seven years before being destroyed.
- ♦ I may cease to participate at any time during the on-line survey.

❍ I understand and accept the conditions
❍ I do not accept

INSTRUCTIONS FOR COMPLETING THE SURVEY

Below are a series of questions and statements about emergency vehicle encounters. Each question requires a response, and your progress through the survey is indicated by the bar at the bottom of each page. The answers to most questions are in the form of a scale. To answer these questions, you need to select the answer that reflects your level of agreement. Other questions require a numerical input or a sliding scale, such as number of years driving and preferred music level. You may save a partially completed survey to continue later, but you may only submit one completed survey.

Are you 18 years of age or over?
❍ Yes
❍ No

Do you currently live in Western Australia?
❍ Yes
❍ No

How many years have you been driving? _____

Thinking about the past year, how often have you driven a motor vehicle on Western Australian roads?
❍ Daily
❍ Nearly every day
❍ A few times a week
❍ A few times a month
❍ A few times a year
❍ Never

How many kilometres do you drive each year?
- ❍ less than 5,000 km
- ❍ 5,001 to 10,000 km
- ❍ 10,001 to 15,000 km
- ❍ 15,001 to 20,000 km
- ❍ 20,001 to 25,000 km
- ❍ over 25,000 km

Thinking about the kinds of roads you drive on, would you say they are:
- ❍ More urban than rural
- ❍ More rural than urban
- ❍ About the same

What is the make and model of the motor vehicle do you drive most often?

What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply)
- ❑ Flashing lights
- ❑ Siren
- ❑ Display the name or markings of their organisation
- ❑ Accessible by dialling 000
- ❑ Other (please specify) _____

What colour flashing lights can emergency vehicles display? (Choose all that apply)
- ❑ Red
- ❑ Blue
- ❑ Orange
- ❑ Green
- ❑ Crimson

Thinking about different types of vehicles, which of the following are emergency vehicles? (Choose all that apply)

	Yes	No	Sometimes
Ambulance	❍	❍	❍
Fire brigade vehicle	❍	❍	❍
Tow truck	❍	❍	❍
Marked police vehicle	❍	❍	❍
Unmarked police vehicle	❍	❍	❍
SES vehicle	❍	❍	❍
Blood and/or medical supply transfer vehicle	❍	❍	❍
Western Power vehicle	❍	❍	❍
Fisheries Department vehicle	❍	❍	❍
Main Roads vehicle	❍	❍	❍
Road works vehicle	❍	❍	❍

I give way to emergency vehicles because it is the right thing to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because it is my civic duty

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because it is common courtesy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because it is what I am expected to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because I have to

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I don't give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I give way to emergency vehicles because I will get in trouble if I don't

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Responding to emergency vehicles is challenging

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Encountering emergency vehicles is stressful

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Responding to emergency vehicles is difficult

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency vehicle encounters do not affect me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I feel confident in my ability to respond to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

A small delay to the emergency vehicle won't make any difference

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Someone's life may be at risk if the emergency vehicle is delayed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

It is important for drivers to give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I feel bad if I cannot get out of the way of the emergency vehicle, even though it's not my fault

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I can predict where the emergency vehicle will go

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If the emergency vehicle needs me to get out of the way, it will be sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

An emergency vehicle is not in a hurry if it is flashing its lights but not sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Thinking about other drivers in relation to emergency vehicle encounters, to what extent do you agree with the following statements?

Other drivers do not pay attention

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers are generally good drivers

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers make me impatient

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers do not drive as well as me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I am just like every other driver on the road

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers do stupid things

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Other drivers do not know what to do around emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Please indicate to what extent you agree with the following statements

Emergency vehicles are allowed to break the road rules when operating their flashing lights or siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I am prepared to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I am allowed to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Sometimes, emergency vehicles use their lights and siren just to get through traffic, they are not going to an emergency

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I would feel better about giving way to an emergency vehicle if I knew where they were going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I like to know where the emergency vehicle is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Sometimes I follow the emergency vehicle to see where it is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency vehicles use their lights and siren too much

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

It does not matter where the emergency vehicle is going, if it is using lights and siren, it must be important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Some reasons for using lights and siren are more important than others

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

It is okay for emergency vehicles to use their lights and siren for training purposes

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

My safety is more important than getting out of the way of the emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency driving creates an unacceptable risk to road users

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency service drivers act safely when driving with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Emergency services drivers are properly trained to drive with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Considering the punishment of drivers who do not give way to emergency vehicles, to what extent you agree with the following statements?
Drivers should get punished for failing to give way to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If a driver has the room to move out of the way but does not, they should be punished

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Drivers should not be punished if they did not hear the emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Drivers do not get punished for failing to give way to an emergency vehicle because it is too hard to catch them

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If a driver breaks the law trying to give way to a police vehicle, the police will stop what they are doing and go after the driver

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

How frequently would you expect to encounter emergency vehicles in these situations?

	Never	Rarely	Sometimes	Often	Most of the time	All of the time
Driving on the freeway	❍	❍	❍	❍	❍	❍
Driving on a highway	❍	❍	❍	❍	❍	❍
Driving on a main road	❍	❍	❍	❍	❍	❍
Driving on a suburban street	❍	❍	❍	❍	❍	❍
At a set of traffic lights	❍	❍	❍	❍	❍	❍
At a roundabout	❍	❍	❍	❍	❍	❍
Driving towards me from the opposite direction	❍	❍	❍	❍	❍	❍
Coming towards me from a side/cross street	❍	❍	❍	❍	❍	❍
Approaching me from behind	❍	❍	❍	❍	❍	❍

Thinking about emergency vehicles driving with their lights and siren on, how likely are they to do the following manoeuvres?

	Very Unlikely	Unlikely	Somewhat Unlikely	Somewhat Likely	Likely	Very Likely
Drive on the wrong side of the road	❍	❍	❍	❍	❍	❍
Force motorists out of the way	❍	❍	❍	❍	❍	❍
Drive through red traffic lights	❍	❍	❍	❍	❍	❍
Go through stop signs	❍	❍	❍	❍	❍	❍
Speed	❍	❍	❍	❍	❍	❍
Drive along the footpath	❍	❍	❍	❍	❍	❍
Drive along or over the median strip	❍	❍	❍	❍	❍	❍

Thinking about your encounters with emergency vehicles, to what extent to you agree with the following statements?

If I hear a siren but cannot find the emergency vehicle I get concerned

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

If I hear a siren but cannot see the emergency vehicle, then it must not be near me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

When I see a police emergency vehicle I worry that they are trying to pull me over

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

When I see an emergency vehicle, I worry that they are going to someone I know

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

When I first detect an emergency vehicle (hear it or see it) I start to:

	Never	Rarely	Sometimes	Often	Most of the time	Always
Slow down	❍	❍	❍	❍	❍	❍
Move left	❍	❍	❍	❍	❍	❍
Continue where I am	❍	❍	❍	❍	❍	❍
Become stationary where I am	❍	❍	❍	❍	❍	❍
Pull over and stop	❍	❍	❍	❍	❍	❍
Move right	❍	❍	❍	❍	❍	❍

When I am moving out of the way of an emergency vehicle I prefer to:

- ❍ Move so that other drivers can follow my lead
- ❍ Wait to see where other drivers go, then follow them
- ❍ Not look where the other drivers are going
- ❍ None of the above

Thinking about responding to emergency vehicles, how often have the following situations occurred?

The emergency vehicle got close to me before I realised they were there

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I saw the emergency vehicle before I heard the siren

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I heard the emergency vehicle siren before I saw the vehicle

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I had to move before I had chance to think it through

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I got surprised and had to move quickly to get out of the way

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I had time to look around to see where I could go before I moved

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I paid so much attention to the emergency vehicle that I nearly hit something or someone

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I could not move so I drove close to the other car(s) to make them get out of my way

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Continued where I was and made the emergency vehicle go around me

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I moved but ended up in way of the emergency vehicle

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I deviated from my route to get out of the way

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I was so focused on the emergency vehicle that I did not realise I was speeding

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I was worried that other drivers would not let me change lanes

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I had to respond differently to how I generally plan to

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I could not move so I slowed down or stopped to let the vehicle go around me

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I could not move so I kept going with the traffic until I could move

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

I moved over but forgot to let other motorists in

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Please indicate to what extent you agree with the following statements

I do not mind deviating from my route, because the emergency vehicle is more important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I always respond appropriately to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I could never imagine the emergency vehicle crew doing the wrong thing

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

The emergency vehicle will always find a way through the traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I will drive in a different direction rather than risk seeing what the emergency vehicle is going to

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

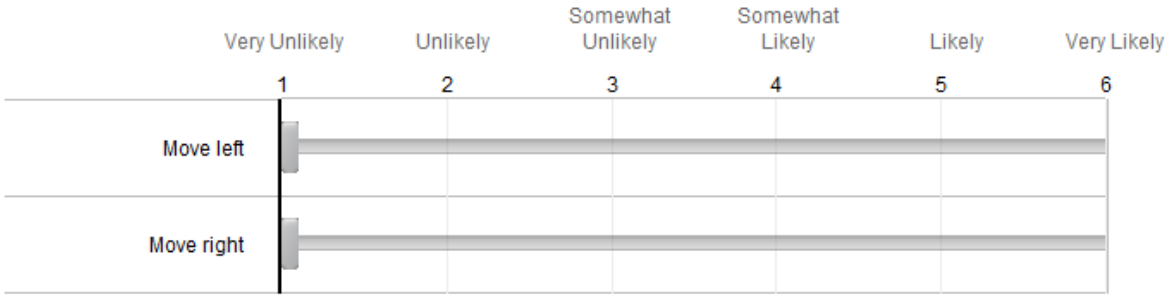
Giving way to an emergency vehicle makes me feel

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Happy	❍	❍	❍	❍	❍	❍
Relieved	❍	❍	❍	❍	❍	❍
Sad	❍	❍	❍	❍	❍	❍
Angry	❍	❍	❍	❍	❍	❍
Frustrated	❍	❍	❍	❍	❍	❍
Annoyed	❍	❍	❍	❍	❍	❍
Anxious	❍	❍	❍	❍	❍	❍
Nothing	❍	❍	❍	❍	❍	❍

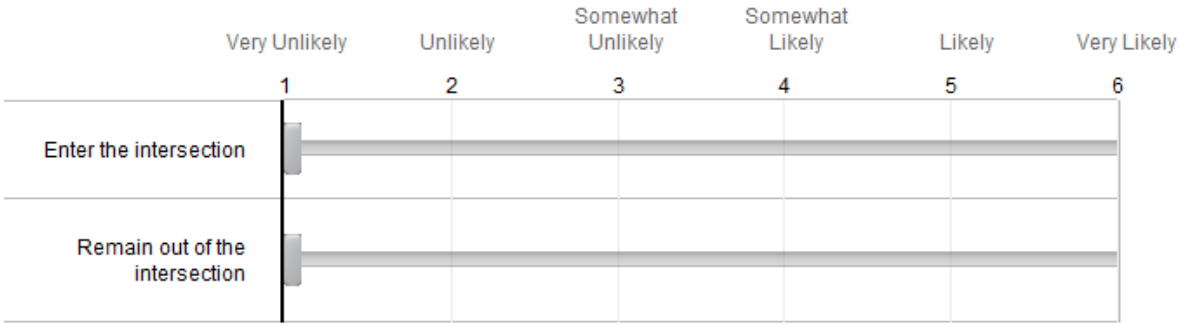
The following questions relate to hypothetical driving scenarios.

Imagine you are driving your motor vehicle during an emergency vehicle encounter. Please indicate how likely you would be to undertake the following responses

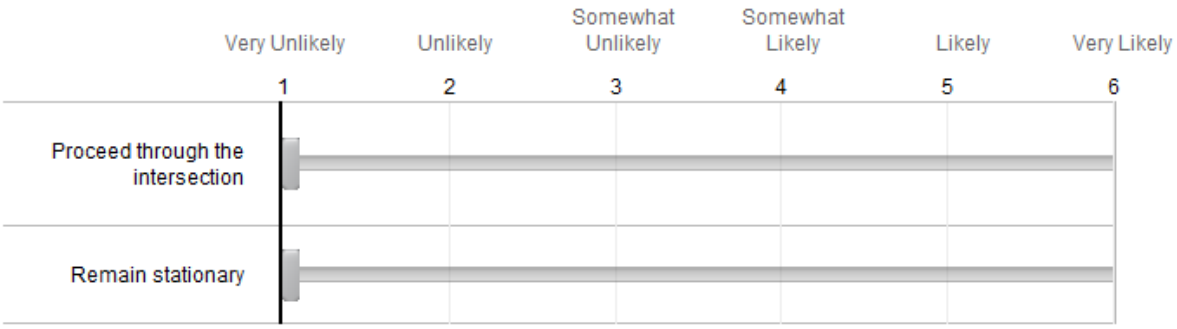
You are driving in the left hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:



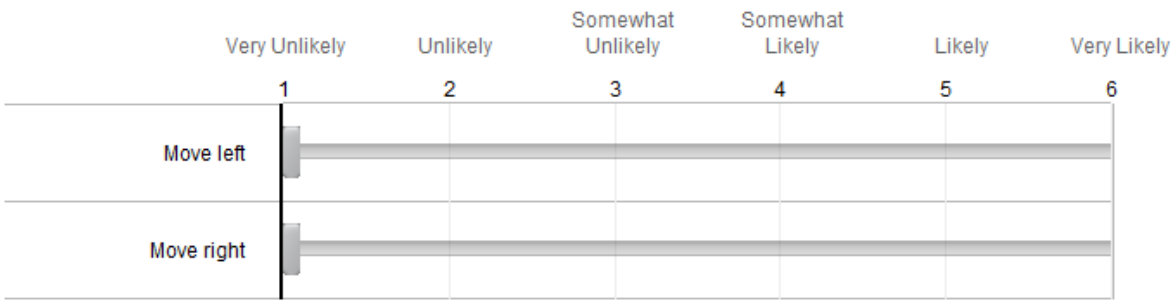
You are stationary at a red traffic light and an emergency vehicle is approaching you from behind. You will:



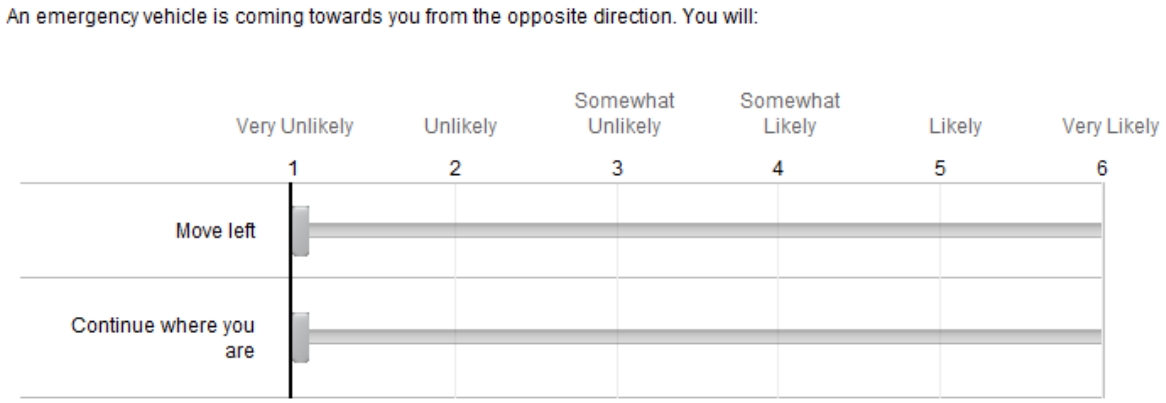
You are at a set of traffic lights that have just turned green when you hear an emergency vehicle siren but cannot see the vehicle. You will:



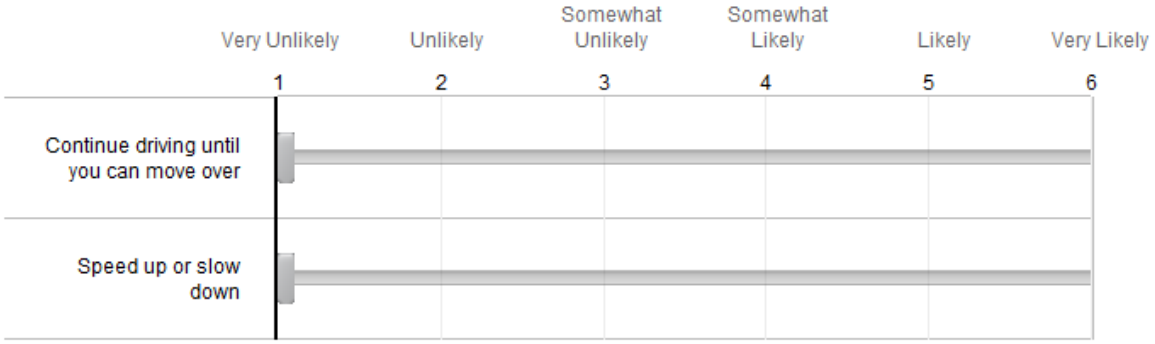
You are driving in the right hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:



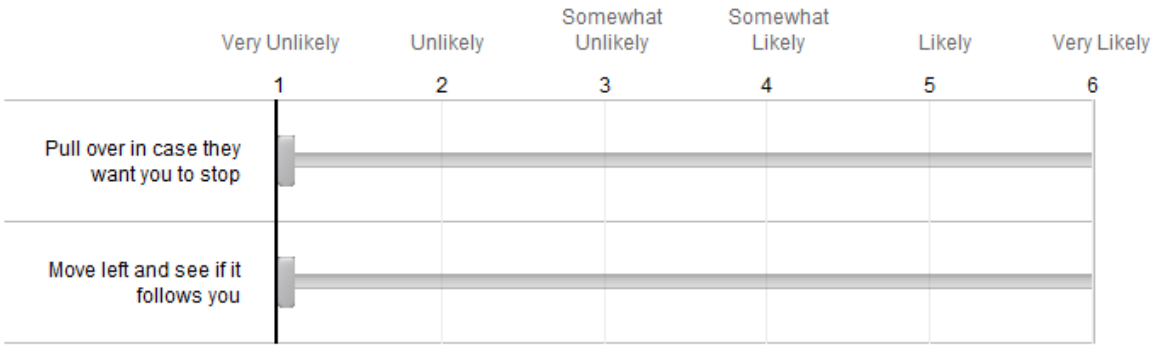
An emergency vehicle is coming towards you from the opposite direction. You will



An emergency vehicle is approaching you from behind and you cannot move over. You will:



The emergency vehicle approaching you from behind is a police vehicle. You will:



Are you currently, or have you ever been, a member of an emergency service?

- ❑ Current member
- ❑ Past member
- ❑ I have never been a member

IF you are or were a member, which emergency service did you belong to? (Choose all that apply)

	Paid Member	Volunteer
Fire	❑	❑
Ambulance	❑	❑
Police	❑	❑
Other (please specify)	❑	❑

Do you know someone that is a past or present member of an emergency service?

❍ Yes
❍ No
❍ Not sure

If yes, which service(s) did they belong to?

❑ Police
❑ Fire
❑ Ambulance
❑ Other (please specify) _____

When I see an emergency vehicle, it makes me think about my own experiences with an emergency service

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

When I see an emergency vehicle, it makes me think about an emergency service person that I know

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

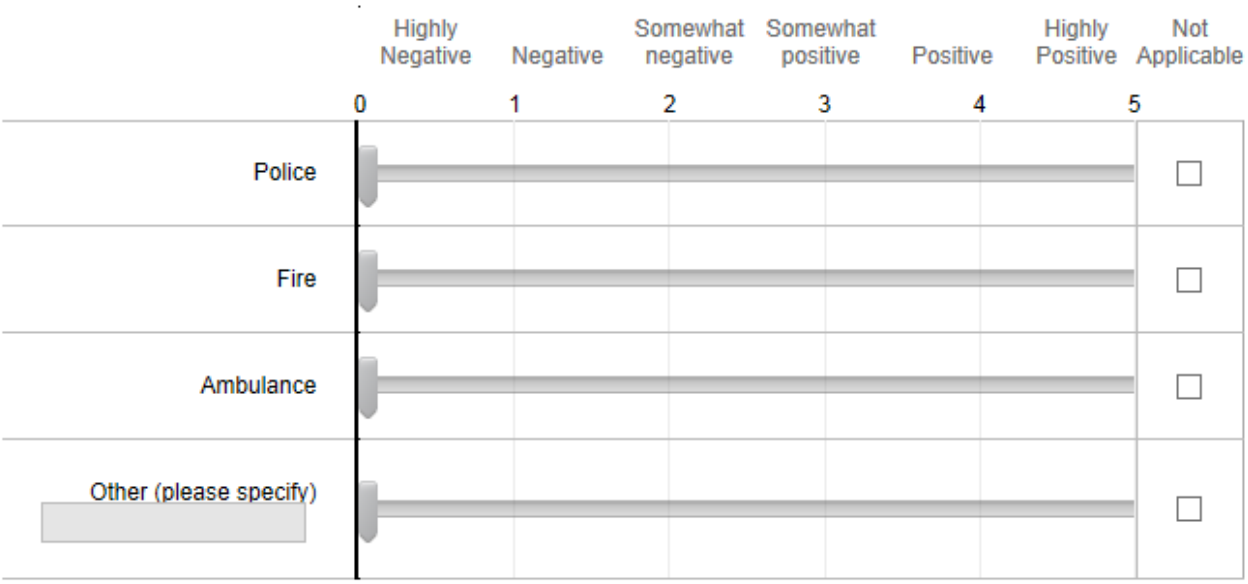
When I see an emergency vehicle, it makes me think about having used that emergency service for myself

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

When I see an emergency vehicle, it makes me think about having used that emergency service for someone else

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

How would you rate your experiences with emergency services and their personnel?



Research has suggested that having early warning of an emergency vehicle being nearby can help drivers respond more effectively. To that effect, technology exists that can allow emergency vehicles to emit a signal when they are operating under lights and siren. Motorists can use a receiver to pick up the signal and be forewarned when the emergency vehicle is nearby. If Western Australia started using this technology, would you purchase an early warning device?

- ❍ Yes
- ❍ No
- ❍ Undecided

How likely are the following to effect the way you respond to emergency vehicles?

I would make more effort to give way to emergency vehicles if I knew I was being recorded by onboard video cameras

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I would make more effort to give way to emergency vehicles if the penalty for not doing so was higher.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

I would make more effort to give way to emergency vehicles if there were a greater likelihood of being caught for not doing so.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Where did you first get your driver's licence?
- ❍ Western Australia
- ❍ South Australia
- ❍ Australian Capital Territory
- ❍ New South Wales
- ❍ Northern Territory
- ❍ Queensland
- ❍ Victoria
- ❍ Another country (please specify) _____

When you were first learning how to drive a motor vehicle, who taught you?
- ❑ Driving Instructor
- ❑ Family member
- ❑ Friend
- ❑ Partner
- ❑ Work colleague
- ❑ Other (please specify) _____

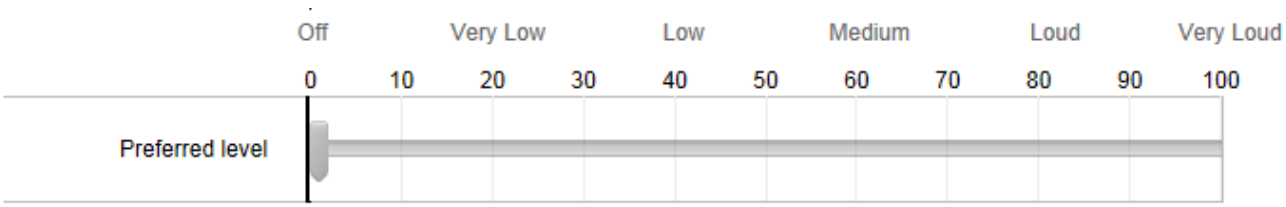
Have you been involved in a motor vehicle crash?
- ❍ Yes
- ❍ No

If so, how long ago was your last motor vehicle crash?
- ❍ Less than 1 year
- ❍ Within the past 5 years
- ❍ Within the past 10 years
- ❍ Over 10 years

Are you?
- ❍ Male
- ❍ Female
- ❍ Other

What was your age in years at your last birthday?
How often do you look in your rear view mirror when you are driving?
- ❍ Not very often
- ❍ Every few minutes
- ❍ A couple of times a minute
- ❍ Every 10 - 15 seconds
- ❍ Every few seconds
- ❍ All the time
- ❍ Not sure

What is your preferred music/radio level when driving?



APPENDIX O **Postcard invitation to complete survey (front and rear) (April 2014)**

WE NEED YOUR HELP

Emergency vehicles need your help to get through traffic and attend life threatening situations, but sometimes things go wrong and lives are put at risk.

You can help us understand the experiences of driving around emergency vehicles by completing an online survey at **www.tinyurl.com/ecusurvey1**

All information provided by you is strictly confidential and if you have any questions, please contact me, my supervisors or the independent Edith Cowan University Research Ethics Officer, Kim Gifkins on 6304 2170.

Thanking you in anticipation

Pauline Grant
(PhD Candidate)
p.grant@ecu.edu.au

Dr Eyal Gringart
e.gringart@ecu.edu.au

Dr Deirdre Drake
d.drake@ecu.edu.au

If undeliverable, return to QUICKMAIL1714 Albany Hwy KENWICK WA 6107

POSTAGE PAID AUSTRALIA

APPENDIX P **Online advertisement (November 2014)**

RESPONDING TO EMERGENCY VEHICLES

Emergency vehicles need the help of motorists to get through traffic and attend life threatening situations, but sometimes things go wrong and lives are put at risk.

If you are over 18 years of age drive on Western Australian roads, you can help us to understand the experiences of driving around emergency vehicles by completing an online survey at LINK TO BE PROVIDED

The survey takes around 15 minutes to complete and you will have a chance to win a $50 fuel voucher (vendor of your choice).

Participation in this research is voluntary and all information provided by you is strictly confidential.

If you would like more information, please contact the researcher, Pauline Grant on pgrant0@our.ecu.edu.au or 0417 958 375

APPENDIX Q **Recruiting flyer (front and rear) (November 2014)**

RESPONDING TO EMERGENCY VEHICLES

Emergency vehicles need the help of motorists to get through traffic and attend life threatening situations, but sometimes things go wrong and lives are put at risk.

If you are over 18 years of age drive on Western Australian roads, you can help us to understand the experiences of driving around emergency vehicles by completing an online survey at http://bit.ly/emergency-vehicles-survey

The survey takes around 15 minutes to complete and you will have a chance to win one of six $50 fuel vouchers.

Participation in this research is voluntary and all information provided by you is strictly confidential.

If you would like more information, please contact the researcher, Pauline Grant on pgrant0@our.ecu.edu.au or 0417 958 375

Principal Researcher
Pauline Grant
(PhD Candidate)

Supervisor
Dr Eyal Gringart
e.gringart@ecu.edu.au

Supervisor
Dr Deirdre Drake
d.drake@ecu.edu.au

APPENDIX R **Revised Survey with Driver Social Desirability Scale (June 2015)**

RESPONDING TO EMERGENCY VEHICLES

THANK YOU for your assistance

Emergency vehicles need your assistance to get through traffic so they can help the community. But sometimes things go wrong, delays occur and lives are put at risk. This survey will help us understand the experience of encountering emergency vehicles from the driver's perspective.

All information provided by you is strictly confidential. Only the researcher and supervisors will have access to it. However, the results of the research, without any identifying information, may be published. This research is undertaken as part of my PhD through Edith Cowan University, Joondalup, Western Australia and participation in this survey is purely voluntary.

If you would like some more information prior to proceeding, please feel free to contact either myself, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 08 6304 2170.

Thank you for your time and participation

INFORMED CONSENT

I understand that:

- ♦ Participation in this project will involve completion of an on-line survey.
- ♦ The information obtained will form the basis for a publishable report.
- ♦ My responses will recorded electronically through the Qualtrics Survey tool.
- ♦ The researcher will secure all information relating to my responses whilst the research project is ongoing.
- ♦ At the completion of the research project, all survey responses will be stored by Edith Cowan University for a period of seven years before being destroyed.
- ♦ I may cease to participate at any time during the on-line survey.

❍ I understand and accept the conditions
❍ I do not accept

Supervisor:	PhD Candidate:	Supervisor:
Dr Eyal Gringart	Pauline Grant	Dr Deirdre Drake
6304 5631	0417 958 375	6304 5020
e.gringart@ecu.edu.au	p.grant@ecu.edu.au	d.drake@ecu.edu.au

School of Psychology and Social Science
Edith Cowan University

Q2 INSTRUCTIONS FOR COMPLETING THE SURVEY

Below are a series of questions and statements about emergency vehicle encounters. Each question requires a response, and your progress through the survey is indicated by the bar at the bottom of each page. The answers to most questions are in the form of a scale. To answer these questions, you need to select the answer that reflects your level of agreement. Other questions require a numerical input or a sliding scale, such as number of years driving and preferred music level. You may save a partially completed survey to continue later, but you may only submit one completed survey.

Q3 Are you 18 years of age or over?
- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

Q4 Do you drive on Western Australian roads?
- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

Q5 How many years have you been driving? (please enter 0 if less than 12 months)

Q6 Thinking about the past year, how often have you driven a motor vehicle on Western Australian roads?
- ❍ Daily
- ❍ Nearly every day
- ❍ A few times a week
- ❍ A few times a month
- ❍ A few times a year
- ❍ Never

If Never Is Selected, Then Skip To End of Survey

Q7 What is the make and model of motor vehicle you drive most often?
- ❍ Small/medium passenger vehicle
- ❍ Large passenger vehicle
- ❍ 4 wheel drive passenger
- ❍ Commercial 2 wheel drive
- ❍ Commercial 4 wheel drive
- ❍ Motorcycle
- ❍ Moped/Scooter
- ❍ Truck/bus
- ❍ Other (please specify) _____

Q8 On average, how many kilometres do you drive each year?
- ❍ less than 5,000 km
- ❍ 5,001 to 10,000 km
- ❍ 10,001 to 15,000 km
- ❍ 15,001 to 20,000 km
- ❍ 20,001 to 25,000 km
- ❍ over 25,000 km

Q9 Thinking about the kinds of roads you drive on, would you say they are:
- ❍ More urban than rural
- ❍ More rural than urban
- ❍ About the same

Q10 What features do you use to identify a vehicle as an emergency vehicle? (choose all that apply)
- ❑ Flashing lights
- ❑ Siren
- ❑ Display the name or markings of their organisation
- ❑ Accessible by dialling 000
- ❑ Other (please specify) _____

Answer If What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply) Flashing lights Is Selected

Q11 What colour flashing lights can emergency vehicles display? (Choose all that apply)
- ❑ Red
- ❑ Blue
- ❑ Orange
- ❑ Green
- ❑ Magenta

Q12 Thinking about different types of vehicles, which of the following can be emergency vehicles? (Choose all that apply)

	Yes	No
Ambulance	❍	❍
Fire brigade vehicle	❍	❍
Tow truck	❍	❍
Marked police vehicle	❍	❍
Unmarked police vehicle	❍	❍
SES vehicle	❍	❍
Blood and/or medical supply transfer vehicle	❍	❍
Western Power vehicle	❍	❍
Fisheries Department vehicle	❍	❍
Main Roads vehicle	❍	❍
Road works vehicle	❍	❍
Police motorcycle	❍	❍

Q13 Thinking about giving way to emergency vehicles, please indicate to what extent you agree with the following statements:

Q14 I give way to emergency vehicles because it is the right thing to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q15 I give way to emergency vehicles because it is my civic duty

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q16 I give way to emergency vehicles because it is common courtesy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q17 I give way to emergency vehicles because it is what I am expected to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q18 I don't give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q19 Responding to emergency vehicles is challenging

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q20 Responding to an emergency vehicles is stressful

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q21 Responding to emergency vehicles is difficult

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q22 I feel confident in my ability to respond to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q23 Someone's life may be at risk if the emergency vehicle is delayed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q24 It is important for drivers to give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q25 An emergency vehicle is not in a hurry if it is flashing its lights but not sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q26 Emergency vehicles are allowed to break the road rules when operating their flashing lights or siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q27 I am prepared to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q28 I am allowed to break the road rules to get out of the way of an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q29 Sometimes, emergency vehicles use their lights and siren just to get through traffic, they are not going to an emergency

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q30 Sometimes I follow the emergency vehicle to see where it is going

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q31 Emergency vehicles use their lights and siren too much

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q32 It does not matter where the emergency vehicle is going, if it is using lights and siren, it must be important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q33 Some reasons for using lights and siren are more important than others

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q34 Emergency driving creates an unacceptable risk to road users

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q35 Emergency service drivers act safely when driving with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q36 Emergency services drivers are properly trained to drive with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q37 Drivers should get punished for failing to give way to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q38 If a driver has the room to move out of the way but does not, they should be punished

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q39 If I hear a siren but cannot find the emergency vehicle I get concerned

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q40 If I hear a siren but cannot see the emergency vehicle, then it must not be near me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q41 I always respond appropriately to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q42 I could never imagine the emergency vehicle crew doing the wrong thing

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q43 Responding to an emergency vehicle makes me feel happy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q44 Responding to an emergency vehicle makes me feel relieved

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q45 Responding to an emergency vehicle makes me feel angry

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q46 Responding to an emergency vehicle makes me feel frustrated

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q47 Responding to an emergency vehicle makes me feel annoyed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q48 Responding to an emergency vehicle makes me feel anxious

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q49 I always know what to do in traffic situations

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q50 I never regret my decisions in traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q51 I don't care what other drivers think of me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q52 I always am sure how to act in traffic situations

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q53 I always remain calm and rational in traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q54 I have never exceeded the speed limit

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q55 I have never wanted to drive very fast

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q56 I have never driven through a traffic light when it has just been turning red

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q57 I always obey traffic rules, even if I'm unlikely to be caught

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q58 If there was no police control, I would still obey the speed limits

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q59 I have never exceeded speed limit or crossed a solid white line in the centre of the road when overtaking

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q60 I always keep sufficient distance from the car in front of my car

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q61 Other drivers do not pay attention

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q62 Other drivers are generally good drivers

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q63 Other drivers make me impatient

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q64 Other drivers do not drive as well as me

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q65 I am just like every other driver on the road

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q66 Other drivers do stupid things

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q67 Other drivers do not know what to do around emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q68 The following questions relate to hypothetical driving scenarios. Imagine you are driving your motor vehicle during an emergency vehicle encounter. Please indicate how likely you would be to undertake the following responses

Q69 You are driving in the left hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:
_____ Move left
_____ Move right

Q70 You are stationary at a red traffic light and an emergency vehicle is approaching you from behind. You will:
_____ Enter the intersection
_____ Remain out of the intersection

Q71 You are at a set of traffic lights that have just turned green when you hear an emergency vehicle siren but cannot see the vehicle. You will:
_____ Proceed through the intersection
_____ Remain stationary

Q72 You are driving in the right hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:
_____ Move left
_____ Move right

Q73 An emergency vehicle is coming towards you from the opposite direction. You will:
_____ Move left
_____ Continue where you are

Q74 An emergency vehicle is approaching you from behind and you cannot move over. You will:
_____ Continue driving until you can move over
_____ Speed up or slow down

Q75 The emergency vehicle approaching you from behind is a police vehicle. You will:
_____ Pull over in case they want you to stop
_____ Move left and see if it follows you

Q76 Please indicate below if you are currently, or have you ever been, a member of an emergency service? (Choose any that apply)

	Current Paid Member	Current Volunteer	Past Paid Member	Past Volunteer
Ambulance	❑	❑	❑	❑
Fire and rescue	❑	❑	❑	❑
Police	❑	❑	❑	❑
Other (please specify)	❑	❑	❑	❑

Q77 Do you know someone that is a past or present member of an emergency service?

- ❍ No
- ❍ Yes, ambulance service
- ❍ Yes, fire and rescue
- ❍ Yes, police
- ❍ Yes, multiple services
- ❍ Yes, other service (please specify) _____

Q78 When I see an emergency vehicle, it makes me think about my own experiences with an emergency service

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q79 When I see an emergency vehicle, it makes me think about an emergency service person that I know

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q80 When I see an emergency vehicle, it makes me think about having used that emergency service for myself

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q81 When I see an emergency vehicle, it makes me think about having used that emergency service for someone else

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q82 How would you rate your experiences with emergency services and their personnel

_____ Police
_____ Fire and rescue
_____ Ambulance
_____ Other service (please specify)

Q83 Where did you first get your driver's licence?

- ❍ Western Australia
- ❍ Australian Capital Territory
- ❍ Northern Territory
- ❍ Victoria
- O South Australia
- O New South Wales
- O Queensland
- O Tasmania
- ❍ Another country (please specify) _____

Q84 When you were first learning how to drive a motor vehicle, who taught you?

- ❍ Driving Instructor
- ❍ Family member (e.g. parent, sibling)
- ❍ Friend
- ❍ Partner
- ❍ Work colleague
- ❍ Multiple sources
- ❍ Other (please specify) _____

Q85 Have you been involved in a motor vehicle crash?

- ❍ No
- ❍ Yes, within the last 12 months
- ❍ Yes, within the last 5 years
- ❍ Yes, within the last 10 years
- ❍ Yes, over 10 years ago

Q86 Are you?

- ❍ Male
- ❍ Female
- ❍ Other

Q87 What was your age in years at your last birthday?

Q88 How often do you look in your rear view mirror when you are driving?

- ❍ Not very often
- ❍ Every few minutes
- ❍ A couple of times a minute
- ❍ Every 10 - 15 seconds
- ❍ Every few seconds
- ❍ All the time
- ❍ Not sure

Q89 Most of the time, when I drive a motor vehicle, I prefer the music/radio to be:
_____ Preferred level

Q90 Thank you for taking the time to complete the survey. If you would like to enter the draw for the fuel vouchers, please provide your preferred contact name, and an email or telephone number.

Preferred contact name

Email or telephone number

APPENDIX S **Email to organisations soliciting participation (October 2015)**

Good morning [name of contact],

If I may introduce myself, my name is Pauline Grant and, aside from being a Police Sergeant, I am in my final year of my Doctorate of Philosophy at Edith Cowan University (ECU), conducting research into motorists' interactions with emergency vehicles.

To date, this research has involved a series of focus groups with emergency service drivers, individual interviews with motorists aged 18 to 85 years, and the development of a scale to assist in identifying factors which facilitate or inhibit effective responding to an emergency vehicle. I have previously used the ECU student body to test and refine the survey, and it is now ready for the broader Western Australian motoring community.

This is an online survey which is expected to take approximately 15 minutes. I have approval from the ECU Ethics Committee to disseminate the survey using social media, and emails and other information sent out through community organisations. As such, I am now seeking permission from organisations, to disseminate my email to their membership, requesting their participation in an online survey which takes approximately 15 minutes. I am conscious of the age demographic drawn to social media and wish to ensure my survey reaches more sectors of the motoring community than social media alone could achieve.

As an incentive, the participants will have a chance to win one of six $50 fuel vouchers (vendor of their choice).

I would be very grateful if I could distribute the survey link through [your organisation] to your Western Australian membership. If you wish, I am happy to provide a short article for your publication, and am available to attend some meetings to speak on my research and related matters if it is of interest to your membership.

Kindest regards,

Pauline Grant
PhD Candidate
Edith Cowan University
0417 958 375
pgrant0@our.ecu.edu.au

APPENDIX T **Social media post soliciting participants (October 2015)**

RESPONDING TO EMERGENCY VEHICLES

Emergency vehicles need the help of motorists to get through traffic and attend life threatening situations, but sometimes things go wrong and lives are put at risk.

If you are over 18 years of age drive on Western Australian roads, you can help me understand the experiences of driving around emergency vehicles by completing an online survey at https://ecuau.qualtrics.com/SE/?SID=SV_bdcOsGtPymqMQFn

It takes around 15 minutes and you will have a chance to win one of six $50 fuel vouchers (vendor of your choice).

Participation in this research is voluntary and all information provided by you is strictly confidential.

Please feel free to share this anyone over 18 years who drives on Western Australian roads.

If you would like more information, please PM me

Like Comment Share

APPENDIX U **Final Survey (October 2015)**

RESPONDING TO EMERGENCY VEHICLES

THANK YOU for your assistance

Emergency vehicles need your assistance to get through traffic so they can help the community. But sometimes things go wrong, delays occur and lives are put at risk. This survey will help us understand the experience of encountering emergency vehicles from the driver's perspective.

All information provided by you is strictly confidential. Only the researcher and supervisors will have access to it. However, the results of the research, without any identifying information, may be published. This research is undertaken as part of my PhD through Edith Cowan University, Joondalup, Western Australia and participation in this survey is purely voluntary.

If you would like some more information prior to proceeding, please feel free to contact either myself, my supervisors or the Edith Cowan University Research Ethics Officer, Kim Gifkins on 08 6304 2170.

Thank you for your time and participation

INFORMED CONSENT

I understand that:

- ♦ Participation in this project will involve completion of an on-line survey.
- ♦ The information obtained will form the basis for a publishable report.
- ♦ My responses will recorded electronically through the Qualtrics Survey tool.
- ♦ The researcher will secure all information relating to my responses whilst the research project is ongoing.
- ♦ At the completion of the research project, all survey responses will be stored by Edith Cowan University for a period of seven years before being destroyed.
- ♦ I may cease to participate at any time during the on-line survey.

❍ I understand and accept the conditions
❍ I do not accept

Supervisor:	PhD Candidate:	Supervisor:
Dr Eyal Gringart	Pauline Grant	Dr Deirdre Drake
6304 5631	0417 958 375	6304 5020
e.gringart@ecu.edu.au	p.grant@ecu.edu.au	d.drake@ecu.edu.au

School of Psychology and Social Science
Edith Cowan University

Q2 INSTRUCTIONS FOR COMPLETING THE SURVEY

Below are a series of questions and statements about emergency vehicle encounters. Each question requires a response, and your progress through the survey is indicated by the bar at the bottom of each page. The answers to most questions are in the form of a scale. To answer these questions, you need to select the answer that reflects your level of agreement. Other questions require a numerical input or a sliding scale, such as number of years driving and preferred music level. You may save a partially completed survey to continue later, but you may only submit one completed survey.

Q3 Are you 18 years of age or over?

- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

Q4 Do you currently drive on Western Australian roads?

- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

Q5 How many years have you been driving? (please enter 0 if less than 12 months)

Q6 Thinking about the past year, how often have you driven a motor vehicle on Western Australian roads?

- ❍ Daily
- ❍ Nearly every day
- ❍ A few times a week
- ❍ A few times a month
- ❍ A few times a year
- ❍ Never

If Never Is Selected, Then Skip To End of Survey

Q7 What is the make and model of the motor vehicle you drive most often?

- ❍ Small/medium passenger vehicle
- ❍ Large passenger vehicle
- ❍ 4 wheel drive passenger vehicle
- ❍ Commercial 2 wheel drive
- ❍ Commercial 4 wheel drive
- ❍ Motorcycle
- ❍ Moped/Scooter
- ❍ Truck/bus
- ❍ Other (please specify _____

Q8 On average, how many kilometres do you drive each year?
- ❍ less than 5,000 km
- ❍ 5,001 to 10,000 km
- ❍ 10,001 to 15,000 km
- ❍ 15,001 to 20,000 km
- ❍ 20,001 to 25,000 km
- ❍ over 25,000 km

Q9 Thinking about the kinds of roads you drive on, would you say they are:
- ❍ More urban than rural
- ❍ More rural than urban
- ❍ About the same

Q10 What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply)
- ❑ Flashing lights
- ❑ Siren
- ❑ Display the name or markings of their organisation
- ❑ Accessible by dialling 000
- ❑ Other (please specify) _____

Answer If What features do you use to identify a vehicle as an emergency vehicle?(choose all that apply) Flashing lights Is Selected

Q11 What colour flashing lights can emergency vehicles display? (Choose all that apply)
- ❑ Red
- ❑ Blue
- ❑ Orange
- ❑ Green
- ❑ Magenta

Q12 Thinking about different types of vehicles, which of the following can be emergency vehicles?

	Yes	No
Ambulance	❍	❍
Fire brigade vehicle	❍	❍
Tow truck	❍	❍
Marked police vehicle	❍	❍
Unmarked police vehicle	❍	❍
SES vehicle	❍	❍
Blood and/or medical supply transfer vehicle	❍	❍
Western Power vehicle	❍	❍
Fisheries Department vehicle	❍	❍
Main Roads vehicle	❍	❍
Road works vehicle	❍	❍
Police motorcycle	❍	❍

Q13 Thinking about giving way to emergency vehicles, please indicate to what extent you agree with the following statements:

Q22 It is important for drivers to give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q21 Someone's life may be at risk if the emergency vehicle is delayed

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q14 I give way to emergency vehicles because it is the right thing to do

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q26 It does not matter where the emergency vehicle is going, if it is using lights and siren, it must be important

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q25 Emergency vehicles use their lights and siren too much

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q32 I always respond appropriately to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q17 I don't want to give way to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q15 I give way to emergency vehicles because it is my civic duty

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q29 Emergency services drivers are properly trained to drive with lights and siren

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q28 Emergency service drivers act safely when driving with lights and siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q20 I feel confident in my ability to respond to emergency vehicles

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q35 I never regret my decisions in traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q16 I give way to emergency vehicles because it is common courtesy

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q27 Emergency driving creates an unacceptable risk to road users

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q31 If a driver has the room to move out of the way of an emergency vehicle, but does not, they should be punished

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q36 I always remain calm and rational in traffic

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q23 An emergency vehicle is not in a hurry if it is flashing its lights but not sounding a siren

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q30 Drivers should get punished for failing to give way to an emergency vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q39 I always obey traffic rules, even if I'm unlikely to be caught

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q24 Sometimes, emergency vehicles use their lights and siren just to get through traffic, they are not going to an emergency

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q19 Responding to emergency vehicles is difficult

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q33 I could never imagine the emergency vehicle crew doing the wrong thing

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q37 I have never exceeded the speed limit

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q43 When I see an emergency vehicle, it makes me think about having used that emergency service for myself

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q18 Responding to an emergency vehicle is stressful

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q44 When I see an emergency vehicle, it makes me think about having used that emergency service for someone else

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q40 I have never exceeded speed limit or crossed a solid white line in the centre of the road when overtaking a vehicle

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q42 When I see an emergency vehicle, it makes me think about an emergency service person that I know

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q34 Responding to an emergency vehicle makes me feel anxious

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q38 I have never wanted to drive very fast

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
❍	❍	❍	❍	❍	❍

Q41 When I see an emergency vehicle, it makes me think about my own experiences with an emergency service

Never	Rarely	Sometimes	Often	Most of the time	Always
❍	❍	❍	❍	❍	❍

Q45 The following questions relate to hypothetical driving scenarios.

Imagine you are driving your motor vehicle during an emergency vehicle encounter. Please indicate how likely you would be to undertake the following responses

Q49 You are driving in the right hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:
_____ Move left
_____ Move right

Q51 An emergency vehicle is approaching you from behind but you cannot move over. You will:
_____ Continue driving until you can move over
_____ Speed up or slow down

Q48 You are at a set of traffic lights that have just turned green when you hear an emergency vehicle siren but cannot see the vehicle. You will:
_____ Proceed through the intersection
_____ Remain stationary

Q50 An emergency vehicle is coming towards you from the opposite direction. You will:
_____ Move left
_____ Continue where you are

Q47 You are stationary at a red traffic light and an emergency vehicle is approaching you from behind. You will:
_____ Enter the intersection
_____ Remain out of the intersection

Q46 You are driving in the left hand lane on a busy road and there is an emergency vehicle approaching you from behind. You will:
_____ Move left
_____ Move right

Q52 The emergency vehicle approaching you from behind is a police vehicle. You will:
_____ Pull over in case they want you to stop
_____ Move left and see if it follows you

Q53 Do you know someone that is a past or present member of an emergency service?
❍ No
❍ Yes, ambulance service
❍ Yes, fire and rescue
❍ Yes, police
❍ Yes, multiple services
❍ Yes, other service (please specify) _____

Q54 Please indicate below if you are currently, or have you ever been, a member of an emergency service? (Choose any that apply)

	Current Paid Member	Current Volunteer	Past Paid Member	Past Volunteer
Ambulance	❑	❑	❑	❑
Fire and rescue	❑	❑	❑	❑
Police	❑	❑	❑	❑
Other (please specify)	❑	❑	❑	❑

Q55 How would you rate your experiences with emergency services and their personnel
_____ Police
_____ Fire
_____ Ambulance
_____ Other (please specify)

Q56 Are you?
❍ Male
❍ Female
❍ Other

Q57 What was your age in years at your last birthday?

Q58 Where did you first get your driver's licence?
- ❍ Western Australia
- ❍ South Australia
- ❍ Australian Capital Territory
- ❍ New South Wales
- ❍ Northern Territory
- ❍ Queensland
- ❍ Victoria
- ❍ Tasmania
- ❍ Another country (please specify) _____

Q59 When you were first learning how to drive a motor vehicle, who taught you?
- ❍ Driving Instructor
- ❍ Family member (e.g. parent, sibling)
- ❍ Friend
- ❍ Partner
- ❍ Work colleague
- ❍ Multiple sources
- ❍ Other (please specify) _____

Q60 Have you ever been involved in a motor vehicle crash?
- ❍ Never
- ❍ Yes, within the last 12 months
- ❍ Yes, within the last 5 years
- ❍ Yes, within the last 10 years
- ❍ Yes, over 10 years ago

Q61 How often do you look in your rear view mirror when you are driving?
- ❍ Not very often
- ❍ Every few minutes
- ❍ A couple of times a minute
- ❍ Every 10 - 15 seconds
- ❍ Every few seconds
- ❍ All the time
- ❍ Not sure

Q62 Most of the time, when I drive a motor vehicle, I prefer the music/radio to be:
_____ Preferred level

Q180 Thank you for your assistance so far in helping me develop this scale on Responding to Emergency Vehicles. The time you have given to do so is greatly appreciated, and I just need a little bit more. The final step in developing a scale is to compare it with other existing scales to ensure it is consistent with related scales and different from unrelated scales.

This last section contains scales which are believed to be either related or unrelated with the Responding to Emergency Vehicle scale.

[RANDOM PRESENTATION OF ADDITIONAL SCALES]

Q95 Thank you for taking the time to complete the survey. If you would like to enter the draw for the fuel vouchers, please provide your preferred contact name, and an email or telephone number.

Preferred contact name

Email or telephone number

APPENDIX V **Prosocial Driving Scale**

Q93 This scale was developed to assess safe and unsafe driving practices. Please indicate how often you undertake the following actions:

	Never	Almost Never	Sometimes	Fairly Often	Very Often	Always
Drive with extra care around pedestrians	❍	❍	❍	❍	❍	❍
Pay special attention when approaching intersections	❍	❍	❍	❍	❍	❍
Drive with extra care around bicyclists	❍	❍	❍	❍	❍	❍
Pay special attention when making turns	❍	❍	❍	❍	❍	❍
Pay attention to traffic and my surroundings while driving	❍	❍	❍	❍	❍	❍
Break slowly enough to alert drivers behind me	❍	❍	❍	❍	❍	❍
Decrease speed to accommodate poor road conditions	❍	❍	❍	❍	❍	❍
Use mirrors and check blind spots when changing lanes	❍	❍	❍	❍	❍	❍
Drive more cautiously to accommodate people or vehicles on the side of the road (e.g., slow down, move over)	❍	❍	❍	❍	❍	❍
Maintain a safe distance when following other vehicles	❍	❍	❍	❍	❍	❍
Slow down in a construction zone	❍	❍	❍	❍	❍	❍
Come to a complete stop at a stop sign	❍	❍	❍	❍	❍	❍
Decrease speed to accommodate poor weather conditions	❍	❍	❍	❍	❍	❍
Give way when the right of way belongs to other drivers	❍	❍	❍	❍	❍	❍
Obey traffic signs	❍	❍	❍	❍	❍	❍
Obey posted speed limits in a school zone	❍	❍	❍	❍	❍	❍
Use turn signals (blinkers) to notify other drivers of my intention to turn	❍	❍	❍	❍	❍	❍

APPENDIX W **Driving Skills Inventory Scale**

Q94 This scale is a self assessment of your driving skills. Please indicate how skilful you consider yourself to be in the following driving situations:

	well below average	below average	average	above average	well above average
Fluent driving	❍	❍	❍	❍	❍
Performance in a critical situation	❍	❍	❍	❍	❍
Perceiving hazards in traffic	❍	❍	❍	❍	❍
Driving in a strange city	❍	❍	❍	❍	❍
Paying attention to pedestrians and bicyclists	❍	❍	❍	❍	❍
Driving on a slippery road	❍	❍	❍	❍	❍
Conforming to the traffic rules	❍	❍	❍	❍	❍
Managing the car through a skid	❍	❍	❍	❍	❍
Predicting traffic situations ahead	❍	❍	❍	❍	❍
Driving carefully	❍	❍	❍	❍	❍
Knowing how to act in particular traffic situations	❍	❍	❍	❍	❍
Fluent lane–changing in heavy traffic	❍	❍	❍	❍	❍
Fast reactions	❍	❍	❍	❍	❍
Making firm decisions	❍	❍	❍	❍	❍
Paying attention to other road users	❍	❍	❍	❍	❍
Driving fast if necessary	❍	❍	❍	❍	❍
Driving in the dark	❍	❍	❍	❍	❍
Controlling the vehicle	❍	❍	❍	❍	❍
Avoiding the competition in traffic	❍	❍	❍	❍	❍
Keeping sufficient following distance	❍	❍	❍	❍	❍
Adjusting the speed to the conditions	❍	❍	❍	❍	❍
Overtaking	❍	❍	❍	❍	❍
Parking in legal places only	❍	❍	❍	❍	❍
Relinquishing one’s rights	❍	❍	❍	❍	❍
Conforming to the speed limits	❍	❍	❍	❍	❍
Avoiding unnecessary risks	❍	❍	❍	❍	❍
Tolerating other driver’s blunders calmly	❍	❍	❍	❍	❍
Obeying the traffic lights carefully	❍	❍	❍	❍	❍

APPENDIX X **Skepticism in Advertising Scale**

Q63 This scale was developed to assess consumer skepticism towards advertising. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
We can depend on getting the truth in most advertising	❍	❍	❍	❍	❍
Advertising's aim is to inform the consumer	❍	❍	❍	❍	❍
I believe advertising is not informative	❍	❍	❍	❍	❍
Advertising is generally truthful	❍	❍	❍	❍	❍
Advertising is not a reliable source of information about the quality and performance of products	❍	❍	❍	❍	❍
Advertising is truth well told	❍	❍	❍	❍	❍
In general, advertising does not present a true picture of the product being advertised	❍	❍	❍	❍	❍
I feel I've been accurately informed after viewing most advertisements	❍	❍	❍	❍	❍
Most advertising does not provide consumers with essential information	❍	❍	❍	❍	❍

APPENDIX Y **Attitudes Towards Older Workers Scale**

Q65 This questionnaire was developed to assess attitudes towards older workers. This questionnaire seeks the first answer that comes to your mind when considering each question. What is asked for are your personal views and not what may seem conventional or politically correct. In the following questions you are asked to compare older workers to younger workers on various qualities. Please indicate the first answer that comes to your mind.

	Far less	Less	Slightly less	No different	Slightly more	More	Far more
How trainable are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How willing to work are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How cautious are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How productive are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How adaptable to new technology are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How reliable are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How physically strong are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How interested in technological change are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How flexible are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How likely are older (55–70) workers to be promoted compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How skilled are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How functional is the memory of older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How satisfactory is the performance of older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How creative are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
Considering the combination of sick days, accident-related expenses, and wages, how cost	❍	❍	❍	❍	❍	❍	❍

	Far less	Less	Slightly less	No different	Slightly more	More	Far more
effective are older (55–70) workers cost compared to younger (25–40) workers?							
How likely are older (55–70) workers to fit in compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How healthy are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How competent at making decisions are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How dependable are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How satisfactory is the job quality of older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How cooperative are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How hard working are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How mentally alert are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How loyal are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How ambitious are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How efficient are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How motivated are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍
How energetic are older (55–70) workers compared to younger (25–40) workers?	❍	❍	❍	❍	❍	❍	❍