

# **Feelings of vulnerability and effects on driving behaviour - a qualitative study.**

Holly Gwyther\* and Carol Holland

*School of Life & Health Sciences, Aston University, Birmingham, B4 7ET, UK.*

\*Corresponding author: Tel: +44 121 204 4063

Email: [gwythehe@aston.ac.uk](mailto:gwythehe@aston.ac.uk) [c.holland1@aston.ac.uk](mailto:c.holland1@aston.ac.uk)

Word count: 6039

Published citation:

[Gwyther, HE, Holland, CA, 2014](#) Feelings of vulnerability and effects on driving behaviour - a qualitative study.

[Transportation Research Part F 24 \(2014\) 50–59](#), <http://dx.doi.org/10.1016/j.trf.2014.03.001>

## **Abstract**

Feelings of vulnerability in driving can be considered an emotional response to risk perception and the coping strategies adopted could have implications for continued mobility. In a series of focus groups with 48 licensed drivers aged 18-75 years, expressions of vulnerability in driver coping behaviours were examined. Despite feelings of vulnerability appearing low, qualitative thematic analysis revealed a complex array of coping strategies in everyday driving including planning, use of 'co-pilots', self-regulation, avoidance and confrontive coping, i.e. intentional aggression toward other road users. The findings inform future intervention studies to enable appropriate coping strategy selection and prolong independent mobility in older adults.

## **Keywords**

Driving behaviour; coping; feelings of vulnerability; older adults

## **1. Introduction**

Feelings of vulnerability as a driver go beyond worries about driving. They reflect emotions about potential susceptibility to harm and can be thought of as an affective response to perceived risk (Klein, Harris, Ferrer, & Zajac, 2011). Given that risk judgements vary between individuals (Millstein & Halpern-Felsher, 2002), it is likely that emotional responses to risk will similarly vary. The aim of this study is to examine whether emotional responses to risk affect driver coping functions and constrain driving or mobility behaviour. If this is the case, then theory based interventions could potentially educate drivers to recognise and overcome such feelings. If drivers are selecting inappropriate, emotion focused (affective) coping strategies such as unnecessary avoidance (over-regulation), modifications to their driving through the adoption of more positive, cognitive (instrumental), coping strategies such as pre-journey planning or vehicle modifications, may assist them to gain confidence, drive more safely and cope in situations they may have avoided previously.

This study begins with the premise that feelings of vulnerability affect normal driving behaviour. A number of studies have demonstrated that females are more likely than males to restrict or self-regulate their driving (Bauer, Adler, Kuskowski, & Rottunda, 2003; Charlton, et al., 2006; Donorfio, D'Ambrosio, Coughlin, & Mohyde, 2008). The reasons for these gender differences are unclear. However, anxiety (Gwyther & Holland, 2012) and risk sensitivity (Ulleberg & Rundmo, 2002) are likely factors.

In a study of young Norwegian drivers, Ulleberg and Rundmo (2002) noted that a group of predominantly female (84%), low risk drivers reported high levels of anxiety and significantly overestimated their risk of being injured in a collision, while Gwyther and Holland (2012), established a link between anxiety and unnecessary driving avoidance or

'over-regulation'. These findings suggest that some drivers are comparatively more sensitive to risk than others and this may influence their coping strategy selection.

Driver coping behaviour has been widely studied in relation to stress (Matthews, 2002), fear (Taylor, Deane, & Podd, 2002) and anxiety (Clapp, et al., 2011). Since feelings of vulnerability can be conceptualised by such feelings, it is likely that the coping strategies adopted will be similar.

Transactional models of driver stress (e.g. Lazarus & Folkman, 1984; Matthews, 2002) suggest that personality and environmental factors affect cognitive processes, generating subjective stress symptoms and impairing driving performance. Reliability studies (Lajunen & Summala, 1995; Matthews, Desmond, Joyner, Carcary, & Gilliland, 1997) have established three dimensions of driver stress: alertness, aggression and dislike of driving.

a) Alertness describes an inclination toward risk awareness and hazard scanning. This is an adaptive, rational response to driving stress (Matthews, Dorn, & Glendon, 1991) and is characterized by observation and planning which are highly desirable characteristics for safe driving.

b) Aggressive driving incorporates anger and risk-taking behaviours. When aggression is used in response to stress, it is known as 'confrontive coping' (Matthews, 2002) and includes behaviours such as shouting, gesticulating and tailgating. Confrontive coping is a risky driving behaviour and has been associated with a higher rate of vehicle collisions (Dula & Ballard, 2003; King & Parker, 2008)

c) Dislike of driving can be conceptualised by feelings of anxiety and low confidence. In terms of coping, it leads to driving avoidance (Ehlers, Hofmann, Herda, & Roth, 1994) as

well as disconnection from the driving task and a tendency to become distracted and display attention gaps (Matthews, et al., 1997; Taubman-Ben-Ari, Mikulincer, & Gillath, 2004).

Traditionally, the terms avoidance and 'self-regulation' have been used interchangeably in driving research with avoidance being particularly prevalent in challenging circumstances, e.g. unfamiliar routes/poor weather/ heavy traffic (Baldock, Mathias, McLean, & Berndt, 2006; Charlton, et al., 2006). However, self-regulation encompasses a broader spectrum of behaviours including restrictive practices such as trip combining and reduction in mileages (Charlton, et al., 2006; Marottoli & Richardson, 1998), active planning strategies including route planning and vehicle adaptations (Molnar, Eby, Scott Roberts, St.Louis, & Langford, 2009) and collaborative strategies such as taking a passenger to assist with navigation and hazard spotting tasks (Shua-Haim, Shua-Haim, & Ross, 1999; Vrkljan & Millar Polgar, 2007).

Research shows that avoidance is particularly prevalent in anxious drivers, inexperienced drivers and older drivers (Baldock, et al., 2006; Charlton, et al., 2006; Gwyther & Holland, 2012). Ultimately, avoidance of the stressor can lead to giving-up driving altogether. While many drivers retire from driving at a suitable time, it is widely reported that a substantial number stop prematurely with recent estimates of 30% stopping before they need to (Lang, Parkes, & Fernandez Medina, 2013), risking a range of detrimental consequences including loneliness and depression (Marottoli, et al., 2000; Oxley & Whelan, 2008). It is well established that female drivers consistently give up driving earlier and in better health than their male counterparts (Charlton, et al., 2006; Hakamies-Blomqvist & Siren, 2003; Siren & Hakamies-Blomqvist, 2005) which may be linked to greater anxiety as noted previously, and contributing to older women's greater isolation and all the implications that has for health, quality of life, and social care requirements.

## **1.1. Study Aims**

The purpose of this study was (1) to examine the prevalence of feelings of vulnerability in drivers across the lifespan but specifically in women (based on the above findings), and (2) to delineate the types of coping strategies adopted in response to those feelings.

There are many possible psychosocial factors involved in discussing driver behaviour, perceived vulnerabilities and reactions to these. In order to explore and understand the relationship amongst such factors, a wholly qualitative approach is adopted. It is felt a quantitative approach is unhelpful and unnecessarily reductive at this stage of knowledge and understanding on the topic. It was not the intention to pick one variable, but to examine a wide variety of psychological variables and their effect in a social context and allow participants to shape and develop narratives on the stressor and coping practices. It was important that the stressors were developed in a bottom-up manner, originating from the participants themselves.

Focus groups were chosen as the most appropriate method of data collection in order to undertake a preliminary exploration of the topic (Krueger, 1988) and to elicit salient beliefs about vulnerability. Certainly, judgements about risks vary between individuals (Millstein & Halpern-Felsher, 2002) and driving behaviour varies between sub-groups of drivers. (e.g. Musselwhite, 2006). Thus, it was expected that the focus groups would generate rich qualitative data and a deeper understanding of the behavioural variation between sub-groups of drivers than would be available using a quantitative method alone (Nagy Hesse-Biber & Leavy, 2006).

The focus group setting helps facilitate a discussion allowing people to build on each other's responses, helping to illuminate new concepts and place their responses within social protocol and norms. Further, this study contributes to the growing body of work using a

discursive approach to driving behaviour and transport safety (Dorn & Brown, 2003; Musselwhite & Haddad, 2010a, 2010b; Natalier, 2001; O'Connell, 2002; Rolls & Ingham, 1992).

## **2. Method**

### **2.1. Participants**

Participants comprised a convenience sample of 48 licensed drivers (8 male, 40 female), aged 18-75 years ( $M=33.89$  years,  $S.D.=20.52$ ). Driving experience ranged from 1 month to 53 years ( $M=13.78$  years,  $S.D.=17.65$ ). Some participants ( $N=30$ ) were students at [University] who received course credits for their participation. Other participants ( $N=18$ ) were sourced through advertising within Aston University, on social networking sites or specifically targeted through the Aston Research Centre for Healthy Ageing (older participants). The only pre-determined criterion for inclusion was that participants had to hold a full driving licence and be practising drivers. Given the differences in male and female driving cessation patterns (Charlton, et al., 2006; Hakamies-Blomqvist & Siren, 2003; Siren & Hakamies-Blomqvist, 2005) and evidence to suggest that women (across the lifespan) are more likely to over-regulate their driving (e.g. Gwyther and Holland, 2012) women were specifically recruited to this study which led to them being over-represented in the final sample. Driving fear was not a necessary criterion for inclusion. Non-student participants were offered the opportunity to have their travel expenses reimbursed. Ethical approval was received from Aston University.

### **2.2. Procedure**

Data were collected through a series of nine focus groups. All discussions were digitally recorded and transcribed and lasted between 36 and 54 minutes. A semi-structured format was used covering driving themes compiled during discussions with the research team and

based on the available literature (see Table 1). The topics were designed to guide a participant led discussion and reduce interviewer bias. Focus group sizes varied between 2 and 8 participants. The composition of focus groups is shown in Table 2.

[Insert Table 1]

[Insert Table 2]

### **2.3. Analysis**

Data were analysed using thematic analysis (Braun & Clark, 2006). Consistent with this model, interpretation of the themes was conducted using an iterative process of reading and re-reading the transcripts, consultation with co-authors and other colleagues and reference to relevant literature.

Individuals' accounts were examined carefully to identify meaningful units of text. These data extracts (quotations) were then manually coded and collated into provisional themes on the basis of semantic content, i.e. surface meanings. Thus the researchers did not attempt to infer anything from the data other than what was explicitly stated. Each item was examined systematically and given equal attention during the coding process. Relevant extracts were collated to form preliminary themes.

Analysis was predominantly inductive, in that preliminary themes were identified directly from the data during the data coding process. However, as analyses progressed and preliminary themes were distilled, a more theoretical process was used to organise the data. This involved reference to the existing literature to identify patterns in the data and to determine which concepts, particularly those related to coping and self-regulation behaviours were relevant to the final themes (Rice & Ezzy, 1999). Themes were reviewed in relation to the coded extracts and against the entire data set, to determine whether they captured a



coherent, consistent and distinctive patterned response (Braun & Clark, 2006). Extracts were also examined to ensure that they provided an appropriate representation of the original data (e.g. Aronson, 1994).

Once themes had been identified, comparisons were made between sub-groups, specifically between the genders, and age groups - younger (18-25 years:  $N=27$ ), middle-years (26-64 years:  $N=12$ ) and older drivers (>65 years:  $N=9$ ) to establish similarities and differences in stressors and coping behaviours.

### **3. Results**

The results suggest that initially, there is a tendency for participants to minimise or even dismiss their feelings of vulnerability during the driving task and to downplay any associated risks. However, on further probing participants related a complex array of coping strategies in every day driving designed to minimise worry and maximise feelings of control and safety. Four overarching themes were identified: *triggering events*, *influence of personal risk biases*, *challenging circumstances* and *influence of passengers, 'co-pilots' and assistive devices*. Data extracts are used to illustrate key concepts and are identified by respondent number (e.g. R1-48), gender and age group. All recordings, notes and transcripts were otherwise anonymised.

#### **3.1. Triggering events**

When participants initially spoke about feelings of vulnerability, their first thoughts were of specific, often traumatic events such as breakdowns, extreme acts of aggression and crashes.

Younger female participants particularly displayed concerns about breaking down and they reported that their concerns were heightened in unfamiliar locations. In these circumstances, feelings of vulnerability stemmed from not knowing what to do and being unable to easily

contact help, either due to a lack of a mobile phone signal (in rural locations) or from forgetting to charge their mobile phone. Only one younger female participant reported that she felt vulnerable about inconveniencing or angering other drivers (specifically in urban locations). Older drivers who discussed breaking down reported that it was an inconvenience rather than a serious concern because they had breakdown cover. This difference between the age groups highlights a sensible preparatory coping strategy, that of having emergency breakdown cover. Younger drivers were less likely to report having breakdown cover than middle-years and older drivers and they implied that this was due to cost.

‘I had that [worries about breaking down] with the long journey I went on. I didn’t have any [breakdown] cover and the car was making noises and I [...] actually started crying while I was driving because I was dead scared.’ (R3, younger female)

In this extract, the participant recognises her vulnerability and implies that breakdown cover would have assuaged her concerns. This is later confirmed when she reveals that she had avoided buying cover because of the cost but on reflection, the financial outlay would be offset by the reassurance of cover: ‘it’s worth it’ (R3, younger female). This was a view unanimously shared by participants, young and old.

Generally, feelings of vulnerability related to an event were described in the past tense and were signalled through statements such as ‘I was scared’ (R15, younger female), ‘I was really panicking and crying’ (R4, middle-years female) and ‘It just scared me’ (R13, younger female). Some younger participants reported that their triggering event had improved their driving behaviour or altered their driving habits.

‘I think that they’ve [near miss and crash experiences] made me a better driver to be honest because now I’m focusing more [...] on who’s in front of me, who’s behind me and if anyone’s overtaking’ (R31, younger male).

This type of task-focused response to an incident demonstrates 'alertness'. The participant reports an improvement in hazard awareness and observation as well as a reduction in the tendency to engage with distractions.

Similar improvements in driving behaviour were reported by other young drivers after significant incidents, as well as self-regulation type changes such as improving route planning and driving earlier in the day (rather than at dusk) and waiting for heavy rain to ease off. Where it was believed an incident was caused by bad weather, younger participants of both genders reported that they had adjusted their driving in those conditions accordingly.

'If it's icy then I get a bit worried because I had a crash when it was icy; [...] now I'm really cautious when it's icy. [...] like if there's a car up my backside I'll just think I'm not going to crash because of them and I'll keep calm and put it in low gears and stuff' (R9: younger female).

Several anxious female participants who described themselves as 'nervous', 'not confident' or 'stressed' by driving also reported that they avoided specific roads because they had been involved in incidents at those locations.

Men of all ages and women in the middle-years group also reported changing their habits in light of the circumstances of their triggering event, notably in terms of road rage. For example, where an incident was exacerbated by their retaliating to road rage, they reported retaliating less after the experience.

A number of younger participants reported being distracted in the car, specifically by their mobile phone. Although several young drivers said that they did not use their phone in the car, many admitted that they did, sometimes with detrimental consequences.

'I was in traffic and I looked down at my phone because I had a text – it was on my lap – and I looked up and I'd started going and went into the back of someone. So

since then I've been really worried about crashing into someone again. I used to be confident but it's just...I feel a bit nervous now' (R9, younger female).

Here, the driver relates her anticipation of serious consequences about crashing again and her feelings of loss of control. However, she fails to acknowledge responsibility for the collision by engaging in an illegal act and instead describes ongoing feelings of vulnerability. This suggests the emotional response to driving stress 'dislike of driving', manifesting in feelings of low confidence. This driver was typical of many young drivers in the study who failed to acknowledge risk until after they had experienced a specific triggering event that 'switched on' their feelings of vulnerability.

### **3.2. Influence of personal risk biases**

Risk biases affected feelings of vulnerability. For example, younger female participants reported greater feelings of vulnerability to low probability events such as personal attack than they did to more common events such as collisions or road rage, particularly when they were in an urban setting. These feelings were exacerbated at night and when travelling alone.

' I do like a quick step so I'm not running but I'm not really walking; I'm doing a little trot. And checking my back seat to make sure there's no one with an axe ....  
[laughs] I don't like it – I don't like the dark anyway. I don't like going to my car at night' (R15: younger female).

Drivers reported a wide range of coping strategies to manage feelings of vulnerability to low probability events ranging from simple techniques such as keeping car doors locked and carrying their car keys in hand (in built up areas), to premeditated actions in younger female drivers such as buying a personal alarm and making their whereabouts known to relatives. Despite inflated perceptions of risk regarding the likelihood of personal attack, and the fact

that many female participants 'armed' themselves against such an attack, they were unlikely to research a secure, well-lit parking location before travelling, generally accepting whatever was closest to their destination.

Although most younger and middle-years participants recounted examples of moderate road rage from other road users such as tailgating, cutting in, gesticulating and swearing, risks were generally underplayed and dismissed as trivial. Participants laughed while sharing their experiences and spoke about retaliating in kind but only in circumstances where they felt secure.

'I do tend to retaliate I'll admit but not so much now since that happened <previous incident> and when I've got <name of baby> in the car. I tend to do it more on motorways because you're going that much faster <laughs> And you can get away quicker!' (R37, middle-years female).

Three middle-years female participants told of extreme victimisations in an urban environment including a face-to-face, out of the vehicle confrontation, being forcibly shunted into oncoming traffic by the vehicle behind and being aggressively trailed by an aggrieved driver. However, participants typically reported that they were not concerned by their experiences of road rage, using phrases such as 'it doesn't worry me' (R12, younger female) and 'I don't really get bothered by that' (R9, younger female).

Many middle-years and younger drivers mentioned that despite the risk of escalating aggression, they coped with road rage by responding in kind, in effect using confrontive coping to manage their feelings of vulnerability. Generally participants admitted to 'mild' retaliation such as swearing, gesticulating and hooting the horn. However, a few confident middle-years and older participants reported the use of more risky manoeuvres, such as blocking or rapid braking. One female driver referred to this as 'engaging the idiot

brake' (R41, middle-years female). Although considered by many participants in this study to be a useful safety warning and intended to demonstrate to other drivers that they are too close or behaving erratically, rapid braking could increase crash risk by escalating aggression or by prompting an over-reaction to the act by the tailgater.

Some female participants recognised the risks associated with escalating road rage and employed passive coping strategies to manage feelings of vulnerability during road rage incidents.

'Most of the time I just ignore it and let them behave stupidly [...] I'll just try to stay calm because there's no point, the situation won't change if you start shouting back and [...] that could make them worse and they could get out and come and have a go' (R40, middle-years female).

Passive coping behaviours included ignoring aggression, failing to react visibly and identifying a safe gap in traffic and pulling out of range. These behaviours can be considered instrumental strategies to lessen feelings of vulnerability while remaining task focused and achieving one's goal.

### **3.3. Challenging circumstances**

As might be expected, feelings of vulnerability were particularly high when drivers had to drive in challenging circumstances. The majority of participants reported feeling particularly vulnerable when driving in extraordinary weather conditions such as heavy snow, fog or ice. Here, participants employed sensible risk reduction strategies such as avoidance. Where journeys could not be easily avoided, most frequently, 'alertness' style strategies were adopted with an emphasis on task focus, planning and preparation. Commonly participants put emergency equipment in the car and reported that when driving in bad weather they would reduce their speed, and allow extra time. These strategies were selected irrespective of

age and gender and participants emphasised the feelings of control and safety that preparing gave them.

Similarly, when driving long distances or making unusual journeys, the emphasis was on route planning and preparation.

‘I always plan in advance and make sure I know the way. And with long journeys I always make sure I’ve got an alternate route because what if the motorway’s blocked?’ (R16, younger female).

Older male drivers were the only group who reported that they checked their vehicle’s condition, including tyres, oil and water before making a long journey.

Restrictive practices were employed as a strategy to reduce feelings of vulnerability in older female drivers who reported that they found driving at night challenging.

‘You feel more vulnerable. If I know the road well, then I don’t mind so much driving at night but if I don’t know the road very well I like to be able to see where I am and in the dark you can’t see when the corner’s coming up.’ (R45, older female).

Conversely, younger participants were often keen to drive at night because it provided them with an opportunity to practice their vehicle handling skills in a traffic free environment,

‘I like driving on the motorway at night. [...] It’s just quieter. Yeah, if it’s rush hour I just feel....it’s people overtaking, changing lanes, that’s what I find stressful.’ (R2, younger female).

Avoidance or over-regulation type behaviours were employed by anxious drivers to manage feelings of vulnerability when driving in unusual circumstances.

'If I've got to go somewhere like another town or a journey where I've never been before, [...] I just wouldn't go because I'm not confident in my own ability to drive safely.' (R39, middle-years female).

This extract demonstrates that feelings about driving can result in over-regulation, whereby everyday behaviour is constrained and participants' lifestyle choices are affected. A number of such instances were found. Some female drivers at either end of the life span (young and old) avoided travelling on motorways, a few older women avoided driving in rush hour or heavy traffic and one younger female driver reported avoiding making right hand turns.

'I absolutely hate it. To get onto the road where I live, [...] you have to turn right but I know there's a roundabout two minutes up the road, so I'll purposefully drive the extra two minutes to go round the roundabout to come back again. You're not only waiting for the traffic coming the other way, you're stopping the traffic behind you because they're waiting for you to turn right. And I just hate it. So I will go out of my way to find another way to do it, normally with roundabouts, or I'll go further and turn round.' (R26, younger female).

One young woman had even made a major life decision, her choice of university, based on her feelings about driving.

'I was looking forward to coming here [to a city centre University] so I didn't have to drive.... I'm glad that everything's so compact that I don't have to stress about driving' (R15, younger female).

Although appropriate self-regulation and avoidance behaviours are effective safety strategies, this type of over-regulation may ultimately culminate in premature driving cessation and lead to the associated negative health and social consequences.



### **3.4. The influence of passengers, ‘co-pilots’ and assistive devices.**

The presence of passengers significantly influenced feelings of vulnerability. Many participants spoke about feelings of safety and protection when travelling with a trusted passenger. However, the role of the passenger was not simply for reassurance. Younger drivers particularly, described feeling more vulnerable when travelling in unfamiliar areas and wanted their passengers to act collaboratively and assist with navigation or observation tasks such as map reading, checking road signs and checking for safe gaps in traffic. Participants’ used phrases such as ‘an extra set of eyes and ears’ (R11, younger female) to describe their passenger’s function. In effect, these participants were employing a ‘co-pilot’ to reduce their workload.

The choice of co-pilot appears critical. Participants reported that it should be a non-judgemental individual and in younger participants, family members were favoured over friends. The reasons for this included a respect for the driving experience that parents possessed as well as a fear of embarrassment in front of their peers.

‘He has no choice and has to come with me because I don’t like long journeys on my own. My Dad. I think it’s always nice to have someone really calm and really patient in the car with you because you don’t feel as nervous and they can calm you down’ (R15, younger female).

However, in older and middle-years’ female drivers, some passengers notably partners, appeared to negatively affect emotions. Respondents signalled the effect on their emotions through statements such as ‘he makes me nervous’ (R42, older female) and ‘I get really stressed’ (R38, middle-years female). These feelings seemed to arise from uninvited collaboration, the so called ‘backseat driver’ and included unsolicited advice on the presence of hazards, speed and manoeuvring.

A few drivers reported that they had become so enraged with their passenger's interjections that they 'stopped the car and [...] said drive yourself' (R47, older female), 'chucked my husband out of the car' (R42, older female), 'think urgh, just drive yourself' (R33, middle-years female), 'literally have to relax my muscles because I'm about to stop the car and push him out' (R38, middle-years female). Although passengers were not always exacerbating participants' feelings of vulnerability, they often negatively influenced emotions, distracting attention from the driving task.

Many drivers commented on their reliance on satellite navigation systems and to some extent, they appeared to act as a substitute for the human co-pilot in terms of navigation. Older and younger drivers described their merits and felt that they reduced feelings of vulnerability.

'I find it so useful because I can't follow a map to save my life; [...] but with the sat nav, it knows what it's doing and I can trust it. I rely completely 100% on it.' (R15, younger female).

#### **4. Discussion**

This study sought to examine feelings of vulnerability in drivers, and to delineate the coping strategies adopted in response to those feelings. Certainly, driver behaviour was affected by emotional responses to risk. Although initially feelings of vulnerability were unlikely to be acknowledged, drivers displayed a complex array of coping strategies in their everyday driving. When explored, these strategies were designed to minimise worry and maximise feelings of control and safety, usually in response to feelings of vulnerability.

The triggering events theme demonstrates the significance of conditioning events in explaining feelings of vulnerability. Younger participants particularly, only questioned their vulnerability when faced with a traumatic experience. Perloff (1983) suggests that individuals

who have not experienced negative life events tend to perceive themselves as 'uniquely invulnerable' and once this illusion is shattered, it creates a sense of vulnerability which is often accompanied by psychological distress. This has been borne out in the driving literature, where traumatic events such as crashes commonly result in fears about driving and seriously affect driving behaviour (Taylor, et al., 2002). Although older drivers mentioned conditioning events, perhaps the finding was more noticeable in younger participants because they had experienced their 'event' more recently, or because it was the first time that they had been faced with their own vulnerability.

Feelings of vulnerability relating to traumatic events had implications for driving behaviour. In some cases, events provoked instrumental appraisals of the situation ensuring that participants established positive risk reduction strategies. On other occasions, they evoked affective responses which resulted in feelings of worry, manifesting in avoidance and over-regulation. The reasons for these inconsistent responses to similar events are unclear, although perhaps differing sensitivities to risk may be responsible. Irrespective, this, and the longevity of these effects are potential areas for future research.

While over-regulation offers a straightforward method of reducing feelings of vulnerability for the individual, there are wider concerns. Driving frequency has been shown to influence decisions about driving cessation (Hakamies-Blomqvist & Siren, 2003) and premature driving cessation has implications for an individual's mental health (Fonda & Herzog, 2001) and quality of life (Marottoli, et al., 2000). It could be considered therefore that encouraging drivers who over-regulate to modify their driving, by adopting instrumental rather than affective coping strategies, would improve their mobility prospects and potential health status. Such strategies might include positive self-regulation behaviours such as pre-journey planning and preparation.

The risk biases theme demonstrated that participants reported greater feelings of vulnerability to low probability events than to common victimisations. Although this is counter-intuitive, this finding is supported by work in the fear of crime literature. Warr (1984) determined that individuals are more 'sensitive' to a perceived risk when they view the consequences as more severe. Although collisions and road rage can result in extreme harm, they can also be minor events. Since the consequences fall on a spectrum, perhaps participants optimistically view the outcome as less serious than low probability events. It may also be that since these events are so frequent, up to 75% of drivers have experienced some form of mild road rage (Roberts & Indermaur, 2005; Smart, Mann, & Stoduto, 2003), drivers have become habituated to them.

Some participants reported retaliating to road rage. Overall, the perception of the sample was that driver aggression is increasing and that retaliation has become socially acceptable. One question for further study is whether it has become more acceptable for drivers, and in particular women, to retaliate to aggressive behaviour and express anger in a car, or whether the car is just a safe place for drivers to vent general anger and frustration. Whichever it may be, the proliferation of confrontive coping is likely to increase crash risk (Dula & Ballard, 2003; King & Parker, 2008).

The challenging circumstances theme revealed the significance of situational factors on driver vulnerability. Many drivers described the adoption of appropriate avoidance strategies in extreme weather conditions as well as self-regulation coping behaviours such as speed reduction where journeys could not easily be avoided.

Interestingly, older participants were most likely to report that they felt vulnerable at night. The literature shows that there is a strong association between ratings of functional night vision and drivers' avoidance of night driving (Charlton, et al., 2006). Perhaps then, feelings of vulnerability in older drivers at night are associated with perceptions of increased crash

risk due to age-related changes in visual acuity. In this case, feelings of vulnerability provoke a sensible response to age-related declines in vision in drivers who avoid driving at night.

Finally, this theme revealed that feelings of vulnerability affect the lifestyle choices of some participants. This provides some evidence for the assertion at the beginning of the study that emotional responses to risk can constrain driving behaviour. However, it seems that in some instances, feelings of vulnerability may have a positive influence on driver behaviour if they lead to appropriate preventative action as long as they do not curtail mobility and social engagement. So, regulating driving at night would be beneficial, as long as the individual rearranged their social events for daylight hours rather than simply stopping socialising.

The influence of passengers theme revealed the importance of collaborative coping on driving, an activity which has previously been considered a solo endeavour. In terms of reducing feelings of vulnerability, collaborative coping offers two categories of support. Firstly, it reduces workload through the delegation of specific tasks and secondly, it appears to provide reassurance to drivers through social interaction.

The influence of passengers on young drivers' behaviour has been widely researched. Generally, passengers increase risk and negatively affect driving behaviour (Chen, Baker, Braver, & Li, 2000; Williams, Ferguson, & McCartt, 2007). However, Aldridge et al., (1999) determined that adult passengers have a protective effect on young drivers and perhaps this effect is related to the reduction of workload established through collaborative coping. Given that older adults use a co-pilot to compensate for declining cognitive resources (Shua-Haim, et al., 1999) it may be that younger adults, who have not yet achieved a state of automaticity in driving, similarly use a co-pilot to compensate for stretched cognitive resources. In effect, delegating certain tasks reduces their workload and enables them to direct attention to basic driving skills such as vehicle handling (Hatakka, Keskinen, Gregersen, Glad, & Hernetkoski,

2002). These findings suggest that encouraging less confident drivers to travel with a co-pilot could potentially improve personal mobility and even reduce driving risk.

A new finding of this study is that the choice of co-pilot is critical. Some female drivers reported that they become stressed by their partner's uninvited collaboration. It is possible that this result could also partly explain why women are more likely to be over-regulators; perhaps women choose to drive less frequently in a partnership because men regularly show uninvited collaboration or because they themselves react more sensitively to feedback or criticism.

In the absence of a human co-pilot, satellite navigation systems provided a well-regarded alternative, with drivers suggesting that to some extent, they act as a substitute for the co-pilot. While they reduce navigational workload, these systems cannot provide the social interaction and reassurance offered by a human co-pilot. Further, complete reliance on satellite navigation systems could be dangerous in that drivers may devolve responsibilities rather than taking active control over their route planning. Nevertheless, satellite navigation may provide a viable alternative to the co-pilot in some circumstances.

#### **4.1. Study Limitations**

The sample was purposefully not balanced by gender, with women being better represented than men. However, since previous research (Gwyther & Holland, 2012) has suggested that women are more likely to be over-regulators, the findings are of value.

The gender balance is of particular interest regarding confrontive coping. Road rage has typically been described in terms of perpetrators and victims, with predictors of perpetration including male gender, youth and history of aggressive/violent behaviour (Fong, Frost, & Stansfeld, 2001). In this study, women commonly reported retaliating aggressively to road

rage. It may be that these women would not have admitted to aggressive behaviours in mixed company since they are not traditionally 'female' behaviours. This raises questions about socially desirable responding and the terminology used in road rage studies, perhaps the inclusion of an additional category 'retaliators' would be beneficial.

## **5. Conclusions**

The benefit of this exploratory qualitative research is that it demonstrates that there is a link between risk sensitivity and decisions about driving behaviour. Emotional responses to risk appear to affect driver safety in terms of choosing appropriate coping strategies, as well as affecting major life decisions and choices about social and economic engagement. With this in mind, there is potential to develop intervention studies to educate drivers about risk and enable them to overcome feelings of vulnerability by selecting appropriate positive coping strategies, for example pre-journey planning or preparation.

## **Acknowledgements**

We would like to thank Dr Rachel Shaw and Dr Charles Musselwhite for their comments on versions of this manuscript.

## **Funding**

This study was funded by an Economic and Social Research Council CASE studentship award [ES/G003777/1]. The collaborative partner was Goodmedia Ltd.

## References

- Aldridge, B., Himmler, M., Aultman-Hall, L., & Stamatiadis, N. (1999). Impact of passengers on young driver safety. *Transportation Research Record: Journal of the Transportation Research Board*, 1693, 25-30.
- Aronson, J. (1994). A pragmatic view of thematic analysis. *The Qualitative Report*, 2.
- Baldock, M. R. J., Mathias, J. L., McLean, A. J., & Berndt, A. (2006). Self-regulation of driving and its relationship to driving ability among older adults. *Accident Analysis and Prevention*, 38, 1038-1045.
- Bauer, M. J., Adler, G., Kuskowski, M. A., & Rottunda, S. (2003). The influence of age and gender on the driving patterns of older adults. *Journal of Women & Aging*, 15, 3-16.
- Braun, V., & Clark, V. (2006). Using thematic analysis in psychology *Qualitative research in psychology*, 3, 77-101.
- Charlton, J., Oxley, J., Fildes, B., Oxley, P., Newstead, S., Koppel, S., & O'Hare, M. (2006). Characteristics of older drivers who adopt self-regulatory driving behaviours. *Transportation Research Part F: Traffic Psychology and Behaviour*, 9, 363-373.
- Chen, L. H., Baker, S. P., Braver, E. R., & Li, G. (2000). Carrying passengers as a risk factor for crashes fatal to 16- and 17- year old drivers. *Jama*, 283, 1578-1582.
- Clapp, J. D., Olsen, S. A., Danoff-Burg, S., Hagewood, J. H., Hickling, E. J., Hwang, V. S., & Beck, J. G. (2011). Factors contributing to anxious driving behavior: The role of stress history and accident severity. *Journal of Anxiety Disorders*, 25, 592-598.
- Donorfio, L. K. M., D'Ambrosio, L. A., Coughlin, J. F., & Mohyde, M. (2008). Health, safety, self-regulation and the older driver: It's not just a matter of age. *Journal of Safety Research*, 39, 555-561.
- Dorn, L., & Brown, B. (2003). Making sense of invulnerability at work - A qualitative study of police drivers *Safety Science*, 41, 837-859.
- Dula, C. S., & Ballard, M. E. (2003). Development and Evaluation of a Measure of Dangerous, Aggressive, Negative Emotional, and Risky Driving *Journal of Applied Social Psychology*, 33, 263-282.
- Ehlers, A., Hofmann, S. G., Herda, C. A., & Roth, W. T. (1994). Clinical characteristics of driving phobia. *Journal of Anxiety Disorders*, 8, 323-339.
- Fonda, S. J., & Herzog, A. R. (2001). Changes in Driving Patterns and Worsening Depressive Symptoms Among Older Adults. *Journal of Gerontology: SOCIAL SCIENCES*, 56B, S343-S351.
- Fong, G., Frost, D., & Stansfeld, S. (2001). Road rage: a psychiatric phenomenon? *Social Psychiatry and Psychiatric Epidemiology*, 36, 277-286.
- Gwyther, H., & Holland, C. (2012). The effect of age, gender and attitudes on self-regulation in driving. *Accident Analysis & Prevention*, 45, 19-28.
- Hakamies-Blomqvist, L., & Siren, A. (2003). Deconstructing a gender difference: Driving cessation and personal driving history of older women. *Journal of Safety Research*, 34, 383-388.
- Hatakka, M., Keskinen, E., Gregersen, N. P., Glad, A., & Hernetkoski, K. (2002). From control of the vehicle to personal self-control; broadening the perspectives to driver education. *Transportation Research Part F: Traffic Psychology and Behaviour*, 5, 201-215.

Formatted: Italian (Italy)



- King, Y., & Parker, D. (2008). Driving violations, aggression and perceived consensus. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology*, 58, 43-49.
- Klein, W. M. P., Harris, P. R., Ferrer, R. A., & Zajac, L. E. (2011). Feelings of vulnerability in response to threatening messages: Effects of self-affirmation. *Journal of Experimental Social Psychology*, 47, 1237-1242.
- Krueger, R. A. (1988). *Focus groups: a practical guide for applied research*. London: Sage.
- Lajunen, T., & Summala, H. (1995). Driving experience, personality, and skill and safety-motive dimensions in drivers' self-assessments. *Personality and Individual Differences*, 19, 307-318.
- Lang, B., Parkes, A., & Fernandez Medina, K. (2013). *Driving choices for the older motorist: The role of self-assessment tools*. London: RAC Foundation Report.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping* New York Springer
- Marottoli, R. A., Mendes de Leon, C. F., Glass, T. A., Williams, C. S., Cooney, L. M., & Berkman, L. F. (2000). Consequences of Driving Cessation: Decreased out of home activity levels. *Journal of Gerontology*, 55, 334-340.
- Marottoli, R. A., & Richardson, E. D. (1998). Confidence in, and self-rating of, driving ability among older drivers. *Accident Analysis & Prevention*, 30, 331-336.
- Matthews, G. (2002). Towards a transactional ergonomics for driver stress and fatigue. *Theoretical Issues in Ergonomics Science*, 3, 195-211.
- Matthews, G., Desmond, P. A., Joyner, L., Carcary, B., & Gilliland, K. (1997). A comprehensive measure of driver stress and affect. In T. Rothengatter & E. Carbonell Vaya (Eds.), *Traffic and Transport Psychology: Theory and Application* Amsterdam Pergamon
- Matthews, G., Dorn, L., & Glendon, I. (1991). Personality correlates of driver stress. *Personality and Individual Differences*, 12, 535-549.
- Millstein, S. G., & Halpern-Felsher, B. L. (2002). Perceptions of risk and vulnerability. *Journal of Adolescent Health*, 31, 10-27.
- Molnar, L., Eby, D., Scott Roberts, J., St.Louis, R., & Langford, J. (2009). A new approach to assessing self-regulation by older drivers: development and testing of a questionnaire instrument. Report No. M-CASTL-2009-04. In Ann Arbor: University of Michigan Transportation Research Institute.
- Musselwhite, C. (2006). Attitudes Towards Car Driving Behaviour: Categorising and Contextualising Risk. *Accident Analysis and Prevention*, 38, 324-333.
- Musselwhite, C., & Haddad, H. (2010a). Exploring older drivers' perceptions of driving. *European Journal of Ageing*, 7, 181-188.
- Musselwhite, C., & Haddad, H. (2010b). Mobility, accessibility and quality of later life. *Quality in Ageing and Older Adults*, 11, 25-37.
- Nagy Hesse-Biber, S., & Leavy, P. (2006). *The practice of qualitative research* London Sage.
- Natalier, K. (2001). Motorcyclists' Interpretations of Risk and Hazard. *Journal of Sociology*, 37, 65-80.
- O'Connell, M. (2002). Social psychological principles: 'The group inside the person'. In R. Fuller & J. A. Santos (Eds.), *Human Factors for Highway Engineers* (pp. 201-215). Amsterdam: Pergamon.
- Oxley, J., & Whelan, M. (2008). It Cannot Be All about Safety: The Benefits of Prolonged Mobility. *Traffic Injury Prevention*, 9, 367-378.
- Perloff, L. S. (1983). Perceptions of Vulnerability to Victimization. *Journal of Social Issues*, 39, 41-61.

- Rice, P., & Ezzy, D. (1999). *Qualitative Research and Evaluation Methods* (3rd ed.). Thousand Oaks, C.A: Sage.
- Roberts, L., & Indermaur, D. (2005). Boys and road rage: Driving-related violence in Western Australia,. *The Australian and New Zealand Journal of Criminology*, 38 (5), 361-380.
- Rolls, G., & Ingham, R. (1992). 'Safe' and 'unsafe'—a comparative study of younger male drivers. AA Foundation for Road Safety Research, Basingstoke, Hampshire, UK.
- Shua-Haim, J., Shua-Haim, V., & Ross, J. (1999). The co-pilot driver syndrome: A newly reported driving habit in patients with alzheimer's disease. *American Journal of Alzheimer's disease and other Dementias*, 14, 88-92.
- Siren, A., & Hakamies-Blomqvist, L. (2005). Sense and sensibility. A narrative study of older women's car driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 8, 213-228.
- Smart, R. G., Mann, R. E., & Stoduto, G. (2003). The prevalence of road rage: Estimates from Ontario, . *Canadian journal of public health. Revue canadienne de santé publique*, 94, 247-250.
- Taubman-Ben-Ari, O., Mikulincer, M., & Gillath, O. (2004). The multidimensional driving style inventory-scale construct and validation *Accident Analysis and Prevention*, 36, 323-332.
- Taylor, J., Deane, F., & Podd, J. (2002). Driving-related Fear: A Review *Clinical Psychology Review*, 22, 631-645.
- Ulleberg, P., & Rundmo, T. (2002). Risk-taking attitudes among young drivers: The psychometric qualities and dimensionality of an instrument to measure young drivers' risk-taking attitudes. *Scandinavian Journal of Psychology*, 43, 227-237.
- Vrkljan, B., & Millar Polgar, J. (2007). Driving safety in later life: Exploring the older driver-passenger relationship. In *11th International Conference on Mobility and Transport for Elderly and Disabled Persons*. Montreal.
- Warr, M. (1984). Fear of Victimization: Why are women and the elderly more afraid? . In *Social Science Quarterly (University of Texas Press)* (Vol. 65, pp. 681-702): University of Texas Press.
- Williams, A. F., Ferguson, S. A., & McCartt, A. T. ( 2007). Passenger effects on teenage driving and opportunities for reducing the risks of such travel. *Journal of Safety Research*, 38, 381-390.

Formatted: Italian (Italy)

*Table 1: Interview topics*

<b>Interview Topics</b>	<b>Aspects considered</b>
Openers	General feelings about driving (enjoyment/dislike) Personal confidence when driving
Feelings of Vulnerability	Feelings of vulnerability when driving (e.g. to crashes, criminal events and road/weather conditions).
Coping behaviours	Strategies used to feel safe when driving Strategies used to reduce victimisation Strategies imposed by others to ensure safety (e.g. parents and curfews, or restrictions on passenger numbers) Behaviour changes after experiences of crashes/victimisation Relaxation techniques e.g. music, breathing exercises

*Table 2: Composition of focus groups*

Focus Group	Age range (years)	Male (N)	Female (N)
1	18 to 33	2	6
2	18 to 31	0	6
3	18 to 19	0	5
4	18 to 39	0	7
5	18 to 35	3	1
6	19 to 20	2	0
7	59 to 65	1	3
8	34 to 54	0	5
9	65 to 75	0	7