



What are the factors that contribute to road accidents? An assessment of law enforcement views, ordinary drivers' opinions, and road accident records



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ABSTRACT

What are the main contributing factors to road accidents? Factors such as inexperience, lack of skill, and risk-taking behaviors have been associated with the collisions of young drivers. In contrast, visual, cognitive, and mobility impairment have been associated with the collisions of older drivers. We investigated the main causes of road accidents by drawing on multiple sources: expert views of police officers, lay views of the driving public, and official road accident records. In Studies 1 and 2, police officers and the public were asked about the typical causes of road traffic collisions using hypothetical accident scenarios. In Study 3, we investigated whether the views of police officers and the public about accident causation influence their recall accuracy for factors reported to contribute to hypothetical road accidents. The results show that both expert views of police officers and lay views of the driving public closely approximated the typical factors associated with the collisions of young and older drivers, as determined from official accident records. The results also reveal potential under-reporting of factors in existing accident records, identifying possible inadequacies in law enforcement practices for investigating driver distraction, drug and alcohol impairment, and uncorrected or defective eyesight. Our investigation also highlights a need for accident report forms to be continuously reviewed and updated to ensure that contributing factor lists reflect the full range of factors that contribute to road accidents. Finally, the views held by police officers and the public on accident causation influenced their memory recall of factors involved in hypothetical scenarios. These findings indicate that delay in completing accident report forms should be minimised, possibly by use of mobile reporting devices at the accident scene.

1. Introduction

Motor vehicle collisions cause more than 1.2 million deaths worldwide and an even greater number of non-fatal injuries each year (World Health Organization, 2015), negatively affecting the health and wellbeing of injury survivors and their families (Donaldson et al., 2009). To improve road safety, insight is needed into preventable causes of road accidents. Police reports of road accidents are the main source of data used for informing research and policy on the causes of road accidents. Concerns have been raised by academics and road safety authorities over the reliability of police-reported contributing factor data (DFT, 2014a), but there has been little or no attempt to investigate this issue empirically. This article aims to contribute to filling this gap by investigating the main causes of road accidents reported in accident records and comparing them with expert views of police officers and lay views of the driving public.

The causes of motor vehicle collisions are complex, but broadly depend on characteristics of drivers. Skill level (McGwin & Brown, 1999), inexperience (McCartt et al., 2003), and risk taking behaviors (Rolison et al., 2014) have been implicated in the collisions of young drivers compared to drivers in other age ranges. Investigations of vehicle collision records have also implicated excessive speed (Gonzales et al., 2005; Lam, 2003), driving recklessly (Lam, 2003), and traffic violations (Gonzales et al., 2005) as well as drugs and alcohol (Bingham et al., 2008) in the collisions of young drivers. For example, Braitman et al. (2008) interviewed 16-year-old novice drivers who had been involved in a collision within eight months of receiving their driver license. Excessive speed, loss of control, and failure to detect another vehicle or traffic control were reported by the teenagers as primary causes of their collisions (Braitman et al., 2008). Collectively, these findings support the role of inexperience, lack of skill, and risk taking behaviors in young driver collisions. Further, these contributing factors

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appear to be influenced by driver gender. Young male drivers are more likely than young females to be involved in collisions due to risk taking, such as excessive speeding and impairment by drugs and alcohol (Begg & Langley, 2004; Clarke et al., 2006; Curry et al., 2012).

In contrast with young drivers, the collisions of older drivers more often involve driver error at intersections and when making turns (Hakamies-Blomqvist, 1993; Langford & Koppel, 2006). McGwin and Brown (1999) found that failure to yield right of way, failure to comply with signs and signals, failure to see objects, and improper turns and lane changes were commonly reported in road accident records for collisions of older drivers. Older driver errors may in part result from age-related decline in visual, cognitive, and mobility functioning in older age (Hu et al., 1993; Janke, 1991). A wealth of research has identified poor performance on measures of visual functioning and cognitive abilities as risk factors for older driver involvement in road traffic collisions (Ball et al., 2010; Ball et al., 2006; Owsley et al., 1991; Owsley et al., 1998). Medical conditions, such as heart disease and stroke, are further associated with increased risk of collision among older drivers (McGwin et al., 2000; Anstey et al., 2005). Finally, psychoactive medications, commonly used by older drivers, can hamper their driving ability, and place them at increased risk of crash involvement (Hemmelgarn et al., 1997; Meuleners et al., 2011; Ray et al., 1992).

In sum, inexperience and risk taking behaviors, including excessive speed and drug and alcohol use, have been associated with the collisions of young drivers. Conversely, as age advances, increased prevalence of visual and cognitive impairments as well as medication use have been associated with the collisions of older drivers.

The majority of research investigating the contributing factors of road accidents involving young and older drivers has used accident data from police reports. In the United Kingdom, police officers attending road accident scenes are required to provide a subjective assessment of the factors that they believe contributed to the collision. Thus, police officers who have first-hand experience reporting on road accidents are likely to possess valuable insight into the causes of accidents involving young and older drivers. Their views are likely to be more accurate than the views of the driving public, which should be more reliant on stereotypic perceptions of young and older drivers. In fact, the views of police officers about some accident causes may be more accurate than official reports based on road accident records. This is because some factors are difficult to verify or substantiate at the roadside and thus may be underreported in accident records. For example, driver distraction due to mobile phone use can be difficult to verify, leading to underreporting in accident records (NHTSA, 2009). In 2008, reports of driver distraction in fatal collisions in the United States varied from 1% to 56% of collisions across states, indicating considerable variability in reporting practices. Worryingly, underreporting of factors contributing to road accidents could potentially lead to a misleading picture of accident causation. This, in turn, may delay the provision of much needed government resources for tackling threats to public health.

Accident reporting practices may also differ depending on driver characteristics, such as driver age and gender. In the United Kingdom, only 54% of drivers involved in road traffic collisions were required to provide a breath test during years 2003 to 2015 (DfT, 2015). This may imply that there is variability in how drivers are approached by officers and asked to undergo testing. In 2015, roadside drug screening was introduced in the United Kingdom, enabling police officers to test for drug impairment for the first time. Thus, road accident statistics from previous years may greatly underestimate the prevalence of drug impairment in crashes. Further, it is not implausible that the characteristics of the driver may be a determining factor in police officers' decisions to request drug testing.

As discussed above, investigating the views of police officers may reveal important discrepancies with accident statistics based on police records, such as when factors are underreported. It may also identify differences in the terminology used by police officers and accident

reporting procedures. In the United Kingdom, accident reports provide a fixed set of contributing factors that relate to driver behaviors, such as driver error or reaction and driver impairment, road environment, and vehicle defects. One possibility is that police officers will identify factors that are not included in the list of potential factors available in accident reports and may instead refer to more specific factors, thus revealing insight into accident causation that is not offered by existing accident records.

While police officers may possess valuable insight into the causes of road accidents involving young and older drivers, their views and those of the public, may be inaccurate for specific instances. For instance, collisions of young drivers may often involve exceeding the speed limit, but this will not necessarily be the case for all instances of a collision involving a young driver. Social expectations (e.g., that a collision involving a young driver will have been caused by the teenager exceeding the speed limit) are known to influence information processing and encoding as well as subsequent recall (Macrae et al., 1993; Sherman & Frost, 2000; Stangor & McMillan, 1992). Expectations influence recall depending on whether the information to be recalled is congruent or incongruent with a person's expectations (Stangor & McMillan, 1992). Recall can be better for information that matches than for information that mismatches a person's expectations, particularly under conditions of reduced processing capacity (Macrae et al., 1993; Stangor & Duan, 1991). Under certain conditions, recall can instead be better for incongruent than for congruent information, particularly when the incongruent information is highly salient (e.g., Hastie & Kumar, 1979). For example, learning that a collision was caused by an older driver who was exceeding the speed limit may be particularly salient if it is unexpected. This, in turn, will elicit more extensive cognitive processing of the information, thus leading to better recall.

When recalling factors from memory, police officers may be less influenced than the public by their expectations. Due to their experience reporting on road accidents, police officers may be better at memorizing road accidents details. As such, police officers may be more likely to suppress any influence of their expectations on their recall of contributing factors. However, if police officers' expectations do influence their memory recall for the factors involved in collisions of young and older drivers, then this finding could have implications for accident reporting practices. A police officer attending a road accident must manage simultaneously a multitude of cognitively demanding tasks, such as attending to injured persons. They would also need to collect statements from eyewitnesses and road users involved, some of whom may have committed a crime (e.g., driving under the influence of alcohol) and must be detained or require investigation (e.g., completion of a breath test). An attending officer must also minimize further dangers, which may include controlling traffic and ensuring that all road users are accounted for and are safe from further harm. This complex task means that some time may pass before an investigating officer completes their accident report (e.g., parts of the accident report form are completed at the station), potentially affecting the reliability of their report when details must be recalled from memory.

In the current research, we investigated causes of road accidents reported in accident records and compared them with expert views of police officers and lay views of the driving public. In Study 1, police officers and the public were presented hypothetical scenarios of collisions involving drivers of varying ages and gender were asked to generate the factors they believe could possibly have contributed. Doing so enabled us to investigate whether police officers and the public generate the same kinds of factors as those reported in road accident records and whether they associate certain factors with drivers of certain ages and gender. In Study 2, police officers and the public were asked to rate the likelihood that a subset of the generated factors could possibly have contributed to the collisions in the scenarios to further assess their views about the association between contributing factors and driver age and gender. In Study 3, we tested for an influence of expectations on memory recall for contributing factors per age and gender of drivers in

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