



Q2 Role of sensation seeking and attitudes as mediators between age of driver and risky driving of Powered Two Wheelers

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ABSTRACT

Introduction: This study examines the effect of age of driver on risky driving of Powered Two-Wheelers (PTW) employing sensation seeking and safety attitudes as mediators. **Methods:** A survey was conducted with 1299 PTW drivers (1089 males and 210 females) within the age of 18 and 63 years, living in the state of Kerala, India. The questionnaire consisted of 31 items to measure sensation seeking, safety attitude, and risky driving of the drivers. **Results:** Mediation models were examined using sensation seeking as mediator and secondly safety attitudes as mediators. The relationship between the driver's age and risky driving was fully mediated by all the three variables. **Practical applications:** Results of this study suggest that safety strategies should be employed to reduce risky driving tendencies that could be achieved by shaping or adapting the mediators (reducing sensation seeking and enhancing safety attitudes). This goal could be reached by starting to educate children about this at an early stage when they are at school as well as by social learning and safety awareness campaigns.

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Powered Two-Wheelers (PTW)

1. Introduction

Road traffic crashes are a leading cause of death globally and the main cause of death among those aged 15–29 years (Global Status Report on Road Safety, 2014). Generally, Powered Two-Wheelers (PTWs) are dynamically unstable vehicles; therefore, the possibility for a crash involved by a PTW is higher than for other vehicles on the road. Studies on road crashes have shown that PTW drivers specifically have a greater risk of being victims (fatalities or injuries) in a traffic crash compared with any other vehicle user (Elliott, Baughan, & Sexton, 2007; Keall & Newstead, 2012). Lin and Kraus (2009) report that PTW drivers are over 34 times more likely have a fatality in a traffic crash than other type of motor vehicles.

In the state of Kerala, PTW population has grown from 54% of the total vehicle fleet in 2011 to approximately 62% in 2015. Records show that PTW-related crashes and fatality have increased by 28.13% and 21.24% during this period. This is a matter of concern when an increase of 2.58% in crashes and decrease of 6.0% in fatality are recorded in the case of all other vehicles put together during the same period (Economic Review - Government of Kerala, India, 2015). With the road conditions remaining the same for all types of vehicles and inherent safety issues of powered two wheelers also remaining the same, the possible influencing factor for this higher percent increase in PTW involved crashes over the percent increase of crashes among other vehicle types may be related to the driver characteristics. Therefore, it is

important to study the mechanism with which the attitudes and characteristics of drivers work together contributing to PTW crashes. On analyzing the relative levels of risk it can be concluded that driving a powered two wheeler is a high risk activity and can be generally placed as the most risky mode of transport in use. The effects of age have been reported globally as one of the major factors of motorcycle crash risk (Fernandes, Job, & Hatfield, 2007; Golias & Karlaftis, 2002; Keall & Newstead, 2012; Lin, Chang, Pai, & Keyl, 2003; McKnight & McKnight, 2003).

Road crashes result from various risky driving behaviors such as self-assertiveness, speeding, and rule violation (Chen, 2009; Jonah, 1997; Lourens, Vissers, & Jessurun, 1999; Shibata & Fukuda, 1994; Simon & Corbett, 1996; Ullberg & Rundmo, 2003), drunk driving (González-Iglesias, Gómez-Fraguela, & Luengo, 2014; Kasantikul, Ouellet, Smith, Sirathranont, & Panichabhongse, 2005; Kulick & Rosenberg, 2000; Papadimitriou, Theofilatos, Yannis, Cestac, & Kraïem, 2014; Savolainen & Mannering, 2007), and cell phone usage while driving (Elliott et al., 2007; Lee, 2007; Lesch & Hancock, 2004; Perez-Fuster, Maria, Rodrigo, Ballestar, & Sanmartin, 2013).

Risky driving depends more on personality factors (Falco, Piccirelli, Girardi, Corso, & Carlo, 2013; González-Iglesias et al., 2014; Oltedal & Rundmo, 2006; Ullberg & Rundmo, 2003) and attitude toward risky driving than on the driving skills (Iversen, 2004).

Research on risky driving finds that personality trait of sensation seeking and safety attitude have key roles in their relationship to risky driving (Chen, 2009; Fernandes et al., 2007; González-Iglesias et al., 2014; Jonah, 1997; Ullberg & Rundmo, 2003). A change in attitude is one of the important ways to reduce or prevent the number of traffic

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accidents (Muzikante & Renge, 2011). Therefore, the strategies intended to promote road safety can be aimed at changing drivers' attitudes toward unsafe driving (Chen, 2009) and decreasing drivers sensation seeking through driver education so that it addresses directly to the adolescents' propensities for sensation seeking (Arnett, Offers, & Fine, 1997).

Many authors used mediational analysis to test whether the effect of independent variable (X) on the outcome variable (Y) has been decreased, when the third variable (mediator) is thought to come in between X and Y. In other words, mediation is indicated when a previously significant relation between the independent variable and dependent variable is substantially reduced when the mediator variable is entered into the regression equation (Baron & Kenny, 1986). As an example, González-Iglesias et al. (2014) found that peers' norms and self-efficacy mediated between drivers sensation seeking and drunk driving significantly, which helped to reduce drunk driving. In another study the link between parental bond and risky driving was mediated by adolescent's sensation seeking (Smorti & Guarnieri, 2014) and partial mediation was supported among female drivers by shaping the sensation seeking.

There is no research evidence examining the mediation role of sensation seeking and attitudes to traffic safety in the relationship between the age of PTW drivers and risky driving behaviors. Likewise, the interventions to reduce the risky driving among the PTW drivers of Kerala are also scarce. This research gap motivated the authors to take up this study.

This study is conducted among drivers of PTW including motorcycles and scooters powered by engines with the capacity of 50cm³ and above. These vehicles are registered with the authorities and the drivers need a driver's license issued by the Motor Vehicles Department of the State. Kerala Motor Vehicles act, 1988 reveals that aspirants age 18 years or more can apply for a driver's license to drive a PTW (Kerala, 2015). Authorities will issue the driving license in two stages: (a) Learners license for a period of 6 months after qualifying a written test based on road safety during, which the driver should operate the vehicle under the supervision of a licensed driver; (b) Full license for a period of 10 years after qualifying a practical test. After 10 years of driving they can renew the license for every 5 years. If the driver gets a ticket for any driving offense, such as speeding or drunk driving, then he/she will be disqualified to drive the vehicle from six months to one year with a fine. After completion of this disqualifying period a new license will be issued after endorsing this information.

Studies have shown that the risk of getting severely injured is much higher for the PTW driver than others due to the inherent instability of the vehicle (Aare & von Holst, 2003; Zambon & Hasselberg, 2006– cited in Chen, 2009). It can be seen that the majority of the studies investigating the relationships between driver characteristics and driving behavior are conducted among powered four wheelers. However, most of the variables and scales are directly applicable to studies related to powered two wheelers also.

The purpose of the present investigation is to examine the possibility of the mediation role of safety attitudes and sensation seeking in the relationship between age and risky driving behavior among the PTW drivers in Kerala. Researchers of this study believe that 'a change in safety attitude and sensation seeking' among the PTW drivers of Kerala will decrease their risky driving behaviors.

1.1. Age and risky driving

The effect of age of the PTW drivers on crash severity and crash risk has been investigated by many authors. Risk taking behaviors are associated with young and inexperienced PTW drivers that eventually increase the risk of their being involved in a collision (Chen, 2009; Keall & Newstead, 2012; Lin et al., 2003; McKnight & McKnight, 2003; Vassallo et al., 2007; Yeh & Chang, 2009). Rutter and Quine (1996) found that young and intermediate age groups were alike in presenting

frequent "unsafe" behaviors such as violating traffic laws, driving too close to the vehicle in front, and so forth. It is a surprising fact that novice drivers (aged 16–18 years) do not engage in as much risky behavior as the slightly older drivers (aged 18–24 years; Harré, Brandt, & Dawe, 2000; Jonah, 1990). Similarly, in another study, Romano, Peck, and Voas (2012) found that young drivers are less likely to be involved in drunk driving than the older ones. Further, older drivers use mobile phones mainly for conversation while the younger drivers use mobile phones for a wider variety of tasks, such as texting (Young & Lenné, 2010). Studies show that drivers below the age of 24 years are involved both in cell phone usage while driving and speeding above the legal limits, which are the main reasons for getting traffic citations (Hassan & Abdel-Aty, 2013; Pöysti, Rajalin, & Summala, 2005). Thus it can be established that the PTW drivers' age is important among the variables that may influence risky driving behavior.

1.2. Sensation seeking as mediator

Studies on risky driving suggest that there are strong and positive associations between the personality trait of sensation seeking and risky driving (Arnett et al., 1997; Dahlen, Martin, Ragan, & Kuhlman, 2005; Iversen & Rundmo, 2002; Jonah, 1997). Sensation seeking is the need for excitement and stimulation (Ullberg & Rundmo, 2003) that develops during early adolescence, builds up between ages of 10 and 15, peaks around the age 20 and declines or remains stable thereafter (Arnett, 1994; Ball, Farnill, & Wangeman, 1984; Roberti, 2004; Rosenbloom & Wolf, 2002; Roth, Schumacher, & Braehler, 2005; Srivastava, John, Gosling, & Potter, 2003; Steinberg et al., 2008). It directly influences risky driving and moderates the driver's response to other factors such as alcohol impairment. Individuals with a high score in sensation seeking tend to drive: (a) faster, (b) more aggressively, and (c) more often while drunk (Jonah, 1997).

This seems to suggest that there exists a link between the drivers' age, sensation seeking, and risky driving. It is therefore important to better understand the role of sensation seeking in the relationship of age and risky driving, and mediation analysis is an appropriate tool to do so.

1.3. Attitudes as mediators

Research has found strong and significant relationship between safety attitudes in traffic and risky driving (Chen, 2009; Fernandes et al., 2007; Iversen, 2004; Parker, Lajunen, & Stradling, 1998; Ullberg & Rundmo, 2003). Results of Ullberg and Rundmo (2003) reveal that attitude toward traffic safety is the only variable that has a direct effect on risky driving and Chen (2009) concludes that strategies intended to promote road safety will be effective only by changing drivers' attitudes toward unsafe driving. Ullberg and Rundmo (2003) and Chen (2009) considered three attitude scales, namely traffic flow vs. rule obedience, speeding, and fun riding and examined its influence on risky driving behavior. Ullberg and Rundmo (2003) found that attitude to traffic safety functions as a mediating variable in the relation between personality traits and behavior, while Chen (2009) identified a significant relationship between attitudes toward traffic safety and risky driving behaviors. Many more research studies also found significant association between driver age and safety attitudes (Fernandes et al., 2007; Harré et al., 2000; Jonah, 1990; Mann & Lansdown, 2009; Parker, Manstead, Stradling, & Reason, 1992). Unsafe attitude to drive fast, dangerous overtaking, close following, and drunk driving are found significantly high among the young drivers compared to older ones (Parker et al., 1992). The studies of Yagil (1998) show that younger and male drivers express a lower level of safety attitude to comply with traffic laws than do the older and the female drivers.

These facts indicate the existence of a relationship between the age of the driver, safety attitude, and risky driving. This study therefore tries to examine the role of individual attitudes in the relationship between age of driver and risky driving.

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