



The impact of Stereotype Threat on the simulated driving performance of older drivers

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ABSTRACT

Older drivers are perceived as being dangerous and overly cautious by other drivers. We tested the hypothesis that this negative stereotype has a direct influence on the performance of older drivers. Based on the Stereotype Threat literature, we predicted that older driving performance would be altered after exposure to a Stereotype Threat. Sixty-one older drivers aged 65 and above completed a simulated driving assessment course. Prior to testing, half of the participants were told that the objective of the study was to investigate why older adults aged 65 and above were more implicated in on-road accidents (Stereotype Threat condition) and half were showed a neutral statement. Results confirmed that exposure to the threat significantly altered driving performance. Older adults in the Stereotype Threat condition made more driving mistakes than those in the control group. Interestingly, under a Stereotype Threat condition, older adults tended to commit more speeding infractions. We also observed that domain identification (whether driving is deemed important or not) moderated the impact of the threat. Taken together, these results support recent older drivers' performance models suggesting that the interaction between individual and social factors need to be considered when examining older drivers' performance.

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1. Introduction

By 2030, it is expected that the population of drivers aged 65 and above will reach approximately 57 million in the United States alone (United States Government Accountability Office, 2007). Understandably, these projections have generated widespread interest in the issue of the fitness to drive of older drivers, both in the scientific community and in the media. Unfortunately, this intensified interest in older drivers is not only motivated by objective scientific scrutiny. Indeed there is evidence suggesting that the general population holds a predominant negative view of the older driver. In the grey literature, Martin et al. (2005) observed from newspapers articles reporting on on-road accidents involving older adults that 58% were demeaning of older drivers (e.g., *Old dear trashes 7 cars*), 15% were positive, and 27% were neutral. Furthermore, studies have shown the age of the driver can influence perception of on-road aggression and on-road reactions, attribution of responsibility for accidents and likelihood of police investigation

(Carver and de la Garza, 1984; Davies and Patel, 2005; Matthews and Moran, 1986; Rosenfeld et al., 2011).

We recently validated the existence of older driver stereotypes (Joanisse et al., 2012) using simulated clips of on-road behaviors. Participants were asked to review three categories of simulated driving behaviors (i.e., younger adults' unsafe behaviors, older drivers' unsafe behaviors, and appropriate and optimal driving reactions) and rate how representative these driving behaviors were of a typical younger, middle-aged, or older driver. Findings revealed that while some safe on-road reactions were associated with older drivers, participants held primarily a negative perception of older drivers. Specifically, participants indicated that unsafe behaviors rarely seen in older drivers were representative of the typical older driver. A qualitative analysis performed in a following experiment revealed that the typical older driver was described as overly cautious, uncomfortable behind the wheel, and unsafe and dangerous (Joanisse et al., 2012). Observations supporting the concept of the older driver stereotype were also described in other investigations (Carver and de la Garza, 1984; Davies and Patel, 2005; Glendon et al., 1996; Matthews and Moran, 1986; Parker et al., 2001).

This negative view of the older driver is alarming given that recent theoretical driving models have highlighted the likely influence of self-monitoring, beliefs about driving abilities, and environmental factors on driving performance (Anstey et al., 2005;

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Lindstrom-Forneri et al., 2010). In their transactional model of driving in older individuals, Lindstrom-Forneri et al. (2010) expressed the need for research to examine global and environmental factors such as social policies, laws, and institutional factors. They also explicitly stated that negative stereotypes of aging drivers could influence driving competence of the older adults. However, the link between negative stereotypes and older adults' driving has yet to be supported by empirical evidence.

We believe that the Stereotype Threat paradigm is particularly suitable for this endeavor. The Stereotype Threat paradigm posits that in an evaluative context, individuals tend to confirm the negative stereotypes about their group's performance on a particular task when they are reminded of these stereotypes (Aronson et al., 1998; Steele, 1997; Steele and Aronson, 1995). The influence of Stereotype Threat on performance has been found in various contexts with different populations across numerous domains, including the performance of: African-American college students on intelligence tests (Steele and Aronson, 1995); women on math assessment tests (Cadinu et al., 2005; Good et al., 2008; O'Brien and Crandall, 2003; Schmader, 2002; Schmader and Johns, 2003), low-income individuals on tests of verbal abilities (Croizet and Claire, 1998); traumatic brain injury survivors on neuropsychological test results (Suhr and Gunstad, 2002; see also Wheeler and Petty, 2001 for a review), young university women on negotiating skills (Kray et al., 2004, 2001), and gay men's social interaction with pre-school children (Bosson et al., 2004).

Older adults have also been found to be sensitive to stereotype-based threats. Research has shown that when confronted with information or instructions indicating that memory declines with old age (negative stereotype), or that a given task offers a memory diagnostic, memory performance was significantly decreased, especially for those who valued this ability (Chasteen et al., 2005; Hess et al., 2003). While most of the studies on Stereotype Threat and aging have examined the detrimental effects of stereotypic expectations on various cognitive domains, one recent study has looked at the effects of Stereotype Threat on older adults in the driving domain (Gaillard et al., 2011). Using the Regulatory Focus Theory (Higgins, 1997), this study examined the self-regulating processes that could moderate the influence of positive and negative expectancies on the performance of older adults on a written driving test. Their findings revealed that the test scores of prevention-focused older adults (i.e., apprehensive of negative consequences, loss and more likely to display safe, and defensive strategies to attain minimal goals) were negatively altered when exposed to negative expectations and improved when exposed to positive expectations (Gaillard et al., 2011). Conversely, promotion-focused participants (i.e., oriented towards advancement, growth, gains, and more likely to display eager and ambitious strategies to achieve goals) test scores were not significantly influenced by negative or positive expectations. Considering that Stereotype Threat can influence the older adults' performance on a written examination of driving knowledge, it seems logical to investigate whether its negative influence can also be observed while driving. This approach seems particularly suitable given that Yeung and von Hippel (2008) have shown that women assessed under Stereotype Threat were more likely to hit a pedestrian who unexpectedly crossed the road in a simulated driving task, in comparison to women exposed to neutral information.

Furthermore, Stereotype Threat is more likely to influence one's reactions when the domain assessed is meaningful to the individual (Aronson et al., 1998; Hess et al., 2004; Lesko and Corpus, 2006; Spencer et al., 1999). Given that for a large proportion of older drivers, driving symbolizes freedom, autonomy, as well as independence (Classen et al., 2009; Rudman et al., 2006; Yassuda and Wilson, 1997), and is seen as their favored mode of transportation (Martinez, 1995), it seems justified to postulate that

their driving performance could be altered in a Stereotype Threat context.

Therefore, drawing from the above empirical data and theoretical models of aging and driving, we hypothesized that older drivers exposed to a Stereotype Threat condition will perform more poorly on a driving assessment completed on a driving simulator. More explicitly, it is expected that when told that the objective of the study is to understand why older drivers are more implicated in on-road accidents (Stereotype Threat condition), older drivers would exhibit more driving errors and would be more likely to crash in reaction to a surprising simulated on-road event, compared to participants in the control condition. We also examined whether domain identification could moderate the influence of Stereotype Threat on driving performance. We hypothesized that individuals who valued driving would respond more strongly to the Stereotype Threat condition than those who highly value driving in the control group.

2. Methods

2.1. Participants

Ninety-nine participants (38 women and 61 men) aged between 64 and 88 ($M=71.41$, $SD=5.50$) from Canada's Capital Region (Ottawa) took part in this study. All participants were required to hold a valid driver's license. Participants needed to be generally healthy and without specific health-related problems that could interfere with their driving abilities (i.e., neurological and psychomotor diseases, substance abuse, and history of severe head trauma). Recruitment strategies included putting advertisements in local papers, as well as placing flyers in community centers, libraries, recreational centers, and street posts. Alumni and retiree associations, veterans groups, and seniors' clubs were also solicited for their help via telephone, mail, and email. Socio-demographic data revealed that 65% reported English as their mother tongue, 15% French, and 20% other. Most participants indicated White/European as their ethnicity. Their driving experience ranged from 5 to 67 years ($M=51.83$, $SD=9.01$), and they reported driving an average of 980 km per month ($SD=820$).

Health history was surveyed through a health questionnaire administered over the phone. Most participants (i.e., 95%) reported being in good health or better (i.e., very good, and excellent). Severe cognitive decline was screened using the Mini Mental State Examination (MMSE; Folstein et al., 1975). Only one participant scored below the 24 cutoff score (Spreen and Strauss, 1998) and was removed from the sample. In total 38 participants were removed for reasons that will be explained in Section 4. Participants took part in the study on a voluntary basis. Parking fees or bus fares were reimbursed. Participants received \$10 as compensation. All participants gave formal consent prior to testing in compliance with the University of Ottawa Research Ethics Board requirements.

2.2. Material

2.2.1. Induction of the Stereotype Threat

Prior to the simulated driving task, participants were asked to read the objective of the study displayed on the central simulator screen. Half of the participants were told that the objective of the study was to investigate why older adults aged 65 and above were more implicated in on-road accidents (Stereotype Threat condition) while the other half were told that the objective was to understand the underlying processes involved in driving (control condition).

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