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A psychological predictor of elders' driving performance: social-comparisons on the road

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Abstract

Older individuals often believe they can drive better than their contemporaries. This belief is an example of downward social-comparisons; they can be self-enhancing tools that lead to beneficial outcomes. As predicted, we found that drivers who engaged in downward social-comparisons were significantly less likely to have adverse driving events over time, after controlling for relevant factors (p = .02). This effect was particularly strong among women, who tend to experience more negative driving stereotypes (p = .01). The study was based on 897 interviews of 117 elder drivers, aged 70–89 years, over 2 years. Our findings suggest that interventions to reduce adverse driving events among elders could benefit from including a psychological component.

The opportunity to drive is an important quality of life issue for the old because it provides independence (Sargent-Cox, Windsor,Walker & Anstey, 2011). Older individuals who stop driving are less likely to participate in social activities and more likely to have depressive symptoms (Edwards, Bart, O'Connor, & Cissell, 2010; Marottoli et al., 1997; Marottoli et al., 2000). Therefore, identifying factors that could allow older drivers to continue driving safely for as long as possible is critical.

Research on older drivers has shown that increasing age alone does not predict the likelihood of having an adverse driving event, such as an accident or a near miss (Marottoli, 1993; Marottoli et al., 1994). Most studies of the risk factors that contribute to adverse driving events among older drivers have focused on visual, cognitive, or physical causes. An area that has received little attention is the relevance of psychological factors to adverse driving events in later life.

The psychological factor on which this study focuses is derived from social-comparison theory, which postulates that individuals tend to compare their abilities to others who are similar to themselves (Festinger, 1954; Taylor & Lobel, 1989;Wood,1989).According to this theory,those experiencing negative affect can enhance their self-esteem by measuring themselves against those who are perceived to be less fortunate—a process called "downward social-comparison" (Crocker & Garcia, 2009; Wills, 1981).

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One way that social-comparisons may operate is by mitigating the effect of negative age stereotypes. Studies have found that older individuals tend to internalize the negative age stereotypes they encountered in their culture across life spans (e.g.,Levy,2009).In turn,these negative age stereotypes act as self-fulfilling prophecies: They are associated with a variety of adverse cognitive and physical outcomes (e.g., Levy, 2003; Wurm, Tesch-Römer & Tomasik, 2007). Driving combines cognitive and physical functioning. Among negative age stereotypes are ones portraying older individuals as unsafe, slow, and accident prone (Adler & Rottunda, 2010; Kite, Stockdale,Whitley, & Johnson, 2005; Martin, Balding, & O'Neill, 2005).A study found that 85% of drivers over the age of 65 felt they were victims of negative stereotypes and 68% felt at least some of these stereotypes were true (American Medical Association, 2010).

The negative stereotypes that are often applied to older drivers in general are even more negative and prevalent in connection with older women drivers (Berger, 1986; Walsh, 2007). That is, stereotypes of both age and gender are used to target them.

It has been shown that in order for negative stereotypes to have their most deleterious effect, they must be regarded by targeted individuals as self-relevant (Levy, Slade, Kunkel, & Kasl, 2002; O'Brien & Hummert, 2006). Social comparisons may provide a mechanism for older drivers to distance themselves from others in their age group and also, in the case of women, gender group. This distancing would then, perhaps, provide insulation from the adverse effect of the negative stereotypes. For if individuals believe the stereotypes are not applicable to themselves, there should be a reduced risk of acting in accordance with them. Specifically, an internalized belief by elders that older individuals and, even more, older women are inherently incompetent drivers is less likely to result in incompetent driving if social-comparisons deflect these stereotypes from themselves.

We hypothesized that (1) older drivers who engaged in downward social-comparisons about their driving will be less likely to experience adverse driving events during the following two years, after controlling for relevant factors including age and cognitive ability; and (2) the effect of downward social-comparisons on adverse driving events will be stronger for older women than for older men.

Methods

Participants

The 117 participants in this study were recruited from several community sites in the greater New Haven, Connecticut area, including senior centers, medical clinics, and housing complexes. Eligibility criteria were English speaking, community dwelling, aged 70 or older, community dwelling, drives at least once per week, English speaking, owns a telephone, distance vision of 20/70 or better, score of greater than or equal to 18 on the Mini Mental State Examination (MMSE, Folstein, Folstein & McHugh, 1975), and responded to a driving social-comparison measure and to monthly questions about adverse driving events over the next two years. These criteria were met by 125 individuals. We excluded eight: four who either died or withdrew before the first follow-up, and four without information for one or more covariates. Our final cohort consisted of 33 women and 84 men between the ages 70

and 89 (*M* = 77 years). The female participants were more educated, had higher MMSE scores, and drove fewer miles in a week than their male peers (see Table 1). All of these factors were adjusted for in the models.

Eighty-four percent of the participants gave the highest rating when asked,"How important is driving to you?"Nearly all of the participants reported driving either every day (77.8%) or every other day (20.5%). We had complete follow-up data for all eight time periods on 87.2% of the participants and for six or more time periods on 94.0% of the participants.

Measures

Independent variable: driving-social-comparison

At baseline, participants were asked two open-ended questions: "When you think of a senior citizen who drives, what are the first five words or phrases that come to mind?" and "When you think of yourself as a driver, what are the first five words or phrases that come to mind?"

Two raters, who were not aware of the age, driving performance, or pattern of adverse driving events of the participants, coded the positivity-negativity dimension of each word or phrase participants used to describe older drivers, using a scoring method similar to one that was developed to assess different aspects of age stereotypes (Levy & Langer, 1994). The raters judged the descriptions with -1, signifying negative (e.g., *dangerous*); 0, signifying neutral (e.g., *wears penny loafers*); and 1, signifying positive (e.g., *competent*). A total positivity score was created by adding the scores for each of the words. Scores for the self-as-driver and other-older-driver questions ranged from −5 to 5, with scores greater than 0 indicating more positive views. The raters' effective reliability was 95%, as measured by the Spearman–Brown formula (Rosenthal & Rosnow, 1991).

We created our driving-social-comparison variable by subtracting the score of the other-older-driver question from the score of the self-as-driver question, resulting in values ranging from −10 to 10, with scores greater than 0 indicating a more positive view of oneself as a driver compared to other older drivers or a higher downward social-comparison score.

Participants tended to practice downward social-comparisons (*M* = 4.09, *SD* = 3.30). They described themselves more positively as drivers (*M* = 3.94, *SD* = 1.65) than they described other older drivers (*M* = -.15, *SD* = 3.02). Eight participants (six males and two females) practiced upward social-comparisons, 11 practiced neither upward nor downward social-comparisons, and 98 (72 males and 26 females) practiced downward comparisons.

Outcome variable: adverse driving events

In order to minimize the possibility of recall bias,participants were interviewed by telephone, every three months following baseline for two years, about their driving practices since the last interview. There were 897 interviews included in the analysis. Our outcome, adverse driving events, was derived from asking participants whether they had (1) been the driver in a car accident; (2) any near misses while driving; (3) been stopped by the police while driving; or (4) received a ticket for a moving violation, such as speeding, running a

red light, or driving too slowly. If respondents answered “yes” to one or more of these questions in a follow-up period, they were given a score of 1; those who answered “no” to all four questions were scored 0. Several studies have found that self-reported adverse driving events are as valid as state records or other archival data (Marottoli, Cooney, & Tinetti, 1997; Winfred et al., 2001).

Covariates

We selected baseline covariates for this study that have been identified as factors that contribute to the risk of experiencing an adverse driving event (Alvarez & Fierro, 2008; Marottoli et al., 1994) and/or have been significantly related to downward social-comparisons (see Table 2). The demographic covariates included age, gender, race, and years of education. Cognitive ability was assessed using the MMSE (Folstein et al., 1975). The health covariates included distance vision, measured by the smallest line a participant could read on the Graham-Field eye chart placed at 10 feet (Herking, Priest, & Schiller, 1983), and physical impairment, assessed by six tasks (neck rotation, trunk rotation, hip flexion, shoulder abduction, manual dexterity, and mobility; Marottoli et al., 1998; Tinetti & Ginter, 1988). If a person was able to do a particular task, they were assigned a score of 0, and if unable to do a particular task, they were assigned a score of 1; thus, total scores ranged from 0 to 6 with a higher number indicating greater impairment.

The covariate of road-test performance was assessed by a 45 minute on-road driving evaluation. Two trained evaluators, who were not aware of participants’ social-comparison scores, assessed driving with a 36 item scale derived from the driving evaluation form utilized by the Connecticut Department of Motor Vehicles. Each of the items was scored 0 for major problems, 1 for minor problems, and 2 for no problems, and then summed to give a total score ranging from 0 to 72, with higher scores indicating better driving. In addition, driving distance was assessed by an open-ended question about the average number of miles driven weekly.

Results

As predicted by our first hypothesis, older drivers who engaged in downward social-comparisons about their driving were significantly less likely to experience adverse driving events during the following two years, $t = 2.22$, $p = .03$.

This protective effect of downward social-comparisons on adverse driving events remained in multivariate generalized logistic models with all covariates included, ($\beta = -.08$, $p = .02$; see Table 3). For each unit increase in baseline downward social-comparison score, the odds of having an adverse driving event in the next two years decreased by approximately 10%, assuming all other covariates remained constant. None of the other covariates emerged as significant predictors of adverse driving events in our model. Thus, downward social-comparison was a stronger predictor of adverse driving events than age, gender, race, years of education, MMSE, distant vision, physical impairment, driving distance, and road-test score.

As predicted by our second hypothesis, the effect of downward social-comparisons on adverse driving events was stronger for older women than older men. When we added an interaction term between gender and downward social-comparison to the overall model with all covariates included, we found that this term was significant, such that women showed a stronger effect than men in the fully adjusted model, β = -.270, p = .005. We next stratified the effect of downward social-comparison on the adverse driving event model by gender. The model, which included only women, confirmed our interpretation of the interaction term: Those who practiced downward social-comparisons at baseline were less likely to experience adverse driving events over the following two years, after controlling for the covariates (β = -.356, p = .012; see Table 4). For every unit increase in downward social-comparison, women's risk of having an adverse driving event decreased by 30%.

Although both male and female participants tended to engage in downward social-comparison, it did not emerge as a significant predictor of adverse driving events in the model containing only male subjects, β = .034, p = .52, after adjusting for covariates. Thus, it appears that the performance of women drivers led to the overall effect of downward social-comparisons on adverse driving events,as found in the model conducted to examine the first hypothesis.

Discussion

As expected, downward social-comparisons predicted fewer adverse driving events for older drivers, and this effect was greatest for older women drivers. We controlled for a number of factors that had been previously shown to be associated with adverse driving events and downward social-comparisons. This was the first study to examine whether social-comparisons predict driving outcomes in older individuals.

An anomalous finding was produced by this study: Men had significantly higher downward social-comparison scores than women, yet scores did not predict the driving performance of men, whereas they did for women.An explanation for this anomaly may be that old-driver stereotypes did not tend to be self-relevant for men, so there was no need for the distancing effect from the downward social-comparisons. In contrast, old-driver stereotypes may tend to be self-relevant for women who would, therefore, benefit from the distancing effect of downward social-comparisons.

The greater self-relevance among females, compared to males, may be explained by the negative stereotypes of women that are internalized and directed at females long before old age (Martin & Ruble, 2010). Among these stereotypes are the ones relating to women drivers that share characteristics with older-driver stereotypes; for example, both are targeted with the stereotype that they are incompetent behind the wheel (Yeung & von Hippel, 2008). Women, however, tend to have fewer accidents than male drivers and in our study did not differ significantly from the men in their road-test scores (Gebers & Peck, 2003).

As with the gender stereotypes held by females, age stereotypes are internalized by both males and females starting in early childhood, but, unlike gender stereotypes, they are

directed only at others until the point in old age when they become self-relevant. This point occurs when individuals start to define themselves as old as a result of interpersonal and institutional cues (Levy,2009).The self-relevance process involves applying to oneself the negative age stereotypes that have been directed at others, so that there is overlap in viewing others and viewing oneself. Because women, unlike men, may tend to enter old age holding gender-based self-relevant stereotypes about driving, they would not have to wait for the self-relevance age-stereotype process to evolve in order for there to be responsiveness to downward social comparisons.

Our results suggest that interventions to reduce adverse driving events among elders ought to include a psychological component,as well as the more traditional ones.Also relevant to interventions is our showing that psychological predictors of these events may operate differently by gender. These findings point to the potential effectiveness of an intervention directed at enhancing older women's images of themselves as drivers, so that they can maintain their mobility and independence.

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Table 1

Baseline Demographic and Driving Characteristics Stratified by Gender

Baseline characteristic	Total sample Mean (*SD*)or *n* (%)	Female	Male	*p* values
Social comparison[a]	4.1 (3.3)	3.0 (2.6)	4.5 (3.5)	.026
Female	33 (28.2%)	33 (28.2%)	84 (73.8%)	.04
Age	76.8 (4.1)	76.1 (3.7)	77.3 (4.2)	.15
Ethnic minority	13 (11.1%)	4 (12.1%)	9 (10.7%)	.83
Years of education	12.6 (2.7)	13.5 (2.6)	12.2 (2.6)	.01
MMSE	28.0 (1.7)	28.9 (1.2)	27.7 (1.7)	.0002
Physical impairment	1.8 (1.2)	1.9 (1.1)	1.8 (1.2)	.85
Distance vision	28.4 (9.8)	30.6 (9.7)	27.5 (9.7)	.12
Driving distance[b]	120.6 (102.1)	90.5 (92.4)	132.4 (103.8)	.05
road-test score[c]	60.4 (5.6)	61.1 (4.9)	60.1 (5.8)	.41
Adverse driving events	14.6 (1.6)	14.4 (2.0)	14.7 (1.5)	.34

Note. MMSE = Mini-Mental State Examination.

[a]Social comparison scores ranged from –10 to 10 with higher scores indicating stronger downward social-comparisons (thinking more positively of oneself as a driver relative to other older drivers).

[b]Average mile driven per week.

[c]The road-test score ranged from 0 to 72, with higher scores indicating better driving performance.

Table 2

Correlations of Covariates with Social Comparison Scores

	Social comparison
Female	–.21*
Age	–.18
Race	.09
Years of education	–.01
MMSE	–.02
Physical impairment	–.10
Distant vision	–.17
Driving distance	–.17
road-test score	.09
Adverse driving event	.21*

Note.

* $p < .05$.

Table 3

Impact of Downward Social Comparisons on Adverse Driving Events in the Elderly

Characteristic	Parameter estimate (β)	Standard error	*p* value
Intercept	–4.489	3.815	.24
Social comparison	–.080	.035	.02
Gender	–.122	.268	.65
Age	–.007	.031	.81
Race	–.321	.353	.36
Years of education	–.003	.047	.94
MMSE	.176	.090	.05
Physical impairment	–.025	.099	.80
Distance vision	.015	.013	.23
Driving distance	–.0001	.001	.50
road-test score	–.013	.020	.51

Note. The outcome variable, adverse driving events, was measured every 3 months over 2 years.

Table 4

Impact of Downward Social Comparisons on Adverse Driving Events Among Elderly Women

Characteristic	Parameter estimate (β)	Standard error	*p* value
Intercept	13.940	12.822	.28
Social comparison	–.356	.139	.01
Age	–.103	.096	.28
Race	–.352	.911	.70
Years of education	.257	.120	.04
MMSE	–.394	.281	.17
Physical impairment	–.454	.269	.10
Distance vision	.048	.027	.08
Driving distance	–.002	.005	.67
road-test score	.016	.060	.80