Driving-related Attitudes among Older Adults in Australia

Paweena Sukhawathanakul[1], Michelle M. Porter[1], Holly Tuokko[2], Judith L. Charlton[3], Sjaan Koppel[3], Michel Bedard[4], Gary Naglie[5], Shawn Marshall[6], Mark J. Rapoport[7], Brenda Vrkljan[8], Isabelle Gélinas[9], Barbara Mazer[9]

[1] Centre on Aging, Faculty of Kinesiology and Recreation Management, University of Manitoba, Winnipeg, MB, Canada;

[2] Institute on Aging and Lifelong Health, University of Victoria, Victoria, BC, Canada

[3] Monash University Accident Research Centre, Monash University, Clayton, VIC, Australia

[4] Centre for Research on Safe Driving, Lakehead University, Thunder Bay, ON, Canada

[5] Baycrest Health Sciences and University of Toronto, Toronto, ON, Canada;

[6] Ottawa Hospital Research Institute, University of Ottawa, Ottawa, ON, Canada;

[7] Department of Psychiatry, University of Toronto, Toronto, ON, Canada;

[8] School of Rehabilitation Science, McMaster University, Hamilton, ON, Canada;

[9] School of Physical & Occupational Therapy, McGill University, Centre de Recherche Interdisciplinaire en Réadaptation du Montréal Métropolitain, Montreal, QC, Canada

Corresponding Author: Paweena Sukhawathanakul, Centre on Aging, University of Manitoba, 338 Isbister Building–183 Dafoe Road, Winnipeg, Manitoba, Canada, R3T 2N2 Paweena.Sukhawathanakul@umanitoba.ca (250) 385-1986.

Key Findings

- The Decisional Balance Scale can be used to assess driving-related attitudes among older adults
- Changes in attitudes covaried with changes in self-regulatory driving practices across six annual assessments in a sample of Australian older drivers.
- Attitudes related to driving may facilitate self-regulatory driving practices among older adults.

Abstract

The Decisional Balance Scale (DBS) was developed to assess older adults' attitudes related to driving and includes both intra- and inter-personal motivations for driving. The current study examines the DBS in a sample of older drivers from Australia ($n = 257$). Longitudinal evaluation of the DBS subscales revealed that changes in attitudes covary with changes in self-regulatory driving practices across 6 annual assessments. Specifically, negative attitudes related to inter-personal motivations for driving (*con-other*) were associated with participants' scores on the Situational Driving Frequency (SDF) scale. Negative attitudes related to intra-personal motivations for driving (*con-self*) were associated with participants' scores on the Situational Driving Avoidance (SDA) scale. These findings highlight the importance of considering attitudes in understanding older drivers' decisions to regulate their driving practices.

Keywords

Driving, Attitudes, Beliefs, Older driver

Introduction

For many older adults, driving provides a sense of independence. However, age-related declines in cognition and physical health can impair driving ability (Anstey, Wood, Lord & Walker, 2005; Babulal et al., 2017; Roe e al., 2017). The number and proportion of individuals aged 65 and older in Australia is expected to double over the next 30 years along with the percentage of older drivers who remain on the road (Australian Bureau of Statistics, 2013). Self-regulation can facilitate safe driving practices. Driving self-regulation refers to the ability to use compensatory strategies, such as reducing driving exposure, and avoiding challenging driving situations to accommodate age-related declines and to better adapt to the driving environment (Molnar & Eby, 2008; Sullivan, Smith, Horswill, & Lurie-Beck, 2011).

Reviews of the literature on older drivers calls for the consideration of attitudes in assessing cognitive processes that promote behaviours related to driving self-regulation (Wong, Smith, Sullivan, & Allen, 2014). However, the association between attitudes and driving practices has primarily been examined in North American samples. The current study specifically examines driving-related attitudes and associations with driving self-regulation in a sample of older drivers from Australia who participated in the Candrive II/Ozcandrive study, a multi-centre prospective cohort study examining the predictive validity of tools for assessing fitness to drive in a cohort of older drivers in seven cities in four Canadian provinces, as well as in two sites in Melbourne, Australia and Wellington, New Zealand (Marshall et al., 2013).

Various approaches have been used to assess driving-related attitudes among older adults. For example, the Day and Night Driving Comfort Scales (DCS-D and DCS-N, respectively) were developed to assess older adults'

Table 1. Number and percent of participants with data at each annual assessment

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Number (% of original sample)	257	241 (94%)	225 (86%)	215 (84%)	197 (77%)	180 (70%)

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perceived driving confidence (Myers et al., 2008) and are based on the Social Cognitive Theory construct of self-efficacy (Bandura, 1986). Ratings on the DCS-D and DCS-N scales have been shown to be related to both self-reported (MacDonald, Myers, & Blanchard, 2008; Myers et al., 2008) and objectively measured self-regulatory driving practices in older drivers residing in Canada (Blanchard & Myers, 2010; Crizzle & Myers, 2013; Myers, Trang, & Crizzle, 2011). Another measure, the Decisional Balance scale (DBS) derived from the Transtheoretical Model of Behavior Change (Prochaska & DiClemente, 1982), was developed to assess positive and negative driving attitudes concerning intrapersonal (i.e., attitudes concerning one's driving) and interpersonal (i.e., attitudes concerning one's driving in relation to others) motivations for driving (Tuokko, et al., 2006). Previous studies involving Canadian older drivers have reported that individuals who possessed more positive attitudes about how their driving impacted others were less likely to restrict their driving (measured by self-reported driving frequency), whereas those who held more negative attitudes toward how their driving impacted others were more likely to active restrict their driving (Jouk et al., 2013; Jouk et al., 2016; Tuokko et al., 2006; Tuokko et al., 2016). Similarly, in a cross-sectional study on Australian older drivers, negative attitudes towards driving have been shown to predict more driving self-regulation, particularly among women (Conlan et al., 2017).

To our knowledge, to date, no longitudinal studies of the relationship between attitudes and self-regulatory driving practices have been reported among older drivers in Australia. The DBS is one of the instruments included in the Candrive II/Ozcandrive study (Marshall et al., 2013). The longitudinal associations between driving-related attitudes (measured by the DBS) and self-regulatory driving practices have previously been examined in the Canadian sample (Sukhawathanakul et al., 2015, Tuokko et al., 2016), but not in the Australian sample. The primary objective of the current study was to examine whether changes in the attitudinal subscales covary with changes in self-regulatory driving behaviours (situational driving frequency and avoidance) across 6 periods of assessment.

Methods

Participants

Participants (n = 257) were recruited from Melbourne, Australia. At baseline, participants ranged in age from 75 to 94 years (M = 79.74, SD = 3.51); 71% (n = 182) were men. Twenty-one percent of individuals completed some post-secondary education, 44% had obtained a diploma or a trade/

technical certificate beyond high school, 11% completed high school, and 24% did not continue beyond grade school.

The number and percent of participants with data at each assessment is provided in Table 1. By the last assessment of the study, 70% of the original sample had been retained. Selective attrition was assessed by testing for differences at T1 on demographics variables (sex, age, education) and number of medical conditions between participants who remained in the longitudinal study (n = 180) and those who did not participate at the last time point in T6 (n = 77). No significant sex or educational differences were found. Participants who dropped out of the study also did not have more medical conditions at baseline. However, participants who remained in the study were slightly younger at baseline (M = 79.33, SD = 3.12) than participants who dropped out of the study (M = 80.69; SD = 4.17), t(255) = 2.88, *p* = .004.

Procedure

All participants provided written informed consent and underwent 6 annual comprehensive evaluations of their health status, functioning, driving habits, and intentions. Psychosocial scales and measures of driving restrictions were completed at home and returned by mail. Marshall et al. (2013) provides detailed information outlining the procedures of the Ozcandrive studies.

Measures

Decisional Balance. The DBS scale asks participants to rate their responses on a 5-point scale ranging from "Strongly Agree" to "Strongly Disagree" to statements concerning attitudes towards driving that comprise four subscales, each with seven items. Specifically, the DBS examines positive aspects of driving relevant for the individual (Pro-self), positive aspects of driving relevant for others (Pro-other), negative aspects of driving relevant for the individual (Con-self), and negative aspects of driving relevant to others (Con-other). Specific descriptions of each subscale are presented in Table 2. Measurement invariance across multiple time points for the DBS has been established previously (Sukhawathanakul et al., 2015).

Driving Self-regulation. The Situational Driving Frequency (SDF) and Situational Driving Avoidance (SDA) scales were developed for older adults to assess self-reported practices (frequency and avoidance, respectively) concerning driving in challenging situations such as driving at night and on highways. On the 14-item SDF scale, respondents rated how frequently they engage in challenging driving situations (such as at night, in new or unfamiliar areas) on a 5-point scale ranging from "Never" to "Very Often." Scores ranged

Table 2. Description of the Decisional Balance Subscale

Decisional Balance Subscale	Example and Scoring of Items
Pro-self: positive perceptions of the self in relation to driving.	e.g., "Driving a vehicle is pleasurable"; higher scores indicate fewer positive perceptions of the respondent's own driving
Pro-other: positive perceptions of driving in relation to others	e.g., "Others count on me being able to drive"; higher scores indicate fewer positive perceptions of the respondent's driving in relation to others
Con-self: negative perceptions of the self in relation to driving.	e.g., "The financial cost of maintaining a vehicle is an increasing concern of mine"; higher scores indicate fewer negative perceptions of the respondent's own driving
Con-other: negative perceptions of driving in relation to others	e.g., "My driving bothers other people"; higher scores indicate fewer negative perceptions of the respondent's driving in relation to others

from 0 – 56 with higher scores indicating greater frequency of driving in challenging situations. On the 20-item SDA scale, participants were asked to indicate which challenging situations, if any, they try to avoid (such as bad weather or heavy traffic). Possible SDA scores range from 0 to 20, with higher scores indicating greater avoidance of challenging situations. Both the SDF and SDA have shown good test-retest reliability with multiple samples (Blanchard & Myers, 2010; MacDonald et al., 2008). The two constructs are moderately negatively correlated concurrently across time (rs = -.47 at T1; -.44 at T2; -.52 at T3; -.40 at T4; -.51 at T5; and -.51 at T6) suggesting that while driving frequency and avoidance are related, the constructs are not multicollinear.

Data Analytic Strategy

Multilevel models were used to assess time-varying associations between the DBS self and other subscales with driving self-regulation across 6 annual assessments. Situational Driving Frequency (SDF) and Situational Driving Avoidance (SDA) were assessed separately. All models were estimated in MPlus 7.1 using a full-information maximum likelihood estimator (FIML) with robust standard errors (MLR) to correct bias due to missingness, which uses all available data (Little & Rubin, 2014; Muthen & Muthen, 2012). Multilevel modelling procedures handle the hierarchical structure of the data in which yearly measurement occasions are nested within individuals. Multilevel models allow for individual changes to be modelled at the within-person level and the individual differences in these changes to be modelled at between-person level.

First, a time-based model estimated individual rates of driving self-regulation as a function of time across the 6-year period. DBS subscales were then included in the longitudinal models as within-person predictors of driving self-regulation. Age, sex, and level of education were added in the intercept and slope parameters to examine between-person differences in initial levels of driving self-regulation and in rates of change over time.

Results

Means and standard deviations for the DBS, SDA, and SDF scales across the 6 annual assessments are provided in Table 3. An unconditional time-based model that excluded demographic predictors was first examined with the SDA and SDF outcomes in order to determine their longitudinal trajectories. Findings from the multilevel analyses revealed that on average, SDF increased over the 6 annual assessment periods (β = .795; SE = .072; p <.001). That is, older drivers report engaging in more challenging driving situations over time. SDA did not change over time (β = .083; SE = .051; p = .099), suggesting that the frequency of avoiding challenging situations remained stable.

Demographic variables (age, sex, education) were added as between-person predictors of baseline levels and changes in SDA and SDF over time. The DBS subscales were included as within-person predictors to determine their time-varying effects on SDA and SDF over time. The subscales were estimated simultaneously in the models in order to assess their independent effects. Table 4 provides results of the multilevel models for SDF and SDA.

Situational Driving Frequency

Age and sex predicted between-person differences at baseline. Specifically, women who were older reported lower SDF at baseline (βs = -.430 and -3.031; SEs =.118 and .984; ps < .001). None of the demographic variables moderated changes in SDF over time. At the within-person level, the con-other subscale was associated with SDF after accounting for the independent effects of the other subscales (β = .215; SE = .099; p = .029). Specifically, individuals engaged in greater SDF during years when they held less negative attitudes regarding their driving in relation to others (con-other) relative to their average yearly attitudinal levels.

Situational Driving Avoidance

None of the demographic variables predicted between-person differences at baseline. However, age and sex moderated changes in SDA over time. Specifically, individuals who were older and women increased their SDA strategies over time at a faster rate than individuals who were younger and men (βs = .036 and .333; SEs = .016 and

Table 3. Means and standard deviations of study variables

	Waves					
	1	2	3	4	5	6
Decisional Balance Subscales						
Pro-self	21.28(5.27)	21.42(5.27)	21.18(5.64)	21.18(5.49)	21.17(5.82)	21.07(5.61)
Con-self	34.19(4.94)	34.47(4.85)	34.77(4.83)	34.51(5.03)	34.35(5.18)	34.65(7.70)
Pro-other	13.93(3.07)	14.23(3.02)	14.15(3.44)	13.95(3.36)	14.79(7.72)	14.16(3.59)
Con-other	30.44(3.28)	30.40(3.54)	30.43(3.47)	30.44(3.56)	30.27(3.61)	30.03(3.64)
Driving Self-regulation						
Situational Driving Frequency	32.89(6.71)	32.99(6.92)	32.71(6.92)	32.44(9.70)	45.48(6.45)	31.28(6.82)
Situational Driving Avoidance	5.33(3.77)	5.39(3.60)	5.67(3.82)	4.67(3.84)	4.57(3.92)	5.04(4.35)

Note. Standard deviations provided in parentheses.

Table 4. Multilevel models of the self-regulatory driving practices

	Situational Driving Frequency		Situational Driving Avoidance	
	β	SE	β	SE
Intercept	58.924***	9.918	6.655	6.102
Age	-0.430***	0.118	0.046	0.071
Sex	-3.031**	0.984	0.890	0.560
Education	-0.084	0.263	0.122	0.153
Time Slope	1.580	1.973	-2.691*	1.307
Age	-0.007	0.025	0.036*	0.016
Sex	-0.179	0.158	0.333**	0.108
Education	-0.030	0.044	-0.047	0.030
Time-varying Effects				
Pro-self	0.024	0.060	-0.014	0.024
Con-self	0.099	0.088	-0.129**	0.047
Pro-other	-0.161	0.124	-0.002	0.034
Con-other	0.215*	0.099	-0.054	0.043
Variances				
Intercept	15.977	24.101	5.552	7.457
Time Slope	0.005	0.832	0.133**	0.040
Pro-self	0.001	0.018	<.001	0.005
Con-self	0.001	0.004	0.001	<.001
Pro-other	0.018	0.017	0.006	0.020
Con-other	0.002	0.015	<.001	0.006

Note. *p < .05; **p < .01; **p < .001

.108; ps = .027 and .002 respectively). At the within-person, con-self was associated with SDA after adjusting for the effects of the other DBS subscales (β = -.129; SE =.047; p = .006). Specifically, during the years when individuals reported more negative attitudes about their own driving relative to their average yearly level of negative attitudes, they engaged in more driving avoidance behaviours.

Discussion

The DBS is an established scale that provides insights into driving-related attitudes that may affect older driver's decisions to regulate their driving. The DBS captures the multidimensional construct of driving-related attitudes that acknowledges the influence of both intrapersonal and interpersonal factors. This study assessed the DBS in a sample of Australian older drivers. Examination of the longitudinal associations between the DBS subscales and self-regulatory driving practices revealed that both negative and positive attitudes covary with changes in situational driving frequency and avoidance across 6 annual assessments.

On average, older adults in this sample report engaging in more challenging driving situations over time while avoidance behaviours remained stable. This finding is surprising and is in contrast to what is reported in previous studies with Canadian samples (e.g., Jouk et al., 2016) where SDF tends to decrease and SDA increases over time. However, previous studies have examined SDF and SDA over a shorter time frame of three or fewer years. It may be that over a longer period of time, older adults who remain on the road increasingly encounter more challenging driving situations. Participants who remain in the study may also be more comfortable with driving in challenging situations relative to participants who do not remain in the study. However, these average SDF and SDA levels are moderated by changes in attitudes related to driving.

Significant longitudinal associations between the DBS subscales and frequency of driving in and avoiding challenging situations (SDF and SDA) suggest that changes in older adults' attitudes correspond with self-regulatory driving practices over time. With regards to situational driving frequency, individuals who reported fewer negative attitudes of their driving in relation to others (con-other) drove more frequently in challenging situations. These findings portray a complex relationship between negative attitudes and older adults' driving behaviours, particularly concerning attitudes that value relationships with other people (e.g., when others count on you to drive, driving as an important part of one's community, concern when others are critical of your driving). On the other hand, negative attitudes in relation to the self (con-self) were most predictive of situational driving avoidance. Specifically, individuals who held more negative attitudes towards their own driving engaged in more driving avoidance behaviours. This finding suggest that actively avoiding certain driving situations may depend on the appraisal of one's own driving ability and comfort (e.g., increasing apprehensions about driving, concerns about own driving ability) rather than positive attitudes or attitudes related to interpersonal relationships.

Taken together, these findings suggest that driving-related attitudes consisting of both intra- and interpersonal motivational components have implications for driving self-regulatory behaviours. The longitudinal associations between the DBS subscales and driving self-regulation are consistent with previous studies. In particular, in the Canadian Candrive sample of older drivers, individuals whose attitudes towards their own driving (con-self) became more negative over time were increasingly restricting their driving by avoiding more challenging driving situations compared to individuals whose attitudes towards driving remained stable across a three-year period (Tuokko et al., 2016). The positive association between con-other and SDF has also been reported in a three-year longitudinal psychometric examination of the Decisional Balance Scale (Sukhawathanakul et al., 2015). Results of this study further support the utility of the DBS in assessing attitudes with older drivers from Australia. Specifically, findings from this study, examined over a longer assessment period across six years than was previously reported in the Canadian studies, suggests that changes in attitudes can have enduring associations with driving self-regulatory practices. As older adults increasingly adopt more self-regulatory practices as they age (D'Ambrosio, Donorfio, Coughlin, Mohyde, & Meyer, 2008; Donorfio, Mohyde, Coughlin, & D'Ambrosio, 2008), it is possible that attitudinal changes can facilitate or deter self-regulatory driving practices over time. Future research is needed to understand the underlying mechanisms between driving attitudes and self-regulatory driving practices, as well as how these mechanisms change over time.

Limitations

Findings from this study highlight the longitudinal relationship between driving-related attitudes and self-regulatory driving practices. However, causal conclusions cannot be made due to the limits of the analyses. It is unclear whether shifts in attitudes promote the use of self-regulatory driving strategies or whether it is the increasing use of compensatory strategies that spur a change in attitudes. Future studies that test these directional pathways are needed.

Moreover, measures of self-regulatory driving practices used in this study were limited to self-reports. Although the SDF and SDA scales have good psychometric properties and provide an indication of self-regulation, studies have shown that older adults may drive more in challenging situations and avoid such situations less than they report (Blanchard, Myers & Porter, 2010; Crizzle, Myers & Almeida, 2013). Future examinations of their associations with objective driving measures (e.g., mileage driven) may yield different information about how attitudes shape driving practices.

Despite these limitations, our study demonstrates that the DBS can be used as an instrument for measuring attitudes toward driving among Australian older drivers. Continued use of this scale in future studies is warranted to better

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understand how self-regulatory behaviours develop in older adulthood, including corresponding decisions to restrict and cease driving.

Acknowledgements

References

Anstey, K. J., Wood, J., Lord, S., & Walker, J. G. (2005). Cognitive, sensory and physical factors enabling driving safety in older adults. *Clinical Psychology Review*, *25*(1), 45-65.

Australian Bureau of Statistics (ABS) 2013. Population projections, Australia, 2012 (base) to 2101. ABS cat. no. 3222.0. Canberra: ABS.

Babulal, G. M., Stout, S. H., Head, D., Holtzman, D. M., Fagan, A. M., Morris, J. C., & Roe, C. M. (2017). Neuropsychiatric Symptoms and Alzheimer's Disease Biomarkers Predict Driving Decline: Brief Report. *Journal of Alzheimer's disease*, *58*(3), 675-680.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs: Prentice-Hall.

Blanchard, R.A., & Myers, A.M. (2010). Examination of driving comfort and self-regulatory practices in older adults using in-vehicle devices to assess natural driving patterns. *Accident Analysis and Prevention, 42,* 1213-1219.

Crizzle, A. M., & Myers, A. M. (2013). Examination of naturalistic driving practices in drivers with Parkinson's disease compared to age and gender-matched controls. *Accident Analysis & Prevention*, 50, 724-731.

D'Ambrosio, L. A., Donorfio, L. K. M., Coughlin, J. F., Mohyde, M., & Meyer, J. (2008). Gender differences in self-regulation patterns and attitudes towards driving among older adults. *Journal of Women & Aging, 20*, 265-282.

Donorfio, L. K., 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*(6), 555-561.

Donorfio, L. K., D'Ambrosio, L. A., Coughlin, J. F., & Mohyde, M. (2009). To drive or not to drive, that *isn't* the question—the meaning of self-regulation among older drivers. *Journal of Safety Research*, 40(3), 221-226.

Gwyther, H., & Holland, C. (2012). The effect of age, gender and attitudes on self-regulation in driving. *Accident Analysis & Prevention*, 45, 19-28.

Jouk, A., Tuokko, H., Myers, A., Marshall, S., Man-Son-Hing, M., Porter, M. M., ... & Candrive

II Research Team. (2014). Psychosocial constructs and self-reported driving restriction in the Candrive II older adult baseline cohort. *Transportation Research Part F: Traffic Psychology and Behaviour*, 27, 1-10.

Jouk, A., Sukhawathanakul, P., Tuokko, H., Myers, A., Naglie, G., Vrkljan, B., ... & Man-Son-Hing, M. (2016). Psychosocial constructs as possible moderators of self-reported driving restrictions. *Canadian Journal on Aging/La Revue canadienne du vieillissement*, *35*(S1), 32-43.

Kostyniuk, L. P., & Molnar, L. J. (2008). Self-regulatory driving practices among older adults:

Health, age and sex effects. *Accident Analysis & Prevention*, 40(4), 1576-1580.

MacDonald, L., Myers, A.M., & Blanchard, R.A. (2008). Correspondence among older drivers' perceptions, abilities and driving behaviours. *Topics in Geriatric Rehab, 24*, 239-252.

Molnar, L. J., & Eby, D. W. (2008). The relationship between self-regulation and driving-related abilities in older drivers: an exploratory study. *Traffic Injury Prevention*, *9*(4), 314-319.

Muthén, L.K. & Muthén, B.O. (1998-2012). Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén

Myers, A.M., Paradis, J., & Blanchard, R.A. (2008). Conceptualizing and measuring confidence in older drivers: Development of the Day and Night Driving Comfort Scales. *Archives of Physical Medicine and Rehabilitation*, 89, 630-640.

Myers A.,M., Trang, A., & Crizzle, A.M. (2011). Naturalistic study of winter driving practices by older men and women: examination of weather, road conditions, trip purposes and comfort. *Canadian Journal on Aging*, 30, 577-589.

Prochaska, J.O., and DiClemente, C.C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research & Practice*, 19, 276-288.

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behaviour change. *American Journal of Health Promotion*, 12(1), 38-48.