

Interventions to reduce the adverse psychosocial impact of driving cessation on older adults

Timothy D Windsor
Kaarin J Anstey

Centre for Mental Health Research,
Australian National University,
Canberra, ACT, Australia

Abstract: As a result of our aging population, the coming years will see increasing numbers of older adults faced with the prospect of giving up driving due to poor health or functional limitations. Driving cessation has been associated with negative psychosocial outcomes for older adults including restricted mobility and depression. While several studies report evaluations of interventions designed to help older adults to drive safely for longer, there is a paucity of published research concerned with the design or implementation of intervention programs intended to reduce the negative consequences of driving cessation. This paper reviews cognitive and educational interventions designed to promote older driver safety, and discusses possible approaches to the design and implementation of clinical interventions for older adults who have ceased driving. A broad framework for adaptable interventions based on the theoretical tenets of social cognitive theory, with an emphasis on planning for cessation, problem-solving and the involvement of friends and family members is proposed.

Keywords: driving, driving cessation, intervention, older adults

Introduction

Demographic changes associated with population aging mean that increasing numbers of drivers will be faced with the prospect of giving up driving due to health or functional limitations. Results from the Australian Longitudinal Study of Aging show that among participants aged 80–84 years at the study baseline, 51.0% were drivers, with this percentage dropping to 15.2% after 5 years (Anstey et al 2006). Foley et al (2002) estimated that for US adults aged 70–74, on average, males and females would be dependent on alternative transport subsequent to driving cessation for seven years and ten years, respectively. Similar estimates of life expectancy beyond retirement from driving are also likely to apply to older adults in other Western countries with heavy reliance on the private car as the primary mode of transport.

There is growing evidence of the negative social and psychological consequences of driving cessation (Fonda et al 2001). For many older adults, the transition from driver to ex-driver is accompanied by a sense of lost independence (Yassuda et al 1997), social isolation (Marottoli et al 2000), and clinically significant depression (Marottoli et al 1997). Given the importance of mental health and social integration for general wellbeing and for the prevention of dementia and other health problems in aging (Fratiglioni et al 2004), interventions to address the negative consequences of driving cessation may play a significant role in public health. To date, there have only been a few interventions targeted at older drivers, with these programs primarily aimed to promote safety through older drivers' adaptation of driving behavior to compensate for changing functional capacity.

Correspondence: Timothy D Windsor
Centre for Mental Health Research,
Australian National University, Canberra,
ACT 0200, Australia
Tel +61 2 6125 8407
Fax +61 2 6125 0733
Email Tim.Windsor@anu.edu.au

This review aims to draw together the literature in this important emerging field of clinical intervention in late life. Two areas of research are surveyed. First, studies with implications for intervention programs designed to promote safety and driving longevity for older adults are reviewed. Second, avenues by which interventions might be extended or adapted to reduce the negative consequences of driving cessation when safe driving is no longer a practical option are explored.

Interventions designed to help older adults drive safely for longer

Despite the growing awareness of issues associated with older driver safety, relatively few studies have been conducted to evaluate the effectiveness of existing intervention programs. The studies identified describe approaches to interventions that fall into two categories: (1) cognitive speed-of-processing interventions designed to improve aspects of visual attention and processing that are fundamental to the driving task, and (2) educational interventions designed to promote effective self-regulation and appropriate adaptation of driving behavior.

Cognitive interventions

Research indicates that cognitive abilities are important enabling factors for safe driving (Anstey et al 2005). Several studies have focused on the specific functional role of visual-processing speed and visual selective attention in determining driving outcomes for older adults (Roenker et al 2003). These aspects of cognition have typically been assessed among older drivers using the useful field of view test (UFOV). The UFOV assesses the extent to which individuals are capable of extracting visual information in a given moment without movement of the eyes or head, with the testing process requiring the detection, localization, or identification of targets against a complex visual background. A number of studies have demonstrated that older drivers with UFOV impairments are more frequently involved in at-fault crashes, and driver simulator crashes, while UFOV performance has been found to be linearly related to the probability of passing an on-road driving evaluation (Roenker et al 2003). Significantly, research has also demonstrated that performance on the UFOV is subject to improvement with the appropriate speed-of-processing training. This raises the possibility that the driving capacity of older adults could be improved, or maintained at acceptable levels through interventions that incorporate

speed of processing training. Consequently, several studies have taken the step of directly examining the impact of speed-of-processing training on driving outcomes.

Roenker et al (2003) compared the driving simulator performance, an on-road driving performance of adults defined as “high-risk” based on initial UFOV performance who participated in a UFOV-based speed-of-processing training program, with high-risk adults who had taken part in a traditional driving simulator-based program and a low-risk control group. Outcome measures were obtained at baseline, immediately post-test, and at an 18-month follow-up. Initial results indicated that the group who underwent speed-of-processing training improved on the UFOV task to a level that was comparable with that of the low-risk control group at post-test and follow-up, while high-risk participants who underwent traditional driver training did not show an improvement in UFOV performance. There was also evidence to suggest that speed-of-processing training had a beneficial effect on driving performance. Improvements in this group were evident in tasks that relied on visual attention and higher order processing speed such as improved choice reaction times in driving simulator testing, while the simulator training group showed a post-test improvement in measures of correct turning and signal use. Perhaps most significantly, the speed-of-processing group showed a decrease at post-test in a measure of “dangerous maneuvers” taken as part of the on-road test, that persisted at the 18-month follow-up. Comparable improvements were not evident for the control group, or the simulator-training group (Roenker et al 2003).

Mazer et al (2003) used a randomized controlled trial to investigate the effectiveness of a visual attention-retraining program on the driving performance of adults who had been referred for driving evaluation following a stroke. The participants were randomized to two intervention conditions: the first involved 20 sessions of visual processing training using the UFOV, the second involved 20 sessions of computer-based training with programs traditionally used for visuoperceptual training that did not target speed of visual processing. The results of the study indicated that the participants with stroke who underwent the UFOV training did not show significantly better performance on a driving test, or on measures of visuoperception and attention relative to the group who underwent traditional visuoperception retraining. Both groups showed an improvement in UFOV scores at post-test (no pre-test driving evaluation was conducted). However a subgroup of participants with right-sided lesions who underwent

UFOV training showed much higher success rates in the on-road evaluation (52.4% pass rate) relative to participants with right-sided lesions who underwent traditional training (28.6% pass rate). Given that right hemisphere lesions have been associated with deficits in the higher-order processing of visual stimuli, the results indicate that the UFOV may be of particular use in clinical settings for improving the driving outcomes of subgroups of individuals whose speed of visual processing is impaired (Mazer et al 2003).

The ACTIVE trial, a large-scale randomized controlled trial of cognitive training interventions with older adults has examined the effects of speed of processing training on cognitive test performance and functional activities of daily living, including driving behavior (Jobe et al 2001; Ball et al 2002). Speed of processing training had a positive effect on proximal cognitive measures, an effect that was further improved for participants who underwent additional "booster" training. However speed-of-processing training was not related to self-reported driving habits recorded at one and two year follow-ups (Ball et al 2002). The authors point out that the lack of transfer to functional domains was to be expected, as most participants in the study were not yet impaired in the cognitive domains that were targeted by the training interventions, with high proportions of participants operating at ceiling levels (Ball et al 2002). Consequently, as the participants in the ACTIVE trial experience more pronounced levels of cognitive decline, future studies have the potential to provide valuable insights into the efficacy of speed-of-processing interventions in enhancing older driver safety at a community level.

Studies examining the effects of speed-of-processing interventions on older driver behavior have yielded initial results that hold promising implications for clinical interventions aimed at improving older drivers' cognitive capacity to drive safely for longer. However, further research is required to determine whether there is a particular age or level of function at which interventions may be most beneficial and whether benefits of training in preventing decline are greater than benefits for improving performance. The practical aspects of administering such interventions in clinical contexts must also be evaluated, including the most effective modes of delivery for cognitive re-training. It is possible that perceptual training using techniques other than the UFOV could also be efficacious for enhancing driving ability among populations of older adults with different functional limitations. One small-scale study demonstrated that undertaking simple paper-and-pencil tasks designed to enhance perceptual skills, was associated with

improved driving performance in a sample of eight participants with acquired brain damage (Sivak et al 1984). Significantly, cognitive interventions are not designed to address the adverse psychosocial impact of driving cessation. Consequently, the potential utility of speed-of-processing training and other forms of cognitive intervention should ideally be considered in the context of more comprehensive approaches to intervention that address the difficulties associated with this transition.

Educational interventions

Several recent papers have reported evaluation studies of education-based driving interventions for older adults. Eby et al (2003) assessed the utility of the driving decisions workbook, a self-assessment tool which prompted older drivers to identify potential problems faced in the domains of health, driving ability, and driving experiences, attitudes and behavior. The booklet also provided appropriate feedback as to how potential problems might be addressed. Results from a convenience sample of older drivers indicated that those who completed the workbook indicated that the exercise increased their awareness of age-related changes that could affect driving, and served as a useful reminder of issues related to road safety. Significantly, all participants indicated that the workbook could be useful in helping older adults to discuss driving concerns with their families. The Eby et al (2003) study was limited by its use of a non-representative sample, a lack of follow-up data on whether the workbook influenced actual driving behavior, and the absence of a control group. However the results indicate that interventions that use approaches like the older driver workbook have promise, and could be of specific use as tools for facilitating family discussion of issues associated with driving reduction and cessation, particularly as conversations of this nature are often avoided and can be fraught with difficulty when they do take place (Eby et al 2003).

Bedard et al (2004) reported a randomized controlled trial of an educational intervention adapted from the 55 Alive program of the American Association of Retired Persons. The intervention consisted of two half-day driver training sessions addressing topics ranging from self-assessment to aspects of the driving environment and the influence of alcohol and medication on driving performance. Drivers underwent pre- and post-test on-road evaluations, with results indicating that the intervention group improved at post-test, however the extent of their improvement was not significantly different to that of the control group, who

underwent the on-road testing without the educational intervention. Perhaps the most interesting implication of these findings is that older drivers (in both intervention and control groups) demonstrated the ability to improve on a driving task that they had some familiarity with.

Perhaps the most comprehensively designed and evaluated educational program for older drivers is the Knowledge Enhances Your Safety (KEYS) project, an intervention developed to improve the safety of older drivers at high risk of accident involvement due to visual impairment. This project used a theoretical framework based on the tenets of social-cognitive theory and transtheoretical models, which emphasize knowledge, motivation, and self-efficacy as prerequisites for adaptive behavior change. Drivers were engaged in one-on-one sessions with a health educator, covering the implications of visual impairment for driving, the development of skills and strategies for avoiding potential hazards, and a confidence building component. The effectiveness of the KEYS was evaluated by comparing the outcomes for participants randomly assigned to a condition comprising both usual care (eye examination with discussion of the implications of impairment for activities of daily living) and the KEYS, with outcomes for participants randomly assigned to a condition where only usual care was received (Stalvey and Owsley 2003).

Evaluation of the project revealed that at six months post-test, drivers who had received the KEYS intervention demonstrated a greater awareness of their visual limitations, and reported a greater degree of self-regulation of driving behavior relative to the control group (Owsley et al 2003). The educational intervention group also reported engaging in a reduced amount of driving relative to the controls. Despite the promise of the initial self-reported attitudinal and behavioral changes resulting from the KEYS, a subsequent study that compared collision rates adjusted for distance driven did not reveal a difference between the intervention and control groups (Owsley et al 2004). The failure of the intervention to affect crash rates may reflect an unrealistic expectation that educational programs alone could exert an impact on accident involvement, given the multiplicity of factors involved in any given accident (Owsley et al 2004). Whatever the reason, the fact that visually impaired drivers who underwent a carefully designed treatment intervention theoretically grounded in validated models of behavior change, had similar crash rates to controls, suggests that educational interventions may have only limited value in promoting older driver safety.

In a recent review of the factors that enable driving safety in older adults, Anstey et al (2005) proposed a schematic model which identified the importance of vision and physical functioning in providing the capacity to drive safely, while cognition was identified as playing a crucial role in enabling both driving capacity and effective self-monitoring. Given their fundamental importance to all activities of daily living, the promotion of optimal physical functioning (including vision) in older adults remains a broad but central focus for gerontology. Consequently, it is not surprising that interventions designed specifically for older drivers have targeted the improvement of cognitive abilities, with speed-of-processing training using the UFOV (Roenker et al 2003) aimed at enhancing basic driving skills, and educational interventions (Owsley et al 2004) designed to promote better understanding of issues and difficulties associated with the driving task, and consequently more effective self-monitoring and safer driving behavior. It is something of an irony that speed-of-processing interventions that appear to have resulted in improvements to driver behavior were not perceived by participants as being relevant to the driving task (Roenker et al 2003), while the possible benefits of older driver educational interventions that focus explicitly on driving-related issues remain unclear (Stalvey and Owsley 2003), despite their obvious face validity. The results of the Eby et al (2003) study suggest that one of the primary benefits of educational interventions for older drivers might be in prompting and/or facilitating the discussion of issues related to driving cessation with family members. Consequently older driver education programs might be more effectively targeted at helping older drivers to prepare for life after retirement from driving, rather than enhancing safety.

Clinical interventions for driving cessation

Some of the most effective methods for reducing the negative consequences of driving cessation are likely to be applied at the population or community level, and include improvements to existing public transport services to make them more acceptable and accessible for older adults (Marottoli et al 1997), and the development of community-owned and operated transport services that both empower and directly provide for the needs of older adults who no longer drive (Kostyniuk and Shope 2003). However there is also a need for development of adaptable approaches to ameliorating the negative effects of driving cessation that can be used by professionals such as general practitioners,

community nurses, and occupational therapists, who occupy significant roles in promoting the health and functioning of older adults. The following discussion raises a number of key issues, identified with a view to stimulating research into, and development of effective clinical approaches to interventions for driving cessation.

A theoretical approach

Social cognitive theory (Bandura 2005) provides a promising theoretical framework for future interventions designed to address adverse psychological consequences of driving cessation. Giving up driving is frequently seen as representing lost independence, or as signaling a transition into a final dependent phase of life (Yassuda et al 1997). With its emphasis on self-efficacy, self-regulation, and the exertion of control over the environment (Bandura 2005), approaches to intervention grounded in social cognitive theory could be efficacious in helping older adults to re-evaluate what remains achievable in terms of mobility following driving cessation, and to retain or re-establish a sense of control over the environment.

Depression resulting from reduced mobility, social isolation or threats to self concept, has been identified as a potential problem faced by ceased drivers (Marottoli et al 1997; Fonda et al 2001), which might also be ameliorated by interventions informed by social cognitive theory. The promotion of self-efficacy has been identified as a key element for success in interventions designed to reduce depressive symptoms in late life (Blazer 2002). Through the enhancement of knowledge regarding issues such as the availability of alternative transportation, along with the promotion of efficacy beliefs, interventions based on social cognitive theory have the scope to address threats to independent mobility (and associated social isolation) and threats to the sense of self; two clearly apparent and inter-related negative consequences of driving cessation.

Practical approaches

While interventions should be informed by appropriate theory, practical considerations are also of obvious importance in conceiving of approaches to address negative outcomes associated with retirement from driving. One important approach to intervention that fits within the framework of social cognitive theory is concerned with older drivers actively planning for driving cessation while they remain capable of driving. Strategies involved in planning for life after driving might include familiarization with

transport alternatives such as public transport, considering residential relocation when transport alternatives are not available, and initiating discussion of future transport arrangements with friends and family. Activities of this type provide obvious practical benefits, but also should also serve to reinforce efficacy beliefs as well as allowing older adults to better emotionally adapt to cessation. The anticipation of a negative event as part of a normal transitional process is likely to result in better adjustment than the experience of loss as sudden and untimely (Woods 1999).

Some existing interventions have used educational approaches to assist older adults planning for driving cessation. In the Australian Capital Territory (ACT), residents are provided with an educational booklet that addresses safe driving practices and techniques for self-evaluation when they turn 70 (ACT 2003). When they turn 75, a supplementary booklet is provided that outlines strategies in planning for driving cessation including identifying local community providers of alternative transportation (MUARC 2001). Objective evidence regarding the effectiveness of this intervention is not currently available; however anecdotal evidence suggests that older adults in the ACT regard the *Retiring from Driving* booklet as helpful. Adapted materials of this type could prove useful at a population level through their distribution to older adults, and could also provide a valuable resource for health professionals working with older adults.

Future directions

For individuals who have already ceased driving and may be experiencing a related reduction in quality of life, interventions that aim to directly address problems such as social isolation and reduced mobility are likely to be of particular utility. Problem-solving treatment (Mynors-Wallis 2002) is one specific method of intervention that is in keeping with the principles of social cognitive theory, and could prove efficacious as a means of addressing the mobility, emotional, and psychosocial difficulties faced by some older former drivers. Based on the rationale that psychological symptoms are a result of everyday problems, problem-solving treatment equips individuals to better deal with current difficulties by outlining a problem-solving framework within which the individual identifies problems, achievable solutions, and mechanisms for attaining those solutions (Mynors-Wallis 2002). With its emphasis on patients using their own skills and resources to solve problems (Mynors-Wallis et al 2000), problem-solving

treatment could provide a framework for enhancing efficacy and ameliorating the threat to self that can result from driving cessation. The approach can also be effectively administered by health professionals who do not have training in psychotherapy (Mynors-Wallis 2002), and has recently been found to be effective in improving depression outcomes for older adults with comorbid medical illness (Harpole et al 2005). This issue is particularly pertinent to driving cessation, as functional impairment resulting from medical conditions is likely to be a factor in precipitating the decision to give up driving.

Intervention attempts to reduce the negative consequences of driving cessation are also likely to benefit from the involvement of supportive friends and family of the older individual. Older ceased drivers rely heavily on friends and family for the maintenance of mobility (Kostyniuk and Shope 2003), however this reliance can be associated with feelings of lost independence (Yassuda et al 1997), and may result in a reluctance to ask for help with non-essential trips. The educational intervention by Eby et al (2003) already discussed provides promising evidence that the provision of relevant educational materials could assist in stimulating discussion. Family counseling (Zarit and Edwards 1999), could provide another effective approach, and is probably best initiated while the older adult is still driving. Communication of the needs and expectations of both older adults with mobility restrictions, and those in a position to assist with transportation is needed in order to strike an effective balance between adequate mobility, and any real or perceived imposition on family members. Interventions also need to be adapted to take account of cultural and ethnic factors that influence driving habits, social participation, and transport use.

Finally, interventions for older ceased drivers should incorporate a degree of flexibility that allows them to be tailored to the specific needs of the older adult(s) in question. Issues such as location (urban vs regional or isolated areas) and the associated availability of public transport, the availability of co-residents capable and willing to provide transport, and the subjective experience of driving cessation as an untimely shock, or as an anticipated, if unwelcome transition, need to be taken into account. The approaches to intervention should also allow for the probability that issues affecting individuals in earlier stages of functional impairment who cease driving are likely to be different to those who have been non-drivers for a number of years. For example, someone who has recently ceased driving may be more likely to experience a sense of distress resulting

from a loss of independence, while an older adult who has been a non-driver for a number of years could be at greater risk of depression resulting from social isolation. The development of intervention programs designed to reduce the negative impact of driving cessation could be of significant social benefit, and programs of this type have the potential to be successfully incorporated with existing cognitive and educational interventions for older drivers, or to stand alone.

In the US, professionals from a range of backgrounds including research, traffic safety administration, medical practice, and seniors advocacy groups have combined to form the Older Drivers Project, with the goal of developing an improved approach to managing issues related to older drivers at a policy level. The advocated approach is focused on both the promotion of safety for road users, and on helping older adults to drive safely for as long as possible. Specifically, the optimization of the health status of drivers, the rehabilitation of functional limitations that effect driving capacity, creating a safer driving environment through improvements to roads and traffic control devices, and vehicle optimizations tailored to the needs of older drivers are each recommended (Wang and Carr 2004). The development of interventions in each of these areas has the potential to improve safety for all road users. However it is significant that despite calls for educational action to assist in older adults' better preparing for driving cessation (Yassuda et al 1997), commensurate intervention frameworks have not been designed to meet the needs of older adults once they are no longer able to drive; a life transition that will be an inevitable development for a significant proportion of current older road users. Given the negative consequences of driving cessation for older adults, intervention strategies need to retain their current focus of assisting older adults to drive safely for longer. However additional work is needed in planning for interventions to improve opportunities for retaining mobility and independence, and to promote better psychosocial outcomes for older adults who can no longer drive.

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