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### ABSTRACT

Self-regulation is a coping strategy that allows older drivers to drive safely for longer. Selfregulation depends largely on the ability of drivers to evaluate their own driving. Therefore the success of self-regulation, in terms of driving safety, is influenced by the ability of older drivers to have insight into their declining driving performance. In addition, previous studies suggest that providing feedback to older adults regarding their driving skills may lead them to change their driving behaviour. However, little is currently known about the impact of feedback on older drivers' self-awareness and their subsequent driving regulatory behaviour. This study explored the process of self-regulation and driving cessation among older drivers using the PAPM as a framework. It also investigated older adults' perceptions and opinions about receiving feedback in regards to their driving abilities. Qualitative focus groups with 27 participants aged 70 years or more were conducted. Thematic analysis resulted in the development of five main themes; the meaning of driving, changes in driving pattern, feedback, the planning process, and solutions. The analysis also resulted in an initial model of driving self-regulation among older drivers that is informed by the current research and the Precaution Adoption Process Model as the theoretical framework. It identifies a number of social, personal, and environmental factors that can either facilitate or hinder people's transition between stages of change. The findings from this study suggest that further elaboration of the PAPM is needed to take into account the role of insight and feedback on the process of self-regulation among older drivers.

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#### 1. Introduction

In Australia, it is estimated that the proportion of people aged 65 years and more will increase from 13% in 2007 to approximately 25% in 2056 (ABS, 2008). As the population ages, there will be an increased number of older licensed drivers on our road system (King, Soole, Watson, & Schramm, 2011). Moreover, as the baby boomers age, they will be driving more than previous generations (Wang & Carr, 2004). In Queensland, drivers aged 60 years and above are over-represented in fatal and life-threatening crashes and their involvement increases steadily with age (Rakotonirainy, Steinhardt, Delhomme, Darvell, & Schramm, 2012). Furthermore, drivers aged 80 years and above are most likely to be at a fault for injury or death-related crashes (Rakotonirainy et al., 2012). As a result, the safety of older drivers has been receiving more attention from road safety researchers in recent years.

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Ageing is associated with non-pathological changes in the sensory, motor, and cognitive functions that can impair people's ability to safely operate a motor vehicle (Molnar, Eby, St. Louis, & Neumeyer, 2007). Nevertheless, there is a considerable variation in how individuals experience these declines (Eby, Trombley, Molnar, & Shope, 1998) and the impact of such declines on actual crash risk is not always fully known (Whelan, Langford, Oxley, Koppel, & Charlton, 2006). Further, older adults consider driving to be key to their independence and mobility (Molnar et al., 2007). Restricting or stopping driving can be associated with increased risk of depression (Ragland, Satariano, & MacLeod, 2005), isolation (Fonda, Wallace, & Herzog, 2001), and entering long-term care facilities (Freeman, Gange, Munoz, & West, 2006).

Previous studies have indicated that some older adults adopt strategies to reduce their crash risk while maintaining their driving, a process known as self-regulation. Self-regulation has been defined as "the adjustments made by drivers in their driving behaviour that adequately match changing cognitive, sensory and motor capacities" (Charlton et al., 2006) which largely depends on the individual's ability to monitor his/her driving ability (Anstey, Wood, Lord, & Walker, 2005). Common examples of self-regulation seen in older drivers include reducing their overall amount of driving and avoidance of various driving situations (e.g. avoiding driving at night or peak hours, travelling shorter distances) (Anstey & Smith, 2003; Baldock, Mathias, McLean, & Berndt, 2006; Charlton et al., 2006). Driving cessation is sometimes viewed to be the end result of the process of self-regulation among older drivers (Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001; Lyman, McGwin, & Sims, 2001). While uncommon, driving cessation can occur unexpectedly as a result of sudden illness, involvement in an accident, or failing a driving test (Dellinger et al., 2001). However, driving cessation is more of a gradual and voluntary process whereby the driver will gradually increase self-imposed restrictions until ultimate cessation (Dellinger et al., 2001; Hakamies-Blomqvist & Wahlström, 1998).

The question remains as to whether older drivers can accurately adjust their driving in response to their age-related declines. The literature suggests that self-awareness and insight into driving ability play a major role in successful driving regulation among older drivers (Anstey et al., 2005). It is argued that individuals who lack awareness of their abilities and limitations may engage in behaviours that compromise their safety and the safety of those around them (Marottoli & Richardson, 1998). In addition, older drivers who are aware of declines in their abilities are more likely to practice self-regulation than those who are less self-aware (Blanchard & Myers, 2010; Holland & Rabbitt, 1992). Lack of adequate support and feedback can impact older people's ability to make an informed decision about the future of their driving. This can result in some older people stopping driving prematurely while other continues to drive where it is not safe to do so (Berry, 2011). Feedback may assist older drivers to appropriately monitor their driving and thus results in proper adjustments in their driving behaviours.

Furthermore, the driving cessation process may occur through stages, and interventions and feedback may be perceived differently at each stage (Kostyniuk, Trombley, & Shope, 1998). This suggests that older driver interventions should be tailored to the specific needs of each individual (including the stage they are at) and recognizes that older adults should not be treated as a homogenous group. Such interventions would therefore need to be customised to move individuals through the stages of change towards adoption of safe driving behaviour. They would be developed by taking a strategic approach using both a theory of the change process and existing evidence from previous attempts to achieve change. However, there has been little development of stage-based theories applied to driving self-regulation, and hence a lack of research on theoret-ically-informed interventions that facilitate older drivers' planning for future self-regulation and even driving cessation. There is also a lack of consideration about the role of feedback about behaviour in the stage process, such as responsiveness to feedback, acceptable sources of feedback, and ability to modify behaviour in relation to feedback. This research aims to contribute to the development of a theoretical framework for a stage-based process leading to self-regulation of driving which incorporates the role of feedback, with the intention of testing the theoretical approach in future research with older drivers.

The research approach builds on existing theory rather than starting from a blank slate. The stage-based theoretical model used as the basis for the study is the Precaution Adoption Process Model, or PAPM (Weinstein, Sandmand, & Blalock, 2008), which provides a framework for understanding why older drivers adopt self-regulatory (precautionary) behaviours intended to reduce their road crash risk. The PAPM assumes that people need to be aware of the risk associated with their behaviour before they are susceptible to behavioural change, and that awareness of the risk is not necessarily



Fig. 1. Stages of the precaution adoption process model. Source: (Weinstein & Sandmand, 2002).

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