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A qualitative investigation of older pedestrian views of influences on their road crossing safety.

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Abstract

With Australia's population rapidly ageing, older pedestrian safety has begun to receive greater attention from road safety researchers. However, reliance on simulator studies and observational techniques has limited current understanding of why older pedestrians adopt particular crossing behaviours, and how they perceive crossing the road. The current study aimed to investigate the psychological factors that may contribute to older pedestrians' crash risk by examining their perceptions of the issues they encounter on the road. Qualitative semi-structured interviews with 18 pedestrians aged 55 years and older were conducted, and the interview transcripts underwent thematic analysis. From this analysis, four key themes emerged. Firstly, the physical design of the road was perceived as posing a significant threat for older pedestrians, particularly sloped, semi-mountable kerbs and designated crossings. Secondly, declines in older pedestrians' confidence in their ability to cross the road were evident through fewer reported risks being taken. Additionally, older pedestrians sensed an increased threat from other road users when crossing the road, particularly from drivers and cyclists. Finally, older pedestrians referred to the informal rules and strategies used to guide their road crossing. The results suggest that the road environment is perceived as increasingly dangerous and hazardous environment for older pedestrians. Implications regarding the physical road design in areas with an existing high proportion of elderly people are discussed.

1. Introduction

Older pedestrians are largely overrepresented in crash statistics. Despite comprising only 16 percent of the Australian population, pedestrians aged 60 and over represent 38 percent of all pedestrian deaths (ATSB, 2006). This over-representation can be attributed to a number of interacting factors. Firstly, declines in visual, perceptual, cognitive and motor abilities due to ageing compromise older pedestrians' ability to effectively cross the road (Oxley, Corben, Fildes, O'Hare, & Rothengatter, 2004) thus making them more likely to be involved in a crash. In addition, natural ageing processes reduce muscle mass and tone and decrease bone density, increasing older people's frailty (Bendall, Basse, & Pearson, 1989; Larsson, Grimby, & Karlson, 1979). This increased physical frailty means that the consequences of road trauma are more severe for older pedestrians, resulting in longer healing and hospitalisation time and an increased need for rehabilitation (Oxley, et al., 2004). Additionally, there is research suggesting that many elderly people do not perceive themselves as 'old' or recognise that their skills and abilities are deteriorating. This results in a tendency to not adopt compensatory behaviours, thus increasing the risk associated with their crossing behaviours (Rouse, 2002). Population projections indicate that the proportion of older people will increase dramatically over coming decades (Australian Bureau of Statistics, 2006). As a result, issues

concerning older pedestrian safety are becoming increasingly important, and have begun to receive greater attention from road safety researchers.

This research has predominantly used observational methods or simulators to study the behaviour of older pedestrians. Harrell (1990) used observational techniques to examine differences in younger and older pedestrian crossing habits, and found older pedestrians waited further back from the kerb than younger pedestrians at an observed intersection. Harrell concluded that this behaviour displayed a high level of caution and was indicative of older pedestrians' understanding and appreciation of their increased risk as pedestrians. In Australia, a substantial body of research has been conducted by Oxley and colleagues involving simulator studies and on-road observations (Oxley & Fildes, 1999; Oxley, Fildes, Ihsen, Charlton, & Day, 1997; Oxley, Ihsen, Fildes, Charlton, & Day, 2005). These researchers (1997) used video recordings to observe younger and older pedestrians crossing the road at several inner-city locations. On two-way undivided roads, older pedestrians were found to adopt less safe road crossing strategies than younger pedestrians, crossing more frequently where there was closer moving traffic. The researchers attributed this finding to age-related perceptual and cognitive deficits. Additionally, Oxley and colleagues (Oxley, et al., 2005) used simulated traffic environments to examine age differences in gap selection decisions. Although older pedestrians appeared to possess the ability to process the distance and speed of oncoming traffic, those aged 75 years and older were found to select insufficient gaps to cross. Recently, Dommès and colleagues (Dommès, Cavallo, Vienne, & Aillerie, 2012) used simulator based training to test an intervention aimed at enhancing older pedestrians' decision-making abilities when crossing the road. Although older pedestrians made more conservative judgements after completing training, their ability to judge the speed of a car was not found to improve, and older participants were found to make more unsafe decisions as a car's speed increased.

A fundamental shortcoming of simulators and observational techniques is their reliance on inference and interpretation of the reasons underlying the observed behaviour. In doing so, gaps exist in our understanding of the motivations behind older pedestrians' crossing behaviours. In particular, few studies have examined older pedestrians' perceptions regarding what aspects of crossing they perceive as troubling, and their thoughts and feelings regarding crossing. For example, Job, Haynes, Prabakhar, Lee, & Quach, (1998) concluded that older pedestrians have greater confidence in the lawful operation of traffic around signalised intersections. This conclusion was based on their findings that older pedestrians did not appear to scan the traffic around them as much as younger pedestrians at signalised intersections in Sydney. However, a plausible alternative explanation is that older pedestrians did not observe traffic as carefully because they were less able to perceive any risks or dangers crossing at that particular stretch of road. Directly asking older pedestrians about their own habits is a method that might allow researchers to gain an enriched understanding of the crossing behaviours of older pedestrians. The current research aimed to explore psychological factors that may contribute to older pedestrians' crash risk, and to explore older pedestrians' perceptions of the problems they encounter crossing the road, and the informal rules or strategies they use to guide their road crossing decisions.

2. Method

In order to thoroughly examine the experience of older pedestrians' and obtain rich, in-depth information regarding their perceptions of the issues they encounter crossing the road, and the strategies used to manage these issues, qualitative techniques were chosen for this study.

2.1. Participants

A total of 18 older pedestrians (9 men, 9 women) took part in an interview. To ensure a diverse sample of older pedestrians, several recruitment strategies were utilised. As a first step, an advertisement was placed in local community newspapers calling for older pedestrians interested in attending an interview to contact the research team. However, this advertisement was discontinued, as it predominantly appealed to older pedestrians with quite vehement concerns regarding a particular stretch of road or designated crossing, who perceived the interview as an avenue to voice these concerns. As an alternative, the advertisement was placed at an over 55's housing complex at Carseldine on Brisbane's north. One interview resulted from this advertisement. Finally, people aged 65 and over who were members of the Centre for Accident Research and Road Safety-Queensland (CARRS-Q)'s participant pool and who lived within an hour or two's drive from Brisbane were invited to take part. From this, seventeen people consented to an interview, all of whom resided in and around Caloundra, on Queensland's Sunshine Coast. Due to the high number of respondents residing in this location, rooms were hired out in a community centre in the area to conduct the interviews. To be eligible to take part in an interview, respondents had to be over 65 years of age, must have been mobile, must have reported crossing the road at least once a week, must not have had any cognitive impairments and must have been willing to travel a short distance to attend an interview. All respondents were offered \$40 cash for their time and travel expenses.

2.2. Materials and procedure

Semi-structured, one-on-one, interviews of 30-40 minutes duration were conducted by trained research officers. All interviews were audio-recorded and later transcribed by professional stenographers. Consent was obtained from respondents to audio-record the interviews. To build rapport and make respondents feel comfortable, interviews began by asking them to describe their general health, fitness and exercise regime, and their general walking habits, including where and how they usually cross the road. To obtain information regarding strategies used to cross, respondents were asked to describe how they decided if it was safe to cross the road. As many of these strategies are implicit, probe questions focused on encouraging deeper reflection to provide a detailed description of road-crossing behaviours. To consolidate this line of questioning, respondents were asked which sections of road (if any), they felt were unsafe to cross, and why. Finally, respondents were asked to provide their thoughts regarding the crossing behaviour of other older pedestrians. This question was included to gauge respondents' sense of their own behaviour relative to others their age, and mitigate the possibility of socially acceptable or self-serving (impression management) responses when discussing their own behaviour.

2.3. Analysis

Thematic analysis using the guidelines delineated by Braun and Clarke (2006) was conducted by the first author to identify themes and issues in the interview transcripts. All transcripts were read twice to familiarise the author with the content and to identify recurring issues across all responses. Following this, transcripts were re-examined and key words and phrases identified and assigned a numeric value to generate initial codes. Once this was completed, the preliminary numeric codes were reviewed, and those referring to similar or overlapping aspects (e.g., all codes referring to footpaths, gutters, designated crossings etc) were grouped together and assigned an overarching code number to refer to the group of similar codes. This resulted in four groups that reflect the four

themes discussed below. Following this, preliminary codes within each group were reviewed to identify emergent sub-themes also discussed below.

3. Results

As expected, ailments commonly associated with ageing such as loss of sight, hearing and agility, balance problems, inflamed joints, brittle bones, difficulties making decisions and judging speed and being easily distracted were frequently reported. However, most of these complaints are commonly associated with increasing age, and were often referred to in quite general terms. Therefore, these were not considered a stand-alone theme. These ailments were only considered in the analysis when they were discussed as a facet of an issue affecting a respondent's crossing safety. Consequently, four themes emerged from the interviews which together suggest that the pedestrian environment is perceived as a more threatening and hazardous environment for older pedestrians. These themes are discussed below.

3.1. Physical characteristics of crossings and roads

This theme pertains to difficulties respondents reported experiencing when crossing as a result of the physical infrastructure of roads and crossings. Within this theme, two significant issues were evident.

3.1.1. Sloped kerbs

Respondents expressed difficulties negotiating new kerb systems that have seen kerbs change from a 90 degree step to a sloped semi-mountable kerb. This sloped kerb was considered by the respondents who commented on it to be markedly more difficult to negotiate because it requires the pedestrian to step out across the slope and then down, rather than simply stepping down. As one respondent described:

Yes the slope is worse because when you have got to step off a slope you have to step over that slope whereas if it's an angle you step up to it like a step and you stand at the top of the step and then step down. *67, Male.*

Traversing sloped semi-mountable kerbs appeared to pose difficulties for respondents because it was taxing on their knees and hips, and led to feelings of unsteadiness when stepping down from them. Consequently, it appeared that respondents perceived sloped kerbs as creating a danger, and thought that their concentration would be diverted away from the road and focused instead on safely stepping down the kerb:

And a lot of people will concentrating on that [stepping down the sloped kerb] rather than concentrating on the road. Now that's...I know that they only seem to put those things in suburban areas rather than in you know main street shopping...areas where there's strip shopping and so forth. But that takes people's concentration, elderly people's concentration off the road because they're frightened of falling. *67, Male.*

3.1.2. Difficulties with designated crossings

Although most of the respondents indicated they would prefer to use designated crossings, a number of difficulties and concerns were expressed regarding the reality of using them. Firstly, respondents thought that there were not enough designated crossings in the areas they frequently

walked, and indicated that those that do exist were inconveniently placed or poorly maintained. As a result, respondents who commented on the lack of crossings indicated that they would be inclined to exercise more caution and cross at an unmarked stretch of road rather than detour from their route to use a designated crossing. For example:

Yeah if there's one, yeah if there's one within the vicinity I'm going I will use it you know but if it's sort of way up the street and I'm going the other way I might just be careful crossing you know. 73, *Gender Unknown*.

Well there's no pedestrian crossings, very few I mean you know there might be one about a mile away but so you just have to sort of duck and weave. 67, *Male*.

Secondly, respondents indicated that insufficient time is provided to cross at timed and/or push-button crossings, as evidenced by the following:

Well there's usually more traffic, more people and I think you've got to watch too that there's sufficient time to get across where you've got a set of lights. You don't have a lot of time for pedestrians to cross do you now? 74, *Male*.

This issue appeared to be exacerbated by age-related cognitive declines for respondents, as it takes them longer to process the light change and then negotiate the kerb. For example:

Mind you some of them also seem to take a long time to realise that they lights have turned green. You know they've wasted time sort of stepping up. 75, *Female*.

Additionally, the lights currently used in Queensland do not provide an indication of how long the light has been green for or how long is left on it. Therefore, when approaching a crossing where the light is currently green, there is currently no way for pedestrians to gauge how long they have left to safely cross the road. Some respondents indicated that 'timed lights' counting down the seconds remaining to cross would be helpful to assist older pedestrians in their decision to cross the road, and reduce their chances of winding up in a vulnerable situation. For example:

[talking about crossings overseas]...It doesn't start straight away but perhaps when it's got fifteen seconds to go, you get fifteen, fourteen, thirteen...so older people know that good God we'd better stop it's only got three seconds to go we're never going to make it. And they were, I thought they were a really brilliant idea. 75, *Female*.

3.2. Confidence

This theme refers to a subject that surfaced in a number of different ways throughout the interviews, and has been labelled 'confidence'. It refers to behavioural changes or issues that have occurred as respondents have aged, that appeared to impact their confidence crossing the road. For many respondents, this lack of confidence was related to a fear of falling, which stemmed from health and physical problems. That is, because of the abovementioned age-related health declines, older pedestrians are more likely to fall when they trip than regain their balance. Additionally, because the

consequences of falling are potentially severe for older pedestrians, they are more fearful of it. As a respondent suffering from osteoporosis indicated:

Oh yes. Because you know if I have a fall I'm you know in all sorts of trouble. Because I'm borderline osteoporosis, it's something that's always in my mind you know I mustn't have a fall. But you know you've got to take into account for elderly people that they do need a bit more time to get across. They're probably a little bit slower in making decisions, and young people can sort of you know assess the situation a bit quicker than us. *69, Female.*

Similarly, respondents expressed the view that although the consequences of a fall may not be physically severe for them due to existing health problems, even one minor fall may increase hesitancy in future:

...And they've only got to fall once and then they lose their confidence you know they think "oh if I fall once I'll fall again" sort of thing you know. *74, Male.*

Behaviourally, these declines in confidence were manifested in taking fewer risks when crossing the road:

But that said again generally the older person is more inclined to sit and wait until....until there is no risk there. *82, Gender Unknown.*

...I try to stop doing that because I know I can't get there... *74, Gender Unknown.*

3.3. Other road users

This theme has been labelled 'other road users.' Material classified under this theme referred to comments in respondents' conversation that suggested that difficulties crossing the road were perceived as being the result of the behaviour of other road users, namely drivers and cyclists.

3.3.1. Drivers

Older pedestrians appeared to experience a sense of fear stemming from the unpredictability of drivers. For example:

I think as far as drivers go they need to be more aware of the older people and the difficulties they face in crossing the road because it can be a traumatic experience for them because they don't know what drivers will do. *69, Gender Unknown.*

Additionally, some respondents appeared to perceive a sense of impatience and intolerance directed towards the elderly by drivers.

Tooting horns and all that sort of thing, I mean we get it driving... They're just too impatient, they really are. Just no, they think that they're going to be older themselves one day. *69, Gender Unknown.*

However, some respondents acknowledged that there are an increasing number of distractions for drivers in modern society, and behaviour that some older people may interpret as motivated by

malice or disregard for the elderly, may simply be the result of inattention, as evidenced by the following:

Yeah I mean, I mean when you drive around the place there is a lot of distractions for drivers. I mean there's road signs, there's bloody advertising, there's the stereo burping and perhaps somebody is ringing you on the mobile, the kids are screaming in the back seat and the missus is telling you you're going the wrong way... So who's going to bloody be caring about that silly old fart trying to cross the road? 67, *Male*.

3.3.2. Cyclists

Respondents, particularly those experiencing declines in hearing, indicated that cyclists present just as much threat to their safety as cars, as evidenced by the following:

People riding push bikes, I can't hear them approaching, and I could, at the precise moment as they come alongside me, decide to cross. As I turn, they are going to run right into me because they have not sounded a warning device, a bell or anything, so I won't know they are there and I could turn and I have often thought one of these days that's going to happen. *Male, age unknown*.

3.3.3. Other older pedestrians

Although not an issue concerning safety per se, a strong theme that emerged concerned the perceptions of the behaviour of other older pedestrians. As stated, respondents were asked about the behaviour of other older pedestrians to address the possibility that they may give self-serving (impression management) or socially acceptable responses when describing their own behaviour. Respondents expressed a degree of contempt and annoyance towards other older pedestrians and suggested that 'other' older pedestrians expect different treatment, as illustrated by the following:

Oh well I pretty well always do [use the crossing] when there's a crossing there. Because, look, I've seen so many older people- I don't feel like I'm blasted older- but crossing [not using the designated crossing] and I think "you've only got to walk down a short distance to a pedestrian crossing or traffic lights" but they won't [do that]. And it's like they think all the cars are going to stop for them. 66, *Gender Unknown*.

Paradoxically, when probed further almost all respondents indicated that they perceived other older pedestrians to be over-cautious when it came to crossing the road. Even respondents who considered themselves quite vigilant about their safety still perceived other older pedestrians as more cautious. For example:

People inmy age group yeah probably most of them are a bit more careful than me. I'm not saying I'm careless by any means but what I'm saying is that at this stage I don't always particularly pick a pedestrian crossing which to cross whereas most of my friends do. 67, *Gender Unknown*.

3.4. Road crossing strategies

The final theme refers to the informal rules or strategies used to safely cross the road. Respondents expressed the view that, regardless of age, crossing the road is a matter of common sense, having a sense of responsibility for one's own personal safety and following the rules learnt in early childhood. These included using the lights to cross, looking both ways and waiting until it is clear both ways before crossing. Mirroring this, respondents stressed that their road crossing strategies were heavily influenced by a desire to teach their grandchildren these same strategies they learnt in order to instil good road safety practices from a young age.

As a primary school pupil we had it drummed into us look right, look left look right again and I suppose that's always stuck with me. So that's a routine that we have fun in teaching our grandkids the same routine. 75, *Male*.

Finally, to mitigate their increased risk from ageing, respondents indicated that they tried to seek out a straight stretch of road when crossing to allow for clear vision both ways, and tried to make eye contact with drivers at crossings to ensure that the driver has seen them and some sign that they will stop for them.

4. Discussion

The current research sought to explore older pedestrians' perceptions of the difficulties they encounter crossing the road and identify strategies or informal rules used to manage these problems. The themes outlined above point to two main areas for discussion: perception of the road and traffic environment as threatening, and the move towards crossing strategies that rely on the observation of road rules.

4.1. Perception of a threatening environment

The results suggest that the pedestrian environment is perceived as increasingly threatening and hazardous for older pedestrians. This heightened sense of threat manifested throughout most themes, particularly issues relating to confidence. Older pedestrians experienced decreased confidence in their own crossing capabilities, resulting from an increased physical frailty stemming from natural ageing changes or health problems. Additionally, they expressed concerns surrounding inattentive drivers and believed a significant danger was posed by cyclists due to the older pedestrian's diminished hearing ability. One road environment characteristic that respondents focused on was the negotiation of sloped kerbs. Older pedestrians indicated that they believed sloped kerbs to be dangerous because of the risk of a fall and the injury this could entail. In addition, focusing on safely traversing the kerb could divert attention from the traffic. As a result of these sloped kerbs, the street is transformed from a place where older pedestrians are able to step off at any place to safely cross the road, to one where the whole length (with the exception of driveways) is implicitly perceived as hazardous.

Designated crossings presented another challenge, i.e. a lack of or inconveniently placed designated crossings and insufficient time on timed crossings. This is consistent with a recent report by Asher, Aresu, Falaschetti, & Mindell, (2012) which found that pedestrians aged 65 years and over were unable to walk fast enough to cross within the timing parameters routinely employed at traffic signals.

4.2. Crossing strategies

Although older pedestrians expressed that they would prefer to obey the road-rules and use designated crossings, the reality for many was they were perceived as an inconvenience and not particularly safe (i.e., due to inattentive drivers or insufficient time). There was evidence that, in response to this, older pedestrians' behaviour shifts to relying on their own judgments and being guided by an informal rule-based approach. This was not immediately obvious; when respondents were asked about strategies for crossing the road, they generally responded as if they had no particular strategy, it was just something they did. However, analysis of the way they talked about crossing revealed references to an informal rule-oriented approach. Respondents suggested that their safety as older pedestrians was a matter of common-sense behaviour and drawing on the crossing rules learnt in early childhood such as crossing at designated crossings, looking both ways and waiting until traffic is clear both ways before crossing. This was also reflected in respondents indicating that their crossing behaviour is partly influenced by a desire to model good crossing practices for their grandchildren.

This finding is consistent with other research conducted locally, which indicates a high level of non-compliance with pedestrian crossing rules, even at signalised crossings (King, Soole & Ghafourian, 2009).

Nevertheless, adoption of different crossing strategies implies some degree of awareness of age-related changes, and there is indirect evidence that respondents differed in their awareness. They sometimes saw other older pedestrians as too cautious, and sometimes as behaving in too risky a manner. In practice both could be true, since difficulties in perceiving and processing information when crossing can lead to both overcaution or an unsafe gap judgement. However the tenor of the comments points to an awareness of age-related changes in the behaviour of other older pedestrians. This raises a question about the degree to which older pedestrians are aware of their own limitations, not just those of other older people. It would be worth considering further research into the relationship between actual and self-perceived ability to cross safely among older pedestrians, since pedestrian activity is overwhelmingly self-managed.

4.3. Implications

The emphases on healthy ageing and "ageing in place" involve a basic assumption that continued everyday activity is an important part of maintaining quality of life for older people. However, if older people find the road environment threatening, this presents a psychological barrier to normal functioning and hence presents a threat to their continued health and quality of life. More attention needs to be paid to the physical design of the road environment, particularly in areas with a high proportion of retirees. The challenge presented by sloped kerbs needs to be taken into account in the design of streets and precincts used by older people. The reliance on an informal rule-based approach to crossing with increasing age suggests that a greater priority should be placed on the installation of signalised crossings where there are high numbers of older people crossing. There is also potential for public information campaigns that clarify the respective responsibilities of drivers and pedestrians reading the initiation of road crossing and responsibilities during road crossing.

4.4. Limitations

As qualitative techniques rely on self-report, the limitations surrounding this method apply to the findings reported here. Specifically, responses may be subject to social desirability biases and demand characteristics imposed by the presence of a researcher. Future research would benefit from

combining qualitative techniques with quantitative measures (including observation) to examine if self-reported crossing behaviours mirror actual behaviour. Additionally, as this sample was drawn from an area with a high proportion of retirees, the generalisability of these findings may be limited. Further research should aim to replicate this qualitative technique in a range of geographic locations, including inner-city, metropolitan locations, and rural and remote populations.

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