Investigating the impact of attentional declines on road-crossing strategies of older pedestrians

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The main reason for older pedestrians for being involved in accidents is related to attentional deficits. The aim of the current research is to investigate the link between attention and road crossing strategies of older persons. Two group discussions were carried out to investigate what types of crossing locations are perceived as dangerous. Additionally, an observation interview was conducted including 102 pedestrians of three age groups at six different crossings. Based on these investigations a questionnaire was developed examining attention, behaviour and risk perception in road crossing. The questionnaire consists of eight different crossing situations. Participants have to estimate the risk and indicate their crossing strategies by choosing possible actions from a predefined set. Additionally, they answer twelve items with regard to their experience of attention-critical traffic situations. Seventy-eight participants filled in the questionnaire, half of them were over the age of 65 years, the other half younger than 35 years. It turned out that road crossing behaviour varies with age as well as with the type and the size of the road. In contrast, estimation of risk does not depend on age. Surprisingly, reported attention deficits turned out to be more present in younger than in older participants. Potential reasons for the findings and the relevance of different behavioural strategies for traffic safety are discussed.

Introduction

Everyday pedestrian mobility is a crucial need for older persons’ ability to live independently. With an increase in age, more and more quotidian activities are carried out by foot (e.g. Limbourg & Matern, 2009). In contrast, older pedestrians are at high risk in traffic. In Germany in 2012, more than half of the pedestrians dying after a crash were older than 65 years (Statistisches Bundesamt, 2013). While they are not involved more often in crashes than younger adults, their risk of being injured in relation to their average walking distance is higher (Rytz, 2006). A lack of paying attention to traffic was identified as the main reason why older pedestrians are involved in crashes with motorists (Statistisches Bundesamt, 2013).

The aim of the research group FANS (Fußgänger-Assistenzsystem für ältere Nutzerinnen und Nutzer im Straßenverkehr - Pedestrian Assistance System for Older Road User) is to develop and evaluate an assistance system for older pedestrians supporting them in road crossing. The process of development is based on an
iterative user-centred approach. Therefore, it is necessary to investigate the behaviour of older pedestrians and identify crucial factors. Crossing strategies may change as a function of increasing age-related deficits. Thus, the system should not prevent people from using their own coping strategies, but provide assistance in critical situations.

The aim of the studies presented here was to develop a questionnaire that links road crossing behaviour to attentional deficits of older people. Past studies with regard to road crossing behaviour have investigated aspects such as gap acceptance, misperception of distances, ability of behavioural adaptation, etc. (cf. Papadimitriou, Yannis & Golias, 2009). Most of these studies focused on the miscalibration of behaviour and situation. Others investigated the impact of declines in motor and cognitive abilities (including attention) on road-crossing decisions in the ongoing traffic (e.g. Domnès & Cavallo, 2011). In contrast, the current approach aims to understand the reasons for overlooking potential dangerous road users. Research shows that several different attention abilities decline with an increase in age. Therefore, problems in crossing roads may be attributed to those age-related attentional declines (cf. Ball et al., 1990) as some of them can be linked to traffic requirements. Examples are difficulties in the estimation of the direction of a moving object, problems to distinguish between relevant and irrelevant stimuli, etc. Additionally, older persons’ performance in visual search tasks decreases more strongly compared to younger people when a parallel visual task is carried out (e.g. Ziefle et al., 2008; Musselwhite & Haddad, 2010). The same seems to be true for additional motor tasks even though they require different cognitive resources (e.g. Beurskens & Bock, 2012). The questionnaire should provide information with regard to attentional deficits in traffic and to the visual search strategies applied by younger and older pedestrians.

In order to develop and to use such a questionnaire, some open questions had to be answered in advance. The first question refers to the traffic environment from the perspective of older pedestrians. Two group discussions were carried out in order to learn more about everyday mobility of older pedestrians and to identify safety-critical aspects of traffic and environmental conditions. Second, as a precondition for administering a questionnaire study, it had to be investigated whether people are aware of their own road crossing strategies (i.e. able to report them). To answer this question, pedestrians of different age groups were observed while crossing a road and asked to describe their behaviour afterwards. This procedure should allow controlling for the accuracy of the described behaviour, to identify systematic age-related differences in behaviour or the description of it, and to control for reporting normative instead of realistic behaviour. Procedures and results of group discussions and observation-interview are used for the development and conduction of the questionnaire study.

**Group discussions**

The theoretical framework for the group discussions is based on the combination of Hägerstrand’s (1970) time geography and Giddens’ (1997) theory of structuration. Both theories are located within the social sciences and mainly used in the fields of human geography and sociology. From Hägerstrand’s (1970) point of view, time and
space restrict freedom of action. He defines three kinds of constraints limiting the spatial range of human actions: **capability constraints** describe biological needs such as eating and sleeping, **coupling constraints** refer to the environmental context of every action, and **authority constraints** subsume general rules or laws. However, constraints are exclusively restricting human actions. Thus, Giddens (1997) theory of structuration was integrated, because it includes also enabling factors that support peoples’ actions. The combination of both theories offers a more holistic view on the everyday mobility of older pedestrians.

**Method**

Two group discussions were carried out. Focal points were older persons’ motivation to participate in traffic by foot, factors that impair or support their behaviour, and the resulting consequences for everyday mobility. However, only results with regard to road crossing will be reported here.

The group discussions were conducted based on the methods suggested by Zwick & Schröter (2012). Criteria based selection was done according to previous findings (e.g. Limbourg & Matern 2009). They identified gender, age, walking ability, and place of residence as relevant criteria for everyday mobility of older pedestrians. Both groups differed with regard to number and expertise of participants. The aim of the first group was to benefit from the aggregated view of representatives of organisations dealing with the concerns of pedestrians or older persons. The focus of the second group was on the individual experiences of older pedestrians in the city of Berlin.

**Participants**

Four representatives (all of them older than 55, half of them female) took part in the discussion of the first group. The participants of the second group were eight senior citizens between the ages of 60 and 81 (M=69; SD=7.21) with experience in walking through the city of Berlin on a regular basis. Half of them were female, two were using a walking aid and they lived in districts, which differed with regard to accident frequencies.

**Discussion-guidelines**

Two guides with questions were prepared as stimuli for the discussions. Specific questions for participants were different for the two groups, but the main subjects were the same: (1) importance of walking, (2) traffic safety, and (3) actual behaviour. Each subject contained several main questions with additional sub questions to ensure a continuous discussion without influencing its direction too much.

**Analysis of the discussions**

Discussions were analysed using the qualitative content analysis as stated by Gläser and Laudel (2010). A first category system was generated based on the theoretical considerations (Hägerstrand, 1970; Giddens, 1997). It was then iteratively complemented and adapted based on the stepwise analysis of the discussion transcripts. The complete category system includes motives for actions, actions themselves, and factors relevant for action (impeding and enabling). The latter
category consists of person-related and environment-related factors. The environment-related factors are further subdivided into other individuals, social regulations, ambient conditions, and infrastructure. Relevant for the current considerations is only the latter category: infrastructure.

Results and discussion regarding the impact of infrastructure on road crossing

Statements, relevant for road crossing behaviour of older pedestrians, subsumed under the category infrastructure can be distinguished in (1) type of street, (2) pedestrian crossings, (3) condition of the road surface, and (4) obstructions:

(1) Type of street refers to the number of lanes (to be crossed) and traffic density. Uncertainty and even fear are growing with the number of lanes and the traffic load. In complex and confusing situations, older pedestrians do not know when to cross the street and often hesitate, which may result in risky behaviour due to late decisions.

(2) Official pedestrian crossings are sometimes inconveniently located forcing people to do detours. Most pedestrians are not willing and some are not even able to choose longer ways, which is especially true for those with walking disabilities. This may lead to taking unsafe shortcuts.

Pedestrian crossings with traffic lights are very suitable for crossing roads with two lanes or more. However, older pedestrians experience the green phases as being too short. Therefore, they hurry in order to reach the other side or centre island in time. This can compromise their attention to traffic. This problem has already been identifies in other countries such as Ireland and the UK (Romero-Ortuno et al., 2010; Asher et al., 2012).

On pedestrian crossings with a centre island, older pedestrians tend to look out for traffic in only one direction. Neglecting the other direction may lead to overlooking road users such as cyclists who ride on the wrong side of the road.

(3) The condition of the road surface can be problematic for older pedestrians, especially those with an impaired walking ability. Pavement damages, high kerbstones, and cobblestones can impede the progress of older persons. Problematic surface conditions can lead to uncertainty and may reduce resources need to attend to traffic.

(4) Obstructions mostly refer to plantings at the roadside and the centre island. The view into traffic can be greatly impaired forcing pedestrians to step on the road to gain better sight or even to cross the street without looking for approaching cars.
Observation-interview

Method

Participants
One hundred and two pedestrians of three different age groups (i.e. 34 in each group), participated in this study. Younger group: ≤35 (19 male, 15 female), middle-aged group: 35≥65 (17 male, 17 females), older group: ≥65 (13 male, 21 female).

Procedure
Two persons conducted the observation-interview: an observer and an interviewer. Participants’ behaviour was logged while crossing one of six different roads of similar size with one lane for both directions. Afterwards, questions about their previously shown behaviour were asked.

Observation-questionnaire
The observer focused on the same behavioural components as the interviewer: Gaze frequencies (how often participants looked for traffic) and whether a person stopped before crossing. To facilitate participant’s responses, gaze frequencies were categorized into four groups: did not look at all, looked only in one direction, looked in both directions, and looked several times in both directions.

Dependent measures
Observed behaviour in terms of gaze frequencies and number of stoppings were analysed. Observed and self-reported behaviour were compared. Incorrect estimations were further analysed with regard to their tendency to describe normative behaviour.

Results
A one-way ANOVA was performed to analyse age differences in observed gaze frequencies. In addition 3x2 χ²-tests of independence were used to check for age differences in observed stopping behaviour and in the accuracy of the self-assessments of stopping and looking. A 2x2 χ²-test of independence was used to compare observed and reported stopping behaviour.

Observed Behaviour
No difference in gaze frequencies and number of stops was found between age groups. On average, participants looked for traffic 2.84 times and 27.4% of them stopped before crossing the road.

Relation between observed and self-estimated behaviour
Accuracy of estimation gaze frequencies did not differ between age groups. The same was true for estimation of number of stops. Overall, only 45.8% of the participants were able to estimate correctly how often they looked for traffic. 73.5% estimated correctly whether they had stopped before crossing.
Incorrect estimations
Significant differences were found between age groups with regard to their tendency to describe normative behaviour, \( \chi^2(2, N=53)=6.144, p=.046 \). Taking only into account participants with incorrect estimation, older participants overestimated in 84.6% of the cases how often they looked for traffic, while the younger and the middle-aged group underestimated their gaze frequencies in 63.6% and 61.1% of the cases. No age differences were found with regard to incorrect estimation of stops. However, participants had a tendency to report normative behaviour, \( \chi^2(1, N=100)=4.233, p=.04 \). Of those who did not stop, 30.6% stated that they did, while only 10.7% of participants who stopped reported they did not stop before crossing the road.

Road-crossing Questionnaire
The questionnaire was developed based on the results of the previous literature review, the group discussions, and the observation interview. Questions regarding attention abilities and attention deficits were derived from previous findings respecting different types of attention deficits of older persons (cf. Ball et al., 1990). The presented behavioural alternatives included both aspects of visual search and aspects of motion, as being potential relevant aspects of road crossing of older pedestrians (e.g. Musselwhite & Haddad, 2010; Beurskens & Bock, 2012). The stimulus material for the questionnaire was created based on results of the group discussions. It includes different aspects of infrastructure relevant for road crossing, such as number of lanes, architecture and surface of pedestrian crossings vs. absence of pedestrian crossings, problematic surface conditions, and obstacles. Findings of the observation interview served for decisions on sample and questions. Given that ageing is a continuous process, the younger group instead of the middle-aged group was chosen as reference in order to assure the absence of age-related declines in the control group. Observed behaviour in terms of gaze frequencies and stopping were not related to age, but seemed to depend more on the actual traffic conditions. One possible reason for the absence of age effects might be the similarity of the road design used for the observation. Therefore, participants were asked to provide descriptions of behaviour in different situations. Comparison of observed and reported behaviour revealed no effects of age, which is a precondition for a systematic comparison of answers in the questionnaire. As percentages of correct estimations were rather low, questions were revised and questions were asked about behaviour that is more general excluding details such as gaze frequency. Further analysis of incorrect estimations showed that older persons had a stronger tendency to report normative behaviours, while younger persons tended to the opposite. In order to prevent these biases or at least reduce them, instructions given to the participant emphasized the importance of honest responses. Additionally, a scale of risk estimation was included in order to understand whether potential differences in reported behaviour resulted from different strategies or from diverging perceptions of the situations. It was hypothesised that differences in behaviour would occur based on the type and the size of the road. It was expected that certain conditions such as uneven surfaces, obstacles and traffic lights would lead to different behaviours in younger and older participants. Older participants were expected to report higher estimations of risk than younger participants. Furthermore, it was
expected that older participants would experience more often situations were attentional deficits become manifest than younger participants.

**Method**

**Participants**
Seventy-eight participants of two age groups attended the study. The younger group (≤35) consisted of 39 students (20 male, 19 female); their age ranged from 18 to 34 years (M=26.3; SD=3.7). The older group (≥65) also consisted of 39 participants (16 male and 23 female), ranged in age from 64 to 83 years (M=72.6; SD=4.7), a participant younger than 65 was included because recruiting was based on the year of birth. Further characteristics of younger and older participants are, respectively: driver licence (27 vs. 28), regular drivers (10 vs. 19), regular cyclists (28 vs. 20), walked regularly (39 vs. 39), had experienced a fall on the pavement outside (11 vs. 15), and were involved in an accident as pedestrians (4 vs. 3).

**Description of the road-crossing Questionnaire**
Photographs of the same person in eight different road crossing situations were shown to participants (see Figure 1). Situations differed systematically with regard to crossing type (4 with and 4 without pedestrian crossings) and road size (from small to large in four steps, ranging from one lane for two directions to two lanes for each direction). Additional variations were: height of kerbstone (1 high, 7 low), surface damage (5 with damages, 3 without), line-of-sight obstruction (5 with free sight, 3 with obstacles), centre islands (3 of the pedestrian crossings), and traffic lights (2 of the pedestrian crossings). Photographs were presented in a random order. For each photograph, participants were asked to indicate their estimation of risk in the specific situation. Furthermore, for each crossing situation, they had to indicate, which of the ten predefined actions they would show and in which order. The actions were either related to visual search, relevant for save crossing (check for traffic coming from the left side or coming from the right side), related to additional visual search with regard to safe walking (control for asperity on the pavement or on the road, pay special attention to the kerbstone), or related to motions (accelerate; slow down; stop; continue; step onto the road).

The questionnaire included an additional part assessing potential attention deficits in traffic situations. It consisted of 12 items. Each item described a different attention-critical traffic situation related to one of the known attentional deficits occurring with increasing age. Participants had to indicate how often they experience such situations. For example: ‘When a car is far away, I have difficulties deciding whether it moves towards me.’ This statement referred to the finding that older people, on average, have greater difficulties detecting the direction of movements than younger people.
Figure 1. Three of the eight photographs used in the questionnaire with and without pedestrian crossings.
Procedure
Participants were tested in groups of up to six persons. After filling in the demographical part of the questionnaire, participants received detailed written instructions. They were instructed to choose any number of actions they would perform to cross the road from the predefined set, and to sort them into the order in which they would be executed. “Road crossing” was finished when reaching the other side of the road or, in case of a centre island, when reaching this point. After having described their behaviour, participants estimated the risk of the current situation. Finally, participants filled in the part of the questionnaire related to attention. After finishing the study, they were thanked for their participation and received financial compensation.

Design and Dependent Measures
The behavioural part consisted of a 2 (age) x 2 (road type) x 4 (road size) design with repeated measures on the second and third factor. For the actions related to visual search for safe walking, roads were grouped according to surface damage and high kerbstones (5 with and 3 without), resulting in a 2 (age) x 2 (surface damage) design. Attention values were compared only between age groups.

Frequencies of the single actions served as behavioural measure. The variables ‘accelerate’ and ‘slow down’ were adjusted before the analysis. Instances when participants chose to slow down before accelerating were not taken into account for ‘accelerate’. Instances when participants chose to stop after slowing down were not taken into account for ‘slow down’.
Risk estimation was assessed on a 5-point Likert scale ranging from 1 = very low to 5 = very high.
Attention was assessed on a 5-point Likert scale ranging from 1 = very rarely to 5 = very often. Answers of all 12 items were summed up to an overall attention score.

Results
Behavioural data and risk estimation were analysed with 2x2x4 ANOVAs for repeated measures, actions related to surface control were analysed with a 2x2 ANOVA with repeated measures. A priori defined single t-test comparisons with regard to surface damage and line-of-sight obstruction were calculated for risk estimation. Attention was analysed with a t-test for independent samples. Additional 2x2x4 and 2x2x2x4 ANOVAs with gender as a control variable were calculated.

Behavioural Data
A list of all main effects and all single interaction effects with regard to visual search for safe crossing and motions are displayed in Table 1. Three-way interactions were not part of the hypothesis and are therefore not reported.
Table 1. F-values of 2x2x4 ANOVAs of main effects (with df (1,76)) and interaction effects (with df (3,228)) of single actions with regard to visual search for safe crossing and to motions (* p<0.05, ** p<0.01, *** p<0.001)

<table>
<thead>
<tr>
<th>Action</th>
<th>Age Group (A)</th>
<th>Road type (T)</th>
<th>Road size (S)</th>
<th>AxT</th>
<th>AxS</th>
<th>TxS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>13.84***</td>
<td>62.71***</td>
<td>17.09***</td>
<td>1.921</td>
<td>.49</td>
<td>18.63***</td>
</tr>
<tr>
<td>Slow down (corrected)</td>
<td>9.50**</td>
<td>&lt;1</td>
<td>8.06***</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>11.18***</td>
</tr>
<tr>
<td>Accelerate (corrected)</td>
<td>&lt;1</td>
<td>76.86***</td>
<td>23.58***</td>
<td>3.39</td>
<td>1.15</td>
<td>22.31***</td>
</tr>
<tr>
<td>Check right side</td>
<td>&lt;1</td>
<td>23.85***</td>
<td>30.00***</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>37.31***</td>
</tr>
<tr>
<td>Check left side</td>
<td>&lt;1</td>
<td>27.58***</td>
<td>6.07**</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>7.48***</td>
</tr>
</tbody>
</table>

As can be seen in Figure 2, no effect of age group was found with regard to visual search for safe crossing. Percentages of persons checking the left and the right side were the same in both groups. All participants tended to look to both sides in situations without pedestrian crossings. With pedestrian crossings, they chose more often to look only to the left side. That was especially true when roads had a centre island and thus, cars were coming only from the left. Few participants decided not to look for traffic at all, mainly on roads with traffic lights. No interaction effects of age and road type or road size were found.

**Figure 2.** Selected actions with regard to visual search for safe crossing with and without pedestrian crossings. Actions and combination of actions are categorized into four groups. Categories are mutually exclusive.
As shown in Figure 3, more older persons said they stopped before crossing the road, while more younger persons chose to slow down instead. No effect of age group was found for accelerating. Both age groups accelerated most often on the two large roads with pedestrian crossings that had green traffic lights. Both groups stopped less often on traffic lights, thus they were found to stop more often on smaller roads with pedestrian crossings, while stopping more often on larger roads without pedestrian crossings. Similarly, both groups did not slow down often on traffic lights. Apart from that, they showed a tendency to slow down more often instead of stopping on smaller roads compared to larger roads. No interaction of type or size of road with age was found.

![Figure 3. Selected actions of motions for single roads with and without crosswalk. Actions and combinations of actions are categorized into four groups. Categories are mutually exclusive.](image)

Main effects and interaction effects with regard to visual search for safe walking are presented in Table 2.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Underground (U)</th>
<th>AxU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check pavement</td>
<td>13.37***</td>
<td>6.71*</td>
</tr>
<tr>
<td>Check street</td>
<td>9.06**</td>
<td>.05</td>
</tr>
<tr>
<td>Pay attention kerbstone</td>
<td>9.24**</td>
<td>.10</td>
</tr>
</tbody>
</table>

Table 2: F-values of 2x2 ANOVAs of main and interaction effects (with df(1,76)) of single actions with regard to safe walking (* p<0.05, ** p<0.01, ***p<0.001)
In Figure 4 means of different surface checking actions are displayed. Significant age differences were found for all three checking actions. More of the older participants checked the pavement, the road, and the kerbstone compared to the younger participants. Both groups checked the road more often when its surface was uneven. This difference was more pronounced for the older than the younger. Checking of kerbstones did not vary between streets with even and uneven surfaces. However, only one of the streets had comparatively high kerbstone.

*Figure 4. Selected actions with regard to visual search for safe walking for single roads with and without uneven surface. Participants were able to select any number of the three variables.*

**Risk Estimation**
Younger and older adults did not differ with regard to their risk estimation. Roads without official crossing were considered riskier, $F(1,76)=30.29, p<.001, \eta^2=.285$, as well as larger roads, $F(1,76)=46.591, p<.001, \eta^2=.380$. Roads with uneven surface were considered riskier than roads with even surface, $t(77)=3.42, p<.001$. Roads without blocked sight were considered riskier than roads with blocked sight, $t(77)=-7.22, p<.001$.

**Attention**
Younger participants reported to experience more attention-critical situations ($M=24.87$) than older participants ($M=22.49$). This effect was marginally significant $t(76)=1.903, p=.061$.

**Gender as control variable**
In order to control for gender effects, ANOVAs including gender as additional between-subjects factor were calculated for all dependent variables. No effect of gender was found for risk estimation, attention and behaviour with one exception. Women were found to stop more often before crossing than men, $F(1,74)=6.120, p<.05, \eta^2=.076$. 
Discussion

The questionnaire study was conducted to investigate problems related to attentional demands in road crossing and strategies of older pedestrians in comparison to younger pedestrians. Results revealed a methodological weakness of the attention part of the questionnaire. Analyses of the mean frequency of experiencing critical situations in traffic due to potential attentional declines indicated more attention-related problems for younger than for older participants. This finding is not in line with the broad knowledge regarding the decrease of attentional functions in the later lifespan. Possible reasons for this unexpected finding either may be attributed to the assessment method or may be due to older pedestrians’ general coping strategies. It is possible that older persons learn to avoid attention-critical situation. Research in the driving context show that older persons avoid rush hours, bad weather conditions, complex intersections, unprotected left turns, etc. (McGwin & Brown, 1999). Same coping mechanism may be applied when walking in order to compensate for age-related difficulties. In future studies a different method will be used, which assesses attention abilities more directly in order to avoid ambiguous results.

However, results regarding behavioural strategies offer interesting new insights. The analyses of actions chosen by participants in order to cross roads of different type and size show differences between the age groups as well as for different traffic environment situations. Problematic strategies as well as coping strategies of older pedestrians were identified. It is important to note that differences in behaviour of the two age groups did not derive from differences in perception of the respective situation, because estimated risk did not differ between groups.

In line with previous findings of the observation interview, people of different age groups behaved similar with regard to safety-related visual search. Younger and older participants looked for traffic with the same frequencies. Not checking both directions when only crossing until a centre island was first identified during the group discussions. Results of the questionnaires confirmed this visual search behaviour. Both age groups showed this particular behaviour.

Regarding visual search for safe walking, a clear difference emerged between the age groups. Older participants checked the pavement more often than younger and both checked more often when the surface was damaged. This is a clear indication for problematic strategies. Participants use resources to check the pavement that are actually needed to observe the traffic situation.

Results for actions related to motions show that younger people tend to do both tasks: visual search and walking in parallel. More often than the older, they chose only to reduce their walking speed instead of stopping before checking traffic. Older pedestrians stop more often first and then look for traffic. This sequential task completion represents an adequate coping strategy for declines in the multitask capacities. Both groups stopped more often on larger than smaller roads, without pedestrian crossings. Pedestrian crossings with green traffic lights led both groups to
accelerate their walking velocity. This finding confirms earlier results of the group discussions. It is especially problematic for older persons because of their reduced ability to check for traffic parallel to their walking direction. Albeit pedestrians ‘right’ to cross with green traffic lights, they are nonetheless in risk to be run over by a turning car or cyclist violating the traffic rules.

Results of this pedestrian study are in line with previous findings regarding divided attention and multitasking in older adults (Ball et al., 1990; Musselwhite & Haddad, 2010; Beurskens & Bock, 2012). They indicate that support of an assistance system should primarily focus on two things: the avoidance of multitask requirements while crossing a road and the older persons’ probability of overlooking potential dangerous road users not behaving in the anticipated way. As a next step assistance strategies will be developed meeting these criteria and will then be evaluated in a laboratory and field setting.

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References


