

# Perception of traffic risks for older and younger adults

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## Abstract

The study examined differences in the perception of traffic risks for older and younger adults. Thirty-four younger participants (mean age 24.7 years) and 30 older participants (mean age 70 years) estimated the number of younger and older people (out of 100,000 people) that were injured in car and pedestrian crashes in a recent year. Both age groups viewed older adults' risks in pedestrian crashes as higher than those of younger adults, and saw older adults' risks in car crashes as identical to the risks for younger adults. Both age groups assessed the risks for their own group quite accurately, but erred in their assessment of the risk for the other group. Older participants tended to overestimate the risk for younger adults, and younger participants tended to underestimate the risk for older adults. These results point to the need to enhance awareness of the age-related increase in traffic risk, which could potentially promote more considerate driving behavior.

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## 1. Introduction

Older road users are at high risk of being fatally injured in traffic crashes. In 2002, the older age group (>70) accounted for 17% of all pedestrian fatalities and for 12% of all traffic fatalities in the US, although this age group constituted 9% of the total resident population (NSCA, *Traffic safety facts, 2002*, US Department of Transportation). Thus, older adults are clearly over-represented among traffic fatalities, even though people in this age group tend to drive less than younger people (Ball et al., 1998; Planek et al., 1968; Stewart et al., 1993). The over-representation of the older age group is even larger in pedestrian fatalities. Two reasons may account for the greater traffic risk for older adults. First, because of age-related changes in sensory, perceptual, motor, and cognitive skills and the effects of medication for chronic age-related diseases, older road users may be more frequently involved in traffic crashes. Second, due to physical fragility and impaired health, older adults are less able than younger adults to resist crash forces and to recover from an injury (Evans, 2000; Li et al., 2003). Li et al. (2003) examined the relative contribution of over-involvement in car crashes and fragility to the increased risk of fatalities among older drivers

in the United States. The analyses showed that the death rates for drivers involved in a crash (i.e., fragility) increases steadily from the age of 60, with a sharp increase at the age 80. However, accident involvement rate began to increase not before the age of 75. The authors concluded that both fragility and over-involvement in car crashes contribute to the elevated death risk of older drivers, but fragility is the major contributor.

### *1.1. The accuracy of perceived risk and its relation to risk behavior*

The elevated traffic risks of older adults warrant awareness on the part of older road users themselves, as well as other road users. Being aware of risks in the environment allows individuals to avoid the risks or to control them (Slovic, 1987). Research has indicated that people are typically inaccurate in their risk judgments. For example, Lichtenstein et al. (1978) demonstrated that people overestimate the probability of unlikely but catastrophic events (e.g., dying from a tornado) and underestimate the probability of frequent but less catastrophic events (e.g., dying from a stroke). Numerous studies have replicated these findings, and it is now generally accepted that people's judgments of risk are subject to biases, believed to result from mental short-cuts (i.e., heuristics; for reviews see Kahneman et al., 1982; Slovic, 2000).

The perception of traffic risks can also be subject to systematic distortions. In particular, younger adults (under 25 years of

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age) tend to underestimate the risk of an accident (Deery, 1999; Dejoy, 1992; Finn and Bragg, 1986; Glik et al., 1999; Trankle et al., 1990), and they are prone to optimistic bias, that is, they tend to perceive their own risk as lower than that of their peers (Finn and Bragg, 1986; Glendon et al., 1996; Matthews and Moran, 1986).

Research investigating the perceptions of traffic risks has mainly focused on younger adults. However, findings from research with a younger population may not generalize to an older population. Research addressing the effect of aging on risk perception is sporadic. There is evidence suggesting that older adults perceive traffic risks as greater, compared to younger adults. Sivak et al. (1989), for example, found that older drivers (65–75 years old) assess traffic scenes as possessing higher risk relative to younger drivers (19–21 years old). Similar findings were reported by Trankle et al. (1990).

Biases in risk perception have been linked to risky behaviors (e.g., Glendon et al., 1996; Groeger and Brown, 1989; Matthews and Moran, 1986; Sitkin and Pablo, 1992), such as sensation seeking (Horvarth and Zuckerman, 1993), and risky driving behavior (e.g., Deery, 1999; Harre, 2000). For example, Yagil (1998) reported a positive correlation between perceived traffic risk and a sense of obligation to obey traffic laws, and Deery (1999) reviewed research demonstrating that risk perception in traffic situations is correlated with younger adults' driving behavior.

### 1.2. Awareness of older adults' increased risk

Given that traffic risks increase with age, the question arises as to whether older adults are aware of their elevated traffic risk. Possibly, people update their perceptions of risks as they age, because they directly experience objective changes in physical fragility and in driving (and road crossing) skills. Indirect evidence for this hypothesis was provided by Matthews and Moran (1986) who showed that perceptions of risk (i.e., judged probability of accident involvement) by adults' aged 45–60 are related to their perceived driving ability. Another indication for a possible change in the perception of traffic risk by older adults is the changes they report in driving habits. Older drivers drive less, in particular in adverse conditions, such as at night, during heavy traffic, and in bad weather (Ball et al., 1998; Planek et al., 1968; Stewart et al., 1993). This process of self regulation seems to be related to problems with vision, deteriorating health, as well as concerns about accident involvement (Ragland et al., 2004). These findings indicate that older drivers are aware of their limitations and risks, and that they adapt to these changes by changing their driving behavior.

A second question concerns the extent to which other road users (i.e., younger adults) are aware of older adults' increased traffic risk. Keskinen et al. (1998) and Hakamies-Blomqvist (1996) pointed to the possibility that the higher involvement of older drivers in intersection crashes may be due to younger drivers' high-speed driving, combined with the slower, cautious driving style of the older driver. Nelson et al. (1993) provided evidence showing that younger drivers are aware of older adults' slow driving. Specifically, younger drivers consider older drivers

to be too cautious and slow, and likely to cause crashes. Although younger drivers are aware of the slow response characterizing older drivers' driving style, it is not clear whether younger adults are aware of older adults' increased risk as road users. An accurate assessment of the risks of older adults may induce a more considerate driving style on the part of younger drivers, especially with respect to older pedestrians.

### 1.3. The present study

This study aims to determine whether traffic risk perceptions differ between older and younger participants, how accurate these perceptions are compared to actual injury data, and whether older and younger participants are aware of the increase in traffic risk for older people. To address these questions, younger and older adults were asked to estimate the number of younger and older adults (out of a population of 100,000 young or older adults) that were fatally or seriously injured in car and pedestrian crashes.

### 1.4. Hypotheses

First, based on the findings reported by Sivak et al. (1989) and by Trankle et al. (1990), older adults were expected to perceive traffic risks as greater, compared to younger adults. Second, in general, younger adults were expected to underestimate traffic risks, while older adults were expected to demonstrate a more realistic perception of traffic risk. Third, based on the literature presented, older adults were expected to perceive the risks for their age group as greater than those for the younger age group.

## 2. Method

### 2.1. Design

The study employed a mixed design with crash type (car and pedestrian), injury severity (fatal and serious), and age of the person at risk (younger and older person), as the within subject factors, and participants' age (younger and older adults) as the between subject factor.

### 2.2. Participants

The participants were 64 Israeli younger and older adults. The younger participants were 34 students at the Industrial Engineering and Management Department, in Ben-Gurion University. There were 22 females and 12 males and their ages ranged from 20 to 29 ( $M = 24.7$ ). It is important to note that 11 out of the 34 young participants were under the age of 25, that is, they belong to an age group for which the risk of fatal car crashes is high. The younger participants received course credit for participating in the study. The older participants were 30 socially and physically active older adults who were recruited from community centers and senior citizen clubs in the Beer Sheva area, a city in the south of Israel. There were 21 females and 9 males. Their age ranged from 59 to 86 ( $M = 70.0$ ). Twenty-two older participants

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