Introduction

Research has demonstrated increased accident risks for older driver population [1]. These contributing factors include age-related changes in:

- Sensory processing [2],
- Perceptual processing [3],
- Attention [4],
- Cognitive ability [5].

Recent research shows that repeated training improved visual functions for older adults [6].

Research Questions:
1. What are the characteristics of age-related changes in driving performance, especially under low visibility conditions?
2. Can the age-related decrements in driving performance be recovered by training, especially? Specifically, can contrast sensitivity be improved by training for older drivers?

California, 2009

Subjects:
8 older (age of 72.6 ± 4.6)
8 younger (age of 21.0 ± 2.6).

Independent variables:
Age: young or old
Fog: 0, 0.04, 0.08, 0.12, and 0.16
LV speed: 40, 60, and 80 Km/h

Dependent variable:
Headway distance

Beijing, 2010

79 older participants (mean age of 72.8 ± 7.6, including 47 Female and 32 Male) were tested on several perceptual and cognitive assessments.

Participants (Sub):
10 older (mean age of 80.7 ± 7.7)

Training Tasks (3 sessions):
- Contrast detection (CD, test only)
- Contrast discrimination (CS)
- Orientation discrimination (OS)

Dependent variable:
Threshold in each task before (pre-test) and after (post-test) training.

Example of experiment stimuli

Conclusions

- Older drivers consistently maintained a closer following distance than younger drivers as a result of increased fog density and increased speed.
- Training improved contrast sensitivity function for older adults, which is critical for their driving safety at low visibility condition.
- Training induced improved performance can be transferred between different eyes of origin, different luminance, and different tasks.

Future research

- Investigate the relationship between driving performance in driving simulator and real-world situations for older drivers.
- Examine the effects of different training procedures on different driving-related tasks for both younger and older drivers.
- Investigate the neural mechanisms accounting for age-related differences in driving performance using brain imaging technique (fMRI, to be conducted in Beijing).

References


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