A hazard perception test for cycling children: an exploratory study

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Introduction

Figure 1: Number of victims aged 5 to 14 in 2001

Traffic-related cognitive skills have been tested for young car drivers with a Hazard Perception test but not for children, although they might benefit even more from it than young drivers. Therefore: An exploratory study to the use of a HP-test for testing the cognitive / traffic skills of young cyclists.

Methods

A convenience sample of 27 adults and 21 children (16 females, 21.67±1.94y of age; 10 girls, 8.28 ± 0.46y of age respectively) completed a newly developed Hazard Perception test.

Figure 2: A child performing the HP-test

Children were tested in an empty classroom in their school, adults were tested in a laboratory at Ghent University.

The HP-test consisted of 33 video-clips of 20 ± 30 seconds, shot from the point of view of a cyclist. Videos were presented on a 22” computer screen and Eye-movements were recorded using the Remote Eye-Tracking Device of SMI, operating at 120Hz.

The HP-test consisted three parts:

1) Gaze behavior: only watch the video, pretending they were cycling in the shown traffic situation (10 clips)
2) Environmental awareness: answer a question about video afterwards, example: what animal did you see, did you have priority, ... (10 clips)
3) Hazard judgment: click when you see a hazard on which you would pay extra attention + judge how dangerous you think this situation was on a scale from one to five.

Results

Figure 3: Case study – Pedestrian crossing

48% of the children and 4% of the adults indicated that they would cross the road before the right light turned green (p<0.001).

Summary of results of each part of the HP test and QR-code of 3 of the videos

1) Gaze Behavior

- In general: few differences in dwell time towards different regions
- Children look more towards traffic signs
  Bias: children had traffic school the week before the experiment
- Adults look more towards Cars
  Adults are more aware of the hazardousness of cars

2) Environmental awareness

- Adults scored better on some videos
  Adults possibly have a bigger useful field of view
- largest difference in video with distractions
  Children are more easily distracted

3) Hazard Judgment

- Adults react more and faster to hazards
  Children need more time to process information
  Did not test basic reaction time
- Children judged most videos more dangerous
  Children are not able to judge hazards adequately

Figure 4: Three filmstrips of videos shown in the hazard perception test

Full videos can be watched by scanning the QR-codes above.

Conclusions

Results show that children do not yet have sufficient traffic experience to efficiently judge and react to hazardous situations. These poor hazard perception abilities might be a cause for children’s over-representation in accident statistics.

Future research

- improvement of hazard perception tests for children and adults
  - Better videos with more specific hazards
  - Multiple videos for same type of hazard
  - Automate data process to have quick access to results
- examine effectiveness of a hazard perception training
- Test the validity of the test: does a good score represent a good cyclist?
- Test effect of alcohol, music, fatigue, ... on hazard perception of cyclists

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