

Situation awareness and hazard perception deficiencies of young novice drivers, particularly at night

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Abstract

Hazard perception performance of novice versus experienced drivers (n=63) was investigated during a PhD research program. Results are reported from thematic analysis of transcripts of participants' commentaries on daytime and night-time road-traffic scenarios in suburban Adelaide. They commented while being driven around a set route in normal traffic and whenever they detected hazards in each of 14 video clips. They also rated risk and difficulty throughout each clip. Novices (L- and P-plates) demonstrated poorer situation awareness, including lower awareness of hazards associated with poor visibility, particularly in night-time scenarios. Implications for development of improved driver training programs are identified.

Background

It is clear that perceptual and cognitive errors are often implicated in novice driver crashes (McKnight & McKnight, 2003; Wundersitz, 2012), and novices are over-represented in night-time crashes (Williams, 2003; Adams, 2005). However, there has been little research on how night driving conditions affect novices' situation awareness (SA) and hazard perception. Research reported here addresses this issue. Results are interpreted in terms of the information processing model of Wickens and colleagues shown in Figure 1.

Method

Participants were grouped according to age and experience. Their performance was recorded on both day and night versions of the following tasks:

- Provide ongoing oral commentary on the road-traffic situation while being driven along a set route around suburban Adelaide
- Watch video clips (driver's viewpoint) of road-traffic scenarios similar to those encountered during the drive, and:
 - o each time a potential hazard is noticed, pause video and describe it, then resume video
 - o for each video, position a slider to continuously rate current risk level and, separately from that, driving task difficulty.

SPSS software was used to calculate descriptive statistics for all tasks, and for repeated-measures analyses of variance for mean risk and difficulty ratings with Group as a between-subjects factor and with Time (day, night) and Location of the scenario as repeated factors. NVivo software was used in thematic analyses of commentaries and hazard descriptions (Pidgeon & Henwood, 1997).

Results

Results reported here focus on SA and hazard perception. There were few substantial differences between results of L- and P-plates, so novices (16-20 years; L- or P-plate) are compared with experienced drivers (25-30 years; 5+ years licensed experience).

Novices had poorer SA. They were:

- less aware of situations where visibility was degraded (particularly at night) and less likely to report this as hazardous
- less aware of inconspicuous or potentially hidden hazards.
- less able to 'read the road' accurately and holistically

- less aware of hazards that *might* be ahead
- focused more on vehicle control issues and less on other road users, except when vehicle speed was very low.

In contrast, experienced drivers thought further ahead, with greater focus on predicting potential hazards and what might happen next. Their performance reflected more detailed mental schemata of road-traffic system operating characteristics, beyond what is specified by road rules. They tended to rate risk as higher than novices although the difference was not statistically significant, possibly due to group numbers being small relative to large variation between individuals.

Conclusions

Observed deficiencies in novice drivers’ SA and hazard perception skills would be expected to increase their crash risk, particularly at night. Improved training in these skills is needed. To ensure that learners have enough attentional capacity for such learning to occur, they should not be in control of a vehicle during the earlier stages. Training content should take account of the specific skill deficiencies identified in this project, but further research is needed to support course development.

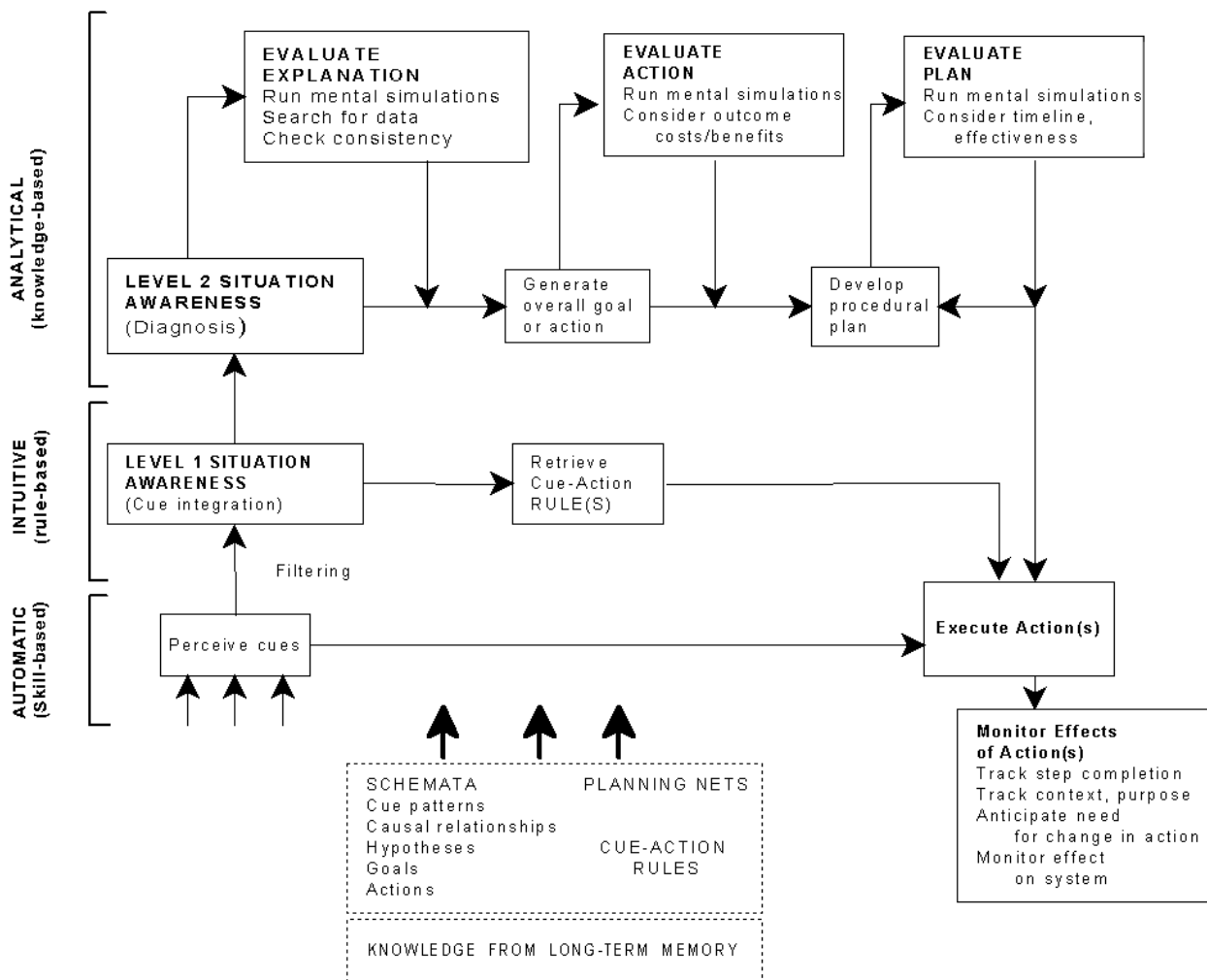


Figure 1. Information-processing model integrating views of naturalistic decision making (from Wickens et al., 1997)

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