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Memory for everyday driving

Samuel G. Charlton *, Nicola J. Starkey

Transport Research Group, School of Psychology, University of Waikato, New Zealand

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ABSTRACT

As drivers, we often have the sense that we can recall very little about our everyday trips, particularly on familiar roads when nothing untoward occurs. The failure to recall incidental events from a routine drive is not surprising if these drives are performed at a fairly automatic or preconscious level of engagement. Some researchers have suggested that danger, difficulty, and consequentiality are what make events and actions memorable for drivers. To investigate what drivers remember from a routine trip, we asked participants (n = 75) to drive familiar local roads on a 15 km urban route either on-road in an instrumented car, or in the University of Waikato driving simulator (with and without a passenger). At ten predetermined locations on the drive participants were asked to provide ratings of perceived risk, difficulty and anxiety. At the end of the drive, participants were asked a free recall question about what they remembered from the drive, followed by cued recall questions about six of the locations from the drive prompted by photographs. In general, participants recalled very similar things from the drive, notably what they saw as the poor behaviour of other drivers. The participants' recall accuracy was rather poor, with memory for whether they had stopped at a particular location having the highest accuracy. Memory of whether there were vehicles ahead and whether they had stopped had a high number of recall false alarms, adding to the suggestion that participants remembered the locations and what usually happens there rather than detailed recollections of a particular occasion. There were no observed relationships between recall accuracy and perceptions of driving risk, difficulty, or anxiety. The results indicated that memories of everyday driving are combinations of examples of bad behaviour of other road users and our recollections of what typically happens at familiar locations.

1. Introduction

For most drivers, our everyday trips to work or home along familiar routes become so routine or commonplace that when we arrive at our destination we often experience the sense that we cannot recall the events that occurred during the drive. Although this feeling of amnesia for everyday driving is a common experience, very few studies have examined the extent and accuracy of our memory for driving. In one experiment, participants drove a fixed route while rating the danger and difficulty of the drive (Groeger, 2000). After completing the drive, the participants were asked to recall as much as they could about the events that occurred at six locations (at intersections) during the drive. In general, if the participant had rated the intersection as dangerous or difficult, the more accurate their recall was for events at the intersections. The participants were able to correctly recall if they stopped at the intersection, if there was a vehicle ahead of them, or whether another vehicle

* Corresponding author at: School of Psychology, University of Waikato, Private Bag 3105, Hamilton, New Zealand.
E-mail address: Samuel.charlton@waikato.ac.nz (S.G. Charlton).

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crossed their path as they drove through the intersection. Other details, such as whether there were parked cars, pedestrians or cyclists present were apparently not able to be recalled. The researchers concluded that the consequentiality of events during a drive, in terms of their danger and difficulty, leads to greater arousal during encoding, and results in more vivid and durable memories (Groeger, 2000).

In another series of experiments, participants viewed short video scenes showing the view through a car windscreen as it proceeded through intersections (Chapman & Groeger, 2004; Groeger, 2000). The participants were then shown a larger set of video scenes and asked to indicate which of them they recognised from the first group of scenes. In these experiments, the participants' average recognition accuracy was rather poor (ranging from 66% to 72% correct) although locations the participants had previously rated higher in risk were generally recognised more often than those rated as low in risk. A higher rate of recognition "hits" for high risk intersections was interpreted as resulting from attention focussing in the presence of danger and risk. Interestingly, high risk examples of intersections were associated with a high rate of false positives, participants incorrectly saying that they recognised video scenes that they had not previously seen (Groeger, 2000). The researchers summarised their findings by suggesting that what we remember from our everyday driving is predominated by central information from dangerous situations (Chapman & Groeger, 2004).

In another, similar experiment participants were asked to "drive" a series of video scenes from local rural roads that were familiar to them in a driving simulator while providing continuous risk ratings using a thumbwheel mounted on the steering wheel (Charlton, Starkey, Perrone, & Isler, 2014). After completing the simulated drive, the participants were shown a series of photographs and asked to identify whether they recognised any of them from the video scenes and to once again rate the driving risk of the situations shown in the photographs. Participants' recognition accuracy for the scenes ranged from 44.93% to 92.75% (M = 70.41%), but in this experiment there was no observed relationship between memorability and the level of risk from either set of risk ratings.

Studies of drivers' memory for hazards and hazard warning road signs have shown that recall and recognition accuracy is quite poor, averaging only 50% accuracy across a range of test methods (Charlton, 2006). One of these methods, the roadblock paradigm, involved stopping drivers after they had driven past a hazard warning sign and questioning them about the content of the sign (Fisher, 1992; Johansson & Backlund, 1970). These studies suggested that the urgency or action potential of warning signs tended to increase the likelihood of them being noticed and remembered by drivers, along with an acknowledgement that intercepting drivers at a roadblock may have produced some retroactive interference with the memory for recently passed road signs.

There is also evidence, however, that conscious attention to a hazard warning sign or other road feature may not be required in order for drivers to process the information and react to it (Charlton, 2006, 2007; Fisher, 1992). As an alternative to the roadblock paradigm, Fisher (1992) posed as a hitchhiker and observed how drivers reacted to warning signs (pedestrian crossing and road junction warnings) and whether they could report having seen them 100 m after passing the signs. While 56% of drivers could correctly recall signs they had just driven past, a considerable proportion of drivers reduced their speed without any recollection of having seen the sign they passed moments before (39% for pedestrian crossing and 43% for road junction). Only 25% of drivers both reduced their speed and were able to correctly recall having seen the signs (Fisher, 1992). Similarly, findings from driving simulation experiments have shown that curve warning signs placed at the tangent point of curves are quite effective in reducing drivers' speeds (Charlton, 2007) even though drivers' detection and subsequent recognition of these signs is quite low (a high of 29.03% detection and 40.32% recognition accuracy) (Charlton, 2006).

While some research suggests that what we remember from our everyday driving is predominated by central information from dangerous situations, other findings indicate that it is the consequentiality of events (in terms of their necessitating action) that attracts our attention while driving and leads to more accurate recall and recognition. On the other hand, there is good evidence that drivers can respond effectively to hazard warnings with little or no explicit attention or subsequent memory of the event. In part, this may be because a substantial portion of our everyday driving on familiar routes can be accomplished at a procedural or automatic skill level without requiring effortful conscious deliberation (Charlton & Starkey, 2011, 2013). The failure to recall incidental events from a routine drive is therefore not therefore surprising if drivers only need to engage with everyday driving at an implicit preconscious level (Groeger, 2000).

The underlying questions remain, how much do drivers remember from everyday driving, and are some types of events more likely to be accurately remembered? This study used both on-road and simulated drives on familiar roads as an incidental memory task to test the extent of memory for everyday driving and to further explore the relationship between memory accuracy and perceptions of driving risk and difficulty. To investigate these issues, drivers were asked to complete a short drive on a familiar local road, or take the same drive through a video in a simulator (where they could control the speed). At selected points during the drive, the participants were asked to rate their feelings of driving risk, difficulty and level of anxiety. After the drive, they were asked to recall events from the drive and, prompted by photographs, were asked to recall details about events that occurred at several locations from the drive.

If the arousal associated with driving hazards or difficulty leads to more durable and accurate memories we might expect that events rated as high risk or high difficulty to predominate free recall narratives and possess superior cued recall accuracy. Similarly, if events that are central or consequential for our own actions are what are remembered best from a drive, then the actions of vehicles immediately ahead of us, and our own actions should be associated with the most accurate recall. Alternatively, if drivers rely on their prior experience and stored schemata to reconstruct what probably happened during a commonplace drive, we might find that neither risk nor consequentiality of events are accompanied by accurate recall, and that instead drivers recall the "gist" of the drive without specific recall of the details of events at specific times or locations.

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