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Commentary driver training: Effects of commentary exposure, practice and production on hazard perception and eye movements

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ABSTRACT

Commentary driving typically involves being trained in how to produce a verbal running commentary about what you can see, what you are doing, what might happen and what action you will take to avoid potential hazards, while driving. Although video-based commentary training has been associated with subsequent hazard perception improvements, it can have a negative impact on hazard perception when a live commentary is produced at test (Young, Chapman, & Crundall, 2014). In the current study we use balanced training and testing blocks to isolate the effects of commentary exposure, production of a commentary with and without practice, and learning from earlier self-generation of commentary on behavioural and eye movement measures. Importantly, both commentary exposed and unexposed groups gave hazard perception responses during the commentary video, ensuring that the unexposed control group remained engaged in the procedure throughout. Results show that producing a live commentary is detrimental to concurrent hazard perception, even after practice, and does not enhance any later effect of commentary exposure. Although commentary exposure led to an initial increase in the accuracy of hazard perception responses, this effect was limited to the first occasion of testing, and showed no later benefits relative to engaged hazard exposure.

1. Introduction

Commentary driving involves producing a continuous verbal running commentary on what you are doing while driving, (e.g. changing gear), what you can see (e.g. a pedestrian by the road), what might happen (e.g. the pedestrian may walk out into the road) and what you intend to do (e.g. slow down, move further out into the road) (Gregersen, 1994). It is a training technique that is used to train advanced drivers and emergency services' rapid response drivers (Coyne, 1997; DIA, 2014; IAM, 2014; Sharp, 1997) and is expected to improve visual scanning and interpretation of the visual scene (Marek and Sten, 1977). In New Zealand new drivers are required to produce a commentary during their Full Licence Test (New Zealand Transport Agency, 2016), encouraging novice drivers to practice a commentary on the road.

Given that commentary involves the verbal prediction of hazards, it is reasonable to assume that the main benefit of commentary is derived from an improvement in hazard perception. Hazard perception is a driving-specific skill that is reliably correlated with collision risk (Wells et al., 2008) and video-based hazard perception tests have been shown to differentiate between novice and experienced drivers (Borowsky et al., 2009; Borowsky et al., 2010; Horswill and McKenna, 2004; Isler et al., 2009; Scialfa et al., 2011). This means that improving hazard perception skills might also reduce collision risk.

There is some evidence that training novice drivers in commentary driving techniques can lead to improvements in hazard responses in simulated driving (Crundall et al., 2010), and that simple video-based commentary exposure and/or practice can improve hazard perception (HP) responses (Horswill et al., 2013; Isler et al., 2009; McKenna et al., 2006; Spolander, 1990; Wetton et al., 2013). Video-based commentary driver training is economical and easily accessible to drivers looking to improve their hazard perception skills; making it a desirable training method, providing it is effective. Indeed, apparent benefits have been observed in some studies with exposure to commentary videos of only eight minutes in length (Castro et al., 2016).

Although typical commentary driver training would involve both *exposure* to an expert commentary and *practice* at producing a live driving commentary (Crundall et al., 2010; Horswill et al., 2013; Spolander, 1990), it is not clear whether both elements are key to realising any benefits of commentary training. Benefits have been observed when drivers are trained via exposure to commentary, without ever producing a commentary of their own (Castro

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et al., 2016; McKenna et al., 2006; Wetton et al., 2013). However, improvements in hazard perception have also been observed when trainees produced their own commentary, without ever being specifically trained in how to produce a commentary (Isler et al., 2009). This might suggest that both commentary exposure and practising commentary production yield separate benefits for later silent hazard perception. In an attempt to disentangle these two effects Wetton et al. (2013) tested the hazard perception abilities of participants after either video-based commentary exposure alone, or a combination of exposure and practising a silent self-generated commentary. Although no additional benefit of the self-generated commentaries was observed, the silent nature of the produced commentaries made it impossible to determine whether the commentary protocol was correctly adhered to.

The question therefore remains whether there are separable effects of practising commentary production and being exposed to expert commentary, on subsequent hazard perception skill. In the current study we decompose training into video-based commentary exposure and separate commentary practise. If producing a commentary out-loud has benefits over and above those of video-based commentary exposure we would expect those participants who watch a commentary video and produce a commentary to perform better in subsequent silent testing, than those who watch the same video but do not practise producing a commentary.

Although we may not yet know whether commentary production is necessary in order to derive the greatest benefits from commentary driving, since current commentary training typically involves production of a commentary on the road, it is important to understand the effects of live commentary on concurrent hazard perception. Not only do trainees produce on-road commentaries with supervision, they are also able to use commercially available DVDs that demonstrate an expert commentary and suggest that the viewer carry out their own on-road commentaries (Gilbert, 2007). Young et al. (2014) found that when commentary exposure is followed by production of a driving commentary during a hazard perception test, hazard perception response times are significantly longer than in a control group that was neither exposed to commentary nor producing a commentary at test. This has important implications for commentary driver training, suggesting that trainees should not be encouraged to perform their own commentary on the road without expert supervision.

In Young et al. (2014) the observed slowing of hazard perception responses occurred when trainees were exposed to commentary using a video-based commentary example, and then produced their own commentary at test. It seems unlikely that commentary exposure caused the observed detriment, given that other research has shown benefits of commentary exposure, so the commentary production element is the prime candidate for having caused interference. Indeed, this fits well with the dual-task literature, which typically shows that when two tasks are carried out concurrently, performance on one or both tasks is inferior to either task when performed alone (for a review see Pashler, 1994). However, the extent of interference depends on the precise timing of the task demands and, in particular, whether both tasks require access to a limited capacity resource at the same time (see Pashler, 1994; or Wickens, 1980). For this reason, it is not clear whether interference in the earlier experiment was caused by talking about the road scene generally, while carrying out hazard perception, or is limited to the more active task of commentary driving. Talking while driving is not necessarily detrimental to performance in all cases. For example, although talking on a mobile telephone is known to cause distraction (for a review see Caird et al., 2008) talking to a passenger is not always associated with poorer performance (Crundall et al., 2005). Additionally, Hughes and Cole (1986) have used a technique known as concurrent verbalisation to gain insight into what viewers are doing when visually inspecting a driving scene. Like commentary driving, this involves verbalising what they are looking at, though without being required to give a continuous commentary or make predictions about the future status of objects in the scene. Hughes and Cole (1986) suggest that a verbal description of what is attended to should not affect processing demands. This idea was supported when Crundall and Underwood (1997) found that producing a concurrent verbalisation while carrying out a hazard perception test did not affect either behavioural responses or eye movements.

Since commentary driving involves talking about the contents of the visual scene, which should be attended to for hazard perception, one might expect the demands to be lower than other types of conversation but a detriment is still observed (Young et al., 2014). In order to establish whether the detriment of a live commentary is specific to producing a commentary following an earlier example or caused by any speech about the visual scene while searching for hazards we can compare the effects of producing a commentary after exposure to those of producing a naïve commentary, based on only limited instruction without commentary exposure. This is because a naïve commentary is subject to fewer rules about what should be said and how, so would be expected to be less effortful. If the detriment is specific to commentary following exposure, we might paradoxically find that commentary exposed drivers' HP performance is worse than that of naïve commentary producers when both groups give a commentary simultaneously with the HP test.

When drivers are fully trained in commentary driving they are initially supervised while gaining experience in commentary production. Even when a driver learns commentary by watching a DVD it is recommended that she practise a commentary over driving clips before doing so on the road (Gilbert, 2007). If detrimental effects are only present in the first few attempts at commentary production the outlook for commentary as a training method would be much brighter than if live commentary is detrimental even after practice. For this reason, it is important to investigate how the effect of commentary production on hazard perception might change with increased commentary experience.

When benefits of video-based commentary exposure or full training have been shown relative to a control group, the control group has typically watched the same commentary video, but without any accompanying audio, so that they were exposed to the same visual materials but without any commentary exposure (Horswill et al., 2010; Horswill et al., 2013; Isler et al., 2009; McKenna et al., 2006; Poulsen et al., 2010; Wallis and Horswill, 2007; Wetton et al., 2013). However, this silent material may not encourage participants to engage with the video or expect any benefits of training. This raises the possibility that the observed benefits of video-based commentary training could in fact be due, at least in part, to a placebo effect. In Young et al. (2014) participants in both the commentary exposed and control groups were asked to search for and respond to hazards during the commentary video, to ensure that *all* participants were engaged in watching the footage, not just those listening to commentary. Although this reduced the likelihood of placebo effects, the effect of commentary production was confounded with that of commentary exposure. In the current study placebo effects are addressed and commentary exposure and production effects are disentangled.

While behavioural data can give an indication of the effect of commentary exposure and practice on hazard perception speed and accuracy, eye movement data can give deeper insight into how commentary affects attention in the visual scene. There has been little research into the effect of commentary exposure or practice on visual search of the driving scene. Young et al. (2014) found that those exposed to commentary and producing a commentary at test had shorter fixation durations than those who were neither exposed to nor producing a commentary. If commentary *exposure* produces shorter fixation durations then this may give us hope that