



The effect of speed limit credibility on drivers' speed choice



Yee Mun Lee^{a,*}, Siang Yew Chong^a, Karen Goonting^b, Elizabeth Sheppard^{a,1}

^a School of Psychology, University of Nottingham Malaysia Campus, Jalan Broga, 43500 Semenyih, Selangor, Malaysia

^b Malaysian Institute of Road Safety Research (MIROS), Lot 125–135, Jalan TKS 1, Taman Kajang Sentral, 43000 Kajang, Selangor, Malaysia

ARTICLE INFO

Article history:

Received 12 April 2015
Received in revised form 15 July 2016
Accepted 28 November 2016
Available online 24 December 2016

Keywords:

Appropriate speed
Credibility
Judgment
Malaysian
Drivers

ABSTRACT

Credibility of speed limits is a key factor affecting drivers' compliance with speed limits. Two experiments were conducted to investigate how credibility of speed limits affects judgments of appropriate speed. The first experiment aimed to establish speeds deemed appropriate by investigating Malaysians drivers' judgments of the appropriate speed to drive based on photographs of roads with the speed limit sign erased. Drivers chose speeds which correlated with but were higher than the actual speed limits of the roads. Analysis of road characteristics suggested they based their decisions mainly on features of the road itself rather than of the roadside. The second experiment tested the impact of credibility of speed limit information on the speed drivers judged appropriate. Drivers judged the appropriate speed to drive for the same photographs as in Experiment 1 with speed limit information provided. Four conditions were included: two conditions where the speed limit posted was 10% higher or 10% lower than the appropriate speed established in Experiment 1 (credible speed limits), and two conditions where the posted speed limit was 50% higher or 50% lower than the appropriate speed (non-credible speed limits). Posted speed limits did affect drivers' judgments about the appropriate speed to drive. Credibility also influenced judgments whereby drivers selected appropriate speeds consistent with the speed limits for the 10% lower condition, but not for speed limits that deviated highly from the appropriate speed judged in Experiment 1.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Speed is one of the most important factors which affect the safety of a driver (Elliot, Armitage, & Baughan, 2005; Nilsson, 2004). A number of studies have shown that increases in speed lead to increases in crash rates and crash severity. For example, Maycock, Brocklebank, and Hall (1999) and Quimby, Maycock, Palmer, and Grayson (1999) measured the travelling speed of vehicles on roads in the UK; Kloeden, Mclean, Moore, and Ponte (1997) used a case-control method to investigate the crash rate of 60 km/h roads in Australia; and Kloeden, Ponte, and McLean (2001) investigated the crash rate of 80 km/h and 120 km/h roads in Australia, all finding that increases in speed lead to increases in crash rates and severity. It has also been found that increasing one's speed decreases the available time to react to sudden changes on roads; it reduces manoeuvrability and the stopping distance is larger (Aarts & van Schagen, 2006).

* Corresponding author at: Department of Psychology, Glyndwr University, Mold Road, LL11 2AW Wrexham, United Kingdom.

E-mail addresses: YeeMun.Lee@glyndwr.ac.uk, yeemun90@yahoo.com (Y.M. Lee), siang-yew.chong@nottingham.edu.my (S.Y. Chong), karenjgoonting@gmail.com (K. Goonting), Elizabeth.Sheppard@nottingham.ac.uk (E. Sheppard).

¹ Present address: School of Psychology, University of Nottingham, University Park, NG7 2RD Nottingham, United Kingdom.

Speed limits are regarded as a crucial part of effective speed management as they should prescribe speeds that are safe for drivers under typical conditions. It has been found that drivers whose speed deviates to a large extent from the speed limit set are most likely to be involved in accidents. Solomon (1964) investigated relationships between vehicle speed and collision rates on main rural highways in the USA using a case-control method. Vehicles that were moving 10 km/h faster than the modus speed had the lowest collision rate and vehicles that were moving much slower or much faster than the modus speed were more likely to be involved in accidents. A recent review also showed that greater speed dispersion is associated with increased crash rate (Aarts & van Schagen, 2006). These findings suggest that some degree of compliance with speed limits is important to maximise safety, yet studies typically indicate that speed limits are not the sole factor which affects speed choice.

Perceptions of a safe speed to travel are affected by the environment, the geometry of the road, weather conditions and adjoining land use (Wilmot & Khanal, 1999). Travelling speed choice was found to increase with wider roads, roads without curves, roads with a smooth surface, with the presence of road markings (Elliott, McColl, & Kennedy, 2003; Martens, Comte, & Kaptein, 1997) and with fewer buildings, trees and vegetation along the roads (Elliott et al., 2003). It has been suggested that the credibility of the speed limit also affects drivers' speed choice (OECD/ECMT, 2006; Van Schagen, Wegman, & Roszbach, 2004). Goldenbeld and van Schagen (2007) argued that it is generally assumed people will comply with speed limits if they regard them as being reasonable or "credible". Conversely, if the limit is not consistent with what they deem to be reasonable based on the road characteristics, then they may well ignore that limit. Goldenbeld and van Schagen (2007) further speculated that if the speed limits in a system appear consistently unreasonable, road users may question the utility of and perhaps disregard the entire system. In support of this suggestion, they cited survey findings which suggest that drivers tend to rely on their own judgments of appropriate speed rather than the speed limit shown when driving past construction (Gardner & Rockwell, 1983). In agreement with this, Kanellaidis, Golias, and Zarifopoulos (1995) asked drivers why they violate speed limits and their most frequently reported answer was that they do not regard the speed limits as being reliable.

While survey studies indicate that people cite credibility as a key reason for compliance with speed limits, few studies have aimed to directly assess the impact of speed limit credibility on speed judgments. Goldenbeld and van Schagen (2007) investigated whether different characteristics of the road affect judgments of the credibility of 80 km/h rural roads in the Netherlands. Different photographs of 80 km/h speed limit rural roads were shown to Dutch road users and they were required to judge their preferred speed and the safe speed limit of those roads. The credibility of the speed limit was operationalised as the difference between the actual speed limit (which was always 80 km/h) and the participants' preferred speed and perceived safe limit. It was found that drivers preferred to drive at about 8 km/h faster than the actual speed limit while they judged the safe speed to be 4 km/h higher than the actual speed limit. It was also found that a number of different environmental features affect drivers' judgments. Preferred speed was decreased with the presence of a curve, a short sight distance, presence of buildings along the side of the road and when there was little view to the right; whereas the absence of trees on the right hand side of the road increased perceived safe limit but not preferred speed (Goldenbeld & van Schagen, 2007). Van Nes, Houtenbos, and Van Schagen (2008) found that participants selected lower speeds and engaged in less speeding for road sections with highly credible speed limits compared to road sections with less credible speed limits. Similarly, Van Nes, Brandenburg, and Twisk (2010) reported that simulator participants drove at speeds closer to those which had previously been rated as reasonable for the roads, than those which had not.

In the current study, we aimed to investigate how modifying the credibility of the speed limit of roads influences drivers' judgments of an appropriate speed to drive. The term 'appropriate speed' was used in both studies we report here because we aimed to elicit drivers' genuine views on a suitable speed for the road, rather than for them to try and guess the speed limit, and it has previously been suggested that this particular term emphasises the importance of participants using judgment based on their own criteria (Nunes & Recarte, 2005). In the first experiment, we aimed to establish the speed at which drivers judged it was appropriate to drive by viewing photographs of roads. This was done in order to establish a baseline for manipulations of speed limit information in the second experiment. Consistent with previous studies (e.g. Fleiter & Watson, 2006; Goldenbeld & van Schagen, 2007), we predicted that the drivers would deem a speed appropriate as higher than the actual speed limits of the roads. In the second experiment, for each of the roads shown in the first experiment speed limit credibility was either manipulated to be low or high. The low credibility was generated by a large discrepancy between the posted speed limit and the mean appropriate speed judged in Experiment 1; the high credibility was generated by a small discrepancy between the posted speed limit and the mean appropriate speed judged in Experiment 1. New groups of drivers were again asked to judge the appropriate speed to drive on the roads. If assumptions about credibility are correct, we would expect to see judgments that are consistent with the displayed speed limit in road scenes where the speed limit was close to the previously identified appropriate speed (i.e. the speed limit appears credible) but not when the limit displayed was a much lower or much higher speed (i.e. the speed limit shown is not credible). Furthermore, in conditions where there is a large disparity between the appropriate speed and the speed limit posted, drivers may disregard speed limit information entirely in making their judgments and make judgments that are very similar to those made in Experiment 1.

Download English Version:

<https://daneshyari.com/en/article/5037317>

Download Persian Version:

<https://daneshyari.com/article/5037317>

[Daneshyari.com](https://daneshyari.com)