Accident Analysis and Prevention 104 (2017) 24–35

Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

Evaluating public education messages aimed at monitoring and responding to social interactive technology on smartphones among young drivers

Cassandra S. Gauld[a,*], Ioni Lewis[a], Katherine M. White[b], Judy J. Fleiter[c], Barry Watson[a]

[a] Queensland University of Technology, Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Kelvin Grove Campus, Kelvin Grove 4059, Australia
[b] Queensland University of Technology, School of Psychology and Counselling, Kelvin Grove Campus, Kelvin Grove 4059, Australia
[c] Global Road Safety Partnership, International Fédération of Red Cross & Red Crescent Sociétés, Route de Pré-Bois 1, CH-1214 Vernier, Switzerland

ARTICLE INFO

Keywords:
Public education messages
SatMDT
Monitoring
Responding
Soical interactive technology
Young drivers

ABSTRACT

Young drivers are more likely than any other age group to access social interactive technology (e.g., Facebook, E-mail) on a smartphone while driving. The current study formed part of a larger investigation and was guided by The Step Approach to Message Design and Testing (SatMDT) to evaluate the relative effectiveness of three different public education messages aimed at reducing smartphone use among young drivers. The messages were each adapted to the specific behaviours of monitoring/reading and responding to social interactive technology on smartphones. Participants (n = 288; 199F, 89M) were drivers aged 17–25 years who resided in the Australian state of Queensland. Message acceptance (i.e., intention and effectiveness) and message rejection were both assessed using a self-report survey. Multivariate analyses found that, overall, the messages targeting monitoring/reading behaviour were considered more effective than those targeting responding behaviour. The message that challenged the underlying motivation that believing you are a good driver makes it easier to monitor/read social interactive technology while driving was considered particularly effective by young male drivers.

The percentage of Australian mobile phone users who own smartphones is expected to reach 91% by 2017 (Telstra, 2014). The increased functionality of smartphones (e.g., access to social networking sites and emails) has meant that they have a greater potential to distract a driver. Despite the illegal nature of hand-held mobile phone use for all Australian drivers, the extra capabilities of smartphones are mostly accessed in hand-held mode, leading to an increase in crash risk (Rudin-Brown et al., 2013). In addition, it is possible that drivers are increasingly concealing their use from outside view, making detection (and enforcement) difficult (Gauld et al., 2014; Rudin-Brown et al., 2013). This concealment, in addition to other factors such as tinted car windows, heightens the need for other countermeasures, such as public education messages, to raise awareness of the dangers of smartphone use while driving.

1. Young drivers

Despite being over-represented in road crash statistics (Department of Infrastructure and Regional Development, 2014), young drivers aged 18–25 years are more likely than any other age group to use a smartphone while driving (AAMI, 2012). Simulator studies have shown that young drivers distracted by their phones are more likely to run yellow-lights (Haque et al., 2013) and take a substantially longer time to detect events originating in the driver's peripheral vision, such as a pedestrian entering a crossing (Haque and Washington, 2013). This evidence indicates that young drivers have an increased risk of being involved in road trauma as a result of using their smartphones (Neyens and Boyle, 2008).

2. Social interactive technology

The term ‘interactive technology’ broadly encompasses functions that respond to user actions which, in turn, may cause the user to respond further (Interactive Technology Learning Curriculum Online, 2012). ‘Social interactive technology’ refers to smartphone functions that allow the user to communicate with other people via, for example, social networking sites (e.g., Facebook, Twitter), emails, and also texting and calling. As most Australians own smartphones, their ability to communicate with others through a variety of functions beyond texting and calling has increased. This expansion in communication channels has been termed ‘media multiplexity’ and is typical of modern relationships (Baym, 2015 p. 156). It is, therefore, possible, that young drivers are also communicating with others through a variety of applications on their smartphones. Indeed, in addition to being twice

* Corresponding author.
E-mail address: c1.gauld@qut.edu.au (C.S. Gauld).

http://dx.doi.org/10.1016/j.aap.2017.04.011
Received 24 November 2016; Received in revised form 3 April 2017; Accepted 16 April 2017

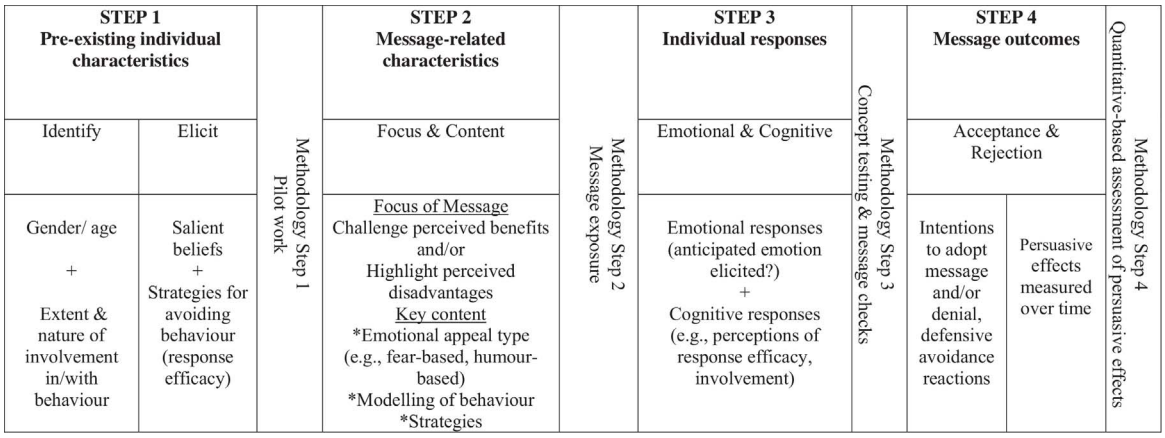

Fig. 1. The SatMDT (Lewis et al., 2009, 2016b).

as likely to make a phone call and four times more likely to text than drivers over 50 years, young drivers are also more likely to read emails while driving (AAMI, 2012) and 14% have admitted to taking a 'selfie' and uploading it onto social media while driving (AAMI, 2015).

3. Monitoring/reading and responding behaviours

Recent research has investigated discrete behaviours associated with mobile phone use, such as reading and responding, as these behaviours have different rates of prevalence, and have been associated with different underlying motivations and different risk perceptions (Atchley et al., 2011; Shi et al., 2016; Waddell and Wiener, 2014). For example, young drivers report responding to communications more often than initiating them while driving (Atchley et al., 2011; Waddell and Wiener, 2014), suggesting that an underlying motivation may be the experience of social pressure to respond (Nemme and White, 2010). Young drivers perceive that sending text messages and replying to text messages are more risky than reading text messages (Shi et al., 2016). However, while this perception may be encouraging young drivers to read communications more often than initiate or respond to them (Gauld et al., 2016a), recent research has shown that simply hearing a notification can significantly disrupt performance on an attention-demanding task (Stothart et al., 2015). It is possible, therefore, that reading a communication may not be as safe as young drivers perceive it to be. While these previous studies were limited to calling and texting behaviours, it is possible that the differences in prevalence and risk perception may also apply to the other social interactive technologies (e.g., Facebook messaging, emailing). The current study addresses this gap in knowledge by investigating the specific behaviours of monitoring/reading and responding to the range of social interactive technology on smartphones among young drivers.

4. Road safety public education messages

Road safety public education messages aim to modify or encourage safer road user behaviours (Elliott, 1993; Lewis et al., 2009; Watson et al., 1996). This persuasive effect can occur either directly by attempting to motivate behaviour change or indirectly through supporting other initiatives such as enforcement, through agenda-setting, or by simply normalising safe road user behaviours (Elliott, 1993; Lewis et al., 2009; Watson et al., 1996).

In Australia, historically, road safety advertising campaigns endeavour to change behaviour through the use of threat appeals that elicit fear. Typically, these appeals aim to motivate through the depiction of the possible outcomes of non-compliance with the safe driving behaviour (e.g., injury or death) that the message is promoting (Dillard et al., 1996; Witte, 1992). For example, these outcomes may be physical injury, death, or legal sanctions (Donovan et al., 1999; Elliott, 1993; Groeger, 2011). Given that fear is an aversive affect which people wish to remove/avoid feeling, they will, therefore, be motivated to change especially if they are equipped with effective strategies for reducing the threat (Witte, 1992). Eliciting fear, however, is not the only way to persuade. Depicting compliance with the desired behaviour, and the associated positive consequences (e.g., approval from others) may also be effective (Lewis et al., 2007b, 2008a, 2013b; Tay, 2011). This modelling of the desired behaviour (which is often associated with positive emotion) can also act to reinforce the behaviour of drivers who are already acting in the desired manner.

Public education messages have been associated with several limitations. These limitations include a lack of theoretical guidance on what constitutes effective message content, failure to segment the audience and to gain a thorough understanding of the target population, and, of relevance to the current study, a lack of scientifically rigorous evaluations measuring different outcome measures (Hoekstra and Wegman, 2011; Lewis et al., 2009; Slater, 1999; Stead et al., 2005). Indeed, the evaluation of the effectiveness of public education messages is not yet standard practise (Elliott, 2011; Hoekstra and Wegman, 2011; Hutchinson and Wundersitz, 2011; Phillips and Torquato, 2009). Evaluations have the potential to provide specific information regarding which key factors in the message design were effective and which were not, thereby building an evidence base regarding how to make public education messages more effective. If evaluations are not conducted, resources may continue to be directed towards unevaluated methods and not towards developing newer, and potentially more effective, methods (Hoekstra and Wegman, 2011; Plant et al., 2011).

5. The step approach to message design and testing

The SatMDT (Lewis et al., 2009, 2016b) is a relatively new and innovative framework specifically designed for guiding the development and evaluation of health message content including road safety (see Fig. 1). While it is acknowledged that many behaviour change models/theories do exist (see Tay (2011) for a comprehensive review of these models) as well as manuals to guide the development and evaluation of campaigns (e.g., Delhomme et al., 2009; WHO, 2016), the SatMDT is unique in that it draws together empirical and multi-theoretical evidence to guide the development and evaluation of road safety message content. Slater (1999) highlighted the need for direction and guidance on message development that specifically draws together complementary aspects of various theories. In addition, the SatMDT attempts to address some of the prior limitations of road safety public education message research and practise. The underlying psychological theories of decision making and attitude–behaviour relations that guide the SatMDT are the Theory of Planned Behaviour (TPB; Ajzen, 1985, 1991), the Extended Parallel Process Model (EPPM; Witte, 1992), The Elaboration Likelihood Model (ELM; Petty and Cacioppo, 1986), and