Connection without caution? The role of mobile phone involvement in predicting young people's intentions to use a mobile phone while driving

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Abstract

The present study examined the predictors of the intentions of young people aged between 17 and 24 years (N = 196) to use their mobile phone while driving. Using convenience sampling, drivers were recruited at petrol station travel centres to complete a cross-sectional survey. The Theory of Planned Behaviour constructs of attitude, subjective norm, and perceived behavioural control (PBC) were measured, as well as mobile phone involvement - a construct based on behavioural addiction components to reflect people's cognitive and behavioural interaction with their mobile phone. Attitudes, PBC, and mobile phone involvement predicted young people's intentions to use their mobile phone while driving, highlighting the need for interventions to address the perceived rewards and costs of the behaviour and to challenge the potentially powerful need to be constantly connected with others by technology irrespective of the associated dangers.

Keywords

Attitudes, Driver distraction, Mobile phone, Road safety, Theory of Planned Behaviour

Introduction

Within the communication field, new technologies have allowed instant connection to information and other people in an unprecedented manner. At the same time, they have created the potential for risky situations involving use of the technologies. One of these contexts is using mobile technologies while driving, where the incorporation of some new applications now available on these devices (e.g., assisted navigation) can serve to aid drivers. In contrast, other functions (e.g., access to email and social networking sites via mobile devices) can provide a distraction from the main purpose of safe driving.

Mobile phone use

In Australia, mobile phone use while driving is a fairly common behaviour but is illegal in the case of hand-held phones [1]. Mobile phone use while driving has been associated with risks of crashing due to reduced driver attention on road conditions and driving tasks [2, 3]. It is likely that people use their mobile phones while driving due to the identified benefits of mobile phone use in general such as remaining in contact with others [4], and allowing instant access to information especially via the increasing number of available applications (e.g., social networking sites). Although these functions may be beneficial in many contexts, when driving, the potential for drivers to respond to contact from others rather than focusing on the task at hand presents a safety risk.

The focus in the present study is the mobile phone use of young people(for the purpose of this study, young people are defined as persons aged between 17 and 24 years), given (i) the general over-involvement of young drivers in road crashes in Australia and internationally and(ii) the greater use of mobile phones among young drivers while driving. First, road crash statistics consistently reveal that young drivers are over-represented in both fatalities and injuries in Australia and many other countries around the world. For instance,within Australia, although road crash fatality rates have steadily declined over recent decades, young drivers continue to be killed at rates that far exceed those of older, more experienced drivers[5]. Second, in Australia, in addition to young adults having the highest level of general mobile phone use [6], they are also more likely to use a mobile phone while driving than older drivers [1].

There is evidence that many young people believe the benefits of mobile phone use while driving outweigh any costs, in particular, the increased risk of crashing [4, 7]. Researchers have examined the predictors of mobile phone use in general, and specifically in the case of risky or problematic behaviours such as while driving [8, 9].A number of researchers have drawn on well-validated models, such as the Theory of Planned Behaviour (TPB) [10], to understand the determinants of decisions made by drivers, including those of young drivers, in this context.

Theory of Planned Behaviour

The TPB is a model of decision-making where behaviour is determined by the individual's intentions to perform the behaviour[10]. Intentions, in turn, are influenced by an individual's attitude, subjective norm, and perceived behavioural control (PBC). Attitude reflects a person's favourable or unfavourable evaluation of performing the behaviour; subjective norm is how much the person feels social pressure to perform or not perform the behaviour; and PBC describes how easy or difficult a person perceives performing the behaviour to be (and may influence behaviour directly). In addition to meta-analytic results across a wide range of behaviours [11],there is some limited evidence for the model in predicting intentions and behaviour for mobile phone use in general [12], and intentions

for mobile phone use while driving among community populations [13]. For younger drivers, there is some support for the utility of the standard TPB constructs in examining road safety behaviours such as drink driving [14] and some emerging evidence related to mobile phone use while driving [15, 16]. Although TPB constructs are usually measured by multiple items, single item measures for TPB constructs have been used in a variety of studies [11, 17, 18]and can provide an initial indication of the utility of the model for predicting a target behaviour.

Recently, researchers have identified that some people develop such a dependent relationship with the functions and connections a mobile phone provides that it can lead to an over-reliance on the medium, even when use is socially inappropriate (e.g., cinemas, lecture theatres) or dangerous (such as whilst driving) [19, 20]. Based on qualitative research [21], Walsh, White, and Young [22] developed their mobile phone involvement questionnaire (MPIQ) which drew on the framework of Brown's [23, 24] behavioural addiction components as the basis for measuring mobile phone involvement. The MPIQ includes symptoms such as cognitive and behavioural salience (the activity dominating thoughts or behaviour), withdrawal (negative physiological or psychological response to not engaging in the behaviour), and loss of control (being unable to control one's desire to perform the behaviour). Factor analytic results supported a unidimensional construct and, based on the criterion of a reliability coefficient of .70 or higher being considered acceptable [25], the MPIQ possessed adequate reliability (α = .78). It may be that the more involved people are with their mobile phone, the more likely they will use it in environments even if risky or illegal due to the priority of mobile phone use in their lives.

Aims and objectives

The aim of the present study, then, was to provide a preliminary examination of the utility of the TPB, incorporating mobile phone involvement, to predict young people's intentions to use their mobile phone while driving. The study focused on young adultsaged between 17 and 24 years, given the general over-representation of young drivers in road crashes in Australia and internationally [5] and because they comprise the group with the greatest mobile phone usage while driving [1].

First, it was expected that the more young people reported a favourable attitude towards using their mobile phone while driving, the stronger their intentions to use their mobile phone while driving.In addition, it was expected that the more participants reported that they perceived social approval to use their mobile phone while driving, the stronger their intentions to do so. Further, it was expected that the more participants believedthat they have control over using their phone while driving,the stronger their intentions to use their mobile phone while driving. Finally, in addition to the impact of the standard TPB constructs, it was expected that young people who reported greater involvement with their phones wouldreport stronger intentions to engage in mobile phone use while driving.

Materials and Methods

Participants

This study was conducted as part of a larger survey examining the mobile phone use while driving patterns of the general public with participants recruited at petrol station travel centres in South-East Queensland, Australia [13].The travel centre managers imposed a maximum time per customer interaction limit of 10 minutes for the study. Potential participants were screened to determine if they held a current driver's licence and if they used a mobile phone at least once a day to ensure that all participants engaged in some form of mobile phone use. After receiving university ethics approval and permission of the travel centres, patrons who were utilising the eating areas of the centres were invited by one of the research assistants to complete a survey about mobile phone use while driving, and were compensated ($10) for their time. Participants were provided with writing utensils if needed and completed hard copies of the surveys in the eating areas, indicating to the researchers when they were ready to return their questionnaires. Some participants completed the questionnaires while seated alone and other participants completed their surveys individually but in the pairs and groups in which they were sitting when approached. Of the total sample, there were 196 (105 males, 91 females) participants aged between 17 and 24 years (M= 20.02, SD = 2.05) and most (87%) of the participants in this age group reported using a hand-held mobile phone for texting and calling more frequently than a hands-free phone while driving. Among a number of other survey measures, participants responded to TPB items about their intentions to use a mobile phone while driving and items assessing the level of involvement with their mobile phone. Participants were asked also about the frequency of previous use of their mobile phone while driving.

Measures

TPB constructs

The TPB constructs were based on standard measures [8] and were assessedwith one item each, all scored on a scale from 1 *(extremely unlikely)* to *7(extremely likely)*, with the starting prompt 'If you were driving in the next week, do you agree that…?'

- *Attitude* was measured with the item 'Using my mobile phone while driving would be good'.
- *Subjective norm* was measured with the item 'Those people who are important to me would want me to use my mobile phone while driving'.
- *Perceived behavioural control* was measured with the item 'I have complete control over whether I use my mobile phone while driving'.
- *Intention* was measured with the item:'It is likely that I will use my mobile phone while driving'.

Mobile phone involvement questionnaire (MPIQ)

Walsh et al.'s [22] mobile phone involvement questionnaire comprised the following eight items: 'I interrupt whatever else I am doing when I am contacted on my mobile phone'; 'I often use my mobile phone for no particular reason'; 'I feel connected to others when I am using my mobile phone'; 'Arguments have arisen with others because of my mobile phone use'; 'I lose track of how much I am using my mobile phone'; 'I often think about my mobile phone when I am not using it'; 'I have been unable to reduce my mobile phone use'; 'The thought of being without my mobile phone makes me feel distressed'. All items were measured on a scale from 1*(strongly disagree)* to 7*(strongly agree)*. Based on the criterion of a reliability coefficient of .70 or higher being considered acceptable [25], the scale was reliable (α = .78).

Data analysis

The TPB constructs, mobile phone involvement, and the demographic factor of age were all measured on continuous scales, with sex (1 = *male*, 2 = *female*) and type of phone use (1 = *predominantly hands-free*, 2 = *predominantly hand-held*) measured as dichotomous variables, Correlational analyses were conducted to assess the inter-relationships between the predictors and outcome variable of intentions. A three-step hierarchical regression was then performed with the background factors entered on Step 1, the TPB predictors entered on Step 2, and mobile phone involvement entered on Step 3. This analysis enabled a calculation of the proportion of variance each step accounted for in the prediction of intentions (and whether or not the step was significant) as well as identification of the significant factors that predicted intentions once all of the variables had been entered into the equation.

Results

Descriptive statistics

Most of the young people in the sample reported using their mobile phone while driving at least once or twice a week for sending texts (53%), reading texts (65%), making calls (60%) and answering calls (69%), with about a third of participants reporting that they performed one of these behaviours at least daily. Means, standard deviations, and correlations among the constructs used in the present study are provided in Table 1 (Appendix 1). Of the predictor variables, attitude, subjective norm, PBC and mobile phone involvement were significantly correlated with behavioural intentions, with attitude as the strongest correlate.

Regression analysis predicting intention

A hierarchical multiple regression was performed to examine the impact of the standard TPB constructs (attitude, subjective norm, PBC) and mobile phone involvement on young people's intentions to use a mobile phone while driving. The background variables of age, sex and type of phone use (predominantly hands-free versus predominantly hand-held) were entered into the equation at step 1. The TPB constructs were entered on step 2 and mobile phone involvement was entered on step 3 – see Table 2 (Appendix2). As a group, the step 1 background variables did not significantly predict participants' intentions (R^2 = .02), F (3, 192) = 1.36, p = .256. Entry of the step 2 variables (standard TPB constructs) accounted for a significant portion of the variance in intentions (ΔR^2 = .43), F (3, 189) = 49.19, p < .001. At the final step,entry of mobile phone involvement added an additional, significant proportion of the variance in people's intentions (ΔR^2 = .02), F (1, 188) = 6.327, p = .013. In the final equation, the model accounted for a total of 47% of the variance and the significant predictors of intentions were attitude, PBC and mobile phone involvement.

Discussion

This study comprised a preliminary investigation to explore whether the TPB constructs of attitude, subjective norm, and PBC predicted the intentions of young people to use their mobile phone while driving. Additionally, the study gauged whether the level of mobile phone involvement was a significant predictor of intentions.

The TPB constructs of attitude and PBC predicted young people's intentions, suggesting that young people who are more favourable towards the idea of using a mobile phone while driving and who perceive that doing so is within their control are more likely to intend to use their mobile phone while driving. As subjective norm did not emerge as a significant predictor, others' approval (or disapproval) did not impact on young people's intentions to use their mobile phone while driving. Although there is evidence for the role of subjective norm influencing young people's intentions to use a mobile phone while driving in some studies [15, 26], there is also mixed evidence in other studies with some support for the role of subjective norm in the case of intentions to send texts, but not read texts while driving [16].

It is possible that, similar to other TPB research in general [11], it may not be the approval or disapproval from others that is important; instead, other sources of social influence should be considered either instead of or in addition to subjective norm. In the case of young people specifically, it may be the norms of their referent group such as their immediate friendship group and whether their friends actually use their phone while driving that has a more direct impact on their decisions (i.e., group norms) than perceptions of explicit approval from others[27] and there is support for the influence of group norms on intentions to text while driving [16]. Further, researchers have found support for the impact of other types of norms on young people's intentions to use their mobile phone while driving and these types of social influence may be important to consider in future examinations. These norms include moral norms

(perception of the socially-derived moral correctness or incorrectness of performing particular behaviours - see [16]) and both verbal and behavioural norms (direct and overt attempts by actors in the environment, such as law enforcers, to encourage individuals to behave in a certain way - see [26]).

The level of mobile phone involvement influenced young people's intentions to use amobile phone while driving, after accounting for the influence of the standard TPB constructs. Those participants reporting greater involvement with their mobile phone were more likely to intend to use their mobile phone while driving. These results highlight the emerging role that mobile communication technologies have assumed in people's lives and that, for some people, the ease and convenience of use of these technologies leads to an excessive attachment that impairs their decision-making. Other researchers [e.g., 15] have examined the perceived importance of the call on people's decisions to use a mobile phone while driving and it is possible that those who are highly involved with their mobile phone consider most calls to be important.

The finding that attitude and PBC emerged as significant predictors of young people's intentions to use their mobile phone while driving can inform efforts to curb thisrisky behaviour. Other studies examining younger people's road safety decision-making also have identified attitudes as an important component to influence actions [14, 15, 16], highlighting their role as possible catalysts of change. For instance, as a suggestion in the present context, strategies to curb young people's mobile phone use while driving could focus on minimising the benefits of using a mobile phone while driving and emphasising the costs (e.g., communicating with others and retrieving information via a mobile phone are risky while driving and are better performed and more efficient with one's full attention). In addition, given that the importance of control perceptions has been highlighted in other studies examining younger adults' performance of unsafe driving behaviours [14, 15], strategies to reduce mobile phone use while driving potentially could highlightthat the decision to use the phone is one's own choice and that everyone has the right to exercise the option not to respond to texts or calls from others while driving. For mobile phone involvement, it may be beneficial to examine explicitly people's relationships with their phone and direct efforts toward any excessive attachment with the technology that may result in poor decision-making such as choosing to use one's mobile phone while driving. One possibility is that strategies could be employed to challenge and manage some people's need to be constantly connected to others irrespective of context or location.

This study had several limitations. The study examined intentions only and did not assess whether or not participants used their mobile phone while driving (i.e., reported behaviour) at a follow-up time point. Although intentions are the strongest predictor of subsequent behaviour [11], a prospective study with a follow-up data collection period may allow for a more in-depth understanding of the relationship between TPB constructs and behavioural performance. Also, given that the items were part of a larger survey where there were time constraints per customer imposed by the management of the travel centres, the TPB measures were one-item scales only. As such, the study provides only preliminary evidence as to the relationship among the TPB predictors and young people's intentions to use a mobile phone while driving. Future research should confirm the current pattern of results with multi-item scales and employ a prospective design to assess behaviour.

Given the potentially fatal consequences of interacting with mobile phone technology on the roads, it is imperative that researchers continue to identify the psychological factors that influence this commonly performed behaviour. The results of this study suggest it would be worthwhile to focus on young people's attitudes and control perceptions about using a mobile phone while driving, as well as acknowledging the dependent relationship some develop with their phones which allows for constant access between themselves and others. This knowledge could be used to inform efforts that help reduce the prevalence of young adults using mobile phones while driving, and to enable strategies to be implemented that foster alternative means for young people to connect with important others in a safer way.

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Appendix 1

Table 1. Means, standard deviations, and bi-variate correlations for the predictor variables

Variable	M	SD	1	2	3	4	5	6	7	8
1. **Age**	20.02	2.05	-							
2. **Sex**	1.46	.500	-.08	-						
3. **Type of phone use**	1.87	.34	-.07	.03	-					
4. **Attitude**	3.17	1.96	.06	-.16*	-.04	-				
5. **Subjective norm**	2.64	1.81	.06	-.10	.04	.64***	-			
6. **PBC**	5.13	2.07	.09	.10	-.09	.24***	.23**	-		
7. **Intention**	4.43	2.25	.05**	-.11	-.09	.64***	.37***	.31***	-	
8. **Mobile phone involvement**	3.53	1.18	-.21	.23**	.04	.16*	.11	-.02	.21**	-

p< .05.p< .01.***p< .001.*

Note. For Sex, 1 = male, 2 = female; For Type of phone use, 1 = predominantly hands-free, 2 = predominantly hand-held

Note. PBC refers to perceived behavioural control

Appendix 2

Table 2.Multiple regression analysis for variables predicting intentions to use a mobile phone while driving (N = 196)

	Variable	B	B	R^2	ΔR^2
Step 1				.02	.02
	Age	.02	.02		
	Sex	-.33	-.07		
	Type of phone use	-.31	-.05		
Step 2				.45	.43***
	Attitude	.71	.62***		
	Subjective norm	-.12	-.09		
	Perceived behavioural control	.21	.19***		
Step 3				.47	.02**
	Mobile phone involvement	.27	.14**		

p< .05.p< .01.***p< .001.*

Note. Weights provided are at the final step of the analysis.

Road trauma, patterns of injury and mortality in an Australian trauma centre

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Abstract

Introduction: Road trauma remains a leading cause of death and permanent disability. The authors investigated differences between road user groups, mortality rates and pattern of injuries. **Methods:** Data were prospectively collected on trauma presentations to the St George Public Hospital (SGH) from January 2002 to June 2008 (n=5118). Injury severity and patterns were evaluated using the Injury Severity Score (ISS), the New Injury Severity Score (NISS) and the Abbreviated Injury Score (AIS). Multiple regression analysis was used to analyse data. **Results:** Risk of death was 5 times higher for injured pedestrians than drivers (OR=5.0 95% C.I 2.97-8.57, p<0.001). Patients with head injuries had an increased risk of death compared to patients without head injuries (adjusted OR=6.04, 95% C.I. 3.79-9.64, p<0.0001).
Conclusion: Vulnerable road users had a significantly higher mortality rate than other road users. These findings highlight the need for further research into factors contributing to pedestrian injury such as road design and pedestrian crossings.

Keywords

AIS, Car occupant, ISS, Mortality, NISS, Pedestrian, Road trauma, Trauma

Introduction

Despite a decrease in the mortality rate of multi-trauma patients over the past two decades, road trauma remains a leading cause of death and long-term morbidity [1]. The decrease is partly due to increased occupant crashworthiness of new vehicle models and safer road design, but is also due to road safety campaigns increasing public awareness of the importance of wearing a seatbelt, avoiding drink driving and speed enforcement legislation [2, 3].

The Crash Injury Research and Engineering Network (CIREN) was developed by the National Highway Traffic Safety Administration (NHTSA) in the United States in 1996. It is a multicentric research collaboration between clinicians and engineers looking at traffic-related injuries presenting to eight 'level 1' trauma centres in the United States. The mission of the