Smartphone Usage Behaviour amongst the "smartphone" generation: Its impact on road traffic safety

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Declaration

I declare that this research report, entitled "Smartphone Usage Behaviour amongst the ‘smartphone’ generation: Its impact on road traffic safety” is my own unaided work. It is submitted for the degree of Master of Psychology by Coursework and Research Report, at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination at any other university.

Signed this _____ day of _____ 2020

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Beverly Mosima Seabi

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Abstract

There has been a dramatic increase in the usage of smartphones resulting in 2.32 billion people using smartphones worldwide. This widespread use of smartphones may have resulted in an increase of smartphone usage while driving. Road traffic accidents are considered to be leading health hazards and economic problems throughout the world. As a result, there has been a steady increase in research in the area of traffic psychology in Euro-western contexts. However, not much is known in developing countries, particularly within the African continent. It was therefore essential to assess the impact of smartphone usage while driving, considering the safety of motorists and pedestrians. The sample consisted of 298 university students with age ranges of 18 to 54 years and mean age 22.30 in Johannesburg. An online survey was used to access the participants and they completed a battery of assessments, which evaluated driving behaviours they considered to be risk, task-management strategies used to address smartphone distracted driving and compared gender groups with regards to their perceptions of risky driving behaviour and task-management strategies. In addition to descriptive statistics, inferential statistics were conducted.

The results revealed that operating a motor vehicle while intoxicated, racing another vehicle, manual usage of a smartphone while driving, not maintaining an acceptable following distance (tailgating), driving when tired, overtaking on a busy road, not wearing a safety belt and speeding over 20km/h of the speed limit as the most dangerous driving activities. Ironically, although the participants regarded texting or browsing on the smartphone as distracting driving behaviour when engaged by other motorists, they deemed it safe when they engaged in the same behaviour. The results also revealed statistically significant differences between males and females in terms of not wearing a safety belt $t(298) = -1.143$, $p = .035$; speeding more than 10km/hour over the speed limit $t(298) = -1.210$, $p = .006$ and using a cell (hands free device) while driving $t(298) = -1.719$, $p = .002$, thereby indicating that males were more likely to engage in risky driving behaviours than females. Statistically significant correlations were found between speeding more than 10km/hour over the speed limit and driving when tired ($r = .13$, $p < .05$), and between speeding more than 10km/hour over the speed limit and not maintaining appropriate following distance- tailgating, ($r = .19$, $p < .05$). These findings are discussed in light of previous empirical studies and suggestions for future studies are made.

Keywords

Smartphone usage, Distracted driving, Driver behaviour, Road safety, Risk perception

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

The use of mobile technology was originally for voice-based communication over telephone, however the advancement in technology has resulted in the expansion of its functions. A standard cell phone has undergone massive transformation, since the turn of the new millennium (North, Johnston & Ophoff, 2014). According to Patil, Karhe and Aher (2012) the new millennium has ushered a rapid change in the functionality of the mobile phone from being a two-pager communication device to a device with several roles comprising internet, global positioning system, navigation, and instant texting tool. During this period, the cell phone wireless development has underwent progression from Zero-Generation (0G) to First until Fourth Generation (4G) which has resulted in increased excellence of service, productivity and operation (Mir & Kumar, 2015). The 4th Generation devices now herald increased accessibility to the internet as well as other internet-based applications like Instagram, SnapChat, Telegram, Twitter, and Facebook messenger. This new refinement has resulted in increased use of the mobile devices especially among the young adults who engage in WhatsApp chatting and video calls, sending messages, view mobile television such as Netflix, group video calls and use of global positioning system, throughout the day inclusive of times when they might be busy with other activities such as walking or driving (Terry & Terry, 2016). These mobile phone devices have come to be known as 'smartphones' particularly as they offer superior sophistication in its functionality and several satisfactions over old-fashioned cellular phones (Oviedo-Trespalacios, Nandavar, Newton, Demant & Phillips, 2019; Panova & Carbonell, 2018). For the purposes of this research report, the term "smartphone" is used when referring to mobile phone or cell phone.

1.2 Problem Statement

Given the growing road traffic accidents, which are considered to pose a leading health hazard and economic problems throughout the world, there has been a steady increase in research in the area of traffic psychology, especially within developed Euro-Western contexts

(Huisingh, Griffin & McGwin, 2015; Overton, Rives, Hecht, Shafi & Gandhi, 2008; Rudisill & Zhu, 2017; Seacrist, Douglas, Huang, Megariotis, Prabahar, et al. 2018; Shaaban, Gaweesh & Ahmed, 2018; Wahlberg, Dorn & Kline, 2008). According to reports by the World Health Organisation (2011) road traffic casualties will rate as the 5th main cause of deaths by the year 2030. Similarly, the Safe International Road Travel estimates the road accidents to be the fifth cause of death in 2030.

Extensive research has been done worldwide, which has indicated that most of the untimely deaths have been related to road traffic accidents. According to Statista (2018) there were 37 000 road traffic-related accidents in the year 2016 which, resulted in deaths in the US. In South Africa there has been a reported 32 accidents per 100,000 people in a year (International Transport Forum, 2013). Countries with low to middle economies such as South Africa experience more than 90 percent of road accidents despite possession of fewer cars in comparison to the world's motor vehicles (Association for Safe International Road Travel, 2018). Road accidents accounts for 23 percent of deaths among the youths. Additionally, traffic accidents were outlined as the main cause for hospitalisation among the youth (Association for Safe International Road Travel, 2018).

According to Creaser, Edwards, Morris and Donath (2015) and Lavorie, Lee and Parker (2016) most of the drivers who are categorised as high risk are young drivers under the age of 24 years. There are a number of factors related to demographic factors and experience of operating motor vehicle amongst the youth that may have contributed to this (Bates, Davey, Watson, King, & Armstrong, 2014). Furthermore, there have been car accidents associated with alcohol consumption particularly amongst the youth (Bosari, 2013). The female drivers have been observed to be a lesser risk category (Bosari, 2013). In addition, there is a growing rate of juvenile drivers who rely much on smartphones while driving (Harbeck & Glendon, 2013; Walting, 2014; Weller, Shackleford, Dieckmann & Slovic, 2013).

Adding on to this, the use of smartphone while driving has been attributed as the chief leading cause of road accidents (Gauld, Lewis & White, 2014; Neyens & Boyle, 2008; White, Walsch, Hyde & Watson, 2012). Despite this, not much is known about the impact of smartphone usage whilst driving, particularly in developing countries.

1.3 Rationale

The use of smartphones has had an impact on the society (Muelhleggera & Shoag, 2014). There has been a dramatic increase in smartphone usage resulting in 2.32 billion people using smartphones worldwide (Statistica, 2017). In South Africa, it is projected that the use of smartphones will continue to increase, with 25 million people expected to own a smartphone by the year 2022. This widespread use of smartphones may have resulted in an increase of smartphone usage while driving. For this reason, it becomes important to have an assessment of and understand the impact of smartphone usage while driving, considering the safety of motorists and pedestrians.

The National Highway Traffic Safety Administration (2015) defines distracted driving as any task which can act as deterrence to the driver's focus while driving. Research has shown that using a smartphone while driving poses a risk for the driver and other motorists (Engelberg, Hill, Rybar & Strayer, 2015). A relationship between smartphone use and distraction which may lead to a compromise of visual, physical and cognitive attention has been reported (Olsonm, Hanowski, Hickman & Bocanegra, 2009). The term 'distraction' refers to any activity which draws away an individual's attention from the principle mission of operating a car and this can include texting, answering a phone call, using navigation technologies (GPS) and eating (Tabunar, 2019). In support of this, Engelberg et al. (2015) found out that while activities such as drinking, eating, smoking, talking and applying make-up while driving may lead to impaired driving due to distractions, usage of smartphone was more disastrous and pervasive among the youth. Distractions are categorised into three forms, namely, manual (which involves removing one's hands off the steering wheel), visual (which involves focusing one's eyes other things than the road) and cognitive distraction (which occurs when a person's attention is not directly on the act of driving). According to Nasar and Troyer (2013) a driver who uses a smartphone while operating a motor vehicle experiences restriction of sight which limits the motorist's capability to inspect the road for possible obstacles in traffic flow because of distraction. The use of smartphones and other portable electronic devices such as Ipad were found to largely have distracting effects among the drivers in the United States (National Highway Traffic Safety Administration, 2006). It is

thus crucial to reflect on all potential factors that can lead to car accidents. It is through studies such as the current research, which explore the relations and effects of smartphones on road safety, that it is hoped more knowledge can help in the reduction of incidence of unnecessary loss of life resulting from simultaneous usage of smartphone while driving.

1.4 Aims of the study

The aim of the research was to investigate whether smartphone usage behaviour amongst smartphone generation impact negatively on road traffic safety.

The present study was led by the following aims:

1. To investigate driving behaviours considered to be risky by smartphone users.
2. To explore what behaviours are distracting when driving while talking on the phone.
3. To explore what behaviours are distracting when driving while texting/browsing on the phone.
4. To investigate task-management strategies used by respondents in order to tackle smartphone distracted driving.
5. To investigate the likelihood of being involved in a motor vehicle accident if using smartphone while driving.
6. To compare gender groups with regards to their perceptions of risky driving behaviour.
7. To compare gender groups with regards to task management strategies.
8. To establish the association between smartphone usage while driving, driving while intoxicated and risky driving behaviours amongst university students.

1.5 Research Questions

In order to investigate the behaviour related to how smartphones are used and their effect on traffic safety, the subsequent questions directed the study.

1. What driving behaviours are considered risky by university smartphone users?
2. What behaviours are considered distracting when driving while talking on the phone?

3. What behaviours are considered distracting when driving while texting/browsing on the phone?
4. Which task-management strategies are used by university students in an effort to address smartphone distracted driving?
5. What is the likelihood of being involved in a motor vehicle accident if you are using your smartphone?
6. Is there a disparity between males and females with regards to perceptions of risky driving behaviour?
7. Is there a statistically significant difference between males and females with regards to task management strategies?
8. What is the association between smartphone usage while driving, driving while intoxicated and risky driving behaviours amongst university students?

1.6 Format of the research report

This report comprises five chapters, namely, introduction, a literature review, research methods, concurrent presentation of the results and discussion of the findings as well as conclusion. The format of the report is elaborated underneath.

- **Chapter One: Introduction**

This chapter serves to provide a background about the study. The focus of the introduction is on problem statement, significance of the study, aims and research questions, which drive the study.

- **Chapter Two: Literature Review**

Chapter Two gives an in-depth review of literature related to smartphone usage behaviour within the context of road traffic safety. The purpose of the review of literature is to provide in-depth critical review and to position the present study within the context of existing knowledge and research in this field. Current trends are also recognised and related to the South African context.

- **Chapter Three: Research Methods**

Chapter Three presents the research methods utilised to ensure realisation of the objectives of the study. The focus is on the context of the study, research design, sampling techniques, participants, research procedure, data analysis and ethical considerations.

- **Chapter Four: Results and interpretation of findings**

Chapter Four presents the findings of the current study based on the analysed data. Tables and graphics are used to present the data. In addition, discussion of the results is presented.

- **Chapter Five: Conclusions and Recommendations**

A discussion of the major findings is provided. Given the limitations of the present study recommendations for future study are made. In addition to this, the conclusion is presented.

1.7 Conclusion

This chapter presents an important introduction of the research and the motivation for the study. The research will focus on smartphone usage as well as how that may have influenced the driving behaviour. This chapter also discussed the problem statement, rationale, and the aims. The next chapter presents a review of literature on various aspects such as smartphone usage, the significance of mobile phone usage, injuries from road collisions, the association between smartphone usage, accidents and theory of planned behaviour.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical review of smartphone usage behaviour among the 'smartphone' generation and the impact that it has made on road traffic safety. It comprised of six sections. Firstly, current statistics on accident related injuries globally and locally are presented. The statistics highlighting the significance of road traffic safety as a health hazard are then presented. The review of the literature shows evidence in support of the notion that juvenile motorists are prone to road injuries and road fatalities on the road. Furthermore, the importance of smartphones and social media will be presented and discussed, taking into considering the South African and the global contexts. A discussion on smartphone usage while driving will be conducted. This chapter will conclude with a summary of main points from the review of literature.

2.2 The function of smartphones in the 21st century

Firstly, it is important to have a discussion on the usage of smartphones and social media in society. This will provide some insight into the key role of smartphones in the 21st century, paying attention to the South African context first and then looking at other countries. Recent research has shown the proliferation of smartphones (Deepend, 2014). Research has revealed that this increase in the use is more pronounced among the youth (Deepend, 2014). Technological advancements has resulted in the smartphones increasing in functionality, moving away from its traditional uses such as dialling and receiving calls to more sophisticated uses such as browsing on the internet (Deloitte, 2015).

The market now has 'new generation' mobiles phones which have been termed as 'smartphones'. These smartphones now have capabilities which were traditionally restricted to personal computers such as word processing and email (Deloitte, 2015). Studies have shown that smartphones have become very popular such that they have overtaken all other forms of technology communication including the television (Nielson, 2015). Smartphones now offer proficient and instant access to information and allows for communication between

parties dispersed in wide geographic location at a relatively lower cost (Deloitte, 2015). In this regard, smartphones have become very popular in the global market (Deloitte, 2015). According to Nielson (2015), it was found in an Australian study that the average hours spent on smartphone by each individual was significantly high. McNabb and Gray (2016) report that there is increased preference to use smartphone rather than personal computer. A report published by the Digital Statistics in South Africa (2017), paints a blurry picture, which indicates that most South Africans spend over eight hours on their smartphones online.

Studies conducted have shown that the use of smartphones has translated to problematic problems around the world (Billieux et al., 2015; Seo, Kim & David, 2015). Seo, Kim and David (2015) conducted an investigation and noted the communication dynamics between family and friends and found that people tended to engage in face to face communication while concurrently communicating with other people on their smartphones. The study showed that mobile communication has a negative influence on person to person communication, especially among family members. Similar studies conducted by Billieux et al. (2015) gave rise to the notion that smartphone usage could be considered to be causing dependency or addiction, to the point that people are no longer able to put their smartphones down and work on other activities. Seo and colleagues (2015) also found that smartphone usage had a negative effect on activities such as driving. It is for this reasons that the current study was conducted in order to assess the impact of smartphones on road traffic safety.

The Oxford University Press (2014, p.54) defines social media as a set of "websites and applications" which allow people to communicate online and to share information or contents to each other. The usage of smartphones to access social media is a prevalent phenomenon worldwide. Anecdotal evidence suggests that the use of smartphones appears to be threatening social contact and interaction between people due to the tendency of people to keep themselves busy on the phone while in queues and so on. It is no wonder that most of the time spend on a smartphone is spent on online (Nielson, 2015).

There are numerous online media platforms. Amongst these platforms in order of popularity, are Facebook, Instagram, Twitter, Snapchat etc. Sensis (2016) found that Facebook enjoys

the spotlight than any other social media platform. It was also found that most of the active users of social media were the age group 18 – 39 years.

2.3 Road Traffic Collisions: A Societal Health Hazard

In order to have an appreciation of the problem of road accidents, this section will discuss the statistics about road accidents focusing on injuries and fatalities.

2.3.1 Worldwide

Research conducted across the globe shows that road accidents are posing a public health issue worldwide (World Health Organisation [WHO] 2014). According to a report published by WHO (2018), road accidents were the 7th highest cause of death worldwide in 2016 and seventy-four percent of those who lost their lives were males. Road accidents injuries have been recognised as a foremost reason of death amongst males between the ages 15 and 29 years globally while for females for such fatalities were rated fifth and fourth between the ages 5 and 14 years and between the ages 15 and 29 years, respectively (University of Washington, 2014). In Australia it was discovered that transport-related deaths ranked eighth in their contribution to premature deaths. These figures have prompted governments to encourage and enforce road safety such as advocating for increased usage of seat belts and better licencing legislation (The World Bank Group, 2014). However, Peltzer (2011) reports the prevalence of road accident victims to be significantly high in Africa.

According to the World Group & University of Washington (2014) increased motor vehicle sales and ownership in East Asia (including China) has resulted in an increase in road traffic accidents in these countries. In the southern region of Africa, there has been underreporting of road accidents and this is attributed to the lack centralised mechanisms to record such accidents (South African Transport Council, 2011).

2.3.2 Road Traffic Accidents in South Africa

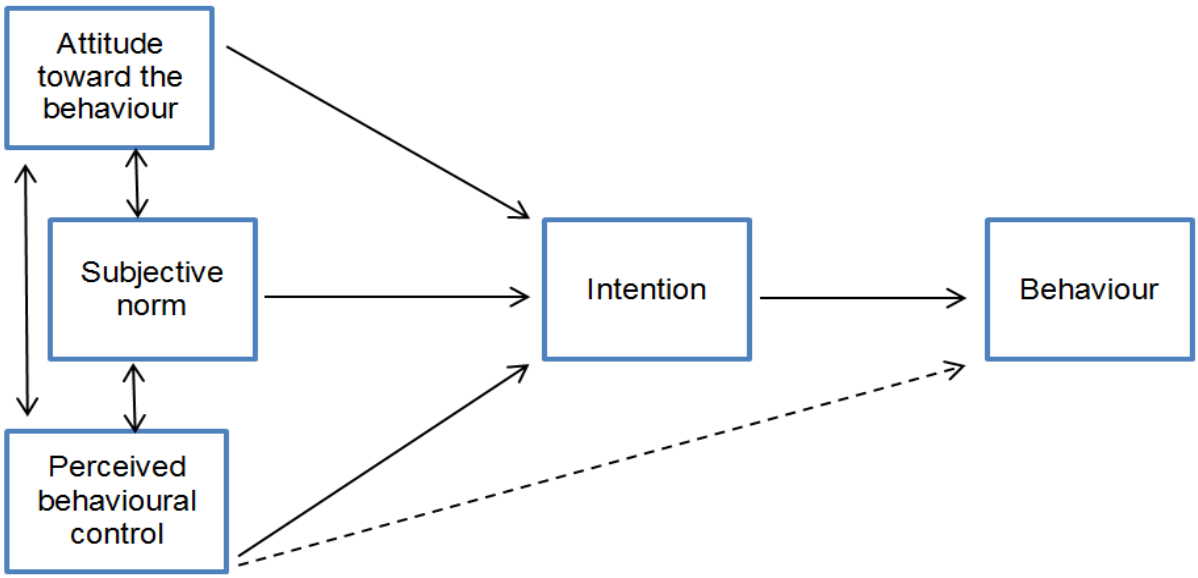
Studies have shown that driver exhaustion is the leading cause of accidents especially amongst long distance motorists in South Africa (Thompson et al., 2013). Road accidents in South Africa have been characterised by slow response rate from the medical team and a delay in the provision of roadside treatment (South African Transport Council, 2011). This has been widespread and inclusive of major metropolitan areas such as Gauteng. There have been recorded cases where roadside assistance arrived 3 or more hours post-accident (Thompson et al., 2013).

Gauteng Road Safety Commission (2016a) identified human error as the foremost cause of the road traffic accidents that occurred in 2015. In the majority of the accidents alcohol use, velocity, exhaustion or distraction contributed (Gauteng Road Safety Commission, 2016a). The Office of Road Safety (2014) confirms that amongst the contributing factors of road accidents are a combination of human errors including operating a motor vehicle while intoxicated as well as excessive acceleration. A major contributing factor in 38 percent of casualties and 42 percent of critical injuries is speed and inattention (Gauteng Road Safety Commission, 2016a). Of significant worry is that statistics show that 15 percent of road accidents involve drivers between the ages 25 and 29 years whilst 19 percent of the fatal accidents involve drivers between 20 and 24 years old. Males have been seen to account for 70 percent of victims of road accidents (Gauteng Road Safety Commission, 2016a).

2.4 Theory of Planned Behaviour

According to the seminal work Ajzen and Fishbein (1991) on theory of reasoned action, a person's aim to implement an activity, is based on his or her willingness as well as their subjective norm (i.e. the degree to which one thinks by executing an action would comply with the norm approved by others) towards that action. This theory indicates that there is correlation between these factors (Auzoult, 2015; Hartwick & Warshaw, 2008). A Theory of Planned Behaviour was developed, which makes provision for perceived behavioural control (Askew, Buckner, Taing, Ilie, Bauer, et al., 2014). Although the Theory of Planned Behaviour initially became popular in the medical field, as it was used to explain health-related behaviours, the theory is now accepted in many other fields (Askew et al., 2014; Croy, Gerrans & Speelman, 2012).

Ajzen (1991) states that the more optimistic an individual's attitudes, subjective norm and perceived behavioural control are concerning a behaviour, the greater their intention to implement a task. Therefore, a person's likelihood of carrying out a task is dependent on the interaction and regulatory factors (attitudes, subjective norm, and perceived behavioural control). As displayed in Figure 2.1 below, the intention to perform the action is the central component of the theory (Ajzen, 1991).



Source: Adapted from Ajzen (1991:182)

Figure 2. 1: Theory of Planned Behaviour

As demonstrated in Figure 2.1 there are mainly three factors that affect intention, namely, the attitude toward the behaviour, the subjective norm as well as the perceived behavioural control. The intention proceeds to have an influence on the behaviour.

2.4.1 Effects of attitude on intention and behaviour

Ajzen (1991) defines an attitude as the extent to which a person possesses a positive or negative assessment or evaluation of the behaviour. Attitudes are formed by individuals based on their underlying beliefs (Ajzen & Fishbein, 2000). Therefore, an individual is likely to engage in behaviours which they regard as being in line with their beliefs (Ajzen, 1991). Research shows that some specific conditions encourage certain behaviours. In addition to this, the length of one possessing that attitude will influence the extent to which it will influence their behaviour (Glasman & Albarracín, 2006; Kraus, 1995). Research established

significant correlations between attitude and behaviour (Glasman & Albarracín, 2006). In this regard, the use of smartphone devices is closely related to the perceived positive attitude that the person has, for example usage of smartphone can be correlated with being modern and being in touch with family and friends.

2.4.2 Effects of subjective norm on intention and behaviour

Ajzen (1991) defines subjective norm as the perceived social pressure, which a person undergoes in order to execute or not to execute certain action. This is one of the components of TPB. Subjective norms emerge from normative beliefs which a person holds regarding the probability that social support networks would agree or disagree with the behaviour. Ajzen (1991) argues that when these subjective norms are multiplied by motivation to engage in the behaviour, this increases the prospect of one carrying out the behaviour. An individual's intention to act is dependent on one of the four norms, which an individual may or may not apply in the formation of intention, namely, moral, descriptive, injunctive, and representative. According to Gordi et al. (2005) a moral norm consists of behaviour that is regarded as morally correct whilst descriptive norms are ones that are based on objective evidence and are reflective of the actual behaviour within the social environment (Lavrakas, 2008a; 2008b; McAlaney, Bewick & Hughes, 2011). Injunctive norms are perceptions concerned with whether certain behaviour is considered acceptable or unacceptable by a given group and whether it has a place in the environment (Dempsey, McAlaney & Bewick, 2018; McAlaney & Jenkins, 2017). Representative norms refer to the degree to which the behaviour would be accepted in a cultural context, similar to the injunctive norm, however still being constructed and perceived by the individual (Lavrakas, 2008a).

2.4.3 Effects of perceived behavioural control on intention and behaviour

There have been studies done on perceived behavioural control (Ajzenm 1991). In these studies, perceived behavioural control has been described as the ease or difficulty of performing behaviour (Ajzen, 1991). Regarding theory of Planned Behaviour it can be seen that the perception and the control beliefs both have an influence on the action or behaviour

of an individual (Ajzen, 1991). The relationship exists in these two and they influence each other without subjective norms.

According to Castainer, Deroche and Woodman (2013) perceived behavioural control is formed by two mechanisms. These two mechanisms, namely, perceived capacity and autonomy, have a direct relationship with each other (Castanier, Deroche & Woodman, 2013). They help in prediction of the intention of an individual in their driving while intoxicated and other related risky driving tendencies (Castanier et al., 2013). Most of the drivers who engage in smartphones usage while driving have the perception that they can multitask, and this influences them to proceed. Due to repetition there is a tendency of individuals to become somewhat mechanical, that they do it without even thinking it through and this will in turn influence their perceived behaviour control and then ultimately their aim and behaviour (Bruijn, Gardner, Osch & Sniehotta, 2014).

2.4.4 The Pros and Cons of the Theory of Planned Behaviour

The Theory of Planned Behaviour provides insights into how and why people behave and what motivates their behaviour. It enlightens us that people behave as they do because of inherent perceived motivational factors. It is been applied in numerous empirical studies (Ajzen, 2002; Ajzen & Fishbein, 2000). However, like any other theory, it is not without limitations.

Indeed it has been widely criticized by researchers (Ajzen, 2011; Sniehotta, Presseau & Araújo-Soares, 2014). Studies have not established statistical links between the components of the theory (Ogden, 2003). This has led to the questioning of the theory and its validity. It has also been questioned with regards to its methodology. This consequently resulted in validity issues. Although there is strong concern that the theory has lost relevance in the academic discourse (Sniehotta et al., 2014), other scholars have continued to advocate for its relevance (Rhodes, 2015). Scholars such as Sniehotta et al. (2014) are now advocating for new theories such as the Integrated Behaviour Model. They argue that this informs behaviour

change better than TPB. The Theory of Planned Behaviour was utilised in the present research as there appear to be limited studies that applied it within the South African context.

2.4.5 Understanding smartphone use while driving: A theory of planned behaviour

A body of empirical research has investigated risky road behaviours such as excessive speeding using smartphone while driving and driving while intoxicated, and these studies have used TPB in an attempt to explain the behaviour (Lheureux, Auzoult, Charlois, Hardy-Massard & Minary, 2016; Rhodes, 2015; Scott-Parker, Hyde, Watson & King, 2013). Empirical studies show that activities that are task oriented in nature are regarded as the main reasons why people engage in this action (Atchley, Atwood & Boulton, 2011). For example, a recent study found that people who tended to utilise their smartphones while driving their motor vehicles, had the likelihood of being engaged in accidents than those who did not engage in it (Chen & Donmez, 2016). Similarly, Oviedo-Trespalacios, Haque and Washington (2018) found that people who send messages while driving a motor vehicle were likely to become victims of collisions.

Research has shown that some of the campaigns may not have a pronounced effect on behavioural change (Glendon, McNally, Jarvis, Chalmers & Salisbury, 2014). In their studies there was not a significant change in behaviour before and after road safety campaign in Australian schools (Glendon et al., 2014). Therefore, it was concluded that the intention to use a smartphone while driving amongst the youth has been found to be influenced by subjective norm (Prat et al., 2015; Rowe et al., 2016). Young people are noted to form their own social norms and these usually over-estimate their peer's behaviours. Among this group there is a high likelihood to operate a car while intoxicated and to use smartphones while driving (Terry & Terry, 2016). Therefore, social norms and the need to belong are considerably pertinent to the youth and seem to supersede their view of danger (Atchley et al., 2011). In a related empirical research, younger drivers (under the age of thirty) were more likely to be persuaded by injunctive and descriptive norms than older drivers in predicting engagement in technology-based distractions (Chen & Donmez, 2016).

In a separate study which involves 746 university students which was conducted in the US, it was established that most of the participants had insights about the dangers involved when

using smartphones while driving and they used risk-reducing strategies (Terry & Terry, 2016). However, they proceeded to engage in such behaviour (Terry & Terry, 2016). Respondents tended to overrate their capabilities for carrying out multiple tasks over and above operating a motor vehicle. They considered that other motorists who utilise their smartphones while driving and other dangerous road behaviours have a higher risk of being involved in road accidents, than themselves (Cazzulino et al., 2014). Research has also revealed a fierce belief that the use of smartphones while driving can be compensated by taking extra caution on the road (Prat et al., 2015).

2.5 Smartphone usage while driving

There have been tremendous efforts to lessen usage of smartphones while driving. In Western Australia, people are fined a penalty of $450 if they use handheld devices while driving (Jessop, 2008). Despite usage of smartphone while driving being labelled as illegal, there are high prevalence rates of young people texting while driving globally. An estimated 50 percent to 90 percent of young drivers were involved in messaging while operating vehicle in America (Beck & Watters, 2016). Likewise, 93 percent of youth were found to have been involved in smartphone usage while driving in Jordan (Ismeik et al., 2015). McEvoy et al., (2006) reported that approximately 57.3 percent of youth in South Africa engaged in smartphone while driving. This has contributed to this being one of the main contributors to fatal or critical injuries (Laschon, 2017).

Smartphone usage while driving contributes to physical interference, visual interference as well as mental interference (Caird, Simmons, Wiley, Johnston & Horrey, 2018; Decker, Stannard, McManus, Wittig, Sisiopiku, et al., 2015; Saifuzzaman, Haquw, Zheng & Washington, 2015). In addition, there is a division of attention and this has been termed the lapse (Just, et al, 2008). This lapse occurs when two mental tasks are performed simultaneously, whereby conversation contends with operation of motor vehicle (Just, et al., 2008). McDonald and Sommers (2015) in agreement outline that inattention to the roadway which is caused by smartphone usage while driving is a significant hazard for young drivers and increases risk for collisions.

2.6 Effects of texting while driving

A body of literature has explored the effects of texting while driving (Atwood, Guo, Fitch & Dingus, 2018; Caird, et al., 2014; He, Chaparro, Wu, Crandall & Ellis, 2015; Hosking, 2016). In their findings, reading and typing text messages were seen to have an effect on the drivers' ability to focus on safe important actions such as focus on the road. In studies of the same nature, Atwood and colleagues (2018) and Hayashi, Russo, and Wirth (2015) discovered that the highest rates of accidents were amongst those who engaged in smartphone texting and calling while driving. Studies by Ortiz et al., (2018) showed that texting using WhatsApp negatively affected driving. The use of Whatsapp was seen to reduce the driver's focus on their driving.

In the study to find out how attention can be affected, scholars tested factors such as reaction time (Guo, Klauer, Fang, Hankey, Antin, et al., 2017). They found that usage of smartphones while driving considerably increased the reaction time. This would usually result in delays in reactions such as brake reaction time (Caird et al., 2008). In addition to this, reaction such as change of lanes when there is an oncoming traffic was seen to be severely compromised. Studies show that the level of inattention was associated with the nature of the chat on the smartphone.

2.7 Empirical Studies

A recent systematic review of studies published in Africa has revealed that over 80 percent of road traffic accident occur because of human related factors, amongst which include smartphone usage, excessive speed, reckless driving, driving while intoxicated, etc. (Deme, 2019). The South Africa Road Traffic Management Corporation 2016-2017 report indicate that human factor as the main cause for 77 percent of all deadly road accidents. This is quite a high percentage which warrants investigation if lives are to be saved. Sanbonmatsu, Strayer, Biondi, Behrends and Moore (2016) conducted an empirical study, which investigated the impact of smartphones usage on safe driving. They used a driving stimulator involving 100 university students with an average age of 22 years. The respondents were asked to use a smartphone while driving in the simulator and then to note their driving errors. The findings

showed that driving mistakes reported were different from the actual errors. In addition to this, there was a tendency to overestimate their capability to use their smartphone while operating the motor vehicle (Sanbonmatsu et al., 2016). In closely similar studies conducted by Bendak (2015) and He et al. (2015) the aim was to investigate the influence of sending texts while operating a motor vehicle. The findings demonstrated that sending a text while driving increased the probability of an accident by up to 5 times.

Papadakaki, Tzamalouka, Gnardellis, Lajunen, and Chliaoutakis (2016) conducted a study in Greece, which sought to explore whether usage of smartphones while driving influenced experienced drivers. The studies showed that among professional drivers there was a tendency to compensate the attention taken from driving while texting by being extra cautious (Papadakaki et al., 2016). In another study, McNabb and Gray (2016) instructed university students to perform activities such as scrolling on Facebook, using Snapchat, and following on Instagram updates. The study found out that the engagement on social media contributed to driving errors.

Studies showed that there was a close association between poor driving tendencies such as non-seat belt usage and smartphone usage while driving (Bernstein & Bernstein, 2015; Waddell & Wiener, 2014). This shows that there is a link between behaviours and therefore those who did not use seat belts were prone to use their smartphones while driving. These findings were corroborated by an empirical study, which examined actions of motorists that often used a smartphone while driving, through a naturalistic observation study (Farmer, Klauer, McClafferty & Guo, 2015b). In their findings, 33 percent of those who engaged in another unsafe driving practice were also seen to engage in smartphone usage while driving (Farmer et al., 2015b).

Research revealed that participants who were passengers with a motorist who sent messages while operating a motor vehicle reported superior rates of smartphone usage than respondents self-reporting this behaviour (Tucker, Pek, Morrish & Ruf, 2015). This shows that people underestimated their bad driving tendencies.

Generally, regarding risk behaviour, a body of research has revealed that males are prone to take risks than females (Oltedal & Rundmo, 2006; Whissell & Bigelow, 2003). Male participants were had higher tendency to be involved in dangerous driving behaviour as opposed to female participants (Tucker et al., 2015). However, Oviedo-Trespalacios, et al. (2018) demonstrated that females were regular users of smartphones for texting, had less favourable attitudes towards safety and were extremely disinhibited thus reporting stronger intentions of using smartphone while driving. Additional empirical studies report large proportion of female motorists in road accidents/collisions than males because of mistakes in yielding and failure to abide by speed regulations (Classen, et al., 2012). Of interest is the emerging recent literature which reveals no greater disparity amongst the males and females concerning risk behaviour. For example, Sun and Jia (2016) found no evidence within the respondents whether using smartphone disturbs safety driving irrespective of the years of driving, age and sex.

Studies also showed that younger people were prone to engage in hazardous driving behaviour in comparison to the elderly (Gupta, Burns & Boyd, 2016). Young people who did not believe that they had self-discipline with regards to texting while driving were more prone to be under the influence of that behaviour (Gupta et al., 2016). Research demonstrates that prevention strategies such as legal bans were found to be ineffective on adolescents using their smartphones use while driving (Delgado et al., 2016; Rocco & Sampaio, 2015).

2.8 The Research Gap

There has not been much study about smartphone being used whilst driving a car in South Africa. Most of the research conducted on this phenomenon has been in Euro-Western contexts. There has been an increasing growth in mobile technology. South Africans have become more digital. North, Johnston and Ophoff (2014) found high usage of smartphones with signs of addiction to their phones among university students in South Africa. There is also a need to find out if the smartphone usage while operating a motor vehicle is influenced by variables related to sex, age, years of driving. Furthermore, there appears to be limited research that investigates the phenomenon related to smartphone usage and regulations on

usage of smartphone while driving in South Africa. The findings from the current study serve as the foundation for more rigorous future studies.

2.9 Conclusion

This chapter reviewed previous empirical studies conducted within the African context and globally. From the reviewed studies, it is clear that usage of smartphones while operating a motor vehicle pose serious health hazard. Statistics on global road fatalities are quite high as illustrated by reports from the World Health Organisation. It also emerges that the youth have high likelihood of involvement in dangerous driving behaviours. Given the lack of such studies, particularly within the South African context, the current study aims to contribute to knowledge production.

CHAPTER 3: RESEARCH METHODS

3.1 Introduction

The preceding section focused on the literature review, concentrating on numerous aspects relating to smartphone usage behaviour within the context of road traffic safety. The current section centres on the methods of the study, approaches as well as the procedures which the researcher applied in a bid to collect relevant data. This chapter further clarifies how data was analysed. The researcher used quantitative research methodology and this is discussed in detail in this section. The data utilised to complete the research was gathered from a sample of university students in Johannesburg.

3.2 Research Methodology

Research methodology is defined as a process of how a researcher conducts a study and gathers data (Saunders, Lewis & Thornhill, 2016). Research methodology involves the process that the researcher will follow to attain data which include, sampling strategy, research strategy, identifying target population and selecting the data collection instrument (Van Zyl, 2014). The process in which data is obtained and analysed using statistical packages can be summarised as research methodology. Scholars emphasised that qualitative and quantitative research strategies are the common methodologies in scientific research (Akhtar, 2016; Naoum, 2012). The current research adopted a quantitative research methodology, which is reviewed in the following section.

3.2.1 Quantitative Research Methodology

Quantitative research can be described as the use of statistical packages establish and evaluate relationship between variables as well as determining if the object really exist (Van Zyl, 2014). Naoum (2012) highlighted that quantitative research can be viewed as deductive in nature and therefore its findings can be inferred to the broader population that was sampled. However, for the results to be generalised, the sample size must be large. Quantitative research can be applied where the sample size is relatively large, and the 9/questionnaire is the most common data collecting instrument used. In this report, quantitative research methodology was deemed to be a suitable method since the research was focused on describing and establishing the relationship between the variables.

3.3 Research Philosophy

There are two key research philosophies, namely, the positivist philosophies and phenomenological approaches (Saunders et al., 2009). The positivist paradigm is the most used research philosophy in scientific research (Saunders et al., 2009). This can be described as one that uses the rule based approach. The positivist research philosophy usually involves the use of hypotheses and logical inferences to data that has been collected and making interpretations of the data.

In this study, a positivist approach was adopted by the researcher in order to investigate smartphone usage behaviour while operating motor vehicle among the young generation. The main benefit of the positivist research approach is its capacity to provide factual information obtained from scientific instruments that are observable and objective.

3.4 Research Strategies

The research strategy is a “general plan of how the researcher will go about answering the research questions” (Saunders et al., 2016, p. 178). In the present research, the online survey approach was adopted as it allowed the information to be gathered from a large population. Amongst the benefits of this method is that it permits the researcher to gather a large dataset

of which enable the researcher to run statistical analyses and make inferences (Saunders et al., 2016). It is as a result of large data set that the findings are generalised to the larger population.

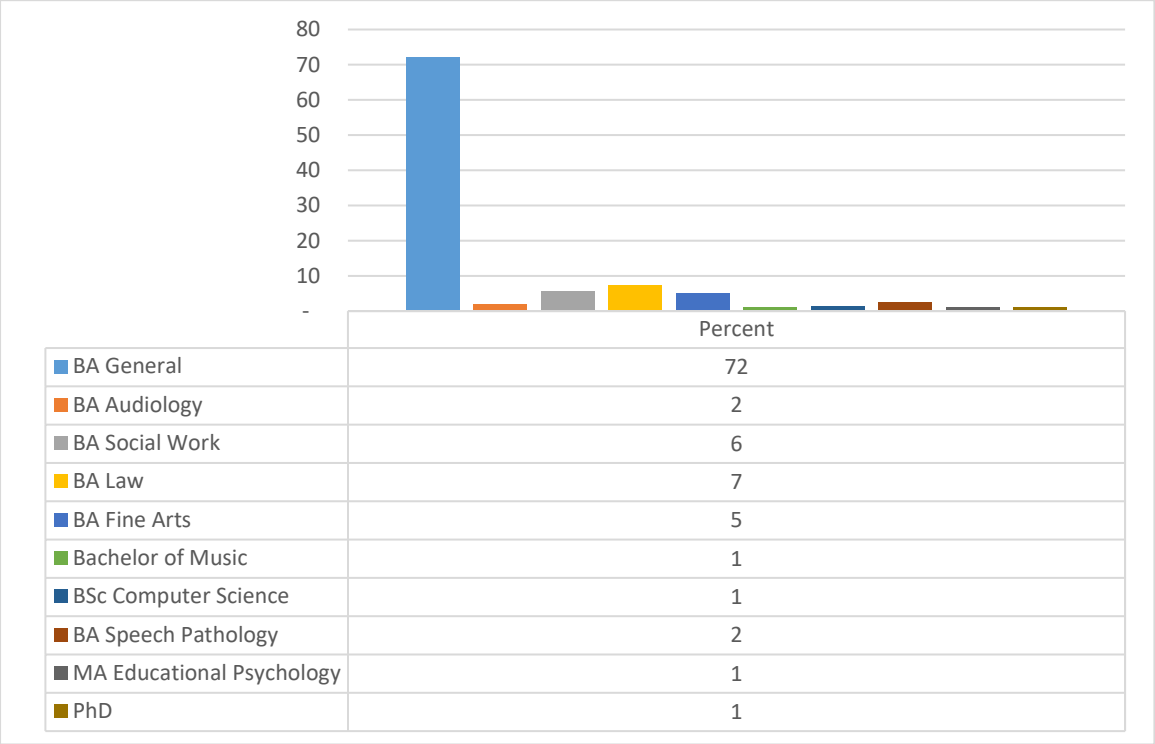
3.5 Sample

The current study consists of 298 participants of undergraduates and postgraduate psychology students; a number allowing for rigorous statistical analysis and permitting the relative generalization to undergraduate psychology students. This sample was chosen because of body of research which has shown association between university students' addiction to their smartphone (Aljomaa, Mohammad, Albursan, Bakhiet & Abduljabbar, 2016) and this cohort was found to be at increased risk of car accidents (Nelson, Atchley & Little, 2009) because they frequently use their smartphone while driving (Penny, 2006). As illustrated by Table 3.1 below, the sample comprised 76.8 percent (n=229) female and 23.2 percent (n=69) male participants. The female participants comprised just over third quarter of the sample. Although this research was implemented in South Africa, the composition of the male/female ratio mirrors that of Euro-Western countries. According to the recent report of the American Psychological Association (APA), women outnumber men in the field of psychology in the educational and employment settings (Clay, 2017). The age ranges of the participants were 18 to 54 years with average age of 22.30.

Table 3.1: Demographic information of study sample

Gender	**n**	**%**
Male	69	23.2
Female	229	76.8
Total	298	100.00

All the participants in the study reported that they owned smartphones, which they always carried with them. Figure 3.1 below depicts a summary of the qualifications of the respondents. Of the total participants, most (72%) of the participants held a BA General degree. The results were consistent with previous empirical findings, which demonstrated higher levels of smartphone use among students studying towards their first degree (Bomhold, 2013). It was also discovered that this group usually used smartphones for productive purposes such as the preparation of learning materials and the information of courses rather than entertainment.



	Percent
BA General	72
BA Audiology	2
BA Social Work	6
BA Law	7
BA Fine Arts	5
Bachelor of Music	1
BSc Computer Science	1
BA Speech Pathology	2
MA Educational Psychology	1
PhD	1

Figure 3. 1: Highest qualifications of participants

3.5.1 Sampling Strategy

A non-probability sampling strategy was appropriate for the current research. Haslam and McGarty (2003) and Stangor (2011) define non-probability sampling as a strategy whereby members of the population have an unequal probability of being chosen to partake in research study. A convenience sampling was thus used as the researcher through the assistance of the course coordinator posted links of the questionnaires on SAKAI to the potential participants.

3.6 Data Collection Instruments

Wegner (2007) reports that primary data comprises data, which is gathered for the first time for a specific reason. Given that data was collected through questionnaires, primary data was thus gathered.

Several instruments were used to collect data, namely, the socio-demographic questionnaire, Driving Risk Perception Scale (Harbeck & Glendon, 2013), Canadian Driver Behaviour Questionnaire (Parker, Reason, Manstead & Stradling, 1995) and self-reported measures adapted from Oviedo Trespalacios, Haque and Washington (2017). These instruments are discussed in detail below.

3.6.1 Socio-Demographic Questionnaire

The socio-demographic questionnaire gathers information concerning respondents' age, gender, educational levels, and so on (Appendix A). In addition, items included questions such as 'have you ever been involved in road accidents in the last three years (Yes\No) and have you received traffic offences\tickets in the last two years (Yes\No)'.

3.6.2 Driving Risk Perception

The present study utilised a 10-item Driving Risk Perception Scale (Appendix B) to measure risk perceptions of risky driving behaviours (Harbeck & Glendon, 2013). The questions focus on gathering information such as operating a motor vehicle while exhausted or intoxicated, speeding, safety belt not worn, hazardous overtaking, racing and the use of smartphone while operating a motor vehicle (hands free and hand-held). Using a 5-point scale the participants reported on their perception of the riskiness of the behaviour. The scale comprised (1) not risky at all, (2) not risky, (3) risky, (4) moderately risky through to extremely risky (5) (Harbeck & Glendon, 2013). Harbeck (2017) reports the significance of the Driving Risk Perception Scale as a measure of risky driving behaviours and exploratory factor analysis established a unidimensional 10-item measure with each item contribution ranging from .31 to .68 and internal reliability coefficient of .83.

In addition, the 15-items Canadian Driver Behaviour Questionnaire [DBQ] (Parker, Reason, Manstead & Stradling, 1995) was utilised (Appendix C). The DBQ is generally utilised to assess deviant risky driving behaviour globally (Bener, Özkan, & Lajunen, 2008). The items are based on a 5-point Likert-type scale of Likely (1), Very Likely (2), Uncertain (3), Unlikely (4), and Very Unlikely (5). The structure of the DBQ was found to be relatively stable across various empirical studies, thus indicating factorial validity and reliability of the DBQ (Martinussen, Hakamies-Blomqvist, Møller, Özkanc, Lajunen, 2013; Özkan, Lajunen, Chliaoutakis, Parker & Summala, 2006a).

3.6.3 Self-reported measures

The present study adapted self-reported measures (Appendix D) that were previously used in the Euro-Western contexts (Oviedo-Trespalacios, Haque & Washington, 2017), and were considered to be relevant for the current study. Empirical studies have established internal reliability coefficients ranging from .8 to .9 (Li & Oviedo-Trespalacios, 2018; Oviedo-Trespalacios, Briant, Kaye & King, 2020).

3.6.3.1 Smartphone use for talking while on the move, driving or walking

In order to assess smartphone, use while driving and walking, the following were asked: "*On a typical day have you spoken on a handheld phone while driving or walking?" (Yes/no scale)* and *"On a typical day have you located and answered a ringing phone while driving or walking?" (Yes/no scale)*. The frequency of these behaviours was assessed by asking, if yes, *"How many times did you engage in this behaviour per hour while driving or walking?"*

3.6.3.2 Smartphone use for texting/browsing while driving

Given that texting or browsing on the internet requires significant visual, cognitive, and manual interactions (e.g. dialling or battery/duration monitoring), the following questions were asked: "*On a typical day have you texted or browsed on your phone while driving? "On a typical day have you looked at a handheld phone while driving for more than 2 seconds continuously (yes-no scale)? The frequency of the behaviours was measured by asking, if yes,*

"how many times in a one hour drive?" for both items". These behaviours are combined because from a human factors perspective, these tasks involve similar demands for the driver (Oviedo-Trespalacios, 2017).

3.6.3.3 Attitudes towards smartphone distracted driving

This category was divided into two main behaviours; the participants' usual engagement in phone conversation and texting/browsing on handheld smartphone. On this category eight items were formulated which sought to find out about the participants' attitudes towards talking or texting/browsing when driving. Responses were based on a Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

3.6.3.4 Risk perception towards smartphone distracted driving

Perceived risk was assessed based on the participant's perceived likelihood of crash risk. Questions were formulated independently for each one of the items used to measure engagement in smartphone conversation and texting/ browsing, namely, "*How likely are you to have a crash if you are using a smartphone for . . .? (i) A voice call, (ii) texting/browsing, (iii) looking at the phone continuously for more than 2 seconds, and (iv) answering a ringing phone*". Responses were given on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

3.6.3.5 Task-management strategies in smartphone distracted driving

Two main groups of task-management strategies were included in this study for smartphone conversation and texting/browsing on a handheld phone. Firstly, participants were asked to report changes in driving behaviour due to smartphone usage, namely, "*When you are using your smartphone while driving, how likely is it that you would . . .?" (i) Lower your driving speed, (ii) increase your distance from the vehicle in front, (iii) scan the environment more often, and (iv) increase the control over the steering wheel.* Secondly, participants were asked to report behaviours performed to avoid police enforcement. "*When you are using your smartphone while driving, how likely is it that you would . . .?" (i) keep your smartphone low*

(e.g. in lap or on passenger seat) for avoiding police, (ii) scan the environment for police, and (iii) cover the phone all the time with your hand". Responses were on a 5-point Likert scale ranging from 1 ("very unlikely") to 5 ("very likely").

3.7 Data Analysis

Statistical Package for Social Sciences (SPSS) version 24 was utilised to examine data. Specifically, descriptive and inferential statistics were conducted. Descriptive statistics permits the researcher to describe and analyse group trends (Schiavetti & Metz, 2002). Gall, Gall and Borg (1999) report that descriptive statistics assist the investigator to identify underlying patterns in the data through summarising the data that was collected. In this regard, descriptive statistics usually comprises of frequencies, percentages and measures of central tendency (Schiavetti & Metz, 2002). Descriptive statistics do not allow one to make inferences or generalisations to the larger population (Babbie & Mouton, 2001). In this study graphs were used to provide visual summary of the findings. Descriptive statistics were utilised to provide description of the sample's background variables related to sex, age and other variables of interest. Frequencies, percentages and mean scores were calculated for these variables.

Inferential statistics were utilised in the present research as they permit the researcher to reach beyond the data by examining correlations between the variables of interest (Terre Blanche, Durrheim & Painter, 2006). Inferential statistics are defined as methods utilised to infer or generalise regarding the population from which the sample was drawn (Saunders et al., 2016; Schiavetti & Metz, 2002). Independent samples t-tests were utilised to examine whether there were statistically significant differences between gender groups on various dependent variables. Chi-square tests and Spearman's rho correlations were conducted to explore the associations between driving under the influence of alcohol, usage of smartphone while driving and risky driving behaviours. A p-value less than 0.05 was deemed to be statistically significant. All computed tests were two-tailed.

3.8 Procedure

i) At the onset of research, ethical clearance was obtained (Appendix E) with the view of safeguarding the rights of the research respondents and to ensure research of the highest possible standards from the Human Research Ethics Committee at the University of the Witwatersrand.

ii) Permission was obtained from the university registrar (Appendix F).

iii) In addition permission was obtained from the course coordinators and lecturers (Appendix G).

iv) Invitations to partake in the research were sent through a link that was published via SAKAI and they completed the Survey Monkey (Appendix H).

v) The respondents were provided with and informed about the objectives of the research. They were assured that by taking part in this research, they would remain anonymous because they were not required to disclose their identities. In addition, the information they provide would be kept confidential. It was reported that, by completing the online questionnaires, participants would be agreeing to partake in the research.

vi) The average completion period for the online questionnaires was 13 minutes.

vii) Following the collection of 298 voluntary participants' data, the responses of the 298 eligible participants were computed into the IBM Statistical Package for the Social Sciences (SPSS) version 24. Herein, both descriptive and inferential statistics were used to analyse data.

3.9 Ethical Considerations

Research can be an intrusion into people's lives. It is therefore essential for the researcher to ensure participants' well-being throughout the research process (Berger, 2015). As previously stated, an ethical clearance was acquired from the Humanities Research Ethics Committee. Authorisation to carry out the research within the university premises was obtained from the university registrar, course coordinators, lecturers and the students. Participants were notified of their rights to withdraw from the study at any point in the study. Confidentiality and anonymity were ensured. Anonymity was guaranteed as the respondents were prohibited from specifying their identifying information on the questionnaires. The potential participants

were informed that there was no direct benefit from participating in the study. By completing the online questionnaires, informed consent was assumed. Electronic data is kept safe where only the supervisor and the researcher have access to it.

3.10 Conclusion

The focus of this chapter was to report on the methods that this study is based upon in order to make it easier for investigators who may wish to replicate the study in the future. Appropriate research method and research design were identified, defined and rationale for selecting them were provided. A fairly large sample was selected. Detailed information about the instruments and how data was analysed were presented. In addition, issues pertaining to ethical considerations were attended to. The next section presents the results and their interpretations.

CHAPTER 4: PRESENTATION OF FINDINGS & DISCUSSION

4.1 Introduction

This chapter presents the results concurrently with the interpretation. The general intent of the present research was to investigate university students' smartphone usage behaviour and its impact on road safety. Specifically, the study investigated driving behaviours considered to be risky, the perception of risk towards smartphone distracted driving amongst university smartphone users; explored task-management strategies used by university smartphone users in an effort to address smartphone distracted driving, and lastly, the study intended to explore the association between smartphone usage while driving, driving while intoxicated and risky driving behaviours amongst university smartphone users.

The findings generated from the current study will assist in the formulation of possible solutions and proposals for future research. The results based on the analysis of reliability of the instruments are initially presented. The results are then presented according to the research questions.

4.2 Reliability of Instruments

The instrument's internal accuracy was assessed using Cronbach's Alpha based on the guidelines set by Manerikar and Manerikar (2015). The alpha reliability test of the Cronbach's Alpha was performed to examine the internal consistency of the calculated structure. As a result, the Cronbach's Alpha was computed for each of the four sections. An alpha can range from 0 to 1 with a total of 1. According to Tavakol (2011) the results below 0.5 are unacceptable, while those between 0.5 and 0.6 are poor; and those between 0.6 and 0.7 are minimally acceptable; those between 0.7 and 0.8 respectable/acceptable; and those between 0.8 and 0.9 are good. Alpha coefficients above 0.9 are regarded as excellent. According to Tavakol and Dennick (2011), any score above 0.7 is commonly regarded as good.

In the present study, for all the survey questions, the Cronbach's Alpha reliability coefficients displayed a very high reliability with an average of 0.953. Moreover, the reliability checks for

each segment were also completed. Table 4.1 presents the reliability analysis of the Driving Risk Perception (Appendix 2) while Table 4.2 presents each of the items of Driving Risk Perception.

Table 4.1: Driving Risk Perception

Reliability Statistics

Cronbach's Alpha	N of Items
.833	9

Table 4.2: Item-Total Statistics for Driving Risk Perception

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Driving under the influence of alcohol	8.81	2.317	.710	.809
Racing another vehicle	8.81	2.303	.737	.807
Not wearing a safety belt	8.78	2.256	.559	.815
Overtaking on a busy road	8.78	2.247	.589	.812
Speeding (more than 20km/h over the speed limit	8.78	2.195	.648	.806
Driving when tired	8.79	2.230	.657	.806
Not maintaining appropriate following distance (tailgating)	8.80	2.276	.683	.807
Speeding more than 10km/hour over the speed limit - Not risky at all	8.62	2.008	.470	.838
Using a cell (hands free device) while driving	8.59	2.054	.398	.853

The results show that the reliability with a figure of 0.833, which indicates that good reliability coefficients for Driving Risk Perception. According to Tavakol (2011), these

findings are considered acceptable, so all questions have been held as valid in answering the research questions. This section did not yield major impact on the performance of the entire research instrument.

Tables 4.3 and 4.4 present the results for self-reported measures (Oviedo-Trespalacios, et al, 2017). The results show an overall reliability coefficient of 0,636, which shows undesirable results of internal reliability of the research instrument used.

Table 4.3: Self-Reported Measures (Appendix C)

Reliability Statistics	
Cronbach's Alpha	N of Items
.636	10

Table 4.4: Item-Total Statistics for Self-Reported Measures (Appendix C)

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Using a cell (hands free device) while driving	14.39	3.053	-.040	.693
Manual use of a cell phone while driving	14.60	3.002	.206	.630
Speak on phone whilst driving	13.81	2.709	.269	.618
Speak on phone whilst walking	14.34	2.427	.381	.592
Text whilst driving	13.76	2.637	.421	.589
Browse whilst driving	13.70	2.838	.357	.608
Text whilst walking	14.37	2.396	.431	.578
Browse walking	13.71	2.765	.399	.599
Look at phone whilst driving	13.79	2.618	.374	.596
Look at my phone whilst walking	14.29	2.366	.398	.587

Table 4.5 and 4.6 presents the results for attitudes towards smartphone distracted driving. An overall reliability coefficient of 0,508 was found, which shows a relatively low figure of reliability.

Table 4.5: Attitudes Towards Smartphone Distracted Driving

Reliability Statistics	
Cronbach's Alpha	N of Items
.508	12

Table 4.6: Item-total statistics for Attitudes Towards Smartphone Distracted Driving

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Tell if their driving has been affected	20.16	9.260	.238	.474
Need convincing it is dangerous	21.21	9.593	.277	.468
24 Effects on driving ability are minor	21.09	9.631	.233	.477
People at risk use a handheld phone while driving	21.17	9.624	.247	.474
Demanding driving conditions prevent me from talking on my phone	19.93	9.914	.141	.500
Safe to talk on the phone when driving	21.08	9.687	.228	.479
Easy for someone to tell if their driving has been affected	20.38	8.862	.197	.492
Would need convincing to believe is dangerous	21.25	9.945	.198	.487
25 Effects on driving ability minor	21.21	9.674	.286	.468
Distracting effects last	20.08	9.937	.095	.515
26 Demanding driving conditions prevent texting while driving	19.95	9.765	.150	.499
Presence of law enforcement prevent talking/texting or while driving	19.85	9.897	.148	.498

As illustrated in Table 4.7 and 4.8, the results for task-management strategies show an overall reliability coefficient of 0,654, which displays a minimally acceptable reliability of the research instrument used.

Table 4.7: Task-Management Strategies in Smartphone Distracted Driving

Reliability Statistics	
Cronbach's Alpha	N of Items
.654	7

Table 4.8: Item-total statistics for Task-Management Strategies in Smartphone Distracted Driving

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Lower driving speed	10.89	5.136	.455	.599
Increase distance car in front	10.85	4.827	.443	.594
Scan the environment	11.03	4.618	.413	.602
Increase control over the steering wheel	11.10	4.560	.447	.590
Keep phone low (e.g. on lap)	10.85	4.771	.442	.594
Cover the phone at all time	10.83	4.647	.288	.658
Predicted group	11.91	6.433	0.000	.673

4.3 Socio-Background Information

The socio-background information of the respondents is reported in this section. The variables that are examined include level of education, age, gender and application used.

4.3.1 Gender

Figure 4.1 provides the summary of male and female participants. The results show an under representation of male participants with 23% while female participants comprised 77%.

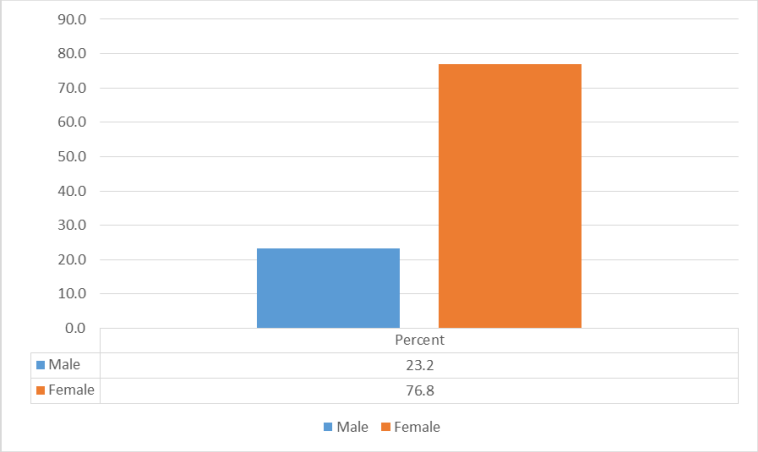


Figure 4.1: Gender composition of the participants

4.3.2 Age range

Figure 4.2 gives the age ranges of the participants in the current study. The corresponding data is explained thereafter.

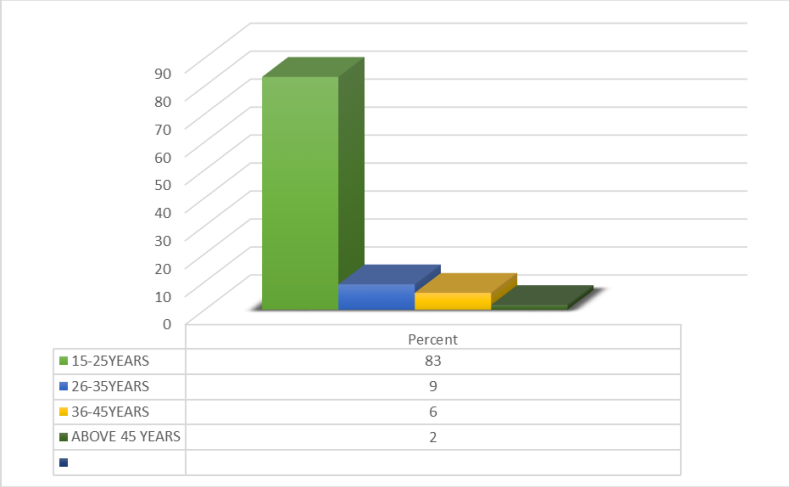


Figure 4.2: Participants' Age

Figure 4.2 displays the age ranges of the respondents, of which most of them (83.22%) were in the 18 to 25 age group. This age group is often defined as youth. It was followed by 9.06 percent of participants who were in the 26-35 age group, 6.04 percent who were in the 36-45 age group, and 1.68 percent who were in the 45 and above age group.

According to Himmelsbach (2012), smartphones are vital in the livelihood of young adults as they remain informed and connected not only to friends and family members, but also to the

world. The current study was essentially represented by young adults as illustrated by 83 percent of participants.

4.4 Risky Driving Behaviours

Question One of the current study, investigated driving behaviours considered risky by the university smartphone users. Table 4.9 presents driving behaviours the participants regarded as risky.

The current results show that most participants were in agreement when considering certain driving behaviours as dangerous, as illustrated in Table 4.9. Most of the participants, specifically, 96.6 percent, 96 percent and 95.6 percent considered operating a motor vehicle while intoxicated, racing another vehicle, manual usage of a smartphone while operating a motor vehicle and not maintaining an acceptable following distance (tailgating) to be dangerous driving activities, respectively.

In addition, to this, 94.3 percent, 93.6 percent, and 93.3 percent of the participants regarded driving when tired, overtaking on a busy road, not wearing a safety belt and speeding over 20km/h of the speed limit, respectively.

Table 4.9: Risky Driving Behaviours

Do you consider the following behaviours risky?	**Not Risky**		**Risky**	
	n	**%**	**n**	**%**
Driving while intoxicated from alcohol consumption.	2	(.7)	288	(96.6)
Racing another vehicle.	2	(.7)	288	(96.6)
Not wearing a safety belt.	10	(3.4)	278	(93.3)
Overtaking on a busy road.	11	(3.7)	279	(93.6)
Speeding more than 20km/h over the speed limit.	12	(4.0)	278	(93.3)
Driving when tired.	8	(2.7)	281	(94.3)
Not maintaining an appropriate following distance (tailgating).	5	(1.7)	285	(95.6)
Speeding more than 10-km/hour over the speed limit.	59	(19.8)	231	(77.5)
Using a smartphone (hands-free device while driving).	67	(22.5)	223	(74.8)
Manual use of a smartphone while driving.	4	(1.3)	286	(96.0)

These results are in line with those of McDonald and Sommers (2015), who found motorists operating a motor vehicle while drunk, driving while drowsy or exhausted, and usage of smartphone while driving, as well as speeding to be hazardous driving behaviours. In addition, Asbridge, Brubacher and Chan (2013) identified the use of smartphones and associated mobile applications (apps) while driving a car to be the cause of road accidents. Tailgating or following a car without adequate space was found to be the foremost cause of

rear-end accident and as a result, it has been considered dangerous form of destructive driving (Sarkar, Martineau, Emami, Khatib, & Wallace, 2000).

Consistent with these findings, Farmer, Klauer, McClafferty and Guo (2015) studied the relationship between the use of smartphones when driving and the danger of crashing or close crashing. The results revealed that when drivers use their smartphones, the danger of accidents increases, especially when they reach or dial the phone. In a related study, it was found that when comparing experienced adult drivers with inexperienced drivers, the likelihood of accident or near-crash increased significantly concerning the quality of secondary tasks, including text and smartphone dialling (Klauer, Guo, Simon-Morton, Quimet, Lee et al., 2015). In a recent empirical study, it was found that usage of smartphones such as texting using WhatsApp negatively affected driving because it reduced the driver's focus on their driving (Ortiz et al., 2018). Linked to this, the next section explored driver's distracted behaviour.

4.5 Attitudes towards smartphone distracted driving behaviour

The present study investigated smartphone distracted driving safety attitudes based on two behaviours, namely, participants usual engagement in smartphone conversation and texting/browsing on their smartphones. This section presents findings concerning behaviours related to distracted driving.

4.5.1 Smartphone distracted driving: Talking

Question 2 of the study investigated behaviours that are distracting when talking on the phone while driving. Table 4.10 presents participants' perceptions of smartphone behaviours they considered to be distracting while driving a car. As illustrated in this table, the majority of the participants reported that they regarded talking on the phone as a distracting driving behaviour, with most of them reporting either strongly agreeing or agreeing on the items.

Table 4.10: Attitude towards smartphone distracting driving: Talking

Attitudes towards smartphone distracted driving: TALKING	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
It is easy for someone to tell if their driving has been affected.	15%	10%	5%	40%	30%
I would need a lot of convincing to believe it is dangerous.	6%	8%	6%	50%	30%
The effects on driving ability are likely to be only minor.	30%	20%	10%	25%	15%
The only people at risk are those who use a mobile phone while driving.	20%	30%	5%	25%	20%
Any distraction effects will last even after the task is finished.	40%	5%	10%	25%	20%
Demanding driving conditions will prevent me from [talking or texting/browsing] on a mobile phone	10%	10%	5%	40%	35%
Presence of law enforcement and risk of a fine will prevent me from [talking or texting/browsing] on a mobile phone.	10%	15%	5%	40%	30%
It is completely safe because I am generally extra careful.	10%	10%	5%	40%	35%

Specifically, it was found that 40 percent and 30 percent of the participant either agreed or strongly agreed that it is easy to for someone to tell if their driving has been affected. Given that the observer is attentive to the driver, it seems logical to notice when one's driving is impaired.

A large percentage of the participants agreed (40%) and strongly agreed (35%) that demanding driving conditions will deter them from conversing on the smartphone. Similarly, 70 percent of the participants agreed (40%) or strongly agreed (30%) that the presence of traffic officials and risk of a charge/ticket will deter them from talking on the smartphone. Indeed many countries including South Africa have passed laws which prohibit motorists from talking on their smartphones while driving. For example, people are fined a penalty of $450 if they use handheld smartphone devices while driving in Western Australia (Jessop, 2008).

Of significant worry is that about 75 percent indicated agree (40%) or strongly agree (35%) to the statement that it is completely safe to speak on the phone while operating a car because

they are generally extra careful. The current finding appears to corroborate previous empirical studies which have demonstrated the tendency of the participants to hold strong belief that the use of smartphones while driving a car can be compensated by taking extra caution on the road (Prat et al., 2015). Similarly, research established the tendency of people to downplay the risks of multitasking partly because of exaggerated beliefs of their capacities (Sanbonmatsu, et al., 2016). Given these findings, it is possible that since motorists generally monitor their driving, when they are distracted by smartphone, they may be oblivious of their poor driving and as such, they may maintain the belief that they can multitask, drive safely while using a smartphone.

4.5.2 Attitudes towards smartphone distracted driving: Texting/Browsing

Question 3 of the study investigated smartphones behaviours that are distracting when texting or browsing on the phone while driving. Table 4.11 presents participants' attitudes towards texting/browsing smartphone behaviours they considered to be distracting while operating a motor vehicle.

A proportion of the respondents in the present study are of the view that texting or browsing on the smartphone is a distracting driving behaviour. There appears to be a similar pattern as that of speaking on the smartphone while operating a motor vehicle as per previous section (4.5.1). For example, as illustrated in Table 4.11, 70 percent of the participants agreed (40%) or strongly agreed (30%) that the presence of traffic officials and possibility of fine will stop them from texting or browsing on the phone while driving.

Table 4.11: Attitudes towards smartphone distracted driving: Texting/Browsing.

Attitudes towards smartphone distracted driving: TEXTING\BROWSING	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
It is easy for someone to tell if their driving has been affected.	40%	5%	10%	30%	15%
I would need a lot of convincing to believe it is dangerous.	30%	20%	10%	25%	15%
The effects on driving ability are likely to be only minor.	20%	30%	5%	25%	20%
The only people at risk are those who use a mobile phone while driving.	10%	15%	5%	40%	30%
Any distraction effects will last even after the task is finished.	10%	10%	5%	40%	35%
Demanding driving conditions will prevent me from [talking or texting/browsing] on a mobile phone	10%	10%	5%	40%	35%
Presence of law enforcement and risk of a fine will prevent me from [talking or texting/browsing] on a mobile phone,	10%	15%	5%	40%	30%
It is completely safe because I am generally extra careful.	15%	10%	5%	40%	30%

A sizeable number of the participants indicated agree (40%) or strongly agreed (30%) to the statement that demanding driving conditions will deter them from texting or scrolling on the phone while driving. These findings appear to be in line with empirical studies which have demonstrated that reading and typing text messages to have an impact on the motorist's capacity to focus on the steering wheel (Atwood, Guo, Fitch, & Dingus, 2018; Caird, et al., 2014; Hosking, 2016).

Given that 50 percent of the participants reported strongly disagree (30%) and disagree (20%) to a need to be convinced that it is dangerous to text or browse while driving as opposed to 40 percent who agreed or strongly agreed to that statement, it would seems that the majority have insights into the danger of texting or browsing while driving. These findings corroborate earlier studies which demonstrated the negative impact of smartphone texting or browsing while driving (Burns, et al. 2013).

Despite their insights about the dangers, they seem to overrate their own capabilities of multitasking while as per previous studies (Terry & Terry, 2016). The overwhelming majority of the respondents in the current study opined that it is completely safe to text or

browse while driving because they are generally extra careful, as illustrated by their reported agree (40%) and strongly agreed (30%).

4.4.3 Task management strategies in mobile phone distracted driving

Question 4 of the study investigated task management strategies applied by smartphone users in order to minimise distraction while operating a motor vehicle. Table 4.12 presents the results relating to task management strategies used by the participants.

Table 4.12: Task-management strategies in mobile phone distracted driving.

Task-management strategies in mobile phone distracted driving:					
When you are using your mobile phone while driving, how likely is it that you would . . .?	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Lower driving speed.	20%	30%	5%	25%	20%
Increase your distance from the vehicle in front.	30%	20%	10%	25%	15%
Scan the environment more often.	15%	10%	5%	40%	30%
Increase the control over the steering wheel.	35%	5%	0%	40%	20%
Keep your mobile phone low (e.g. in lap or on passenger seat) for avoiding police.	30%	20%	10%	25%	15%
Cover the phone all the time with your hand.	45%	5%	10%	20%	20%

As illustrated in Table 4.12, although about 50 percent of the participants reported not using any strategies to minimise road distractions while operating a motor vehicle another half reported using such strategies. For example, when asked if they would decrease their driving speed (45%); increase space from the motor vehicle in front (40%); increase the control over the steering wheel (60%) or cover the phone all the time with a hand (40%), almost half of the respondents reported that they did not engage in such behaviours. This is of significant worry as it appears to show lack of concern about their safety or that of the other cars. It is also worrying that they seem not to be bothered about being fined for such behaviour. Given the current findings, it is not surprising that statistics on road accidents are quite high.

The present research findings concur with those of previous studies (Cazzuliono, et al., 2014; Prat, et al., 2014), which demonstrated that most of those who use smartphones while driving did not engage in task-management activities in order to mitigate the potential risks. This was seen to be more pronounced among young adults such as university students (Cazzuliono et al., 2014; Dale, Scott & Ozakinci, 2017).

About 50 percent of the participants reported strongly disagree (30%) or disagree (20%) to keeping their smartphones low, i.e. on the lap or passenger seat in order to avoid police as opposed to 40 percent of them who agreed (25%) or strongly agreed (15%). Although these findings may at first suggest the absence or lack of worry about the presence of police officials, given that overwhelming 70 percent of the participants scan the environment more often, it seems that they do not hide their smartphones because they are certain that there are no police officials. These findings point to a need for police visibility in major roads and intersections so as to deter usage of smartphones while driving motor vehicles.

4.6 Participants' perception of risky smartphone behaviour

Question 5 of the study investigated the participants' perception of smartphone behaviour regarding the danger of car crashes/collisions due to usage of smartphone. The responses from the participants are presented on Table 4.13.

Table 4.13: Participants' perceptions of risky cell phone behaviours

How likely are you to have a crash if you are using your smartphone for…?	**Likely**		**Uncertain**		**Unlikely**	
	n	%	n	%	n	%
Texting?	260	(87.2)	20	(6.7)	13	(4.4)
Browsing?	259	(86.9)	16	(5.4)	18	(6.0)
Looking at the phone continuously for more than two minutes?	253	(84.9)	23	(7.7)	17	(5.7)
Answering a ringing phone?	152	(51.0)	72	(24.2)	69	(23.2)
Voice call?	125	(41.9)	80	(26.8)	86	(28.9)

As shown in Table 4.13, most of the participants viewed *texting* while driving as a risky behaviour (87.2%). This finding is consistent with previous empirical studies (McDonald & Sommers, 2015; Sommers & Ribak, 2008). A body of literature demonstrates that the use of smartphones and associated mobile apps when operating a motor vehicle increases the danger of accidents (Asbridge, Brubacher & Chan, 2013; Caird et al., 2014).

Browsing (86.9%) and *looking at the phone continuously for more than two minutes* (84.9 percent) were regarded as being highly risky. This is in line with the findings of Farmer, Klauer, McClafferty and Guo (2015), who investigated the close-relationship between usage of smartphone whilst operating a motor vehicle and the danger of accidents. The results revealed that when drivers use their smartphone, the danger of accidents rises, particularly when they reach or dial the phone. In a related study, it was found that when experienced adult drivers are compared with inexperienced drivers, with the quality of secondary activities, including sending text messages, the probability of a collision or close crash increased significantly with the execution of secondary tasks, including texting and dialling a cell phone (Klauer, Guo, Simon-Morton, Quimet, Lee et al., 2015).

Furthermore, the results from the present research show that most of the participants (51% and 42%, respectively) regarded responding to a ringing phone and a voice call while driving as risky behaviours, as illustrated in Table 4.13. Given the present findings, it is no wonder that The South African National Road Traffic Act prohibits motorists from handling their smartphones while driving except when the device is connected to the car using hands-free set. Of interest are the findings of Grobler (2016), who found that motorists who use handheld or hands-free cell phones, they are at an increased possibility of collision due to involvement in numerous tasks such as dialling, calling, sending text messages or conversing while operating a motor vehicle. It was found that conversation can results in cognitive distraction.

These present results corroborate previous studies conducted elsewhere in the world. US surveys have reported that 50 percent to 90 percent of motorists send text messages while operating a motor vehicle (Beck & Watters, 2016; Bergmark et al., 2016; Bernstein & Bernstein, 2015; Delgado et al., 2016; Mizenko et al., 2015; Terry & Terry, 2015). Similarly, it was found in the Middle East that 93 percent of drivers used smartphones while operating motor vehicle (Ismeik, Al-Kaisy, & Al-Ansari, 2015). McEvoy, Stevenson and Woodward (2006) conducted investigations in South Africa with 1,347 Mpumalanga and Gauteng motorists within the age ranges of 18 to 65 years and the results revealed that approximately 57.3 percent of the participants admitted that they have utilised a smartphone while operating a motor vehicle (McEvoy et al., 2006).

4.7 Inferential Statistics

4.7.1 Comparison of gender groups regarding risky driving behaviour

Question 6 investigated whether there is a statistically significant difference between gender groups with regards to driving behaviours they considered to be risky. Table 4.14 presents the results between males and females in terms of their perception of risky driving behaviour.

Table 4.14: Comparison of gender groups regarding risky driving behaviour

Category	Male	Female	t	Sig
Driving under the influence of alcohol	1,46	1,58	-0,662	0,293
Racing another vehicle	1,54	1,72	-0,986	0,590
Not wearing a safety belt	1,48	1,67	-1,143	0,035*
Overtaking on a busy road	1,72	1,60	0,637	0,235
Speeding (more than 20km/h over the speed limit	1,55	1,61	-0,354	0,375
Driving when tired	1,94	1,72	1,079	0,105
Not maintaining appropriate following distance (tailgating)	1,78	1,79	-0,017	0,758
Speeding more than 10km/hour over the speed limit - Not risky at all	1,61	1,79	-1,210	0,006*
Using a cell (hands free device) while driving	1,67	1,96	-1,719	0,002*
Manual use of a cell phone while driving	2,22	2,08	0,587	0,497

* P <0.05

In order to explore if there is a statistically significant difference between males and female in terms of their perception of risky driving behaviour t-test analyses were conducted. The results showed that there was no significant difference between the two gender groups in terms of driving under the influence of alcohol [$t(298) = -0{,}662$, $p = .29$]; racing another vehicle [$t(298) = -0{,}986$, $p = .59$]; overtaking on a busy road [$t(298) = 0{,}637$, $p = .23$]; speeding (more than 20km/h over the speed limit [$t(298) = -0{,}354$, $p = .37$]; driving when tired [$t(298) = 1{,}079$, $p = .10$]; not maintaining appropriate following distance (tailgating) [$t(298) = -0{,}017$, $p = .75$]; manual use of a cell phone while driving [$t(298) = 0{,}587$, $p = .49$].

However, there was a statistically significant difference between males and females regarding not wearing a safety belt [t(298) = -1.143, p = .035]; speeding more than 10km/hour over the

speed limit - Not risky at all [t(298) = -1.210, p = .006] and using a cell (hands free device) while driving [t(298) = -1.719, p = .002]. These findings indicate that females regarded not wearing a safety belt, speeding more 10km/hour over the speed limit and using hands free smartphone device to be risky driving behaviours than males. These findings seem to mirror previous studies, which revealed that male respondents engaged in high risk driving behaviour than their female counterparts (Tucker et al., 2015). Similarly, it was found that males had higher likelihood of being involved in hazardous driving behaviours than females (Kelly-Baker & Romano, 2010; Whisell & Bigelow, 2003).

Based on the current results, it can be understood why car insurance companies such as 'First for Women' were tailored for women in South Africa. Part of the explanation for such differences could be as a result of evidence which show young men in particular to be more aggressive and competitive than women, and thereby increasing the probabilities of accidents/crashing (Aluja & Torrubia, 2004; Waller, Wanka & Hutter, 2017). In addition, it was demonstrated that men tended to be involved in unsafe driving behaviours due to sensation seeking (Book & Quinsey, 2005).

4.7.2 Comparison of gender groups regarding crash risk due to smartphone usage

Question 6 of the present study also investigated whether there is a statistically significant difference between males and females with regards to the likelihood danger of collision due to smartphone usage while operating a motor vehicle. Table 4.15 presents the results between males and female in terms of their perception of probability of crashing using smartphone while driving.

Table 4.15 Comparison of gender groups on crash risk due to smartphone usage while driving

Category	Male	Female	t	Sig
Crash using voice call	2,04	1,99	0,484	0,322
Crash texting	2,10	2,02	1,653	0,145
Crash browsing	2,03	2,00	0,515	0,972
Crash looking at phone continuously	2,06	2,03	0,564	0,634
Crash answering a ringing phone	2,03	2,03	0,028	0,536

* P <0.05

In order to establish whether a statistically difference exists between gender groups with regards to their perception of risk of being involved in a motor vehicle accident due to smartphone usage while driving, t-test analyses for independent groups were computed. As illustrated in Table 4.15, there was no statistically significant difference between the two genders relating to road traffic accident whilst using voice call [t(298) = 0.484, p = .322]; crash texting [t(298) = 1.653, p = .145]; crash browsing [t(298) = 0.515, p = .972]; crash looking at phone continuously [t(298) = 0.564, p = .634]; crash answering a ringing phone [t(298) = 0.028, p = .536]. These findings support the hypothesis that one had the likelihood of being involved in the crash if the individual used their smartphone to make or answer a call, text, browse, and to look continuously at the phone. These findings corroborate those which established association between high crash risks with smartphone use while operating a motor vehicle (Atwood, Guo, Fitch & Dingus, 2018). Similarly, the current findings replicated a large study of 3139 young participants that revealed no gender differences regarding perception of risk (Cordellieri, Baralla, Ferlazzo, Sgalla, Piccardi & Giannini, 2016). However, it was established that the difference between the females and males was not linked to judgement of the perceived probability for risk, instead of the degree of worry felt about the results of the danger (Cordellieri, et al. 2016). Males were thus found to be less worried about the danger of road collision.

4.7.3 Comparison of gender groups regarding their task management strategies

Question 7 of the present study investigated whether there is a statistically significant difference between gender groups regarding task management strategies they use while driving. Table 4.16 presents the results between males and female in terms of task management strategies they used.

Table 4.16 Comparison of gender groups regarding their task management strategies

Category	Male	Female	t	Sig
Lower driving speed	2,02	2,02	-0,107	0,782
Increase distance car in front	2,09	2,05	0,437	0,274
Scan the environment	2,05	1,84	-0,463	0,945
Increase control over the steering wheel	1,89	1,81	-0,006	0,887
Keep phone low (e.g. on lap)	2,14	2,04	1,189	0,348
Cover the phone at all time	2,10	2,07	2,31	0,839

* P <0.05

In order to establish whether a statistically significant difference exists between gender groups in terms of their task management strategies, t-test analyses for independent samples were conducted for each of the items. The results demonstrated no statistically significant difference between the two gender groups on lowering driving speed [t(298) = -0.107, p = .782]; increasing distance from a car in front [t(298) = 0.437, p = .274]; scanning the environment [t(298) = -0.463, p = .945]; increasing steering wheel control [t(298) = -0.006, p = .887]; keeping the phone low on lap [t(298) = 1.189, p = .348] and covering the phone all the time [t(298) = 2.31, p = .839]. On the basis of these findings, it seems gender does not play a role in the task management strategies used when talking and/or texting on the smartphone while driving.

4.7.4 The relationship between usage of smartphone and driving while intoxicated

Question 8 of the present study investigated the association between smartphone usage whilst operating a motor vehicle, under the influence of alcohol, amongst university smartphone users. Chi-squared tests were carried out in order to explore the relationship between using a smartphone whilst driving and driving under the influence of alcohol.

4.7.4.1 The association between driving intoxicated and usage of smartphone

Figure 4.3 presents the association between driving intoxicated and usage of smartphone. Pearson's Chi-squared test was carried out to assess whether operating a motor vehicle whilst intoxicated and usage of smartphone were related. The results show that there is a violation of the assumption of the Chi-square as the projected count is larger than 20% being 53.3%. Therefore the Likelihood Ratio was used.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.884[a]	8	.002
Likelihood Ratio	19.559	8	.012
Linear-by-Linear Association	3.774	1	.052
N of Valid Cases	298		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .64.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.283	.002
	Cramer's V	.200	.002
N of Valid Cases		298	

Figure 4.3: Driving under the influence of alcohol * smartphone usage

The results indicated that there was significant evidence of an association, ($\chi 2$ (2) = 19.559, p < 0.012). These results show consistency with the empirical studies which demonstrated

impairments related to utilising a smartphone whilst driving a car and driving while drunk (Strayer, Drews & Crouch, 2016). Since driving while intoxicated and using smartphone while driving both results in impaired driving ability, it would seem that when they occur simultaneously, the effects could be disastrous.

Although using a smartphone while driving and driving while intoxicated appear to be tremendously hazardous activities and should be avoided, other studies suggest that distracted driving due to smartphone usage is more lethal (Gliklich, Guo & Bergmark, 2016; Sanbonmatsu, Strayer, Biondi, Behrends & Moore, 2016). The National Highway Transportation Safety Administration (NHTSA) reports that sending text messages whilst driving a motor vehicle is six folds more hazardous than driving while drunk. In addition, a recent survey of over 700 drivers compared distracted driving with drunk driving and the results revealed that 63 percent of the participants were more terrified by distracted drivers than those intoxicated (Cambridge Mobile Telematics, 2018). It thus seems more critical that measures are put in place to curb usage of smartphones while driving.

4.7.4.2 The association between risky driving behaviours

Question 8 of the present research also explored the association between risky driving behaviours amongst university smartphone users. Spearman's rho correlation was conducted in order to explore the relationship between driving behaviours considered to be risky.

As illustrated in Table 4.17, the correlation analysis showed significant correlations between speeding more than 10km/hour over the speed limit and driving when tired ($r = .13$, $p < .05$), and between speeding more than 10km/hour over the speed limit and not maintaining appropriate following distance- tailgating, ($r = .19$, $p < .05$). These findings corroborate former empirical research (Wang & Song, 2011).

Of significant interest, the present findings revealed no significant correlations between operating a vehicle while intoxicated, racing another vehicle, not wearing a safety belt, overtaking on a busy road, and manual usage of smartphone while driving. These results were not expected particularly as such driving behaviours are considered to be dangerous to the

driver and other motorists. For example, earlier research has established correlations between usage of smartphones and driving ability (Ortiz et al., 2018; Rumschlag, Palumbo, Martin, Head, George & Commissaris, 2015). It is thus important that future studies explore this area, probably qualitatively.

Table 4.17: The relationship between risky driving behaviours

	1	2	3	4	5	6	7	8	9
Driving under the influence of alcohol									
Racing another vehicle	.042								
Not wearing a safety belt	.042	.064							
Overtaking on a busy road	.086	-.070	.034						
Speeding (more than 20km/h over the speed limit	.039	.016	.027	.067					
Driving when tired	.065	.001	-.011	.089	-.001				
Not maintaining appropriate following distance (tailgating)	.035	.045	-.038	-.053	.006	.103			
Speeding more than 10km/hour over the speed limit	.019	.050	.027	-.065	.122*	.131*	.193*		
Using a cell (hands free device) while driving	.001	-.132*	.002	.030	-.024	.050	.040	.021	
Manual use of a cell phone while driving	.039	.092	-.031	-.033	-.021	-.031	.078	-.040	.060

*. Correlation is significant at the 0.05 level (2-tailed).

4.8 Conclusion

The goal of the study was to assess the impact of smartphone usage while driving, considering the safety of motorists and pedestrians. The findings revealed that operating a motor vehicle while intoxicated, racing another vehicle, manual usage of a smartphone while driving, not maintaining an acceptable following distance (tailgating), driving when tired, overtaking on a busy road, not wearing a safety belt and speeding over 20km/h of the speed limit as the most dangerous driving activities. Ironically, although the participants regarded texting or browsing on the smartphone as distracting driving behaviour when engaged by

other motorists, they deemed it safe when they engaged in the same behaviour. The results also revealed statistically significant differences between males and females in terms of not wearing a safety belt, speeding more than 10km/hour over the speed limit, and using a cell (hands free device) while, thereby indicating that males were more likely to engage in risky driving behaviours than females. These findings are discussed in light of previous empirical studies in the next chapter.

CHAPTER FIVE: CONCLUSION

5.1 Introduction

The general purpose of this research was to examine the impact of usage of smartphone behaviour within the smartphone generation on safety on the roads. Specifically, the study investigated driving behaviours considered to be risk by smartphone users; behaviours that are distracting when driving while talking/texting/browsing on the phone; task management strategies used; gender comparisons based on risky driving behaviour and task management strategies; and association between smartphone usage while driving, driving while intoxicated and risky driving behaviours amongst university smartphone users. In order to investigate these aims, an online survey was conducted, which involved a sample of university students. This chapter presents summary of the discussion of the results, shortcomings of the research and suggestions for future research within this field.

5.2 Integration of the findings

The first aim of the study investigated driving behaviours considered to be risky by the participants. The findings showed that operation of a motor vehicle while intoxicated, racing another vehicle, manual usage of a smartphone while driving and not maintaining an acceptable following distance (tailgating) to be dangerous driving activities, driving when tired, overtaking on a busy road, and not wearing a safety belt and speeding more than 20km/h over the speed limit. Studies have revealed that the majority of road collisions/crashes are triggered by people and their behaviour rather than mechanical faults (Gauteng Road Safety Commission, 2016a). Some of the human behaviours included alcohol use, speed, fatigue and inattention.

There is high probability of an individual engaging in more than one of these risky behaviours at any given time, and thus indicating that an engagement in a risky behaviour increased the possibility of one engaging in another risky behaviour (Terry & Terry, 2016). It was found that usage of a smartphone whilst driving was considered to be more socially acceptable unlike operating a motor vehicle while drunk (Terry & Terry, 2016). Atchley et al. (2011) argue that some of the risky driving behaviours such as smartphone usage while

driving have increased due to them being increasingly socially acceptable, particularly so among younger age groups and young adults age groups such as university students.

The second and third aims of the present research explored the behaviours considered to be distracting when driving while conversing on the smartphone and/or browsing on the phone. The results revealed that most of the respondents in the present study reported that texting or browsing on the smartphone is distracting driving behaviour, particularly when engaged by other motorists. It is for this reason that only demanding driving conditions, the presence of traffic officials and potential fines will preclude them from speaking, texting or browsing on the phone. They considered conversing on the phone whilst driving, safe because they regarded themselves to be vigilant. These findings seem to suggest that the motorists do not regard conversing on the smartphone whilst driving hazardous as they have strong belief in their capability not to be distracted. This is consistent with the Theory of Planned Behaviour in terms of perceived behavioural control, whereby the participants who engage in smartphones usage while driving belief that they have the capacity to multitask and as a result, they engage in such risky driving behaviour (Castanier, Deroche & Woodman, 2013). Given that participants in the present study see the presence of the traffic cops and risk of fines as deterrent, it is crucial that there is adequate police visibility, particularly in major roads, in order to curb this phenomenon of talking, sending messages or browsing on social media whilst driving.

The fourth aim of the study explored task-management strategies used in order to attend to smartphone distracted driving. Approximately half of the participants reported that they did not engage in task-management strategies such as keeping a distance from the car in front, covering the phone with a hand or lowering the driving speed. These findings can be understood within the context of the large percentage of the participants (70%), who reported that they scan the environment more often to check whether there are law enforcement officials around or not. These results are linked with the previous section whereby they seem to fear potential fines imposed by and presence of traffic officials as deterrence, rather than the actual risks to their lives. These findings corroborates previous empirical studies, which showed that young adults such as university students are less likely to engage in task-management activities despite their potential for mitigating factor (Cazzuliono, et al., 2014; Prat, et al., (2016). Given the nonsensical staggering rates of road accidents, it is of

significant worry that the participants continue to engage in destructive driving behaviours, thereby posing treat to their lives and that of the other motorists and pedestrians.

The fifth aim of the study investigated smartphone driving behaviour that the participants considered to be dangerous. In line with earlier studies, the present findings demonstrated that texting and browsing on the phone as well as looking at the phone constantly for more than two minutes while operating a motor vehicle were considered to be dangerous driving behaviours. It is concerning that while they seem to know about the danger of smartphone driving behaviour; they still continue to engage in such hazardous behaviours.

The sixth goal of the present research compared the opinion of the male and female participants with regards to driving behaviours they considered to be risky. The findings demonstrated no disparity between the two groups concerning driving while intoxicated, racing another car, overtaking on a busy road, speeding more than 20km/hr over the speed limit, driving when tired, not maintaining appropriate following distance and manual use of smartphone while driving, and thus indicated that they seemed to hold the same view that such driving behaviours are dangerous. However, the findings revealed that females viewed not wearing a safety belt, speeding more 10km/hour over the speed limit and using hands free smartphone device to be risky driving behaviours than males. It thus seems on the basis of these results that females are less likely to be involved in risky driving behaviours than males.

The seventh aim of this research compared the task-management strategies implemented by male and female participants. The findings established no difference between males and females concerning increasing distance from a car in front, lowering of driving speed, scanning the environment to verify whether traffic officials are not present, increasing steering wheel control, keeping the phone low on lap and covering the phone all the time. Given these findings, it appears that gender plays no function in the task management strategies used when talking and/or sending messages on the smartphone whilst operating a motor vehicle.

The last aim of the study investigated the relationship between operating a motor vehicle intoxicated and using of a smartphone while driving. The results revealed a noteworthy correlation between the said variables, which seems to indicate that their combination can be hazardous. In addition, the association between risky driving behaviours was explored and the results revealed that significant correlations between speeding more than 10km/hour over the speed limit and driving when tired, and between speeding more than 10km/hour over the speed limit and not maintaining appropriate following distance- tailgating. It would seems based on these results that it is crucial that when motorists experience fatigue they take rest, probably pull-off at a petrol station in order to avoid being involved in a car accident. Furthermore, it is crucial that safe and appropriate following distance is maintained to ensure safety.

5.3 Contribution of the Study to Knowledge

This study makes a substantial contribution to research in this field for numerous reasons. Of noteworthy, it is striking that, while laws and regulations to forbid smartphone usage while driving were promulgated in most countries worldwide including in South Africa, motorists continue to engage in risky driving behaviours, thereby endangering not only their lives but those of others. Although failure to abide by these laws often results in punitive measures such as issuing of a fine/or ticket, the current findings suggest that such laws do not serve as a deterrent. Furthermore, police presence on the road do not serve as preventive measures as participants in the present study conceded to engaging on task management strategies such as lowering the phone or putting the phone on their laps when they notice the police. It would thus seem that more stringent measures should be explored. It is suggested that more awareness of police campaigns targeting risky driving behaviour should be introduced. It is recommended that new punitive policies should be promulgated and enforced, and there must be public campaigns to raise awareness. In addition to legislations, insurance companies can play an essential deterrent role like in the United Kingdom and Germany, whereby they cancel the driver's insurance coverage if they cause a car accident as a result of using smartphone while driving (Sun & Jia, 2016).

5.4 Limitations of the study

The results of this research should be read in the context of the following limitations. Like most studies of this nature, the current study was based on cross-sectional design, which implies that data was collected in a specific point in time rather than over prolonged period as in longitudinal designs. Rosnow and Rosenthal (2008) state that one of the shortcomings of cross-sectional studies is that conclusions are correlational and causal inferences cannot be made. Consequently, causality cannot be determined. However, Bryman and Cramer (1999) assert that although causal inferences are unlikely, data gathered from correlational research studies continues to provide valuable knowledge to the field of study.

Although the sample size was relatively large, it was not representative of the university students. Of significant note, most of the participants were females and this could be attributed to the nature of the degrees they are studying. The students were registered for various degrees within the faculty of humanities. Another shortcoming of the present research was the limited time that the researcher had to conduct the study. Had this not been the case, researcher could have approached potential participants in the engineering, science and medicine fields.

In addition to this, the data that was collected was based on self-reported behaviours with the likely risk of being influenced by the participant's subjective thoughts. It is thus likely that the respondents may have intentionally supplied biased feedback in order to be more socially acceptable. The use of empirical data from records such as actual accidents reports may have added more objective data and thus may have increased objectivity.

5.5 Recommendations

The results of this research lend suggestions to upcoming studies in this field. While the present study acts as a foundation for future research about smartphone usage while driving and its impact on road traffic safety among university students, it could be replicated to the larger population. It is suggested that future research adopt an observational design in order to assess the actual behaviour rather than making conclusion on self-reported measures as the main research tool. Lastly, it is proposed that future studies include items that probe on

whether the participants have a driving licence, the duration of driving experience and whether they commonly drive a car.

5.6 Conclusion

This research intended to explore the effect of smartphone usage behaviour amongst the smartphone generation on road traffic safety. In order to do so research questions were formulated. A quantitative study was conducted using an online survey method as a data collection tool. The data was analysed with the aid of statistical software, SPSS. The research findings identified certain driving behaviours as risky. Driving behaviours such as operating a motor vehicle while intoxicated, racing another vehicle, manual use of a cell phone while driving and not maintaining an acceptable following distance (tailgating), driving when tired, overtaking on a busy road, not wearing a safety belt and speeding more than 20km/h over the speed limit were considered to be dangerous driving activities. In addition, they identified texting or browsing on the smartphone as distracting driving behaviours, particularly when committed by the other motorists. They thus considered such behaviours as safe when implemented by them due to their strong belief in their capability not to be distracted. Consequently, they seem not to engage in task-management strategies such as keeping a distance from the car in front, covering the phone with a hand or lowering the driving speed. Of noteworthy, is that they considered the presence of law enforcement and risk of fines as deterrent enough to stop them from engaging in hazardous driving behaviours. Lastly, male participants tended to adopt unsafe driving behaviours, whereas females viewed not wearing a safety belt, speeding more 10km/hour over the speed limit and using hands free smartphone device to be risky driving behaviours than males. It is hoped that this study can serve as the foundation for research on smartphone usage and its associated impact on road traffic safety, particularly within the developing countries.

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APPENDICES

APPENDIX A: Demographic Questionnaire

Please complete the following questions by marking the appropriate answer as indicated.

Present degree		
Age		
Gender	Male	Female
Do you own a cell phone?	Yes	No
Make and model of present device?		
Do you almost always carry your phone with you?	Yes	No
Is your phone switched on for most of your working/studying day?	Yes	No

1. **What apps do you regularly use on your cellular device?** (**Please Tick as many as possible**)

	Yes	**No**
Voice call		
Text messaging		
WhatsApp		
Facebook		
Maps/navigation		
Twitter		
World wide web		
Instagram		

2. **How important are these apps to you?**

Please rate them all.	**Very Irrelevant**	**Irrelevant**	**Neutral**	**Important**	**Very Important**
Voice call					
Text messaging					
WhatsApp					
Facebook					
Maps/navigation					
Twitter					
World wide web					
Instagram					

3. **How frequently do you access these apps?**

Please rate them all.	**Very Rarely**	**Rarely**	**Moderately**	**Always**	**Once per hour**
Voice call					
Text messaging					
WhatsApp					
Facebook					
Maps/navigation					
Twitter					
World wide web					
Instagram					

4.**When do you access these apps?**(Please tick as many as possible)

(a) While in class?	
(b) Walking around campus?	
(c) Walking on public roads?	
(d) Driving?	

9. Do you have a driver's licence?	**Yes**		**No**	
10. How long have you held this licence?				
11. How frequently do you drive?	**Rarely**		**Daily**	
12. Do you use your smartphone (hand-held) while driving?	**Yes**		**No**	
13. Do you use your smartphone while walking?	**Yes**		**No**	
10. Do you drive	**Yes**		**No**	
Locally (within 30km of campus/home)?				
Long distance (road trip across provinces)?				
On busy roads (highway / in town)?				
In rush hour traffic?				
11. Have you ever been involved in a crash\accident?	**Yes**		**No**	
(a) As a passenger				
(b) As a driver				
(c) As a pedestrian				
12. How many traffic offences\tickets have you received in the last two years?				
13. What were the offences for?				

Appendix B: Risky Driving Behaviour (Harbeck & Glendon, 2013)

Please answer ALL questions by simply crossing the answer, which applies, to you.

Risky Driving Behaviour: Do you consider the following behaviours risky?	**Not Risky at all**	**Not Risky**	**Moderately Risky**	**Risky**	**Extremely Risky**
1. Driving under the influence of alcohol.					
2. Racing another vehicle.					
3. Not wearing a seatbelt.					
4. Unsafe overtaking.					
5. Speeding (20 km/h over speed limit).					
6. Using cell phone (hand-held) while driving.					
7. Driving while fatigued.					
8. Tailgating.					
9. Speeding (10 km/h over speed limit).					
10. Using cell phone (hands free device)while driving.					

APPENDIX C: SELF-REPORTED MEASURE (OVIEDO-TRESPALACIOS, HAQUE & WASHINGTON, 2017)

Please answer ALL questions by simply crossing the answer, which applies, to you.

Smartphone use for talking while driving and walking	**Yes**	**No**
1. On a typical day, have you spoken on a handheld phone (a) while driving or		
(b) Walking?		
2. How many times did you engage in this behaviour per hour (a) while driving or		
(b) Walking?		
3. On a typical day, have you located and answered a ringing phone (a) while driving or		
(b) Walking?		
4. How many times did you engage in this behaviour per hour (a) while driving or		
(b) Walking?		
Smart phone use for texting/browsing while driving		
5. On a typical day have you texted or browsed on your phone while driving?		
6. If yes, "how many times in an hour drive?		
7. On a typical day, have you looked at phone while driving for more than 2 seconds continuously?		
8. If yes, "how many times in a one hour drive?		

Attitudes towards smartphone distracted driving: <u>TALKING</u>	**Strongly Disagree**	**Disagree**	**Neutral**	**Strongly Agree**	**Agree**
11. It is easy for someone to tell if their driving has been affected.					
12. I would need a lot of convincing to believe it is dangerous.					
13. The effects on driving ability are likely to be only minor.					
14. The only people at risk are those who use a smartphone while driving.					
15. Any distraction effects will last even after the task is finished.					
16. Demanding driving conditions will prevent me from [talking or texting/browsing] on a smartphone					
17. Presence of law enforcement and risk of a fine will prevent me from [talking or texting/browsing] on a smartphone,					
18. It is completely safe because I am generally extra careful.					
Attitudes towards smartphone distracted driving: <u>TEXTING\BROWSING</u>	**Strongly Disagree**	**Disagree**	**Neutral**	**Strongly Agree**	**Agree**
19. It is easy for someone to tell if their driving has been affected.					
20. I would need a lot of convincing to believe it is dangerous.					
21. The effects on driving ability are likely to be only minor.					
22. The only people at risk are those who use a smartphone while driving.					
23. Any distraction effects will last even after the task is finished.					
24. Demanding driving conditions will prevent me from [talking or texting/browsing] on a smartphone					
25. Presence of law enforcement and risk of a fine will prevent					

me from [talking or texting/browsing] on a smartphone,					
26. It is completely safe because I am generally extra careful.					

Risk perception towards smartphone distracted driving: How likely are you to have a crash if you are using a smartphone for?	**Very Unlikely**	**Unlikely**	**Uncertain**	**Very Likely**	**Likely**
27. A voice call.					
28. Texting/browsing.					
29. Looking at the phone continuously for more than 2 seconds.					
30. Answering a ringing phone.					
Task-management strategies in smartphone distracted driving: When you are using your smartphone while driving, how likely is it that you would . . .?	**Very Unlikely**	**Unlikely**	**Uncertain**	**Very Likely**	**Likely**
31. Lower your driving speed.					
32. Increase your distance from the vehicle in front.					
33. Scan the environment more often.					
34. Increase the control over the steering wheel.					
35. Keep your smartphone low (e.g. in lap or on passenger seat) for avoiding police.					
36. Cover the phone all the time with your hand.					

Appendix D: Canadian Driver Behaviour Questionnaire

Driver Behaviour Questionnaire:	**Not Likely at all**	**Not Likely**	**Moderately**	**Likely**	**Very Likely**
37. Become impatient with a slow driver and pass on the right.					
38. Drive too closely to the car in front as a signal to its driver to go faster or get out of the way.					
39. Attempt to pass someone on an undivided road that you hadn't noticed to be signaling a left turn.					
40. Run yellow lights.					
41. Fail to notice pedestrians are crossing.					
42. Angered by another driver's behaviour, you yell or gesture at them.					
43. Choose to exceed the speed limits when the police are not around.					
44. On turning right, nearly hit a cyclist who has come up on your inside.					
45. When merging, you pay such close attention to the main stream of traffic that you nearly hit the car in front of you.					
46. Drive even though you consumed alcohol.					
47. Underestimate the speed of an oncoming vehicle when passing on an undivided road.					
48. Hit something while backing up that you had not previously seen.					
49. Miss "Yield" or "Stop" signs; narrowly avoiding a collision.					
50. Fail to check your rear-view mirror before pulling out, changing lanes, etc.					

51. Brake too quickly on a slippery road, or steer the wrong way into a skid.					
52. I use the cellular phone while driving.					

Appendix E: Ethics Application

University of the Witwatersrand, Johannesburg

Application to the Human Research Ethics Committee (HREC Non-Medical)

Use this form in applying for clearance of research involving human participants ('human subjects'[1]).

Instructions

1. Completed applications must be submitted to the Research Office by the last day of the month for consideration at the meeting during the following month.
2. Incomplete applications will NOT be considered.
3. Applications will NOT be processed without signatures from supervisors (where relevant) and the Head of School/Unit.
4. Photocopying should be done 'back to back' to save paper.
5. All submissions and materials must be typed. Handwritten submissions are NOT acceptable. Glossy and fancy binding NOT necessary.
6. All appendixes, if any, must be stapled to the ethics form and collated

The following documents must be included with your application as numbered appendices:

☑ Check list

No. of copies required

For all research:

	Completed Ethics Application Form	**15**
	Copies of the research proposal	**4**
	Copies of proposed questionnaires/interview schedules	**4**
	Participant Information sheet	**4**

Where applicable (Attach to this form):

	Acknowledgement of Informed Consent form (for participant's signature)	**4**
	Relevant permissions (from, e.g. company's HR department, National authorities such as Education, Correctional Services, etc.) or other legally required consent	**4**
	Any other required/appropriate release or consent forms (e.g.: Focus group participant consent form, consent to record (audio), model release (for video or photography), etc.	**4**
	Guardian consent form (for participants under the age of 14)	**4**
	Minor assent form	**4**
	Other (Please specify)	**4**

[1] In place of the term 'human subjects', University of Witwatersrand prefers to use the term '(research) participants' in order to reflect the difference between the bio-medical sciences—where 'research subjects' is more appropriate—and the humanities and social sciences.

Declaration:

I recognise that it is my responsibility to conduct my research in an ethical manner according to Guidelines of the University of the Witwatersrand, according to any laws and/or legal frameworks that may apply, and according to the norms and expectations of my discipline.
In preparing this Application for Ethics Clearance from the University of the Witwatersrand, I have consulted the **Guidelines for Human Research Ethics Clearance Application /non-medical** (a separate document available on this web site http://web.wits.ac.za/Academic/Research/Applications.htm and have familiarised myself with the ethical guidelines specific to my discipline.

Signature	BSeabi
Name of Researcher/Applicant	Beverly Seabi

Researcher's personal data

Surname	Seabi			**Name:**	Beverly						
Title (circle one):		**Prof**		**Dr**		**Mr**		**Ms**	**X**	**Other: Miss**	
Department/discipline	**Humanities**										
School	School of Human and Community development										
University address											
Staff / Student number	2057774	**X**	**Full time**		**Part time**		**Staff**				
Your telephone(s)	0711900117										
Your Email:	2057774@students.wits.ac.za										
Name of Supervisor	Ms Enid Schutte										
Supervisor's email address	Enid.Schutte@wits.ac.za										
Supervisor's tel. number(s)	**011 717 4521**										

TITLE OF RESEARCH PROJECT
Mobile Phone Usage Behaviour amongst the "smart phone" generation: Its impact on road traffic safety

Is this research for degree purposes?			**X**	**Yes**		**No**			
If so, for what degree?		**Honours**	**X**	**MA**		**PhD**		**Other (specify):**	
Has it been approved by the relevant higher degrees committee or other relevant unit?		**Yes**		**No**	**X**	**Submitted & pending**			

Where will the research be carried out?
At the University of Witwatersrand.

What are the aims & objectives of the research relevant to human research participants (Please list; be brief)
1. The aim of this study is to investigate the profile of mobile phone usage behaviour in smart phone generation. 2. To explore the association of usage of smart phones with the safety of pedestrians and drivers amongst university students/ smart phone generation. 3. To explore the behaviours and attitude of the smart phone generations towards mobile phone usage amongst public road users.

List the names and affiliations of any *additional* researchers who will be covered by this ethics protocol
N/A

Has appropriate formal permission been obtained, if required (e.g. employer, government department, land owner, etc.)?					
	Yes (attached)		Not required	**X**	Pending (must be supplied before permission is granted)

Do you have any financial or material interest associated with your research participants or with the organisations that you will work with during your research?					
	Yes, current	**X**	**No**		**Potential conflicts of interest may exist**
If yes, please explain how you will manage any existing or potential conflicts of interest.					

Protocols submitted to the Committee must have sufficient information to enable the committee to judge the ethical implication of the proposed research. Please be brief and concise but also as specific and informative as possible.

How will data on human research participants be collected (techniques, methods, procedures)? Be brief but specific	
X	Formal interviews using questionnaires, schedule/list of questions, or formal protocol (**Attach all questionnaires, schedules, etc.**)
	Informal interviews, semi-structured or open ended interviews (**Attach interview protocol, or guidelines**)
	Ethnographic observation, participant observation, other informal descriptive and / or interactive methods
	'Focus group', seminar/discussion group, or other group-orientated research
	Community-based, participant, or 'action research' methods or technique such as drama workshops, community theatre, training workshops, participant rural appraisal (PRA), rapid rural appraisal (RRA), etc.
	Research on/in therapeutic or counselling contexts
	Observation of public performance, and/or public behaviour observation
	Photography, video and/or audio recording (**specific separate consent forms may be required**)
	Mapping or other techniques that involve direct interaction with participants (otherwise exempt)
	Other research methods or techniques—explain below.

Details: This study will adopt a quantitative approach thereby statistically analysing the responses of participants (Babbie, 2016). This study is cross-sectional in nature as data will be collect data one point in time rather than over a period of time. This study will make use of a survey design. Ethical clearance will need to be obtained from the Human Research Ethics Committee in order for this research study to proceed

Permission will be requested from the university and from the head of Faculty of Humanities

Once permission is granted on behalf of the university and from the respective School and Departments involved, lecturers will be informed of the study with the intention to invite students to partake in the study.

Questionnaires will be online and a link will be sent to students via faculty administrators.

Students will be notified about their guaranteed anonymity and confidentiality during their participation. Participants will be informed of consent: by participants completing the research questionnaires they will be giving their consent to participate in this research study.

The information provided in step IV will be distributed to participants in a form of information sheet Participants who are willing to take part in the study will receive a set of self-report questionnaires

How will informed consent be obtained?		Formal		Informal or Verbal	X	Other (e.g. public speech) Online	
Explain your strategy for ensuring informed consent							
Permission will be obtained from the university; specifically it will be sought from registrar and Co-ordinators.The research will be thoroughly explained and the study will be announced on Sakai.							
Attach participant's information sheets, informed consent forms, and/or other related materials							

NB*: **informed consent*** in the social science and humanities research involving human participants Where informal ethnographic or participant observation methods are used, or where signed Informed Consent forms are not possible, or for research involving group contexts (focus group, Participant Rapid Assessment, Rapid Rural Appraisal, public performance, workshops) **state how the quality of informed consent will be assured**. It is essential that direct participants in research be fully informed and agree on this basis to participate in research.

Who will the research participants be? Students					
Age range?	18 and above				
Does this research expose either the participant or the researcher to any potential risks or harm that they would not otherwise be exposed to?		Yes	**X**	No	
Will research involve vulnerable categories?		Yes	**X**	No	
If so, state which ones:					
How will participants be selected and approached?	The participants will comprise students from the University of Witwatersrand. A letter will be sent to the registrar to ask for permission to approach the Faculty of Humanity and the Faculty of Commerce, Law and Management in order to invite students to participate in the research study. Questionnaire links will be sent to faculty administrators for them to send it out to students.				
How will any existing vulnerabilities among research participants be addressed?	N/A				

NB: The term 'Vulnerable categories' includes, among others, children under 14, orphans, prisoners, persons with cognitive or communication disorders, people who are traumatised or currently in traumatic situations.

Can **confidentiality** be guaranteed?	**X**	Yes		No
Can **anonymity** be guaranteed in resulting reports, theses and/or publications?	**X**	Yes		No

Explain how this will be done? What will participants be told in this regard?

The participation will involve completing an online survey that will be accessed and all participants will be assured of confidentiality and anonymity.

NB: While confidentiality may be desirable, it cannot be guaranteed in, for example, focus groups, or ethnographic observation. Similarly anonymity should be preserved in questionnaires, but cannot be offered in workshop methodologies, focus group research, etc. All data however should be kept confidential and safe from unauthorised access once it has been collected. Informants should have the right to remain anonymous in the final report, and this must be respected in handling of all data relating to them.

What is to be **done with the research data** after completion of the project?

Data will be kept safe and will be stored on a password protected computer. Only the researcher and the supervisor involved in the study will have access to the data.

NB:'Raw' or unprocessed data, especially **where the identity or personal data of research participants is included, must be safeguarded** and preserved from unauthorised access. Data may be destroyed after use, but **preservation in an archive or personal collection** may also be appropriate, desirable or even essential. For instance, data sets that contain **historically important information** or information that relates to **national heritage** must be preserved and should be placed in a public archive where possible and appropriate.
All data should be preserved in a way that **respects the nature of the original participants' consent**.

10. How will the results be **reported**, and who will have access to this/these?

The results of the study will be reported in the form of master's research report. Should participants want to obtain results of the study they may request a copy from the either the researcher or supervisor of the researcher via contact details

SIGNATURES (REQUIRED)

In signing this form, the researcher and supervisor (if any) of this project undertake to ensure that any amendments to this project that are required by the Human Research Ethics Committee are made before the project commences.

Declaration: We, the signatories, declare that all information on this form is correct and that we will strive to maintain the highest ethical standards in this research, according to disciplinary and university expectations at all time, recognising that ethical practice in research is always a continuing process.

	Date	Name	Signature

Applicant	26/04/18	Beverly	*BSeabi*
Research **Supervisor**'s name & signature (for students)	26/04/18	Enid Schutte	E.S
Dept/**Unit Head**'s name & signature			

Appendix F: University Permission Letter

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

School of Human and Community Development
Private Bag 3, Wits 2050, Johannesburg, South Africa
Tel: (011) 717-4500 Fax: (011) 717-4559

To the Registrar

Dear Sir/ Madam

Hello. My Name is Beverly Seabi. I am currently enrolled for MA Psychology by Coursework and Research at the University of Witwatersrand. I am asking permission to conduct my research at the University of Witwatersrand. My research study focuses on the Smartphone Usage Behaviour amongst the "smart phone" generation: Its impact on road traffic safety. The research aims to investigate the profile of smartphone usage behaviour in smart phone generation, to explore the association of usage of smart phones with the safety of pedestrians and drivers amongst university students/ smart phone generation and to explore the behaviours and attitude of the smart phone generations towards smartphone usage amongst public road users.

I would like to ask your permission to approach the following Faculty of Humanities in order to invite students to participate in this research study.

All ethical considerations have been looked into to ensure that participants' confidentiality and anonymity is protected and that there are no risks that accompany the study.

Your support to this project will be appreciated. Please feel free to enquire more about the study.

Regards
Beverly Seabi
(MA Psychology student)
Cell: 071 1900 117
Email: 2057774@students.wits.ac.za
Ms Enid Schutte (Supervisor)
Tell: 011 717 4521
Email:Enid.Schutte@wits.ac.za

Appendix G: Faculty Permission Letter

School of Human and Community Development
Private Bag 3, Wits 2050, Johannesburg, South Africa
Tel: (011) 717-4500 Fax: (011) 717-4559

To: Dean of the Faculty of Humanities: Dear Sir/Madam

My name is Beverly Seabi and I am undertaking my Masters in Psychology by Coursework and Research at the University of the Witwatersrand. I am asking for your permission to conduct my research study at your faculty. My request is for permission to send out questionnaire links to faculty administrators for them to send it out to students. The manner in which data will be collected will be electronically which will require faculty administrators to distribute it to students.

My research study focuses on the Smartphone Usage Behaviour amongst the "smart phone" generation: Its impact on road traffic safety.The research aims to investigate the profile of smartphone usage behaviour in smart phone generation, to explore the association of usage of smart phones with the safety of pedestrians and drivers amongst university students/ smart phone generation and to explore the behaviours and attitude of the smart phone generations towards smartphone usage amongst public road users. The participants will be sent an information sheet that will give them relevant information as to what their participation will entail. Factors such as confidentiality and anonymity are addressed. The questionnaire will take participants approximately 10-15 minutes to complete.

For any further information, please feel free to contact either myself or my supervisor, Ms Enid Schutte

Regards.

Beverly Seabi
(MA Psychology student)
Cell: 071 1900 117
Email: 2057774@students.wits.ac.za
Ms Enid Schutte (Supervisor)
Tell: 011 717 4521

Email:Enid.Schutte@wits.ac.za

Appendix H: Participant Information Sheet

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

School of Human and Community Development
Private Bag 3, Wits 2050, Johannesburg, South Africa
Tel: (011) 717-4500 Fax: (011) 717-4559

Dear Sir/Madam

Hello. My Name is Beverly Seabi. I am currently enrolled for MA Psychology by Coursework and Research at the University of Witwatersrand. One of the requirements of the degree is the completion of a research report. I would like to invite you to participate in my research study. My research study focuses on the Smartphone Usage Behaviour amongst the "smart phone" generation: Its impact on road traffic safety. The research aims to investigate the profile of smartphone usage behaviour in smart phone generation and to explore the association of usage of smart phones with the safety of pedestrians and drivers amongst university students/ smart phone generation. This study intends to contribute towards a broader study and limited literature of smartphone usage while driving.

Should you choose to take part in this research study you will be asked to complete a survey. The questionnaire will take approximately 10-15 minutes to complete. Your response will remain confidential and anonymity is guaranteed. Should you decide not to take part in the study, this will not disadvantage you. Please don't hesitate to contact us should you have any questions.

Thank you.

Researcher: Beverly Seabi
Email: 2057774@students.wits.ac.za
Supervisor: Ms Enid Schutte
Email:Enid.Schutte@wits.ac.za