AN APPLICATION OF AN EXTENDED THEORY OF PLANNED BEHAVIOUR (TPB) TO SPEEDING IN SAUDI ARABIA

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Abstract

Speeding is considered one of the leading factors contributing to road traffic injuries globally despite advanced strategies of speed management being adopted worldwide. Crash risk and its severity increase with higher travel speeds. As speeding is considered a voluntary behaviour, which depends on driver beliefs, it is important to understand these beliefs in order to develop effective behavioural countermeasures. This program of research, therefore, comprised a multiphase mixed-methods approach examining the influence of psychosocial factors on speeding in Saudi Arabia (SA) including personal, social, situational, and legal factors. It applied an extended version of the Theory of Planned Behaviour (TPB) which included, in addition to the TPB's standard/direct predictors (of attitude, subjective norm, and perceived behavioural control [PBC]), three additional predictors, namely, descriptive norms, moral norms, and past behaviour. The theory was selected because it has the ability to predict speeding behaviour by understanding psychosocial factors leading to behaviour. The research aimed to generate significant knowledge regarding psychosocial factors influencing speeding intention in the Saudi Arabian context. Three research questions were addressed in the current program of research.

The first research question: "how do Saudis define speeding from their own point of view?" was answered through conducting Study 1. It aimed to provide a specific definition in accordance with the TPB's TACT (T refers to target, A refers to action, C refers to context, and T refers to time) principle from the Saudi perspective. Two major categories of speeding definitions, or scenarios, were identified for further exploration within subsequent studies in this program of research. One of these scenarios was termed as the general speeding definition, which meant exceeding the legal speed limit, abbreviated herein as the "GS" scenario. This

was intended as a broad, overarching scenario applicable to all Saudi drivers and for which the predictors of speeding in such a context were examined in Study 3. The other type of scenario was termed herein as the specific definitions or scenarios for speeding which Study 1 was conducted to identify.

Study 1 was an exploratory, qualitative study among 14 participants. Individual face-to-face interviews were conducted to define speeding behaviour from the participants' perspectives. The target was defined as speeding, but the time was determined in Study 3. Study 1 was conducted to identify both action and context. After conducting Study 1, a conceptual content analysis identified the most frequent factors to be included in identifying context and action. Conceptual content analysis was conducted and sub-themes were included to develop specific speeding scenarios if they represented responses from around 30% or more participants (i.e., five or more participants).. As a result, the action was identified as exceeding the legal speed limit because the majority of participants stated this as their definition of speeding. The context of speeding was defined by including several interrelated factors or responses. The participants, in general, gave two specific situations for speeding which included speeding *in a hurry for no particular reason other than you want to reach your destination quickly,* and *in a hurry because you need to make a scheduled arrangement*. The participants also gave two major speed zones for speeding which were 80 km/h and 120 km/h speed zones. In addition to these speed zones, certain situational factors encouraging speeding were identified. The factors included multi-lane roads, fine weather, clear visibility, and good car condition. Together this information contributed to identifying action and context which were utilised in developing four speeding scenarios, called specific speeding scenarios. Each speeding scenario was given a certain abbreviation. Speeding on 80 km/h speed zones for No Particular Reason was abbreviated as 80-NPR, speeding in 80 km/h speed zones to Make a Scheduled Appointment was abbreviated as 80-MSA; speeding in 120 km/h speed zones for No Particular Reason was

abbreviated as H-NPR; and, speeding in 120 km/h speed zones to Make a Scheduled Appointment was abbreviated as H-MSA.

After defining these specific scenarios, they were examined in Study 2 for further assessment and for the belief elicitations (to identify the indirect predictors) of speeding intentions and behaviour. Study 2 was also an exploratory, qualitative study among 20 participants. Individual telephone interviews were conducted with Saudi drivers. Study 2 was conducted to achieve two aims: first, to identify the indirect beliefs of the extended TPB (i.e., behavioural [advantages and disadvantages of speeding], normative [significant others who approve or disapprove speeding], and control [facilitators and barriers for speeding] beliefs). The second aim was to assess the applicability of each specific speeding scenario for use in the main survey (Study 3). After the beliefs were elicited, the results showed that some participant said they do not speed and that they could see no advantages to speed in such contexts. Thus, two of the scenarios were removed from the final survey to be examined in Study 3. The remaining scenarios ("specific speeding scenarios") were speeding to make a schedule appointment on 80 km/h and 120 km/h speed zones, i.e., 80-MSA and H-MSA. By identifying these scenarios, the first research question was answered.

The second research question, "What are the key psychosocial factors that influence speeding behaviour?", was addressed by conducting Studies 2, 3, and 4. Conceptual content analysis of the beliefs detected in Study 2 was conducted and almost all the sub-themes (i.e., the salient beliefs) that were elicited by from three or more participants (i.e., 15% or more of participants) were included as items in the Study 3 survey. Overall, the participants in Study 3 showed a great level of knowledge of the disadvantages of speeding. In contrast, there were only a few beliefs that were elicited about potential advantages of speeding. Furthermore, the beliefs elicited for control beliefs regarding the facilitators of speeding were also limited. In

Study 3, a critical beliefs analysis was used to identify the significant beliefs for the intention to speed, which partially contributed to answering the second research question.

Study 3 was an exploratory, quantitative study among 112 participants. Online surveys were used. Study 3 substantially contributed to the results of the program of research and made a major contribution to answering the second research question: "What are the key psychosocial factors that influence speeding behaviour?". It is important to note that the time when Study 3 was conducted was considered as the beginning of the COVID-19 pandemic in SA. Consequently, there was a lockdown that restricted behaviours, such as leaving home or driving. For this reason, only speeding intention and not behaviour was examined, and the time acronym of the TACT principle was identified for all speeding scenarios measuring direct, indirect, and additional predictors as "when it is once again legally acceptable for me to drive".

Continuing with Study 3, three speeding scenarios were examined that were the GS, 80-MSA, and H-MSA scenarios. The direct and the additional predictors included attitude, subjective norms, PBC, moral norms, descriptive norms, and past behaviour. All these predictors were examined for all speeding scenarios. Hierarchical regression analysis was applied to identify significant direct and additional predictors for each scenario. The predictive ability of the extended TPB was examined, and, in addition, the significant direct and additional predictors were identified.

The utility of the extended TPB was partially supported across the different speeding scenarios. Overall, the direct predictors contributed to explaining speeding intention, with 35% of the variance for scenario GS, 60% of the variance for scenario 80-MSA, and 64% of the variance for scenario H-MSA. The additional predictors also were supported and contributed to add a further explanation of speeding intention, with 16% of the variance for scenario GS, 8% of the variance for scenario 80-MSA, and 9% of the variance for scenario H-MSA.

The significant direct predictors for speeding intention were examined. Only PBC was found to be a significant predictor for speeding intention in all speeding scenarios, GS, 80-MSA, and H-MSA. The result indicated that the more participants think they can control their driving speed in different speed zones, the stronger their intention to speed. Regarding the additional predictors, past behaviour was also found as a significant predictor of speeding intention for all scenarios. This finding showed that those who sped more in the past were more likely to intend to speed in the future.

For the remaining additional predictors, moral norms and descriptive norms, were found to be significant for scenarios GS and H-MSA only. Moral norms was a significant predictor for scenarios GS and H-MSA indicating that the more participants feel guilty about speeding, the less likely it is that they will intend to speed. Descriptive norms also was a significant predictor for such scenarios meaning that the more participants think other drivers would speed in such scenarios, indicating stronger their intention to speed.

The indirect beliefs were examined by conducting a critical beliefs analysis to identify the significant direct predictors for speeding intention. As a result, a few significant beliefs were found to influence speeding intention among the participants. For instance, for scenario 80-MSA, two normative beliefs, including "wife" and "friends" were significant influencers of speeding intention. These results revealed that if participants thought their wives and friends would not approve of them speeding, they were less likely to intend to speed. In addition to such findings, one control belief was found to be a significant facilitator for intention to speed, which was "no traffic congestion". The result illustrated that uncongested roads would motivate the participants to intend to speed.

Regarding the significant indirect predictors for scenario H-MSA, "wife" was also found to a significant influencer for speeding intention, again indicating that, if participants

thought their wives would not approve of them speeding, they were less likely to intend to speed. One behavioural belief was found to be a significant advantage for speeding that influenced intention to speed and this belief was "speeding will help drivers to arrive earlier". This finding indicated that, if participants believed that speeding would help them to arrive at their destination earlier, it would increase their intention to speed. Lastly, one control belief was found to be a significant facilitator of speeding intention and this belief was "familiarity with the road". This finding showed greater familiarity with the road would increase their intention to speed.

Because the assessment of speeding behaviour could not be applied due to the COVID-19 driving restrictions, Study 4 was added. It sought expert feedback on the significant results and the predictive ability of the extended TPB for each speeding scenario illustrated in Study 3 through seeking the views of seven road safety experts in Riyadh city. The experts were asked whether the results found in the current program of research reflected what they considered to be the reality of speeding behaviour among Saudi drivers in Riyadh city. It was an exploratory, qualitative study. Online open-ended surveys were used.

Another aim of Study 4 was to answer the research question "Which psychosocial factors can be used in future intervention strategies?". The experts' opinions about utilising this knowledge for future interventions for reducing speeding behaviour included two major strategies. They suggested developing road-safety education initiatives which may be delivered within school curricula or via public health awareness campaigns. It was suggested within such campaigns, to include parents, who, in turn, could contribute to increasing children's awareness about speeding behaviour. Furthermore, some delivery modes were suggested, which included media and TV. Study 4 made an important contribution to developing practical implications through engaging the stakeholders in future interventions.

The findings of the current program of research had important theoretical implications. From the outset, arguably, this research contributes new knowledge to the field by being one of the first studies to apply the TPB to help understand speeding behaviours in Arabic countries. Examining the direct predictors (i.e., attitude, subjective norm, and PBC) of speeding intentions in conjunction with their underpinning indirect beliefs (i.e., behavioural, normative, and control beliefs) and, thus, a full operationalisation of the predictors within the TPB, may be considered an especially valuable addition to studies in the field of speeding in Arab countries. Moreover, this research applied such a framework in relation to different speeding scenarios (i.e., general and specific scenarios including two speed zones, 80 km/h and 120 km/h), thus further attesting to its robustness to explain speeding in SA. In comparison, only a limited number of studies from around the globe have ever applied all of the predictors (i.e., direct and indirect beliefs) to understand speeding. The implication of this at an international level is that this program of research adds to the growing body of research that provides support for the application of the TPB in understanding more about the motivators of speeding intentions. Further, this research adds to the growing body of research that indicates support for extended TPB frameworks to better understand drivers' speeding.

In terms of practical implications, road safety experts suggested raising public awareness campaigns and introducing public education initiatives as strategies that findings from the current program of research could inform. These interventions might be more successful in that they focus on personal factors (PBC, and past behaviour, moral norms), social factors (descriptive norms, wife and friends), and situational factors (no traffic congestion, and being familiar with the roads) identified in this research. Benefits could arise from increased public awareness about the fact that personal confidence regarding speeding control can be misguided without considering other unexpected external factors that could emerge when driving, such as other cars on the road (PBC). For past behaviour, it is also important to increase

public awareness. Even though drivers may have committed speeding offences without any negative consequences in the past, this is still considered a violation and it could put their and other lives in danger if they commit them next time.

Moral norms (as a personal factor) and descriptive norms (as a social factor) were significant predictors for the general scenario and for the scenario related to speeding in 120 km/h zones when in a hurry to make a scheduled appointment. Similar findings between the two situations can be used to develop a single public awareness message for all road zones, regardless of the speeding situations. In terms of descriptive norms, as the drivers said that they expected others would exceed the speed limits, it could mean they perceived speeding as a more common and "normal" behaviour in the community. For this reason, the public need to be aware that speeding is not an acceptable behaviour even if it is committed by others. This in turn would contribute to change the norm in the community to make drivers feel more responsible about their lives, lead them to respect road traffic rules in general, and to perceive speeding as an unacceptable behaviour.

For indirect beliefs, the two situational factors (i.e., control factors for 80 km/h speed zones, with "no traffic congestion", and for 120 km/h speed zones), could be utilised in the intervention plan to increase public awareness about speeding behaviour. The normative predictors (i.e., social factors) included "wife" and "friends", who were influencers for the drivers on 80 km/h speed zones. For 120 km/h speed zones, only "wife" was found as an influencer for the drivers' speeding intention. It means that speeding may decrease if such influencers discourage this behaviour. Such findings suggest that targeting these significant others, regardless of which speeding zones, could lead to more respect for the speed limits. Thus, there is a need to engage both males and females to increase their awareness about the negative consequences of speeding and emphasise their responsibility in giving advice.

Regarding the only significant behavioural belief (i.e., "speeding will help drivers for arriving earlier" as a personal factor), this belief may be open to change by reinforcing the negative consequences of speeding, to increase the likelihood that drivers will believe the disadvantages of speeding outweigh the advantages of arriving earlier. Such strategies would contribute to reducing the risk of crashes and injuries. Future recommendations that include piloting the intervention through applying such strategies are recommended.

In conclusion, this study has identified several psychosocial factors as influencing Saudi drivers' speeding intentions. These factors include personal, social, and situational factors, suggesting that such factors need to be considered in future public awareness interventions and educational institutions. The results of the current program of research were assessed in the final study of this study by road safety experts in SA, who gave their expert commentary on the summary results, and provided suggestions for using them in future interventions.

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List of Abbreviations and Glossary

AUD	Australian Dollars
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HBM	Health Belief Model
HDM	Highway Design Manual
H-NPR	Highway-No Particular Reason scenario
H-MSA	Highway-Make a Scheduled Appointment scenario
MOI	Ministry of Interior
MOMRA	Ministry of Municipal and Rural Affairs
MOT	Ministry of Transportation
PBC	Perceived Behavioural Control
PWM	Prototype/Willingness model
RTCs	Road Traffic crashes
RTIs	Road traffic injuries
SA	Saudi Arabia
SAHER	Is an Arabic word means stay wake up in the night which
system	is what the speed camera system is called in SA.
SAR	Saudi Riyal
SLT	Social Learning Theory
TTM	Transtheoretical Model
TPB	Theory of Planned Behaviour
UAE	United Arab Emirates
UK	United Kingdom
US	United States
WHO	World Health Organization

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: QUT Verified Signature

Date: __02/09/2021_____

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Chapter 1: Introduction

Road Traffic crashes (RTCs) lead to more than 1.35 million deaths annually, with road traffic injuries (RTIs) being a leading cause of death internationally (WHO, 2018a). RTCs, therefore, constitute a financial burden on the Gross Domestic Product (GDP) of all countries (WHO, 2015). This financial burden of RTCs results from injuries and disabilities and the loss of productive individuals (WHO, 2004). The financial losses resulting from road traffic deaths and injuries is estimated at more than 5% of GDP in low- and middle-income countries, and at 3% of GDP globally (WHO, 2015).

The chapter contains an overview of the impact of RTCs in Saudi Arabia (SA). In addition, the chapter will include an overview of the most common cause of RTCs in SA.

1.1   BACKGROUND

This section provides a brief overview of fatality rates resulting from RTCs at a global level and then clarifies the position of Saudi Arabia (SA) with respect to such rates. It is based on the World Health Organization's 2015 and 2018 Global Status Reports on Road Safety.

According to the World Health Organization (WHO, 2018a), road fatality rates are higher in low- and middle-income countries than in most high-income countries. However, it has been found that among the high-income countries, some located in the Eastern Mediterranean Region (see Figure 1), have higher fatality rates than rates in the low- and middle-income countries, with a rate of 22.4 compared to 19.7 (WHO,

2015). Although the WHO report (WHO, 2015) does not identify the specific countries in the Eastern Mediterranean Region, it is assumed that they are the six Gulf Cooperation Council (GCC) countries comprising SA, United Arab Emirates, Qatar, Kuwait, Oman, and Bahrain. They are considered to be high-income countries and but they have high rates of road traffic fatalities. It is important to note that SA is the largest GCC country, with the highest number of road traffic fatalities as well as the highest fatality rate. According to recent reports (WHO, 2018a), the number of road traffic fatalities in SA is still higher than the other Eastern Mediterranean countries with low- and middle incomes.

Figure 1: The Eastern Mediterranean Region (Gulf Cooperation Council countries in a red circle) (Adapted from: Google map, 2018)

The differences between the road fatality rates in the GCC countries and the fatality rates in high-income countries in other regions are outlined in Table 1, which presents comparative data for the United States, the United Kingdom and Australia.

Table 1: Road traffic fatality rates among high-income countries in the Eastern Mediterranean Region and high-income countries in other regions.

High-income countries in the Mediterranean Region (Gulf Cooperation Council countries)	
Country	**Road fatality rate per 100,000 population**
Saudi Arabia	28.8
Oman	16.1
Kuwait	17.6
Qatar	9.3
United Arab Emirates	18.1
High-income countries in different regions	
Country	**Road fatality rate per 100,000 population**
United States	12.4
Australia	5.6
United Kingdom	3.1

Table 1 shows that the lowest fatality rate among GCC countries is in Qatar, at 9.3 per 100,000 people (WHO, 2018a), which is less than the United States. However, the highest rate among the GCC countries is in SA, where the fatality rate per 100,000 people is 28.8, about five times higher than Australia and almost 10 times higher than the United Kingdom (WHO, 2018a).

Young adults aged 15-29 years are considered an economically productive age group for all countries. However, it has been found that this age group is over-represented in RTCs fatalities worldwide (WHO, 2015). The same issue exists in SA where RTCs significantly affect younger people and economically productive age groups (Mansuri et al., 2015). Indeed, it has been found that the most affected age group in terms of Road Traffic Injuries (RTIs) is the economically productive age group from 18-40 years (Abdullah, Al-Mutairi, Al-Ali, Al-Soghier, & Al-Shnwani, 2013; Ghaffar & Ahmed, 2015; Hokkam, Gonna, Zakaria, & El-Shemally, 2015).

The incidence rate of RTCs is higher among males than females in SA (Mansuri, Al-Zalabani, Zalat, & Qabshawi, 2015). While this finding is not uncommon, an

additional reason for this difference in SA is possibly because, until recently, the road traffic laws in SA banned females from driving (Mansuri et al., 2015). This law reduces females' exposure to the road environment, and thus reduces their involvement in RTCs. However, on the 26th September, 2017, the Saudi government announced a decree allowing women in SA to drive (Alarabiya, 2017).

In most industrialized countries, the GDP losses resulting from traffic crashes are equivalent to $1 \pm 2\%$ of the national income. However, in SA the GDP loss has been estimated as being between 2.2% and 9% (Ansari, Akhdar, Mandoorah, & Moutaery, 2000; Saudi Arabia Monetary Agency. The 32nd Annual Report 1417H, 1997). The financial burden of RTCs in SA is estimated to be more than US$3 billion each year (Alhindi & Albawardy, 2013). In addition to the economic burden on the country, other consequences of RTCs include the loss of a family member (Al-Naami, Arafah, & Al-Ibrahim, 2010), who may also be the deceased's family breadwinner, resulting not only in psychological problems due to the loss of a member of the family (Al-Naami et al., 2010), but also financial problems experienced by the victim's family.

1.2   RATIONALE FOR THE RESEARCH

Given the extensive economic and personal implications of RTCs, it is important to determine why the RTC rate is so very high in SA. The causes of RTCs are most likely to be multifactorial, including the vehicle (i.e., the condition of the cars), the environment (i.e., road and infrastructure conditions), and the driver or road user (Nofal, Saeed, & Anokute, 1996). The road network in SA is generally considered to be well-designed with wide roads (Bendak, 2011), and there is evidence that 88.8% of recorded crashes involved cars in good condition and less than 10 years of age (Nofal, Saeed, & Anokute, 1996). Therefore, in SA, as in many other countries, the driver or

human factors are considered to be the main contributing factor to RTCs (Al-Naami, Arafah, & Al-Ibrahim, 2010; Ansari et al., 2000; Hassan, 2016).

Driver factors include the driver's knowledge of and their attitude toward driving. It has been determined that Saudi drivers' knowledge of road safety regulations does not match their behaviours. They appear to be aware of the road rules, however they do not often follow them (Al-Khaldi, 2006; Al Turki, 2014; Mansuri et al., 2015). Thus, knowledge alone is not be the only predictor of driver behaviour. Therefore, the development of future interventions requires research to identify factors underpinning Saudi drivers' behaviours.

Speeding, or excessive speeding, is considered one of the driver factors leading to crashes and greater injury severity (WHO, 2015; 2017b). Research indicates that as a car increases its speed by 1 km/h, the incidence of crash injuries and fatalities will increase by 3% and 4-5% respectively (WHO, 2017b). This has substantial cost implications; in the US, the National Highway Traffic Safety Administration (2014) estimated that speeding was responsible for 37% of all fatal crashes in 2012, with an annual cost of approximately US $40 billion.

1.3   SCOPE OF THE RESRACH: SPEEDING AS A BEHAVIOURAL PROBLEM IN SA AND THE GAPS IN RESEARCH

There are different definitions of speeding. Speeding can be defined legally as driving above the posted speed limit or the legislated speed limit or driving too fast for the conditions (Fleiter, 2010). Speed limits vary according to location/context (e.g., in/outside of cities). The posted speed limit is considered to be the highest continuous speed that a car can safely travel on a main road when the weather conditions are ideal and traffic density is low (AljarAllah & Aldahmash, n.d.). The driver is expected to drive at lower than the minimum speed limit in exceptional weather and surrounding

conditions (such as rain, fog, and work hours) to maintain road safety (Alabdulaay et. al., n.d.).

Speeding or driving above the posted speed limit is one of the most common traffic violations in SA. In 2016, Hassan reported that approximately 73% of young Saudi drivers who received a traffic infringement did so due to having exceeded the posted speed limit (Hassan, 2016). Furthermore, Mansuri et al. (2015) claimed that the main reason for RTCs was excessive speeding. Indeed, speeding is the most frequently reported cause of crashes as reported in different studies (Hassan, 2016; Mansuri et al., 2015). A more recent study conducted by Mohamed and Bromfield (2017) investigated the main cause of crashes in SA. The study found that "speedy driving" was the most common reason for crashes (Mohamed & Bromfield, 2017, p. 67). According to the authors of the study, "speedy behaviours" included speeding to cross traffic lights at the last minute, disregarding the speed limit on residential roads, disregarding the speed limit on motorways, and speeding to overtake a slower driver (Mohamed & Bromfield, 2017).

However, in addition to these legal definitions, there is another definition regarding speeding from a psychological perspective; that is, a definition that relates to an individual's perceptions or the individual's definition of speeding (Fleiter, 2010). Thus, it is important to understand how individuals of a particular context, in this case, drivers in SA, define speeding. In particular, this program of research focused on the influence of psychosocial factors on speeding since, as a review of the literature on road traffic issues in SA demonstrates, speeding has not been examined from this perspective.

Speeding in SA is a significant behavioural problem and one that requires further investigation from a public health perspective, especially in terms of understanding its

potential determinants. Currently, there is insufficient evidence addressing speeding in SA from a public health perspective which also incorporates an understanding of the behaviour through the application of behavioural change theories. One of the most extensively applied theoretical models used to study speeding behaviour is the Theory of Planned Behaviour (TPB). The TPB will be explained further in Chapter 2. Prior to discussing this framework, it is important to first review evidence relating to speed limit enforcement in SA as it relates to speeding behaviour. In addition to this, as was noted earlier, the most affected age group in terms of their involvement in RTC are individuals aged 18-40 years (Abdullah et al., 2013; Ghaffar & Ahmed, 2015; Hokkam et al., 2015); thus, the current program of research targets this particular age group.

1.4   RESEARCH AIMS

According to the evidence outlined including potential gaps in knowledge, this program of research has three primary aims:

١. to determine the psychosocial factors that contribute to speeding in the Saudi Arabia context (and, in doing so, address a gap in current knowledge);

2. to provide evidence which may assist in the development of culturally-relevant speed awareness interventions; and

3. to add a theoretical contribution to the road safety field via the application of an extended Theory of Planned Behaviour (TPB) and, in doing so, examine its theoretical robustness within Arab culture.

These aims will guide this program of research. The next chapter contains a comprehensive review of literature that has examined speeding behaviour and factors that influence it and concludes by outlining the research questions that this research program seeks to answer.

1.5   SUMMARY

Briefly, this chapter has outlined the impact of RTCs in SA which occur at a rate considered to be one of the highest among high-income countries globally. The focus of the program of research, namely, understanding the psychosocial factors of speeding among people aged 18-40 years, was presented. An overview of defining speeding in SA has been clarified. The next chapter will focus on reviewing evidence regarding the psychosocial factors that contribute to speeding. It will also outline the theoretical framework underpinning this research program.

Chapter 2: Literature Review

In the injury prevention field, the application of theoretical frameworks has an important role in ultimately helping to promote public health through understanding the issue or behaviour and informing interventions to reduce or prevent it (Sleet & Gielen, 2008). RTC prevention is a major issue considered in the injury prevention field as road crashes are preventable (WHO, 2015). Appropriate theoretical frameworks are important to aid the examination of psychosocial factors which influence drivers' behaviours and, ultimately, contribute to road crashes. As clarified in Chapter 1, speeding among Saudi drivers is the target behaviour of study in this program of research and its examination has been guided through the application of a robust theoretical framework, the Theory of Planned Behaviour or TPB.

The TPB represents one of the most frequently applied theoretical frameworks used to explain and predict speeding behaviour in different countries. It will be explained in detail after comparing it with other theoretical frameworks to establish a rationale for its choice in this research to examine the psychosocial factors of speeding in SA. The chapter will end with the research questions that guide this program of research. The chapter commences, however, with an overview of the psychosocial factors related to speeding.

2.1 PSYCHOSOCIAL FACTORS OF SPEEDING

Speeding is considered a complex behaviour because it can be caused by many and different interrelated factors. According to Fleiter (2010), the contributing factors to speeding may be classified broadly into personal, social, legal, and situational factors. Each of these classifications is discussed further in the sections that follow.

2.1.1 Personal factors

Personal factors consist of anything pertaining to an individual or group of individuals. For instance, such factors include gender, age, attitude and past behaviours of individuals as factors that can influence speeding behaviour. For instance, a study showed that male passengers were more likely to encourage speeding than female passengers (Conner et al., 2003; Forward, 2009b). One's age may also influence speeding behaviour with some studies showing that young drivers were more likely to engage in speeding or risky driving than older drivers (Horvath et al., 2012; MacMillan & Hewitt, 2008). Attitude toward speeding, and whether the consequences of speeding were perceived as positive or negative, can also influence the likelihood of engaging in this behaviour (Elliott and Thomson, 2010). For instance, the impact of attitude on speeding has been reviewed by Fylan et al. (2006), who found that a reported driver's perception of the threat of crashing or being caught for speeding affected the frequency with which they sped. Attitude to speeding also determines how drivers define speeding (e.g., exceeding the posted speed limit; Horvath et al., 2012; Silcock, 2000) or based on what they consider a safe speed limit (Ekos Research Associates, 2007; Fleiter, 2010).

Past speeding behaviour also, perhaps unsurprising, increases the likelihood of engaging in speeding behaviour in the future (Conner et al., 2007). This factor has been discussed by Beck and Ajzen (1991) and Elliott and Thomson (2010) who found that the more individuals reported having sped in the past, the more they reported an intention to speed in the future.

Another personal factor that could lead to more frequent speeding is Type A personality[1] (Watson, et al., 2015). Other personality-related characteristics known to increase speeding behaviour for drivers in different studies included perceiving speeding as a thrill-seeking behaviour, and having high perceptions of the ability to remain in control even when speeding (Fylan et al., 2006). Furthermore, driver knowledge can have a significant impact on speeding. When a driver has poor knowledge of traffic rules, then speeding and other road traffic violations increases. For this reason, speeders may be classified into four groups, which are unintentional speeders, moderate occasional speeders, frequent high speeders, and socially deviant speeders (Fylan et al., 2006).

According to Fylan et al. (2006), unintentional speeders refers to those speeders who have poor knowledge about different speed limits and they may underestimate their speed. Moderate occasional speeders perceive themselves as an expert in driving; thus, they believe that they can safely exceed the speed limit, as they consider the standard speed limits as being relatively low. They speed less frequently than high speeders and do not perceive speeding as a pleasurable behaviour. Frequent high speeders find pleasure in speeding. Lastly, socially deviant speeders perceive speeding as a dangerous behaviour; however, they enjoy the thrill of speeding and enjoy breaking the rules. This group consists mainly of young people (Fylan et al., 2006).

The judgment of the personal speed definition can also be influenced by various social factors such as normative influences of others including family, peers, and community. It may also be influenced by situational factors such as the density of

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[1] Type A personality includes some personal characteristics such as being aggressive, competitive, and impatient (Fylan et al., 2006).

traffic, and road type as well as the condition of one's vehicle. These latter factors are discussed in subsequent sections.

2.1.2 Social factors

Social factors can influence engagement in speeding behaviour. The driver tends to compare their driving behaviours with other typical drivers or how they think passengers think or feel about speeding. For instance, normative influences such as descriptive norms, have been shown to influence speeding behaviour. Descriptive norm relates to a driver's perceptions of the probability that other people in general engage in speeding (e.g., Conner et al., 2007; Elliott & Thomson, 2010; Forward, 2009b). Different studies have also shown that driving alone can encourage more speeding behaviour, compared to driving with others in the vehicle (Fleiter, 2010; Horvath, 2009); however, it is much more complex in that evidence has also shown that it can depend on whom the others are in the vehicle at the time.

Driver behaviour can also be influenced by significant others (i.e., important people to the driver). It was found that the drivers regardless of their gender or age tend to exceed the posted speed limit if they perceive approval from a greater number of family members or friends (Fleiter, Watson, Lennon, & Lewis, 2006). Furthermore, it was found that this can be influenced by the age or gender of the passengers. For instance, male drivers who tend to exceed the speed limit are more likely to perceive approval to speed from their closest friends than drivers who do not intend to speed (Horvath et al., 2012). Friends as passengers were found in a previous study to encourage road traffic violations more than the presence of a child or spouse (Regan & Mitsopoulos, 2001). The influence of friends on speeding behaviour has also been found in other studies (Conner et al., 2003; Forwards, 2009a; Regan & Mitsopoulos,

2001). Furthermore, it was found that young drivers tended to drive slower when the passengers in their vehicle were family members including older people or children and, as such, these others in their vehicle function to increase their sense of responsibility and thus decrease their driving speed (Regan, & Mitsopoulos, 2001).

Passengers of different genders can also have varying effects on drivers' speeding. According to Conner et al. (2003), males perceive greater normative pressure in terms of more people approving of their speeding than females. Male passengers have also been found to have an influence in encouraging female drivers to speed more than female to female influence (Forwards, 2009a; Regan, & Mitsopoulos, 2001).

Another social factor that can influence speeding relates to the role models drivers are exposed to at a young age. Having a role model in early childhood life appeared to have an influence on individuals' future driving behaviours in general (Muir et al. 2010). Parents, for example, have a modelling effect on their children, as children tend to imitate parents. In other words, if the parents are committed to following the road rules, their children are more likely to do the same in the future (Muir et al. 2010).

2.1.3 Situational factors

Situational factors are one of the common factors affecting driving behaviour. There are some situations that can motivate drivers to speed, which may be related to the road environment or personal circumstances. Certain situational factors can even lead some drivers to believe that it is safe to speed; this situation has been referred to as speeding for 'acceptable reasons' (Ekos Research Associates, 2007, p. 14).

The road environment represents a situational factor that can impact a driver's speeding. For instance, there are various different types of roads which can motivate speeding such as motorways (Al Turki, 2014; Fleiter & Watson, 2006), and wide,

straight roads (MacMillan & Hewitt, 2008; Nofal & Saeed, 1997). For this reason, it is important to determine the road type or speed zone in order to understand speeding factors related to it among any community. Indeed, many studies have focused on studying speeding behaviours through determining specific speed zones such as urban roads (Conner et al., 2003; Conner et al., 2007; Forward, 2009a; Newnam et al., 2004; Parker et al., 1996), rural roads (Conner et al., 2007; Forward, 2010; Jovanovic et al., 2017), and motorways/highways (Conner et al., 2007; Horvath et al., 2012).

Furthermore, other factors such as one's vehicle condition and, in particular, a vehicle that the driver perceives to be in good condition (Fleiter, 2010; Nofal & Saeed, 1997) and good or dry weather conditions with clear visibility can also encourage speeding (Conner et al., 2003; Lewis et at., 2010; MacMillan & Hewitt, 2008). In contrast, in contrast, residential areas or inner-city roads can decrease speeding behaviour (MacMillan & Hewitt, 2008). In addition, there are several physical speed-reducing measures that can reduce speeding in the road environment, such as roundabouts, humps, road narrowing, and rumble strips. These factors have been used by many high-income countries to control speeding-related problems.

Other situational factors can be related to personal circumstances. For instance, being late for work or in a hurry (Fleiter, 2010; Hassan, 2016; Horvath et al., 2012), the traffic volume, and how traffic is flowing (Conner et al., 2003; Fleiter, 2010; Lewis et at., 2010; MacMillan & Hewitt, 2008), and being familiar with the roads can all increase speeding (Horvath et al., 2012).

Not surprisingly given the array of potential situational factors and their impact on speeding, there is much value in understanding the types of situational factors that influence speeding from the perspective of drivers in a particular context. One of the benefits of identifying them from previous studies is so as to enhance the ability to

develop a speeding definition and scenarios to examine within the current program of research. For instance, one of the main speeding scenarios that other studies have examined have included reference to a combination of interrelated situational factors, such as driving in dry weather (e.g., Conner et al., 2003; Conner et al., 2007; Cristea, Paran & Delhomme, 2013; Horvath et al., 2012; Jovanovic et al., 2017). Besides this factor, driving time has also been referred to in given scenarios examined in previous studies, such as driving in the morning (Forward, 2009a; Parker et al., 1996; Jovanovic et al., 2017), or in the afternoon (Cristea, Paran, & Delhomme, 2013; Newnam et al., 2004), or at night (Horvath et al., 2012).

2.1.4 Enforcement and legal consequences

They are the main ways in which government authorities try to control driving behaviour, including speeding. Driver behaviour is monitored through police systems or, more recently, with automatic cameras to detect those exceeding the speed limit. The penalties for speeding vary from one country to another (e.g., demerit points, monetary fines, loss of license, jail, and social work) (Fleiter, 2010).

Different studies in Western cultures have been conducted to examine the influence of enforcement-related countermeasures on drivers as a means of determining the quality of service. For instance, drivers in the previous studies have one of two relatively common responses to such enforcement. Some drivers perceive getting fined or losing money as a barrier to speeding (Horvath et al., 2012; Waner & Aberg 2008), while others may be concerned that they could lose their driving licence (Waner & Aber, 2008). In SA, like in many other countries there are penalties for being caught speeding.

In SA, the ministry of interior (MOI) has the primary responsibility for applying speed enforcement and any penalties for road traffic violations in SA (for all driving zones in all cities in the country). There are three major penalties for road traffic violations, including monetary fines, jail, and compulsory community service. Information about the full list of sanctions and traffic violations are clarified on the MOI website (Ministry of Interior, 2018). Speed cameras operating within the SAHER system are used in SA to monitor drivers' speed, and to issue penalties. Warning signs may be placed to indicate an upcoming speed camera (see Figure 2), which is a similar practice that occurs in jurisdictions in Australia.

Figure 2: Warning sign of upcoming SAHER camera (i.e., a speed limit camera) (Alriyadh Newspaper, 2013)

According to the MOI website, the penalty (infringement) for exceeding the posted speed limit by 25 km/h or less is 300 to 500 SAR (approximately $104 to$168 AUD) and exceeding the speed limit by more than 25 km/h ranges from 500 to 900 SAR (approximately $168 to $302 AUD) (MOI, 2018). The deadline for paying the infringement is within 30 days; if it is not paid within this time, the infringement cost is increased. The speeding infringement notification is sent to the driver by SMS. The registered owner of the car is responsible for paying the penalty regardless of who was the driver of the vehicle at the time the speeding infringement was incurred. There are also posters informing the drivers about the presence of speeding cameras in different driving regions.

More recently, on January 2018, a new penalty was added in SA which involves drivers who frequently commit road traffic violations undertaking community service in governmental hospitals and injury clinics. This community service means that they

can observe the consequences of road traffic violations, as represented by the victims of RTC caused by speeding and who have been admitted to hospital.

Several studies have been conducted to examine the influence of the SAHER system on drivers as a means of testing the quality of this service in SA. According to Alhindi and Albawardy (2013), who conducted a study among 815 male participants to measure drivers' perceptions about this system, they found that more than half of the participants considered it as merely "collecting traffic fines' instead of being seen as a tool for reducing crashes. Based on such results, the authors recommended that there was need to "Improv[e] citizens' perception of the speed control system and its objectives by continuing to raise awareness of the system's benefits" (Alhindi & Albawardy, 2013, p. 178). A more recent study conducted by Al-Shammari and Ling (2019), based on 251 participants, sought to understand the reaction of drivers to the SAHER system. Different factors were identified which increased the drivers' probability of speeding and receiving tickets. These factors included such aspects as being younger, being a driver who tended to not use seatbelts or who covered their vehicle registration plates to avoid being fined, being a driver who lacked knowledge of the aims of the SAHER camera system, as well as a driver who tends to accelerate after passing speed-cameras. One factor, the lack of knowledge regarding the aims of the SAHER system, suggests there is less awareness of the negative consequences of speeding and, thus, less understanding of the importance of speeding monitoring systems for reducing crashes. According to evidence, the locations where the SAHER system are located are critical places where crashes have occurred, but drivers tend to slow suddenly only after seeing the speeding camera (Al-Shammari and Ling, 2019). Such tendency may indicate that the drivers are not aware of the dangers of speeding and only slow down because of a fear of being fined not because of awareness of a

high risk or high crash area. To raise awareness of the system's benefits or the benefits of complying with the speed limit, further investigations of why people do not view speeding as a behavioural problem are required. This goal can be achieved by studying the psychosocial influences that can lead to increased public awareness about the importance of speed cameras and where they are placed for safety purposes. In this program of research, the psychosocial factors that influence speeding in the Saudi community are investigated in order to improve such awareness about speeding.

Posted speed limit and road design in Saudi Arabia are clarified in this section. The posted speed limit and road design are factors based on guidance from the Highway Design Manual (HDM). According to the HDM, the posted speed limits should be a function of the geometric design features, weather, traffic volume, and the services they manage for in terms of whether urban or rural roads. For instance, in an environment with a winding alignment in rolling or mountainous terrain, the posted speed limits should be low for safe driving. Conversely, in an environment with level terrain, the posted speed limit can be higher. In addition, the posted speed limit can be different in rural and urban areas. In this program of research, urban roads, where the majority of road traffic injuries occur (The General Authority for Statistics, 2015), were to be of focus (further justification for this choice is offered in Section 3.4 of Chapter 3 of this thesis). The posted speed limit in urban areas can vary depending on the road class. For instance, urban local roads have a minimum of 30 km/h and a maximum of 50 km/h while urban collector roads have a minimum 50 km/h and a - maximum 60 km/h. In addition, there are urban arterial roads where the speed limit depends on the degree of interruption[2] as well as urban expressways which have a

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[2] Fr example: buildings, pedestrians, and other facilities that may interfere driving.

minimum of 90 km/h and a maximum of 120 km/h. Table 2 and Figure 3 provides

further details regarding the road classifications and characteristics in SA.

Table 2: Road classification and posted speed limit (Highway Design Manual, n.d.;
Transportation Planning Guide in Saudi Cities, 2005).

Road classification	Posted speed limit	Road characteristics
Urban expressways	Minimum 90 km/h - Maximum 120 km/h	-They are free-flow roads and are all multi-lanes. -They bear the largest traffic load.
Urban arterial roads	Speed limit can be 80 km/h – 100 km/h, or 70 km/h – 90 km/h, or 50 km/h – 60 km/h	-They link the main urban centres to the regional network and bear a large traffic load in the urban area. -They can be more than two lanes. - Access can be by frontage roads through passing slip-ramps or at intersections.
Urban collector roads	Minimum 50 km/h Maximum 60 km/h	-They direct vehicles from the arterial roads or expressways and distribute them to the local roads. -They are usually two-lane roads.
Urban local roads	Minimum 30 km/h Maximum 50 km/h	-They direct vehicles through residential areas. -They carry the least amount of traffic in the road network.

Figure 3: Road design in Riyadh city – King Fahad Road (adapted from Alfalah, 2016)

2.1.5 Speed limit enforcement for safer road users in SA: an overview from The Decade of Action for Road Safety (2011-2020)

Before describing speed limit enforcement in SA, a brief mention of The Decade of Action for Road Safety (2011-2020) is needed. The Decade of Action for Road Safety (2011-2020) was a 10-year action plan aimed to prevent road traffic injuries throughout the world (WHO, 2017a). The plan aimed to enhance road safety in order to save lives (Al Turki, 2014). To achieve this outcome, the plan included five goals, or pillars: road safety management, safer roads and mobility, safer vehicles, safer road users, and post-crash response (WHO, 2017a). The first pillar, road safety

management, aimed to form a multi-sectorial road safety action plan with time-bound targets. The safer roads and mobility pillar aims to remove high risk roads. The third pillar, safer vehicles, aimed to eliminate the production and import of new vehicles with low safety ratings/standards. The fourth pillar, safer road users, aimed to reduce such behaviours as speeding over the posted speed limit and drink driving, as well as increasing the use of motorcycle helmets and seatbelts by at least 10% per year. Lastly, post-crash response relates to the facilitation of greater access to emergency services (WHO, 2017a). Different indicators were introduced to measure the implementation of these pillars, and the WHO evaluated the plan midway through the decade, publishing a progress report in 2015. Although only pillar three, "safer road users" (specifically 'speed limit"), will be investigated in this program of research, it does not imply that the other pillars are not equally important. There is, however, much need to understand the psychosocial factors which influence Saudi drivers to engage in speeding, acurrently under-researched behaviour and context.

As part of the 2015 report, the WHO assigned scores to the enforcement of speed in nations around the world; SA scored 7 out of 10. The assessment, represented on a scale from 0-10, assigns "0" for "ineffective" and "10" for "highly effective" (Nelson et al., 2014). The speed limit enforcement score of 7 out of 10 in SA indicates that, in the opinion of the SA respondents, there is a good application of national speed limit enforcement in SA. However, the number of deaths is still high. It is perhaps noteworthy that the score was only one point less than that assigned to Australia, yet Australia has a much lower road score fatality rate of about 5 per 100,000 deaths compared with about 28 per 100,000 in SA (WHO, 2018a).

Al Turki (2014) has affirmed that, in relation to the Action Plan, there is a great motivation from all sectors in SA to decrease road traffic injuries. There is increasing

recognition of the important contribution of education that aims to increase public awareness for driving behaviours besides just placing speed cameras on the highways. Al Turki (2014) asserts, however, that the Action Plan is not adequate in terms of increasing young drivers' awareness and reducing speeding behaviours on the highways. Further, he mentioned that the main issue with young drivers aged 17-21 years is the difficulty of changing their behaviours in relation to speeding. He recommended developing educational materials and activities in the curriculum of both schools and universities in SA, although there were no identifiable factors of speeding mentioned in his study to be targeted in the formation of educational material or speeding awareness messages. In support of actions to reduce speeding and associated crashes among young drivers in SA, there is a need for further understanding of the psychosocial factors influencing speeding behaviour. As will be discussed in section 2, the TPB is an appropriate framework for this research, although it will be argued below that an extension of the TPB which incorporates the constructs of moral norm, descriptive norm, and past behaviour could provide a better explanation of speeding in the SA context.

2.2   COMPARING THE THEORY OF PLANNED BEHAVIOUR WITH OTHER COMMON BEHAVIOURAL CHANGE THEORIES

As mentioned previously, the current thesis will focus on speeding, given it is the most common cause of RTIs in SA. In order to understand this behaviour and identify ways to address it, it is beneficial to utilise a behavioural change theory. Michie, Rothman, and Sheeran (2007, p. 250) stated that, in the field of psychology, a "good" theory will determine the correlation between variables and identify the consequences of developing an intervention to improve communities' health. In order to determine which theories are considered to be "good", it is necessary to compare

different behavioural change theories by reviewing the previous literature using them in different health behaviours, and to establish their efficacy with regard to their application to speeding behaviour in particular.

The TPB is a well-validated framework that has demonstrated utility in explaining speeding. It can be broadened to an extended framework with additional factors added to the original model (Elliott & Thomson, 2010; Horvath, 2009). In this program of research, there was a need to apply a validated framework that may lead to a better understanding of speeding behaviour. However, it is acknowledged that the TPB is not the only theoretical framework that could have potentially been used. There are different theoretical frameworks used in the public health field, such as the Health Belief Model and the Transtheoretical model. Nevertheless, there are several justifications for not applying them in this current research. The following section briefly outlines these theories together with reasoning as to why they were not selected for program of research.

2.2.1 Health Belief Model (HBM)

The HBM is one of the most common behavioural change theories in the public health field (McKellar & Sillence, 2020). According to the HBM, any health behaviour is influenced by personal beliefs. Based on this notion, six constructs are identified: first, perceived susceptibility, which is a personal assessment of being susceptible to getting a disease; second, perceived benefits, which are defined as the personal assessment of the benefits that can result from undertaking a behaviour; third, perceived barriers, which are personal beliefs regarding the obstacles that will impair an individual from adopting a new behaviour; fourth, perceived seriousness, which refers to the personal opinion of an individual regarding the severity of a disease; fifth, modifying variables including the personal factors that can influence the adoption of a

new behaviour, such as an individual's educational level or past experiences; and, lastly, cues to action that include factors which can facilitate behavioural change (Rosenstock, 1974).

Many authors have discussed the potential limitations of the HBM. The limitations can be summarised in four main points. First, there is no clear concept of social influence/norms construct in the model that may have a role in predicting health behaviour. While normative beliefs may be included in the cues of action construct in HBM, this has not been defined explicitly (Norman, Abraham, & Conner, 2000). Second, the HBM lacks a concept related to intention to perform a behaviour, a concept which has previously been demonstrated to be an important predictor of actual behaviour. For this reason, some authors have suggested adding intention when studying behaviours using the HBM (Norman, et al., 2000). Third, the HBM has no explanation of how the explanatory variables can be combined to influence behaviour. Fourth, the empirical power of both the HBM and the TPB constructs to predict behaviours have been examined by Fylan et al. (2006) using a meta-analysis. These authors reviewed different studies applying the HBM and the TPB for a number of health behaviours such as cancer screening behaviours and physical activity. They then compared each of the HBM and TPB constructs' efficacy in predicting behaviours. The results of this meta-analytic research suggested that most of the TPB constructs had better predictive ability than the HBM constructs across a range of health-related behaviours. Consequently, with limited evidence available regarding theory-driven understanding of factors influencing speeding in the SA context, it was important that the current program of research be based upon the most robust framework for being able to explain and predict speeding. Thus, for this reason, the TPB was the preferred framework over the HBM in this context.

2.2.2 Transtheoretical Model (TTM)

The TTM was developed in the early 1980s to understand how people change their behaviour. It was initially developed to understand addictive behaviours such as smoking and alcohol use when psychologists found that patients could not only change their behaviour by a psychotherapist but also by themselves (Norcross & Goldfried, 2005). This motivated psychologists to try to understand how behavioural change occurred for some behaviours. The model assumes that, for any behavioural change to occur, it will undergo different stages. The stages include precompletation, contemplation, preparation, action, and maintenance, and it is noted that relapse may be possible at any stage (Norcross & Goldfried, 2005).

The main justification for not applying the TTM in this program of research relates to the intended applicability of the TTM which was, in short, intended for quite different contexts to one, such as that of the current research which aimed to understand the psychosocial factors influencing speeding. Specifically, the TTM was initially developed to understand addictive behaviours such as smoking and alcohol use and is used to understand how behavioural change occurs for such addictive behaviours throughout different stages of change (Prochaska, Prochaska, & Levesque, 2001). In other words, the TTM is a stage change theory that focuses on identifying the stage of behaviour change individuals are at and then categorising individuals at their particular behavioural stage (Fylan et al., 2006). It was thought that this model was less likely to be used successfully to understand speeding. In fact, speeding is considered a complex behaviour (Fleiter, 2009) that needs to be defined in a culturally relevant context. Arguably, the TTM lacks guidance of how to define a behaviour like speeding, which is a critical step for understanding speeding behaviour in SA. With

these considerations in mind, once again, the TPB was the preferred approach in accordance with the aims of the research rather than the TTM.

2.2.3 Social learning theory (Aker's theory)

The premise of Aker's Social Learning theory or SLT is that behaviour is established by imitating others who are perceived as a model in their social environment, or by direct conditioning (learning through specific previous events in the individual's life) (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). The key constructs of SLT are differential association, definitions, imitation, and Differential reinforcement. Differential association refers to the people in the social environment who individuals associate with. Definition implies a similar meaning to attitude which include assessing behaviour in terms of whether it is right or wrong, and good or bad. Imitation refers to learning through observation of role models and observing the consequences of their behaviours. Differential reinforcement refers to an individual's assessment of the rewards and punishments of behaviours, and their assessment of a behaviour as good or bad. The constructs are said to predict the performance of a deviant behaviour (Akers & Jennings, 2019).

There are two advantages of the SLT. First, the theory can be applied in different cultures (Akers & Jensen, 2011). Second, additional predictors can be added and this has been applied successfully to speeding in previous studies (e.g., Fleiter, 2010). Fleiter's study applied Akers' SLT to understand the psychosocial factors of speeding in different cultural contexts. The study was carried out in two different countries, Australia and China. The study sought to identify the similarities of the psychosocial influences of speeding between countries. It was a mixed-methods study that included both quantitative and qualitative methods. The quantitative results of the studies in

both countries showed promising results in terms of the value of applying Akers' SLT to understand speeding. For instance, in Australia, by conducting a study on 833 drivers, they found that greater self-reported speeding was associated with different significant predictors included self-identity, favourable definition (i.e., positive attitude towards speeding), previous experience of escaping detection and punishment, and perceived acceptance from family and friends of speeding. Similar results were found in China by conducting a study of 299 drivers, where Fleiter found that greater self-reported speeding was associated with different significant predictors which included self-identity, favourable definition (i.e., positive attitude towards speeding), previous experience of escaping detection and punishment, and perceived acceptance from the community of speeding. The application of the SLT seems to be beneficial in SA context for future studies in the scope to understand the drivers' perceptions with the traffic rules and their behaviour. However, in the current program of research, arguably, the intent was even broader in terms of gaining a comprehensive knowledge about various factors influencing speeding in SA. In contrast, the SLT is heavily focused upon enforcement-related perceptions and, thus, speeding-related enforcement. This program of research aimed to extend beyond a specific focus on the role that enforcement may play in influencing speeding by understanding the myriad of factors from the broad array of psychosocial factors that may motivate speeding.

2.2.4 The Theory of Planned Behaviour (TPB): Description

Developed by Icek Ajzen in 1985 (Ajzen, 1991), the TPB is one of the most commonly used behavioural prediction theories. According to Godin and Kok (1996), it has been shown to explain and predict many health-related behaviours. The TPB asserts that behavioural intention is the most important predictor of behaviour (Godin

& Kok, 1996). Intention refers to the extent to which an individual intends or plans to engage in a certain behaviour (Ajzen & Fishbein, 1980).

The TPB includes three standard constructs which are each proposed as directly influencing intention (see Figure 3); namely, attitude, subjective norms, and perceived behavioural control (PBC). Each of these direct beliefs is underpinned by a set of indirect beliefs. Specifically, attitude refers to "the degree to which performance of the behaviour is positively or negatively valued" (Ajzen, 2016a). It has affective (emotional) and instrumental (cognitive) aspects. Attitude is underpinned by indirect beliefs, namely, *"behavioural beliefs"*, which are the perceived advantages and disadvantages of performing the behaviour. Subjective norms refer to "the perceived social pressure to engage or not to engage in a behaviour" (Ajzen, 2016d) and this construct is underpinned by *"normative beliefs"*, which relate to the specific important others who would approve or disapprove of one performing the behaviour. PBC refers to "people's perceptions of their ability to perform a given behaviour" (Ajzen, 2016c). It has three aspects: perceived difficulty, perceived control, and self-efficacy. This construct is underpinned by "*control beliefs"* which relate to the perceived facilitators or barriers to performing the behaviour. The inclusion of PBC acknowledges that not all behaviours are under volitional control, as one may intend to perform a particular behaviour, but factors either internal or external to the individual may impede one's ability to enact the behaviour. Unlike attitudes and subjective norms, PBC may influence behaviour either indirectly, through intentions, or directly. The TPB represents an extension of The Theory of Reasoned Action (TRA). The main difference between the TRA and TPB is the addition of PBC to the TPB which enables the TPB to better account for behaviours not under complete volitional control.

Figure 4: The Theory of Planned Behaviour (Ajzen, 2006)
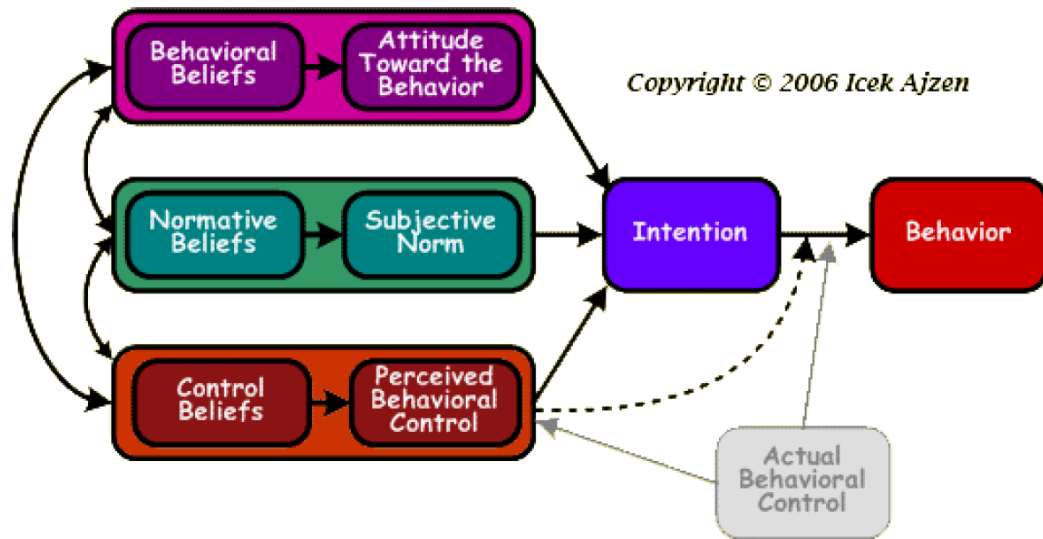
Different reviews have been conducted to support the application of the TPB. For instance, a meta-analysis carried out by Armitage and Conner (2001) included 185 studies and concluded that the TPB constructs have the efficacy to predict both intention and behaviour. The TPB variables (i.e., attitude, subjective norms, and PBC) were able to predict 39% of the variance in intention and 27% of the variance in behaviour. Another review conducted by Fylan et al. (2006) found that the best predictors of a behaviour were the direct measures of the TPB and self-efficacy, which is often included as part of the PBC concept.

A more recent meta-analysis, analysing 237 prospective studies, supported the efficacy of the predictive ability of the TPB across different behaviours, including physical activity, dietary intake, cancer detection, safer sex, abstinence, and risk behaviours. The risk behaviours included speeding, drinking alcohol, smoking, and using drugs. The results showed that the TPB had strong predictive ability across these risk behaviours. However, the efficacy of the TPB's predictive ability was not the same across the behaviours. The TPB's predictive ability was best for physical activity and dietary behaviours, with the variance explained of 23.9% and 21.2%, respectively, in

explaining behaviours. It had the lowest efficacy for predicting risk, cancer detection, safer sex, and abstinence behaviours, with the variance ranging from 13.8% to 15.3% in explaining behaviours (McEachan, Conner, Taylor, & Lawton, 2011).

It is important to note that the TPB can be extended by adding additional constructs/predictors. According to Ajzen (2016), any additional predictors can be added to the TPB as it is an open theory. However, before adding any predictors, they have to be addressed carefully and empirically investigated. Furthermore, Ajzen has clarified that any additional predictors should not be redundant in relation to the standard constructs of the TPB and it is important that it is empirically tested before being considered as an additional predictor. Even though the openness of the TPB for additional predictors is considered to be an advantage of the theory, others consider it to be a disadvantage and have criticised it (see next section).

Critique of the TPB

The TPB has been criticised as having a number of shortcomings. These include: the lack of evidence of the ability of the TPB to change behaviour; its insufficient validity as there are limited numbers of experimental studies to identify any causal relationship between the constructs and behaviour; the lack of measurements of unconscious influences and emotional arousal; and its need to add additional predictors, which represents insufficiency of the predictive ability of the standard theory (Sniehotta, Presseau, & Araújo-Soares, 2014). Most of these criticisms were defended by leading authors in the field such as Conner (2015) and Ajzen (2015). For instance, with regard to concerns about its ability to produce behavioural change, Ajzen stated that the TPB is a predictive theory rather than a behavioural change theory, which aims to identify the predictors for intention and the behaviour to inform further interventions (Ajzen, 2015). However, it is worth mentioning that, with regard

to speeding, there are various interventions which have successfully used the TPB as a basic approach (e.g., Chorlton & Conner, 2012; Stead, Tagg, MacKintosh, & Eadie, 2005).

For instance, an intervention based on the standard TPB was conducted through an advertising campaign in Scotland that lasted for 4 years. The aim of the campaign was to increase awareness of the importance of reducing speeding among participants aged 17 to 54 years (both males and females). The mass media campaign included three anti-speeding advertisements to increase awareness. The three messages of anti-speeding advertisements were targeted at the three standard predictors of the TPB, namely, attitude, subjective norms, and PBC. The content of the messages was based on previous studies aimed at predicting traffic violations and was also based on the results of a belief elicitation study to understand the beliefs influencing or underpinning speeding. The study concluded that there was a significant change in participants' attitude and affective beliefs which supported the application of the TPB as a basic framework for the development of anti-speeding awareness campaigns to reduce speeding (Stead et al., 2005).

Conner (2015), in disagreeing with the criticism that there have been limited numbers of experimental studies to identify any causal relationship between the TPB constructs and behaviour, confirmed that there were different experimental applications of the TPB. Furthermore, a literature review conducted by Steinmetz, Knappstein, Ajzen, Schmidt, and Kabst (2016) attempted to determine the efficacy of the TPB in designing a behavioural change intervention. The review included 85 articles applying randomized controlled trials, and 38 articles that applied quasi-experimental studies. Their conclusion was that the TPB can be used as a guide to

design behavioural change interventions, thereby contradicting previous criticisms regarding insufficient experimental tests of the TPB.

The TPB has also been criticised for failing to assess emotional arousal. It has been argued that a person's emotional state may affect their responses. Indeed, the assessment of intention may conflict with the assessment of actual behaviour when the individual perceives any emotional imbalance (Conner & Sparks, 2005). For this reason, some researchers have added new predictors such as anticipated regret (regretting performing a behaviour because of its outcome), which measures one aspect of emotional arousal as an additional predictor of intention and behaviour (Conner et al., 2007; Elliott & Thomson, 2010).

The TPB has also been criticised for its need for additional predictors. Conner (2015) stated that the standard TPB was previously found to have a strong predictive ability without adding any further predictors and acknowledged that the additional predictors were added to explain even more variance in some specific behaviours. Such claims are supported by literature and as have been discussed elsewhere herein (see section 2.2).

However, regardless of the accuracy of some criticisms of the TPB, the focus of this program of research is on predicting speeding behaviour rather than designing an intervention per se as part of the investigation. That is not to say that future efforts may not benefit from the insights that the research offers (as will be discussed in subsequent sections particularly relating to Study 4 of this program of research). The current literature review presented many promising results of the application of the TPB in predicting speeding behaviour across different populations including Asian and Western populations (Tankasem, Satiennam, & Satiennam, 2016; Conner et al., 2007; Elliott and Thomson, 2010, see the examples in section 2.2, and section 2.3).

Furthermore, the extended TPB and its additional predictors for identifying speeding intention and behaviour enabled more variance to be explained in some studies. The extended model, by adding additional predictors such as moral norms, may also compensate for the criticism of the TPB for its lack of emotional arousal measurement/s. This additional predictor will also be examined to the model in this program of research. These elements suggest that the TPB is a valuable framework for understanding the psychosocial factors that predict speeding behaviour in SA.

To summarise, the TTM is a stage model which is unlikely a suitable model for predicting speeding. The HBM has relatively less utility predicting behaviours than the TPB. The SLT includes an understanding of speed enforcement from individual's point of view and, while certainly of importance, the intent of the current research was to be broader in terms of the range of psychosocial factors that may influence speeding intentions and behaviours (beyond a particular focus on a factor such as speeding enforcement). The next section will present a review of the application of the TPB to speeding as well as reviewing its predictive ability with regards to intention and/or behaviour for speeding in particular.

2.3   LITERATURE REVIEW OF THE APPLICATION OF THE TPB ON SPEEDING

The TPB has been applied extensively to help understand speeding and has been shown to offer valid and reliable results in explaining speeding in different contexts (Elliott & Thomson, 2010; Horvath, Lewis, & Watson, 2012). Before reviewing such studies, it is first necessary to define the principle of TACT (Ajzen, 2006). The TACT principle highlights the need to identify the context of any behaviour before studying the effect of the TPB variables on that behaviour; thus, the participants will be guided

to express their beliefs within such a context. Many studies which have used the TPB identify the TACT before examining the effect of the TPB variables on behaviour (e.g., Horvath et al., 2012; Warner & Åberg, 2006). According to Ajzen (2006), there are some elements which must be addressed before applying the TPB to any health behaviours, namely, target, action, context, and time or, in other words, the TACT principle. The information obtained in defining the TACT principle can be clearly clarified in statement form or even in a behavioural scenario presented before asking any questions in relation to a behaviour to ensure the specificity of the context under investigation and that everyone considering it, is doing so from the same position or understanding. For example, a speeding scenario used elsewhere was, *"You are driving along a dual carriageway which you know has pedestrian crossings at various points along it. You are driving alone. It is a fine, dry day and the traffic in your opinion is moving too slowly. Therefore, you decide to move into the outside lane and exceed the 40 mph speed limit by 20 mph."* (Conner, Smith, & McMillan, 2003, p. 255). There will be further explanation of the TACT principle in Chapter 4 (i.e., Method section) in terms of how the context of speeding behaviour was identified in the current program of research.

Although there are many studies applying the TPB to speeding, not all studies have applied the TPB in the same manner. All these differences will be clarified in the next section. Thus, before reviewing the literature that has applied the TPB/extended TPB to speeding, there is a need to clarify that there is no standard surveysurvey when applying it (Ajzen, n.d.). This means that the items measuring the influence of each construct or belief can be modified or varied among different surveysurveys according to the specific research aims. However, it is important to note that the main definition of the constructs/beliefs of each predictor remained the same in all studies and any

changes in developing the survey were not intended to change the conceptual meaning of the TPB constructs/beliefs.

In fact, the application of the TPB/extended TPB can be categorised into three types. Some studies have measured the standard constructs or predictors of intention and speeding behaviour (i.e., attitude, subjective norm, PBC), others measured the determinants of the standard predictors (i.e., the indirect beliefs including behavioural, normative, and control beliefs), and others still have measured either or both these direct and indirect beliefs and/or added additional predictors to extend the TPB framework.

2.3.1 The categories of the TPB applied to speeding in the literature

There are various studies which have applied the TPB to speeding for different purposes and aims. The purposes for conducting them were various, for example, some studies were conducted to test the influence of specific additional predictors over and above other standard TPB predictors (within extended TPB frameworks). Other studies were designed to measure speeding intention only, while others have measured both speeding intention and behaviour. The following section will provide some examples of these studies after clarifying the research keywords and main terms used to refer to the TPB's variables.

Literature review-research keywords

The TPB is a widely used theory especially in the field of traffic psychology and includes evidence of its application to speeding. To identify the most relevant articles, five databases were used in the literature review: PubMed, Scopus, Embass, PsycINFO, and Web of Science. The key words used included ("theory of planned

behavior" OR "theory of planned behaviour") AND (speeding OR speeders OR speeder).

The extended TPB variables and the terms of naming them in this thesis:

For clarity, it is important to note there are some particular terms used to describe the TPB variables and the additional variables. The direct or standard constructs are referred to as direct measures/variables/predictors of intention and/or behaviour and include attitude, subjective norm, and PBC. Indirect beliefs can be referred to as indirect measures/variables or the indirect determinants of intention and include behavioural, normative, and control beliefs. Finally, the additional factors can be referred to as additional predictors of intention or additional constructs/variables. However, in this thesis, to avoid any confusion, the terms used to refer to each of the aforementioned variables will be direct predictors (constructs), indirect beliefs, and additional predictors, respectively.

Category 1: Studies applying the direct/standard predictors (constructs) of the TPB

There are several studies which have used the direct constructs of the TPB to predict speeding intention and behaviour in a variety of contexts. Generally, these studies have provided support for the explanatory value of the TPB (see Table 3 for a summary of these studies). For instance, Elliott and Thomson (2010) conducted a study among 1403 participants (both males and females), aged from 17 to over 60 years. The speeding contexts they examined included urban, rural roads, and motorways roads. The speed limits were not mentioned in the study but they defined speeding in the driving context as driving faster than the speed limit (thus, whatever that posted speed limit happened to be). For identifying the predictive ability of the TPB's direct

constructs for predicting speeding intention and behaviour, a multiple hierarchical regression was used. The study found that most of the TPB's constructs significantly predicted intention to speed, including attitude and self-efficacy, explaining 55% of the variance. However, subsequent speeding behaviour (actual behaviour) was significantly predicted by both intention and self-efficacy, explaining 47% of the variance. The researchers also examined the correlations between the TPB variables. For instance, the average attitude to speeding was negative (i.e., the average score was below the scale midpoint), indicating higher perceived disadvantages of speeding. The average intention to speed was also negative suggesting that the participants had lower speeding intention. Regarding subjective norms, the mean reflected that the participants perceived disapproval of speeding from significant others. The PBC for avoiding speeding was found to be under the participants' control. Regarding subsequent speeding behaviour, both intention and PBC were found to be related to speeding behaviour, as theoretically expected.

Another study in Asia, examining the three countries of Thailand, Laos, and Cambodia, applied the TPB. The total number of participants was 570 (both males and females), aged 18-67 years (Tankasem, Satiennam, & Satiennam, 2016). This study measured the influence of the direct predictors of the TPB on speeding intention. It was found that, for Thailand, Laos, and Cambodia, the TPB explained 33%, 47%, and 84%, respectively, of the variance in speeding intention. Attitude to speeding was the only significant predictor in Thailand and showed that given that speeding was considered acceptable and normal, and speeding intention among the participants was also high. However, in Laos, all the direct predictors were significantly related to speeding intention and PBC was the strongest predictor. In Cambodia, PBC was the only significant factor for speeding intention. From such results, it can be verified that

different contexts of speeding across unique countries can have different predictors that affect participants' speeding intention.

Support for the TPB's direct predictors has also been found in another study conducted in the UK examining speeding intention and behaviour (Conner et al., 2007). In this study, the participants were males and females, aged 17-86 years. The context of speeding was driving faster than the posted speed limits on urban roads (30 mph), with dry weather, single carriageway with shops and car parked on both sides, and with the presence of pedestrians. The results based on the different speed zones were combined to identify the overall predictors of speeding. The study showed that the TPB's direct predictors were significant in predicting intention to speed, explaining 53% of the variance. Both PBC and subjective norms were positive significant predictors of speeding intention. Regarding speeding behaviour, the TPB's direct predictors also significantly predicted speeding behaviour, with 20% of the variance being explained with intention to speed and PBC the significant predictors of speeding behaviour, as theoretically expected.

In Sweden, a study of 162 participants was conducted to examine the predictors for speeding intention (Warner, 2006). The results showed full support for the TPB direct constructs in predicting speeding intention. The study included males and females, aged from 28-86 years. The context of speeding was driving faster than the posted speed limit and there were four scenarios based in rural and urban road contexts. The study showed that the TPB's direct predictors were significant in predicting intention to speed, explaining 70% of the variance of speeding on urban roads and explaining 73% of variance in speeding on rural roads. All of the direct predictors were positive significant predictors of speeding intention, as theoretically expected.

Forward (2009b) also conducted a study in Sweden to examine the predictors of speeding intention. The results showed that holding a positive attitude toward speeding, more positive approval/greater subjective norms (i.e., different referents accepted speeding) and greater perceived ease (i.e., a measurement component for PBC) were all significant direct predictors of speeding intention. This study included 275 participants, males and females, aged from 20-75 years. The context of speeding was driving 15 km/h faster than the posted speed limit at 50 km/h speed zones in the morning and dry weather. The study showed the TPB's direct constructs explained 47% of the variance in intentions to speed on urban roads.

Another study, also conducted in Sweden by the same author (Forward, 2010) in the next year, but for rural roads only, showed support for the application of TPB to understand speeding intention. It included 1798 participants, both male and female, aged from 18-70 years. The context of speeding was driving on a narrow road (approx. 9 m wide) on 90 km/h speed roads and driving 20 km/h above the posted speed limit. Again the results of this study was similar to the previous study by Forward (i.e., Forward 2009b) in that all of the direct predictors were positive significant predictors of speeding intention, as theoretically expected. The framework explained 53% of the variance for speeding intention.

In Australia, a TPB-based study was conducted to understand speeding behaviour among drivers when driving within their work or personal vehicles (Newnam, Watson, & Murray, 2004). The study included 204 male and female participants, aged from 40-59 years. The context of speeding was driving 15 km/h faster than the posted speed limit in 50 km/h speed zones in the morning when the weather is dry. The study indicated that drivers in their personal vehicle were less likely to have an intention to speed than drivers within their work vehicles. Having a

positive attitude and higher PBC were significant predictors for speeding intention for drivers in a personal vehicle as well as for drivers in a work vehicle. The study showed the TPB's direct constructs explained 15% of the variance in intentions to speed for drivers in the personal vehicles and explained 23% of variance in intentions to speed for drivers in their work vehicles .

Fewer studies have applied the TPB to understand factors influencing speed limit compliance as opposed to speeding. One such study was conducted in the UK and included 341 participants who were males and females aged 18-85 years (Elliott et al., 2003). The authors defined the behaviour as complying with the speed limit in residential areas over the next three months. As theoretically expected, the results showed that all predictors were positive and significant, with 63% and 49% of the variance in speeding intention and behaviour explained. The full TPB was supported whereby a positive attitude toward complying with the speed limit was a significant predictor of intention to comply and a positive subjective norm (i.e., important people approving speed limit compliance) toward compliance to speed limits intention was also a significant predictor, and finally, when drivers had greater control and confidence in their ability to keep within the speed limit (PBC), their intention to comply was also greater.

Another example was a study conducted in both Australia and Malaysia in 2010 (Abdul Hanan, 2014). It included 118 participants in Australia, both males and females, aged 25 years and above, and 210 participants in Malaysia, males and females, aged 19 years and above. The speed limit compliance was defined in different scenarios that shared some road factors. The behaviours were defined in Australia as driving at or below 40 km/h in a school zone in the daytime before and after school time. The behaviours in Malaysia were the same, except for the travelling speed limit

which was driving at or below 30 km/h (which was applicable speed zone set for school zones in the Malaysian context). Overall, the results in Australia showed that positive attitude and PBC were significant predictors for intention to comply and accounted for 39% in the variance in intentions to comply (i.e., subjective norm was not a significant predictor). The results in Malaysia, however, showed that attitude, subjective norm, and PBC were positive significant predictors for intention to comply with school zones and accounted for 51% of the variance and intention. The results meant that having a positive attitude toward complying with speed limit, more perceived approval from significant others, and greater control to comply with speed limit, all contributed to a stronger intention to comply; however, subjective norm was only significant in the Malaysian context and not the Australian context. This result is consistent with expectations to the extent that Ajzen recognises that the relative importance of particular constructs will likely vary across different behaviours and contexts (Ajzen, n.d.).

Table 3 Summary of studies which have applied the standard TPB to predict speeding intentions and behaviour

Author	Key outcome of focus/Intention Behaviour	Context	TPB R2	Attitude	Subjective norms	PBC	Intention
Elliott & Thomson (2010)	Intention	Urban and rural roads And	55%	√	x	√	
	Behaviour	motorways	47%			√	√
Tankasem, Satiennam, & Satiennam (2016)	Intention	Thailand	33%	√	x	x	
		Laos	47%	√	√	√	
		Cambodia	84%	x	x	√	
Conner et al. (2007)	Intention	Urban roads	53%	x	√	√	
	Behaviour		20%			√	√
Warner (2006)	Intention	Rural roads	70%	√	√	√	
		Urban roads	73%	√	√	√	
Forward (2009b)	Intention	Urban roads	47%	√	√	√	
Forward (2010)	Intention	Rural roads	53%	√	√	√	
Newnam, Watson, & Murray (2004)	Intention	Urban roads (personal vehicle)	15%	√	x	√	
		Urban roads (work vehicles)	23%	√	x	√	

Note: √ significant predictor, x not a significant predictor.

Category 2: Studies applying the indirect beliefs of the TPB

The studies mentioned in the preceding section focused on the direct predictors of the TPB in explaining variance in speeding intention and/or behaviour. The application of indirect beliefs in examining speeding intention and behaviour is relatively limited. Examining indirect beliefs facilitates the identification of underlying cognitions that motivate speeding intention and behaviour which, in turn, provide better understanding of speeding and, therefore, contributes to the development of more effective interventions (Horvath, Lewis, & Watson, 2012). According to Patterson (2001) who argued that, even though there is no significant difference between measuring the direct beliefs and the indirect beliefs, removing indirect beliefs can lead to losing important detail that identifies enablers and barriers to performing behaviours.

As an example of a study measuring indirect beliefs, research conducted by Horvath et al. (2012) among university students aged 17-22 years (both males and females) aimed to identify beliefs that motivated them to speed. The beliefs included the TPB's behavioural, normative, and control beliefs which were elicited from a previous belief elicitation study. The researchers divided the participants into two different groups to compare their beliefs according to gender. The two different groups were *high* intenders and *low* intenders. Among females, the study revealed a significant difference between *high* and *low* intenders in terms of their behavioural beliefs. The likelihood of agreement with positive speeding statements among high intenders was greater than for *low intenders*. For instance, compared with *low intenders, high intenders* were more likely to view speeding as a way to reach their destination quicker, speeding as being exciting, and as minimising time sitting in a car. Additionally, compared with *low intenders, high intenders* did not view being involved in a crash as

a significant disadvantage. Among males, the difference between *high* and *low intenders* was significant for only one item. The item "viewing speeding as exciting", was more significantly endorsed by *high intenders* than *low intenders*. Among females, *high intenders* perceived more approval to speed from their closest friends than *low intenders*. Normative beliefs were found to be different between *low* and *high intenders* for females; this difference also was found among *high* and *low intending* males. Additionally, *high intending* females were less likely to perceive disapproval to speed from their important friends and friends they often drive with than were *low intenders*. For males, *high intenders* were more likely to perceive approval to speed from their friends, family, and closest friends than *low intenders*. Indeed, the study revealed that normative beliefs were more likely to affect male high intenders than female high intenders. Control beliefs were statistically different between *high* and *low* intending females, with the same results for males. Control beliefs of female *high intenders* were significantly different from those of *low intenders*. Similar significant differences were found among *male high* and *low intenders*. In fact, both male and female *high intenders* claimed that the road condition and familiarity with roads were the most important facilitators of their *speeding intention*.

Forward (2009a) conducted a study to identify the effect of indirect beliefs on intention to speed and overtake. Only the findings for *speeding* intention (as opposed to overtaking) are discussed herein because it is the target behaviour of the current research. The study included 275 participants, males and females aged from 20-75 years. The speeding scenario (context) was identified as driving 15 km/h over on 50 km/h urban roads. In this study, Forward divided the participants into two groups as those reporting intentions and no intention to speed (i.e., *intenders* vs *non-intenders)*. This approach to analysing indirect beliefs among two groups is consistent with the

traditional approach of analysing the TPB's indirect beliefs by comparing those reporting low or no intentions with those reporting high intentions. The indirect beliefs items were based on beliefs the researchers had elicited in a preceding pilot study. Overall, there were significant differences between *intenders* and *non-intenders*. For instance, there was a significant difference between *intenders* and *non-intenders* in that *the intenders* were more likely to believe that speeding is an exciting behaviour, a helpful behaviour for reaching their destination quicker, or helping to maintain the flow of traffic in conjunction with other drivers. *The intenders* also were less likely than *non-intenders* to view speeding as a possible leading behaviour for colliding with a pedestrian, and to perceive being fined as a negative impact. The control beliefs were significantly different between *intenders* and *non-intenders*, indicating that *intenders* were more likely than *non-intenders* to believe that speeding was easy to do, and perceive more external pressure to speed. Regarding normative beliefs, it is important to mention that one of the study's aims was to identify gender differences in beliefs of the influence of different referent groups. It was found that normative beliefs were significantly related to intention. The referents for the normative beliefs included men of the same age, women of the same age, and people older than the driver. The overall result showed that both males and females stated that men of the same age as themselves tend to agree with speeding more than male and female non-intenders.

Another study was conducted with 126 participants, males and females, with a mean age of 21 years (Conner et al., 2003). The speed over the speed limit in a given scenario was specified as 20 mph over in a 40 mph limit. In this study, male and female responses were compared in relation to four driving scenarios: driving alone; driving with a same-sex passenger; driving with an opposite sex passenger; and driving with a group of passengers. The study found that the intention to speed for both genders in

the different driving scenarios was significantly predicted by behavioural beliefs (perceiving positive outcomes of speeding) and by normative beliefs (meeting social approval). The researchers examined the influence of gender differences and it was found that normative beliefs influenced both genders. However, the social pressure of not speeding was higher for females than males. Nevertheless, the control beliefs for both genders predicted speeding intention, indicating that the participants perceived more facilitators for speeding than inhibitors. The males, however, were found to perceive even more facilitators for speeding than females. Furthermore, the researchers tested the moderation effect of gender throughout the four driving scenarios to examine how normative beliefs of speeding intention were moderated by the presence of passengers for both males and females. They found that, when driving alone, normative pressure for males was greater than females. Additionally, the social pressure for both genders was found to be a more important predictor when the passenger was male. Such results are consistent with other studies (i.e., Forward, 2009a) in that a male passenger had a greater influence on encouraging speeding for both males and females.

This program of research examined the indirect beliefs in addition to the direct predictors of the TPB in relation to the specific scenarios examined (to be outlined further in Chapter 6). By examining indirect beliefs, this research will likely add detailed information which may be used to inform recommendations regarding any future anti-speeding interventions in SA.

Category 3: Studies applying the extended TPB

In previous TPB-based speeding research, additional predictors have been added because authors have found those variables predict intention to speed over and above the standard TPB constructs (Conner et al., 2007). For instance, after reviewing the

literature, it has been found that the commonly applied additional predictors for speeding intention and behaviour include past behaviour, moral norms, descriptive norms, and anticipated regret. They have been found to be significant additional predictors of speeding intention and behaviour in TPB based studies (Conner et al., 2007; Elliott & Thomson, 2010; Forward, 2009b).

As mentioned previously, extending the TPB with additional variables has been supported by Ajzen. In particular, Ajzen (2016) supports the addition of variables to the model if such variables enhance prediction and make theoretical sense (Ajzen, 2016b). Past behaviour added 10.9% of variance on intention after adding direct constructs for a range of health behaviours such as physical activity and drinking (McEachan et al., 2011). Past behaviour has also been found to be a significant predictor of speeding intention and behaviour in different studies (e.g., Beck & Ajzen, 1991; Elliott & Thomson, 2010). For instance, Conner et al. (2007) found that past speeding behaviour significantly explained variance in speeding intention. Moral norms have also significantly influenced behavioural intention over and above the influence of the standard TPB constructs (Conner et al., 2007; Gorsuch & Ortberg, 1983).

Moral norms can be defined as "personal feelings of moral obligation or responsibility to perform, or refuse to perform, a certain behaviour" (Beck & Ajzen, 1991, p. 289). Moral norms explained a significant 4% additional variance in intention after adding TPB predictors for behaviours such physical activity, leisure behaviours, and smoking (Conner & Armitage, 1998). In the Conner et al. (2007) study, moral norms were a significant negative predictor of intentions and behaviour, indicating that the more an individual considered it morally unacceptable to speed, the less they intended to speed, and the less they actually engaged in speeding. Similar results have

been found in other studies (e.g., Elliott & Thomson, 2010). Anticipated regret can be defined as a negative feeling resulting as a consequence of a behavioural outcome, which leads the individual to imagine that they would get a better outcome if they behaved differently (Conner et al., 2007). Anticipated regret has been found to be a significant negative predictor of speeding intention, with individuals who have the intention to speed tending to have low anticipated regret when engaging in speeding (Conner et al., 2007). Finally, descriptive norm is another frequently applied construct in studies of speeding. Descriptive norm refers to a personal perception of the probability of typical people practicing a certain behaviour – so, in this instance, the extent to which others engage in speeding (Forward, 2009b). It has been found to be a significant predictor of speeding intention in a number of different studies (e.g., Conner et al., 2007; Elliott & Thomson, 2010; Forward, 2009b).

It is important to clarify that some studies, such as Elliott and Thomson (2010), considered descriptive norm as one of the direct predictors of speeding intention and behaviour. However, including descriptive norms in the TPB has not been supported by other authors such as Forward (2009b; 2010) who considered descriptive norms as an additional predictor. Even though descriptive norm has been included under the normative concept by Ajzen in the standard TPB framework later on (Ajzen, 2006), it has been still considered by some authors as an additional predictor. Descriptive norms has been found to add a significant 5% of variance in intention for a range of health behaviours such as physical activity and drinking over and above the standard TPB constructs (Rivis et al., 2006). Therefore, in this program of research, the predictor, descriptive norms, was included as additional predictor and its effect on speeding intention and behaviour was examined. Moral norms, descriptive norms, and past behaviour will be examined within an extended TPB in the current program of research

because doing so may lead to a better understanding of speeding in Saudi culture. Behavioural willingness is another significant predictor that can influence actual speeding behaviour (Elliott et al., 2017).

Behavioural willingness from the Prototype Willingness Model (PTM) is another key outcome measure as indicator of behavioural change that may be assessed in addition to speeding intention. Similar to intention, it is expected that willingness may predict subsequent behaviour. Behavioral willingness means that the likelihood of a behaviour commitment increases when the facilitating situation exists for an individual (Gibbons et al., 1998). Regarding speeding behaviour, measures of willingness assess such aspects as how willing a driver is to exceed the speed limit in specific driving situations such as being late for work or light traffic even if they may not explicitly intend to speed. Adding behavioural willingness as an outcome measure has been shown to explain more variance in speeding behaviour (Elliott et al., 2017). For this reason, willingness was also measured in addition to intention in the current research.

Because situational factors have been established as important influences to speeding (i.e., the when, where, and what are the factors which lead people to exceed the speed limit), in the current program of research, the situational factors that may influence speeding behaviour among Saudi drivers were elicited in the qualitative study of Study 1 and then were used to inform scenarios which drivers were asked to report their willingness to speed in such scenarios (for further details see the next section).

Intention and willingness

Both intention and willingness may predict speeding behaviour separately or independently and both are said to be influenced by the TPB's constructs including

attitude and subjective norm (Elliott et al., 2017). In particular, intention to speed may be the better predictor of behaviour for people who previously have the intention to engage in the speeding behaviour. However, willingness to speed depends on the current driving situation; thus, as an example, one's willingness to speed may better predict speeding behaviour given a situation, such as it being midnight and there not being any speed cameras and only light traffic. In this situation, the driver can exceed the speed limit when they have this opportunity even though they may not have been previously planning (or intending) to do it. Similar to intention, willingness is determined by attitude and subjective norm but, unlike intention, it is not determined by PBC (Elliott et al., 2017).

According to Elliott et al. (2017), different studies have showed that both behavioural intention and behavioural willingness are independent predictors for behaviour; however, behavioural willingness showed greater predictive ability than intention. Regarding speeding behaviour, Elliott et al.'s study found that behavioural willingness was a stronger predictor of speeding than behavioural intention, though they have both been found to be independent predictors of actual speeding behaviour. In their study, willingness to speed was examined by asking 198 participants (males and females) how willing they were to exceed the speed limit in such situations as being late for work, university, or an appointment. For this reason, the addition of willingness with the intention to speed as an outcome measure is considered important to examine in the current program of research.

2.4 THE APPLICATION OF THE EXTENDED TPB SPEEDING RELATED RESEARCH IN SA

The previous literature has demonstrated that an extended TPB provides an important opportunity to understand and predict human behaviour, including speeding,

in different countries. Thus, it is beneficial to assess the applicability of the TPB to speeding in SA. According to DeNicola et al. (2016, p. 10), the TPB provides an important opportunity to advance understanding and the prediction of human behaviour especially in the field of driver behaviours in SA. They note that, "using the theory of reasoned action and planned behavior as a framework for researching and understanding the reasons and beliefs that motivate drivers in Saudi Arabia to engage in risky and reckless driving behaviors could provide a stronger, more well-informed foundation for developing intervention and educational strategies to improve traffic safety. Changing beliefs and attitudes at the individual level, and thereby individual behavior, could be the key to significant improvement in traffic safety in Saudi Arabia". Even though this quote refers to all driving behaviours, not only speeding, the issue of speeding warrants considerable attention as it is one of the leading causes of RTCs in SA (Mansuri et al., 2015).

Regarding the applicability of the extended TPB in terms of the context of speeding in SA, it is important to highlight that previous speeding studies were applied in different countries in various contexts of speeding such as Oman (Al Azri et al., 2016). Indeed, the speeding contexts that have been mentioned in the literature are similar to those found in SA in terms of urban roads and speed limits; however, they are still not SA specifically. The preceding evidence has highlighted that it is important to apply the TPB in specific contexts to understand factors that predict a specific behaviour in a given context. Thus, it follows it is important to understand driver behaviour and the reasons underpinning that behaviour in the SA context specifically. It also follows that interventions may then be better targeted to address the underlying motivations (Glanz, Rimer, & Viswanath, 2008). Thus, in all stages of an intervention including planning, implementing, and evaluating, theories are beneficial (Glanz et al.,

2008). The next section will clarify the research question of the current program of research.

2.5   RESEARCH QUESTIONS

The research questions of the current program of research are identified as follows:

> 1) How do Saudis define speeding from their own point of view? (to identify the specific speeding scenario/s)

According to the previous literature, drivers' speed choice is not always determined by simply the legal definition of speeding in terms of the posted speed limit (Fleiter, 2009). In order to develop effective intervention measures, it is essential to have an accurate image of what 'speeding' means to Saudi drivers, with reference to specific definitions or scenarios. Thus, knowledge about how drivers define speeding could contribute to the development of a better intervention for implementation within a specific cultural context.

> 2) What are the key psychosocial factors that influence speeding behaviour?

It has been found that intention is a key factor that predicts people's action or behaviour (Ajzen, 1991). Furthermore, so far, there are no studies that focus on understanding psychosocial factors leading to speeding in SA by applying a well validated theoretical framework such as an extended TPB. By having a better understanding of psychosocial factors leading to speeding, better interventions could be developed (in terms of targeting relevant influential factors) which, ultimately, may contribute to decreasing RTCs.

3) What can be done to change speeding behaviour?

It is important to identify intervention strategies to determine the practical implications of the findings. In accordance with this goal, the opinions of road safety experts about how to utilise this knowledge in any future interventions, as well as strategies to improve road safety, are used in addition to the suggestions from previous studies to help determine the extent to which the current program of research offers evidence-based insights that may inform future interventions.

2.6 SUMMARY

This chapter has highlighted some of the common theoretical frameworks applied in the public health field. Explanations of the psychosocial factors related to speeding was described. Justification was provided as to why the TPB was chosen as the underpinning framework for the research and not any of the other possible frameworks. In addition, the chapter reviewed literature about the application of the TPB to speeding, with additional predictors, to support the application of the extended TPB. The chapter ended by posing the three main research questions guiding this program of research. The next chapter will present key details regarding the proposed research methods including their association with being able to answer the research questions posed.

Chapter 3: Research Design

This chapter overviews key aspects of the design of studies within this program of research including the participants and location of the conduct of a particular study, the translation process of the research materials, and the proposed study methods for each of the four studies comprising the program of research. In the methodology section, the justification and the contribution of each study are discussed in terms of addressing the research questions.

3.1   THE APPROACH

The overall design of this program of research is a sequential mixed-methods design, involving quantitative and qualitative data. Applying a mixed-methods design is typically used when applying the extended TPB. The design includes interrelated studies whereby the results of one study are used to inform the following studies. The TPB's methodology protocol usually starts with qualitative or quantitative studies aimed to identify a behaviour which is used for the second study. The second study in this program of research was a qualitative study and used to elicit beliefs to formulate a survey in the third study (i.e., a quantitative study). The last study (Study 4) was a qualitative study of road safety experts' opinions in Riyadh city about the key findings of this program of research. Specifically, the mixed-methods design in relation to the four studies were as follows:

- **Study 1:** a qualitative study conducted using one-on-one individual interviews with 14 male Saudi drivers based in Brisbane, Australia (i.e., the location of where the candidate was studying for her PhD) as participants.

- **Study 2:** a qualitative study conducted via one-on-one telephone interviews with 20 male Saudi drivers based in SA as participants.

- **Study 3:** a quantitative study conducted by online surveys with 112 male Saudi drivers based in Riyadh city, SA as participants.

- **Study 4:** a qualitative study that was conducted by open-ended online surveys, and which included 7 road safety experts based in Riyadh city, SA as participants.

3.2   THE PARTICIPANTS

In Studies 1 to 3 inclusive in this program of research, the participants were males aged 18-40 years, who had a driving licence, and who are Saudis. These selection criteria were due to the following: they are the most affected age group in terms of RTCs (Abdullah et al., 2013; Ghaffar & Ahmed, 2015; Hokkam et al., 2015); 18 years is the legal minimum age for carrying a driving licence in SA (Alabdulaay et al., n.d.); and, in SA, only males were permitted to drive at the time this program of research commenced. While it is acknowledged that non-Saudi citizens would likely contribute to the number of crashes in SA, according to Ratrout et al. (2017), being Saudi has been identified as a strong predictor of crash proneness in SA, perhaps because they make up the majority of the population. Even though females in SA were allowed to drive from June 2018, they were not included in the study samples within this program of research. The rational for the exclusion of female drivers in this program of research is that the majority of females in SA have limited experience of driving, including speeding behaviour, given they have been only able to drive since 2018. To include them in this program of research would require waiting for them to learn to drive and to have enough experience of driving on SA roads. The number of women who choose to drive is currently difficult to predict, thus, operationally, it was

difficult to include Saudi females in the present program of research. The participants for the fourth study were road safety experts working in SA. It is important to note that for all of the studies, given the recruitment approaches involving widespread dissemination of study information via email distribution lists and social media advertising, it is not really possible to calculate a response rate for the studies in terms of how many participants may have seen the study materials and opted not to participate. Furthermore, consistent with the ethical approved procedures, participation was voluntary and the decision to participate or not could be made without comment or reason offered. In addition to this, for Studies 1 and 2, the candidate did not interview the same people in the different studies.

3.3   THE GENERAL APPROACH TAKEN TO ANALYSING THE QUALITATIVE DATA

For both qualitative studies, namely Studies 1 and 2, Braun and Clarke's (2006) steps of qualitive analysis were utilised. Specifically, a conceptual content analysis was undertaken with the qualitative data obtained via the interviews. The steps started with transcribing the data to develop general ideas and notes. The transcribing was conducted verbatim in Arabic. Then, the scripts were edited for typos to ensure closeness to and familiarity with the data was achieved. After that, general codes and categories were formed. All codes were translated into English, categorised under themes and sub-themes, and calculated into percentages. Lastly, themes and sub-themes were developed in English. To identify the percentages of each sub-theme for both Studies 1 and 2, the number of participants was counted as the following equation:

Number of participants who stated similar statements under a certain sub-theme/total number of participants x 100

For Study 2, the main themes were formed according to six main categories which were related to six questions in each interview (see Section 5.1.6 for further information about the analysis for Study 2).

For Study 4, thematic analysis was applied also using Braun and Clarke's (2006) steps of analysis. The researcher identified the codes of each statement under each question. (see Section 7.1.6 for further information about the analysis for Study 4). As the researcher has no previous driving experience in SA, making assumptions about driving and driving experience was less likely to occur and thus subjectivity was considered reduced. The researcher's lacking of driving experience in SA is considered an advantage likely to improve the reliability of final data obtained by reducing personal judgments on the behaviour and why individuals may engage in it.

3.4   THE GENERAL APPROACH TAKEN TO ANALYSING THE QUANTITATIVE DATA

The SPSS software package (i.e. SPSS statistics subscription version) was used for all analyses. First, hierarchical regressions were conducted to determine the predictors of intentions based on the extended TPB framework (i.e., attitude, subjective norm, PBC, and the additional variables of moral norms, descriptive norms, and past behaviour). Such an analytic approach was consistent with that of other previous TPB-based studies on speeding behaviour (e.g., Conner et al. 2007; Elliott & Thomson, 2010). For identifying the indirect beliefs (i.e., behavioural, normative, and control beliefs) predicting intentions for each of the specific scenarios, a critical beliefs analysis was applied (Abdul Hanan, 2014; Gauld et al., 2016; Von Haeften et al., 2001), for further details about the analysis see section 6.1.1 in Chapter 6.

3.5 THE LOCATION OF DATA COLLECTION

Studies 2 and 3 in the program of research were conducted in Riyadh city. The highways and roads in Riyadh are considered to be urban roads. Riyadh city was chosen as it has the highest percentage of RTCs compared to other cities in SA and had an estimated 33.78% of crashes in 2015 (The General Authority for Statistics, 2015). Study 1 was conducted in Brisbane, Australia using similar inclusion criteria mentioned before (i.e., participants who were males aged 18-40 years, who have a driving licence, and who are Saudis). In addition to these criteria, the participants were citizens who had driven in any city in SA in the previous year. It is acknowledged that it was possible to recruit eligible participants in Brisbane. However, it was difficult to recruit drivers who had previously driven in Riyadh city as was the requirement for Studies 2 and 3 because of the limited number of male Saudis in Brisbane. For this reason, Study 1 included drivers who had driven in any city in SA. Road traffic rules are the same in all cities of SA, and recruiting participants from different cities in SA in the first study had the potential benefit of a more comprehensive view about speeding behaviour in different road types and conditions. The fourth study included road safety experts working in Riyadh city. This location was chosen in order to be consistent with Study 3. As this research is focusing on speeding behaviour among Saudi participants driving in Riyadh roads, the participants were nominated based on their expertise in the field and their experience in Saudi culture.

3.6 THE LANGUAGE OF THE RESEARCH MATERIALS AND DATA (TRANSCRIPTS)

Arabic is the language for citizens in SA; thus, Studies 1, 2 and 3 were conducted in Arabic. The materials were first developed in English then translated into Arabic by

the candidate. To ensure the validity/ rigorousness of the translation, the materials were reviewed by the authorised translation office in Riyadh in SA called Lufta[3], which employs linguists who are fluent in Arabic and English. Any modifications were made as necessary. The survey devised for Study 3 was piloted among 10 participants who were bilingual PhD candidates for further validation of the translation and the clarity. Study 4 was conducted in English because the experts can understand and write in English.

Regarding the transcripts obtained from the collected data, it was important to validate the analysed data which were obtained originally in Arabic and translated into English for Studies 1 and 2. As mentioned above, the data for both studies were transcribed in Arabic and analysed in Arabic before being translated into English by the Lufta translation office. To validate the data, they performed a backwards translation which has been shown to be successful in previous studies (e.g., Alselaimi, 2010; Guermazi et al., 2012). Backwards translation is done by having the translated document (in this case in English) translated back into the source language by a bilingual expert who has not read the original document. This is then compared with the original document to see if they have the same meaning (Tyupa, 2011). After this process, the English version of the data was reviewed by the supervisory team and a thesis editor.

3.7 INTERVIEWER CHARACTERISTIC

There was a point of consideration regarding feasibility of Studies 1 and 2 relating to the research candidate's experience and background. The candidate (as a female with master degree on Health Promotion and Disease Prevention) has a background in Public Health and Health Education within which she has studied

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[3] A certified office in Riyadh city for Ministries and related Departments or Authority and Embassies translation in Saudi Arabia

theories of the behavioural change in these majors. Thus, the candidate is familiar with the theory of study. Additionally, the Health Education department at King Saud University (where the researcher graduated from with her undergraduate degree) was established for female scholars only until 2011; since then, a department for male scholar has been established. For this reason, the application of behavioural change theories from a public health perspective is not yet widespread among many especially male researchers in SA. For this reason, the candidate decided to conduct this study by utilizing her background and experience to understand one of the most serious public health issues in SA (i.e., speeding). In addition, it is not uncommon to have an individual interview between males and females in Saudi Arabia if such interviews are conducted in official places such as a university or hospital campus. The candidate also followed certain protocols in each interview in order to reduce any bias which was clarified under Study's 1 design and procedure (see interview protocol on chapter 4) and under design and procedure of Study 2 (see interview protocol on chapter 5). Please note that for all qualitative studies, the researcher used the Consolidated criteria for Reporting Qualitative research (the COREQ) checklist added in them appendixes G, H, and I (Tong et al., 2007).

Chapter 4: Study 1

In Chapter 2, the literature review, previous applications of the TPB to understand speeding intention and behaviour were discussed according to a number of categories (i.e., category 1 = studies applying the direct TPB predictors/constructs; category 2 = studies applying the indirect beliefs of the TPB; and category 3 = studies applying extended TPB frameworks). It was noted earlier that, in all instances and in accordance with the TPB's TACT principle, all studies were guided by a certain definition of speeding. Defining a behaviour, in this instance, speeding, is the first step of an application of the TPB (Fishbein & Ajzen, 2011). The definition is guided by addressing the TPB's TACT principle which, as noted earlier, refers to the defining of the Target, Action, Context, and Time.

In practice, there is no specific method to identify a behaviour according to the TPB protocol. Fishbein and Ajzen (2011, pp. 29-30) state that *"Clearly, how we parse the behavior into action, target, context, and time elements is to some extent arbitrary. It is up to investigators to define the behavioral criterion as it best fits their research purposes.".* In relation to the present program of research, the subjective method has been applied for a reason that will be clarified in the coming section.

Furthermore, any behaviour can be either general or specific (Fishbein & Ajzen, 2011). For instance, for speeding behaviour, speeding has been defined in general such as the case in Elliott et al. (2017)'s study where the general definition was "drive faster than the speed limit over the next month" (p. 738), while more specific definitions have also been used in certain scenarios, as in the examples mentioned by Conner et al. (2003, p. 255) and Horvath et al. (2012), whereby, they have guided participants

with specific details such as about speeding situations like going to a party, the weather situation, and the road types. Using a scenario-based approach is important in the current program of research as developing scenarios was assumed to provide the researcher with the opportunity to hold constant any situational factors, such as the density of vehicles in the scenario (see Conner et al., 2003). The situational factors of speeding are important elements to be examined in this program of research. They were to help in framing the scenario in the self-report survey to be used in Study 3. Any driving behaviours are influenced by the surrounding environment (either physical or social), such as the condition of roads or weather (Horvath et al., 2012). Thus, examining these influences can help in the development of the content of specific speeding scenarios that, in turn, can contribute to gaining a greater understanding of the psychosocial factors underpinning speeding behaviour. Additionally, situational factors, such as being late, may increase the willingness of speeding among participants which was used in Study 3 to examine the outcome measure of behavioural willingness. For this reason, it was important to examine these factors in this program of research.

In this research, to comprehensively study speeding behaviour, both general and specific definitions were purposefully-devised and applied. The general definition was used in relation to the measurement of the TPB direct beliefs (i.e., attitude, subjective norm, PBC) and the additional predictors (i.e., moral norm, descriptive norm, past behaviour) in Study 3. In relation to the specific definitions of speeding, they were used to identify the indirect beliefs influencing speeding in such contexts in Study 2. After Study 2, both direct and indirect beliefs as well as the additional predictors were examined in relation to the specific scenarios in Study 3.

4.1 METHODOLOGY AND RESEARCH DESIGN

4.1.1 Study 1: Background

Study 1 was an exploratory qualitative study involving one-on-one semi-structured individual interviews that encompassed the scoping and defining of speeding from SA drivers' perspectives. This study addressed Research Question 1, "How do Saudis define speeding from their own point of view?". The purpose of this study was to identify the specific behaviour definition/s from the participant's perspective. The results of the speeding scenario/s of this study were to be used for Studies 2 and 3 to examine participants' responses in relation to the same scenario/s.

The main reason for using a qualitative, one-on-one individual interview study was that qualitative research methods are useful methods to help identify complex behaviours and motivations from participants' perspectives (Thomas, 2008). Given the limited extent that speeding has been studied in SA, it is important to start with a clear understanding of what speeding means to SA drivers. As speeding is an illegal behaviour, it was thought the topic may cause participant discomfort; thus, one-on-one interviews were conducted to ensure privacy. Another reason for selecting a qualitative approach was related to the feasibility of the study. From the outset, carrying out Study 1 was more feasible in Brisbane, where it was easier to find eligible participants and organise an appropriate time and place for interviewing than in SA. Thus, the interviews were conducted in Brisbane, Queensland, Australia.

The definition of speeding used in Study 1 was guided by addressing the TPB's TACT principle (Fishbein & Ajzen, 2011). Initially, the candidate referred to the target behaviour as speeding in the next two weeks. During the two-week period, it was anticipated that participants would have a chance to engage in the behaviour and be

able to recall any speeding behaviour. This two week time frame was planned before the COVID-19 pandemic in Saudi Arabia, but was changed after the emergence of COVID-19 to "when it is once again legally acceptable for me to drive" in order to be consistent with the disease prevention procedures in SA which included restricting driving behaviour and any unnecessary activity outside homes. These two elements shaped the general definition of speeding as "Exceeding the legal speed limit once again be legally acceptable for me to drive", which was retained for the Study 3 (Chapter 6). In regard to the specific definition (i.e., from the Saudi perspectives), both the "action" and the "context" were unknown, which were to be identified from the findings of Study 1.

4.1.2 Study 1: Setting of the study

The study was conducted among Saudis working/studying in Brisbane in Australia. Each interview was conducted by the candidate. The interviews were conducted in a room on Kelvin Grove campus of QUT. Carrying out Study 1 in Brisbane was a means by which the candidate could obtain the most reliable data possible, as this study is a fundamental study upon which all subsequent studies in the research program were to be based upon. The study aimed to identify the specific scenarios for speeding, which informed aspects to be used in the materials in subsequent studies. Thus, it was important to ensure the data are reliable and accurate by discussing the results face-to-face with the supervisory team. Frequent meetings with the supervisory team were undertaken for this purpose. By doing this, any issue regarding the interviews could be addressed promptly and, if required, modifications made for the next interviews, steps that would occur more quickly when basing the study in Brisbane, rather than in SA.

4.1.3 Study 1: Participants

A convenience sample of 14 participants was recruited. Theoretical saturation was reached at this number by identifying redundancy data through the interviews. The mean age of the participant sample was 31.42 years and ranged from 24 to 37 years. They were all students (12 undertaking post-graduate and two undergraduate students) and there was no previous relationship between the candidate and the participant for all qualitative studies. The years of driving experience ranged from 9 to 20 years, and the mean number of years was 14.64, with a standard deviation of 3.77 years. They came from different cities in SA, including 5 participants from Mecca, 3 participants from Jeddah, two from Abha, one from Hail, one from ArRass, one from Riyadh, and one from Al-Qasim. Even though it was not an inclusion criterion, they all had driving experience in Riyadh city (refer to the map in Figure 5).

Figure 5: Locations where Study 1 participants had resided when in SA. Adapted from Maps land.

4.1.4 Study 1: Design and Procedure

Participants' recruitment and ethical clearance:

Ethical approval was obtained from the Human Research Ethics Committee (HREC) at Queensland University of Technology (QUT Reference Number: 1800000768). All of the participants were invited to participate in the one-on-one interviews through the Saudi Club in Brisbane which is part of the Saudi Arabian Cultural Mission in Australia (SACM). The invitations were sent on behalf of the

candidate. The contact details for the candidate were outlined in the invitations, including email address; thus, anyone interested in participating was able to contact the candidate. The SACM had recommended this mode of recruitment to reach the participants in Brisbane city through its club. After the participants contacted the researcher, the interview time was coordinated to be convenient for each participant. The detail of privacy and confidentiality of the participants was clarified in the Participant Information Sheet. The information sheet also outlined that the audio-recording of the interviews was optional.

The interviews' audio-recorded data were stored securely. Email addresses for participants who were interested in participating in this study or any further studies were stored securely and separately to their responses to protect their confidentiality.

Interview protocol:

Participants were advised that the interview would take no more than 1 hour. In practice, interviews took between about 6 to 30 minutes. The intention of Study 1 was to conduct in-depth interviews and to give the participants enough time to express their opinions. In some instances, the interviews were relatively short and were so for potentially different reasons. First, the interview questions were provided to participants as part of the participant information, so it is feasible that some participants had reviewed this information and already were clear on what they intended to say. Second, some participants were keen to talk more than others and, despite prompts, if the participants had addressed the questions as intended, there was not really any need to continue the discussion any further.

The data collection process occurred from November 2018 to December 2018. After each interview, the recordings were transcribed verbatim by the candidate for analysis as well as discussion with the supervisory team.

The Jacob and Furgerson (2012) interview protocol was adapted as a guide for the interviews. To commence the interviews, the candidate, as the facilitator, welcomed the participant and sought to build rapport and trust. After welcoming the participant, a hard copy of the information sheet was given to the participants, and they were given time to read it again (i.e., it was originally sent electronically as well in the email invitations) and given the opportunity to ask questions. The consent sheet was signed before the interview commenced. The procedures of the consent sheet signature were not recorded. In this study, all participants agreed to be audio-recorded.

The candidate took brief notes to be reviewed at the end of each interview to confirm the accuracy of the data. The candidate listened without interruption to the participants' responses. Listening encourages the participants to share their information freely. As this interview was semi-structured with open-ended questions, if and as required, further questions were asked for more clarification. For instance, a participant stated, *'sometimes the roads are wide with low traffic and you get surprised that the speed limits are 80 or 70 or even 60 km/h sometimes." (P2, 32)*. The researcher asked him *"for example?"* to obtain more detail and further explanation. At the end of each interview, the researcher reviewed the written notes with the participants in order to validate the data and to thank the participant. Each participant was provided with an incentive card (i.e., $20 AUD Myer/Coles Gift card); three participants declined the incentive.

4.1.5 Study 1: Materials and Measurements

The in-depth-one-on-one interviews were guided by a semi-structured interview schedule. The schedule involved open-ended questions based on questions adapted (and translated) from previous studies on speeding including the studies by Fleiter (2010, p. 239) and Horvath (2009). In addition to the interview schedule, questions about demographic data were collected via a brief self-report survey and that included age, educational level, years of driving experience, living city in SA, and if they had driven in Riyadh city. The demographic data provided more information about the characteristics of those participating in the study.

The semi-structured interview questions included:

"As a driver, what does the word "speeding" mean to you?"

"Do you think that driving above the speed limit is dangerous? Why/why not?"

"Are there specific circumstances in which speeding is okay?"

"In what circumstances have you personally engaged in speeding?"

4.1.6 Study 1: Analysis

Conceptual content analysis was applied to analyse the data which, ultimately, is based on identifying concepts as themes with a particular reliance upon frequency of responses. As noted previously, Braun and Clarke's (2006) steps of analysis were applied. After each interview, the candidate transcribed the recording, contributing to identifying general ideas and notes. The transcribing was verbatim in Arabic. A few quotes were in English, as some participants used a few English words in their interviews. After transcribing all recordings, the transcripts were reviewed and edited for typographical errors; this step also improved closeness to and familiarity with the

data and thus aided in the forming of general categories of themes. Any personally identifying information was removed before the analysis to protect participant confidentiality. Then, the data were coded. Although the main focus was to answer the research question, all the potential data were identified and categorised in the themes regardless of their relation to the research question. After that step, all codes were translated into English, categorised, and calculated based on percentages. They were then categorised into themes and sub-themes. The analysis and categorisation of the data were guided by the candidate's understanding of the interrelated factors affecting the speed choice mentioned previously in the first chapter. The action and the context of speeding were developed as a result of integrating the most frequent factors which would underpin speeding in that scenario/s. The translation was validated by the official translation office in SA. The categorisation of data was validated by discussion with a bilingual person in the speeding study major before translation into English and discussion with the supervisory team.

4.2   STUDY 1: RESULTS

This study was conducted to identify the speeding scenarios among Saudi drivers in accordance with the TACT principle. What was currently known from TACT's elements regarding the speeding behaviour in SA were the target (speeding) and the time (i.e., when once again it is legally acceptable for me to drive). Both of these elements contributed to the devise of the general definition of speeding. The specific definitions also require the remaining elements of the TACT principle, the action and the context. These are discussed in .

The results were divided into two major themes: "Legal/technical and attitudinal definitions of speeding", and "speeding factors". As will be noted, some

transcripts overlapped across different themes/subthemes. The overlapping reflects a good explanation of speeding behaviour, given that speeding as a behaviour can result from interrelated factors (Fishbein & Ajzen, 2011). The potential meaning of some statements was considered carefully in the categorisation.

In addition, each quote was identified with reference to an arbitrary participant number (i.e., guided by the order of interviews) and their age such as P1 or P2 and the age which confidentially represents the quotes from a certain participant. Through reading the results, some certain places or cities will be noted, all of which can be found on the map of SA in Figure 5.

Overview of responses for each interview schedule question

The data were gathered by asking the main four open-ended questions, and then categorised into two main themes "Theme #1 Legal/technical and attitudinal definitions of speeding", and "Theme #2: speeding factors". Theme #1 was drawn from the interview question "As a driver, what does the word "speeding" mean to you?" which aimed to identify the 'target' of TACT principle. However, Theme #2, resulted from asking the following interview questions which were integrated, organised and synthesised:

"Do you think that driving above the speed limit is dangerous? Why/why not?"

"Are there specific circumstances in which speeding is okay?"

"What circumstances have you personally engaged in speeding?"

In fact, all the responses regarding questions 2, 3, and 4 helped with understanding the factors and the contexts regarding speeding in SA in accordance

with the TACT principle. They are all included in one major theme, Theme #2 "speeding factors", which was further divided into 14 subthemes and contributed to develop a context of speeding that was used in the following studies. The following sections provide some examples of the responses to each question and the themes that were created based on it.

The responses for the first question *"As a driver, what does the word "speeding" mean to you"* resulted in three categories of speeding definitions. Some participants introduced technical/legal definitions, attitudinal definitions, and/or both definitions. The majority of the participants (42.85%) gave a technical/legal definition which is exceeding the posted speed limit (e.g., *"It means exceeding the maximum speed limit of each road" (P9, 37))*. A few of them (21.42%) defined speeding from their attitude either by their assessment of their driving control; for example, *"In my opinion, speeding means exceeding the speed limit at which a person cannot control the car or even cannot control his feelings..." (P13, 26)* or their assessment of the trip time and reaching a certain destination; for example, *"In my opinion speed means reaching the required destination in a short time" (P4, 36)*, or the consequences of the speeding; for example, *"Danger, injuries' (P8, 37)*. Just under a third (28.57%) of participants gave both technical/legal and attitudinal definitions of speeding. For example, participant 3, aged 28, stated *"It is true that speeding means exceeding the legal speed limit. This is one thing. The second thing is that the driver may be in a hurry. Even if he hasn't exceeded the speed limit and if he drives in a high speed in a low speed place or if the car moves in a higher speed, this can be considered exceeding the speed limit"*. All responses for the speeding definitions were included under "Theme#1 Legal/technical and attitudinal definitions of speeding".

Regarding the responses to the second question, *"Do you think that driving above the speed limit is dangerous? Why/why not?",* the majority of the respondents said that is was dangerous (78.57%) due to the negative consequences of speeding, which included accidents, loss of control, and road traffic violations. For example:

"Dangerous because the loss of driving control ability" (P3, 28)

"It is dangerous because of the accidents and violations' (P14, 24)

However, 27.27% of those who agreed that speeding *is dangerous*, claimed there are some exceptions. They related these exceptions to some road factors where they think exceeding the speed limit is not harmful. These factors/circumstances mainly included wide roads and multi-lanes roads. For example, responses included:

"Participant: sometimes the roads are wide with low traffic and you get surprised that the speed limits are 80 or 70 or even 60 km/h sometimes. Researcher: for example? Participant: the speed limit should be approximately from 90 to 100.... If I have a commitment or time is short for me, I don't exceed the speed limit to reach a crazy speed limit... researcher: do you mean above 100? Participant: I mean at a speed limit of 80, even though I can comfortably drive at 100 easily, I drive at 90 but I do not try to exceed it to 120 or 130 km/h which I consider a dangerous speed" (P2, 32)

"Yes, exceeding the maximum speed limit is dangerous. The legal speed limit is set for safety reasons. Sometimes the road has 4 lanes and the maximum speed limit is 110 km/ h. Some people think it must be more than 110 km/h for a 4 lane highway road between cities and it takes a long time to reach the destination... or to be from 120 to 130 km/h" (P13, 26)

The remaining participants (21.42%) said speeding is *not really dangerous,* or it depends on certain factors. Their justifications were similar to the previous group who claimed it is dangerous but not in certain factors/circumstances. For example, responses stated:

"If one is in a healthy condition without any health problems such as visual problems, I don't think driving at 120 or over is dangerous especially if the road is wide with 5 lanes from one city to another, no residential problems and I have no health problems, so I do not think it is dangerous to raise the speed limit slightly… I mean driving at 120 or 140 km/h" (P6, 35)

"Yes, exceeding the maximum speed limit is dangerous. The legal speed limit is set for safety reasons. Sometimes the road has 4 lanes and the maximum speed limit is 110 km/ h. Some people think it must be more than 110 km/h for a 4 lane highway road between cities and it takes a long time to reach the destination… or to be from 120 to 130 km/h" (P13, 26)

In response to the third question, *"Are there specific circumstances in which speeding is okay?",* the majority of participants (71.42%) agreed that speeding in an emergency is acceptable and some of them verified its importance for authorities such as ambulance or firefighters. Being late or in a hurry (71.42%) for a specific appointment or commitment were also claimed by many participants as an acceptable reason for speeding, for example:

"In death cases…. A family member was in a critical case in the hospital …" (P1, 28)

"For emergencies such as rescuing a patient, ambulances and fire fighters can have an exception" (P4, 36)

"In the case of family circumstances, catching a plane or being late for an important appointment for a job" (P2, 32)

"If I am late for work, I exceed the speed limit; and sometimes I just want to arrive early" (P3, 28)

Speeding in emergencies and in a hurry were commonly mentioned in responses to the last question, "*What circumstances have you personally engaged in speeding?"*. The other common circumstance mentioned by 35.71% of participants was when they felt bored from long-distance driving during travelling; for example, *"I drove on long roads between cities. This made me bored as I wanted to reach my destination. So, I had to speed up. I exceeded the maximum speed limit. For example, if the maximum speed limit as 120 km/h, I drove up to 130 km/h which is not a fatal speed" (P1, 28)*. Being late or in a hurry, which was mentioned in response to questions three and four was related to different motivations; for instance, being late for a job or a job interview or a ceremony.

Theme #1: Legal/technical and attitudinal definitions of speeding

This theme included both legal/technical and attitudinal-based definitions of speeding, offered by the majority of participants. Some participants (28.57 %) gave both definitions, including from their attitude and the legal definition:

"Which is exceeding the speed limit according to my feelings' (P1, 28)

"Exceeding maximum speed limit according to my perception" (P1, 28)

"If I exceed the legal speed limit" (P2, 32)

"Dangerous' (P2, 32)

"It is true that speeding means exceeding the legal speed limit. This is one thing. The second thing is that the driver may be in a hurry. Even if he hasn't exceeded the speed limit and if he drives in a high speed in a low speed place or if the car moves in a higher speed, this can be considered exceeding the speed limit" (P3, 28)

"Being in a hurry" (P3, 28)

"Exceeding the speed limit…. The lane…. The road" (P14, 36)

"Exposing others' lives to danger; or this general concept is my personal concept of speeding" (P14, 36)

The majority of participants; however, gave the legal definition only (42.85%):

"It means that I exceed the maximum speed limit on definite roads or in certain times' (P5, 31)

"In my opinion, the definition of speed limit shown on the road is the maximum speed limit which you must not exceed" (P6, 35)

"It means exceeding the maximum speed limit of each road" (P9, 37)

"In my opinion, the term speeding means that I exceed the legal speed limit" (P10, 30)

"If I exceed the posted limit shown on the road, this means that I have exceeded the speed limit" (P11, 30)

"In my opinion, speeding means exceeding the legal speed limit defined for the driver" (P12, 33)

Only a few participants defined speeding solely based on their attitudinal beliefs regarding the behaviour (21.42%):

"In my opinion speed means reaching the required destination in a short time" (P4, 36)

"Danger, injuries' (P8, 37)

"In my opinion, speeding means exceeding the speed limit at which a person cannot control the car or even cannot control his feelings, as I think the difference is relative. For instance, for an old person, 80 km/h speed is a high speed because he cannot control the car, he feels that he loses control or he cannot focus while 80 km/h speed means nothing to young persons' (P13, 26)

Theme #2: Speeding factors

This theme includes many of the contributing factors reported by the participants. The factors have been categorised into 14 sub-themes as clarified in the subsequent sections:

Sub-theme #1: Speeding on highways (Speed zones 110 km/h or above)

This sub-theme includes a highway zone (mostly 120 km/h), which was mentioned by many participants (42.85%). The range of amounts of exceeding the speed limit mentioned by the participants ranged between 5-20 km/h. The reasons for their opinion were various. For instance, one participant claimed that travelling between cities was a factor that had led him to speed in the past, which he now regrets. He was talking about 120 km/h speed zone and described driving 10 km/h over the legal speed limit as "not a fatal speed":

"I drove on long roads between cities. This made me bored, as I wanted to reach my destination. So, I had to speed up. I exceeded the maximum speed limit. For example, if the maximum speed limit as 120 km/ h, I drove up to 130 km/h, which is not a fatal speed" (P1, 28)

In the same speed zone, another participant mentioned that 10 km/h over the speed limit is not speeding. He suggested that this speed was within the error range (i.e., the speed enforcement tolerance) which the SAHER system does not capture as excessive speeding. For this reason, he does not perceive 10 km/h above the legal speed limit as speeding. He talked about the speed tolerance, which is not supposed to be publicly available information:

"Let us say; for instance, that the maximum speed limit in SA is 120 km/h. In my opinion if a driver exceeds the maximum speed limit by at least 10 km/ h, this means that his speed is more than 130 km/h, this will be considered as speeding. Less than this limit we can consider it an error. I consider going above the maximum speed limit by 20 or 30 km/ h hour as speeding" (P5, 31)

Then, he mentioned that driving at between 120-125 km/h in a 120 km/h speed zone is more comfortable for him because it helps him to drive at a similar speed to other cars:

"I drive on the road and I exceed the maximum speed limit by 5 km/ h (my speed is 125, 120, 125km/h) because I feel uncomfortable if I drive a bit slower than the other drivers. I consider 120, 125 km/h the maximum speed limit to me (within the permitted range of speed); so as to avoid a traffic fine in SA" (P5, 31)

Another participant said there is no problem with exceeding the speed limit by 10-20 km/h on a highway with a posted speed limit of 120 km/h. He considers it acceptable under certain conditions, such as on wide roads with five lanes, outside of residential areas, when the vehicle is in good condition and the driver is in good health:

"If one is in a healthy condition without any health problems such as visual problems, I don't think driving at 120 or over is dangerous especially if the road is wide with 5 lanes from one city to another, no residential problems and I have no health problems, so I do not think it is dangerous to raise the speed limit slightly… I mean driving at 120 or 140 km/h… It is not dangerous if I exceed the speed limit; I mean if I drive at 120 or 130 km/h speed, it is not dangerous if there is no problem with the car's condition" (P6, 35)

Another participant acknowledged that speeding is a dangerous behaviour and the legal speed limit is set for safety reasons; however, he thought that other drivers can disregard speed zones especially if there are multilane highways with a speed limit of 110 km/h. He also clarified that those drivers believe that the legal speed limit should be higher than 110 km/h. Continuing with this thinking, he indicated that people thought it is better to be 10-20 km/h over that limit:

"Yes, exceeding the maximum speed limit is dangerous. The legal speed limit is set for safety reasons. Sometimes the road has 4 lanes and the maximum speed limit is 110 km/ h. Some people think it must be more than 110 km/h for a 4 lane highway road between cities and it takes a long time to reach the destination… or to be from 120 to 130 km/h" (P13, 26)

Another participant stated that, when the road is clear, it can be driven at 200 km/h. The candidate asked about the meaning of "clear" for him, and he mentioned a road that shares similar characteristics of the highway:

"If the road is clear you can drive at 200km/h.

Researcher: what do you mean by clear?"

Participant: straight, where you can see 500m of the road, and no dust or bumps or turns' (P3, 28)

In addition, one participant claimed that he usually set his speed limit at 140km/h on the highway:

"I usually on the highway set my speed at 140km/h, which I can drive with full control" (P9, 37)

It is worth mentioning that a participant also mentioned an opposing opinion about speeding on a highway:

"..... However, if they increase the maximum speed limit in highways now to 140 km/h. I consider the speed limit to be too high. 120 km/h is enough for safety reasons' (P11, 30)

Sub-theme #2: Speeding in multi-lanes (speed zones ranged from 40 km/h to 80 km/h)

This sub-theme includes speed zones located inside cities, which were mentioned by some participants (28.57%). These speed zones were assumed to be urban arterial roads. The participants did not explicitly mention these roads types; instead, several participants mentioned characteristics that fit these roads, which are generally wide or multi-lane roads with speed limits of 40, 60, or 80 km/h. It was

deduced by the candidate that these are in urban areas because, in SA, all such zones are located inside cities. The speeding mentioned by the participants ranged between 10-20 km/h above the posted limit.

One participant claimed that there are some situations where exceeding the speed limit by 20 km/h can be acceptable, depending on the road type and the volume of traffic. He called some of these roads the "same as the highway":

"Sometimes exceeding the speed limit is acceptable on roads of 60 km/h speed. So, exceeding the speed limit up to 80 km/h is not dangerous. It depends on the road type…... I see no problem if the speed limit is 40 km/h and you drive up to 60 km/h. Sometimes if the speed limit is 80 km/h and the road is wide (a highway) and there is no traffic pressure, I feel the speed limit is less than what it is supposed to be" (P13, 26)

Another participant also mentioned that if the speed zone is 60 km/h and there are no suburbs around it, and if the road is 15 to 20 metres wide and there are walls around the road, then the speed limit should be higher, such as 80 km/h:

"Participant: speeding means exceeding legal speed limits. Although I think sometimes it is supposed to be lower or higher.

Researcher: when do you think it is supposed to be lower and when do you think it is supposed to be higher?

Participant: I think it is lower from my experience in driving in Riyadh city; for example, in residential areas the road width ranges between 15 to 20 m and the speed limit is low and they are outside residential areas with walls around the road border. So, for example, the speed limit can be 80 instead of 60 km/h.

However, the speed limit in some highways is 140 km/ h. I think it is too high and it can be 120 km/h which is safer" (P11, 30)

Another participant mentioned that speed zones of 80 km/h can be driven at 100 km/h, but depending on the conditions, and if the road was wide or if he was late for a commitment, he drives at 90 km/h:

"Participant: sometimes the roads are wide with low traffic and you get surprised that the speed limits are 80 or 70 or even 60 km/h sometimes.

Researcher: for example?

Participant: the speed limit should be approximately from 90 to 100.... If I have a commitment or time is short for me, I don't exceed the speed limit to reach a crazy speed limit…

Researcher: do you mean above 100?

Participant: I mean at speed limit of 80, even though I can comfortably drive at 100 easily, I drive at 90 but I do not try to exceed it to 120 or 130 km/h which I consider a dangerous speed" (P2, 32)

In addition, the phrase "did not put the correct speed limit" was used to describe the speed limit in a similar context by another participant, in a speed zone of 80 km/h. He said the speed limit could be higher:

"Participant: in some roads of SA I think the speed limit is unfair. I mean they did not put the correct speed limit for such roads. One day while I was driving with my friend and I argued with him as he told me that I was speeding and that I should follow the speed limit of 80 as shown in the signs, but although

the speed limit is 80 km/h, you can increase your speed to above 80 km/h"

(P13, 26)

Sub-theme #3: Not to speed inside cities or residential areas

Some participants (35.71%) indicated that crowding or residential areas or inside cities are all obstacles for speeding:

"I don't think that you have the chance to drive fast inside the city" (P14, 24)

"If the road is wide with 5 lanes from a city to another without residential areas…" (P6, 35)

"...the roads width ranges between 15 to 20 m and the speed limit is low and they are outside residential areas with walls around the road border" (P11, 30)

"Speed limit depends on the driver's location…. Inside cities speeding will be dangerous to the driver and to others in all circumstances. But if the driver is driving on a highway and he has an important condition, it is ok to speed" (P11, 30)

"I can exceed the speed limit by 5 or sometimes 6 km/h... but speeding more than this is so dangerous ... speeding depends on the road and crowding. In my opinion, as the speed limit is low, exceeding speed limit will be more dangerous; as in inside city streets when the speed limit is 60 and you exceed it by 5 km/h it will more dangerous than exceeding the speed limit by 5km/h on a road of 120 km/h speed limit" (P5, 31)

"Also, residential areas have effects' (P13, 26)

Sub-theme #4: Speeding in emergencies

Most of the participants (71.42%) claimed that it is acceptable to speed in emergencies such as taking a person to a hospital or receiving a call about a sick relative in hospital. Only a few of them mentioned that speeding in emergencies is acceptable for authorities such as an ambulance or firefighters:

"In death cases…. A family member was in a critical case in the hospital …" *(P1, 28)*

"Yes, ……. Emergency circumstances like an urgent need of a hospital" (P2, 32)

"An urgent health case …" (P3, 28)

"In my opinion in emergency situations which occur to anyone with a critical health condition and he needs to reach a hospital, speeding is quite acceptable" (P5, 31)

"Yes, it may be an emergency medical case" (P7, 33)

"If on a highway and the case is highly urgent, I think the driver may exceed the speed limit as the case is critical such as the urgent need of a hospital … for example if there is an injured person in another place and I need to reach him urgently, I think speeding is acceptable in such a situation" (P12, 33)

"An emergency case occurred to me where I was in the south and at that time there were no traffic signals or speed signs (.. He laughs). I remember I was driving fast. There was fog and I couldn't see, so I had to reduce speed until I reached the hospital…. The emergency situation psychologically affected me and the passengers also affected me by encouraging me to hurry. I tried to increase my speed and to control the car but I couldn't" (P13, 26)

"To be honest with you I don't see exceeding the speed limit as acceptable behaviour, but you know sometimes a person can have an urgent circumstance which forces him to speed such as emergencies or sickness or even hearing bad news about his family or his friends, so he can exceed the speed limit unintentionally" (P14, 24)

"...but I consider exceeding the speed limit is acceptable for special governmental cars' (P1, 28)

"For emergencies such as rescuing a patient, ambulances and fire fighters can have an exception" (P4, 36)

An opposite opinion about emergencies was claimed by one participant as putting yourself in a more dangerous situation but, to some extent, he considered an emergency as an acceptable reason for speeding:

"I think speeding is always dangerous… but there are some conditions such as an ambulance or critical health conditions…. Although speeding will expose you to danger, but it is to some extent acceptable" (P8, 37)

Sub-theme #5: Bored from long distance roads while travelling

This sub-theme includes statements of some participants (35.71%) who claimed that they did exceed the speed limit on long-distance roads or during travelling:

"I drove on long roads between cities. This made me bored as I wanted to reach my destination. So, I had to speed up. I exceeded the maximum speed limit. For example, if the maximum speed limit as 120 km/ h, I drove up to 130 km/h which is not a fatal speed" (P1, 28)

"If I was traveling by car" (P2, 32)

"The Riyadh-Qassim-Madinah highway has three or four lanes. It is a straight road with no curves, so this kind of road makes you bored and there is nothing to do, so you speed a little bit to finish it" (P4, 36)

"When I was a teenager, I travelled a lot by car. I used to drive at 140- 160 km/h speed, so this is a crazy speed limit, but now I've become quite afraid of fast driving (he laughs)" (P5, 31)

"When traveling" (P9, 37)

Sub-theme #6: Speeding in a hurry

The majority of participants (71.42%) mentioned that speeding can be acceptable or that they have, in the past, exceeded the legal speed limit under specific circumstances, which included being in a hurry to get to appointments such as job interviews, or to catch a flight, meet a work deadline time, or for ceremonies. In addition, a few of them claimed that being in a hurry can be related to arriving early for work and finishing tasks to go back home earlier. The types of situation that make them be in a hurry include:

"In the case of family circumstances, catching a plane or being late for an important appointment for a job" (P2, 32)

"If I am late for work, I exceed the speed limit; and sometimes I just want to arrive early" (P3, 28)

"If you have a specific personal appointment you want to reach such as a family ceremony or a social occasion, or you have a job interview and you want to make it, I think speeding is acceptable in such a situation" (P4, 36)

"... Job interview appointment" (P4, 36

"...and if I were late for an appointment" (P9, 37)

"The only one time in which I madly exceeded speed limit and I regret for it till now but thanks to Allah nothing bad happened at that time when I was driving from Makkah to Obhur just for a party with friends' (P5, 31)

"I think causes are different when you wake up late for work and you are in a hurry to get to work" (P6, 35)

"It can be an important interview or being late for a job" (P7, 33)

"When we are late for work…

Researcher: late…

Participant: late for something even if we control our driving and know there will be dangerous consequences, speeding is unavoidable in this case" (P8, 37)

"Yes, being in a hurry" (P9, 37)

"As I want to return early, I must return early, arrive early, do what I need to do and return back" (P9, 37)

"The second condition when I am late to an appointment or to something" (P10, 30)

"There are a lot of people who I know, and I am one of them, do not want to arrive before an appointment and we prefer to arrive just on time. This is one of the reasons that makes speeding very common in SA from my own perspective" (P14, 24)

Sub-theme #7: Speeding and the traffic volume

This sub-theme considers the high traffic volume as an obstacle for speeding. Traffic volume was mentioned by some participants (28.57%) as having an effect on speed limit choice in two situations. The first situation was the crowding of the traffic (i.e., when there is no traffic congestion, speeding is possible). Second situation was the speed of the other cars or the free flow of the traffic. It was found that both of the aspects led drivers to speed.

"I drive on the road and I exceed the maximum speed limit by 5 km/ h (my speed is 125, 120, 125km/h) because I feel uncomfortable if I drive a bit slower than the other drivers. I consider 120, 125 km/h the maximum speed limit to me (within the permitted range of speed); so, as to avoid a traffic fine in SA" (P5, 31)

"I can exceed the speed limit by 5 or sometimes 6 km/h… but speeding more than this is so dangerous … speeding depends on the road and crowding. In my opinion, as the speed limit is low, exceeding the speed limit will be more dangerous; when on inside city streets when the speed limit is 60 and you exceed it by 5 km/h it will be more dangerous than exceeding the speed limit by 5km/h on a road of 120 km/h speed limit" (P5, 31)

"When the road is empty" (P3, 28)

"Participant: sometimes exceeding the speed limit is acceptable on roads of 60 km/h speed. So, exceeding the speed limit up to 80 km/h is not dangerous. It depends on the road type and the heavy traffic.

Researcher: this means according to the road type.

Participant: I see no problem if the speed limit is 40 km/h and you drive up to 60 km/h. Sometimes if the speed limit is 80 km/h and the road is wide (a highway) and there is no traffic pressure, I feel the speed limit is less than what it is supposed to be" (P13, 26)

Another participant talked about the effect of traffic density at night. He mentioned that, during night time, speeding is possible because there are no cars on the roads:

"For example, at a late time at night while the street is empty and no one is driving I think speeding is acceptable" (P14, 24)

Sub-theme #8: Speeding and emotional factors

A few participants (14.28%) mentioned that anger and escaping from psychological problems might be factors that led them to speed in the past:

"If a person is angry or nervous, he may exceed the speed limit" (P3, 28)

"Speeding possibly is an escape from psychological problems' (P4, 36)

Sub-theme #9: Curiosity and take risks (28.57%)

Being curious to try speeding or trying to drive a new vehicle were mentioned as reasons for speeding at a young age. Furthermore, one participant mentioned that taking challenges or trying to reach his destination in less than the standard time was a reason for speeding when he was young. He mentioned that it was "a challenge" to share with peers. Each circumstance has been illustrated via the following quotes:

"When beginning to learn to drive, one can exceed the speed limit for curiosity" (P3, 28)

"Participant: Ten years ago, in Alhada road it could be an adventure.

Researcher asks: adventure?

Participant: speeding and controlling the car at the same time. I drive and then I tell my friends that I reached my destination in about 15 minutes' (P3, 28)

"Challenge" (P4, 36)

"... trying a new car with a big engine. I would like to try its strength and speed" (P4, 36)

"Some people do not like speeding unless there is another passenger with him… only to show him that he is able to drive speedily" (P14, 24)

Sub-theme #10: Vehicle factors

Vehicle condition was reported by some participants (35.71%) as a factor to make them feel safer in driving; thus, they would feel more confident to speed:

"When I drive a new car, I mean the model of the current year or a car with new tires and brakes ... these things make you feel safe" (P3, 28)

"... trying a new car with a big engine. I would like to try its strength and speed." (P4, 36)

".. It is not dangerous if I exceed the speed limit; I mean if I drive at 120 or 130 km/h speed, it is not dangerous if there is no problem with the car's condition" (P6, 35)

"It is true, even if the driver is very confident of his driving ability, he cannot guarantee the car's condition" (P8, 37)

"It depends on the car's condition" (P13, 26)

Sub-theme #11: Weather and driving time

This sub-theme focuses on the relationship between weather, driving time, and the clarity of vision in driving. A few participants (21.42%) mentioned factors including weather and time of day as affecting their driving. A participant claimed that daytime enables better visibility on the roads, and that can affect his choice of speed, which leads to having a positive influence on speeding:

"And, of course, in the day time when the vision is clear, I don't think it is dangerous' (P6, 35)

Dusty weather or fogs were mentioned as barriers that reduce the visibility in driving and influence the choice of speed negatively:

"... If the weather is dusty or foggy" (P3, 28)

One participant said that hot weather has a positive effect on speeding, which can lead to him driving fast because of the loss of control when feeling hot:

"The hot weather in SA and in other gulf countries is the major cause of speeding as it causes the driver to lose his temper and driver faster and faster than the speed limit" (P4, 36)

Sub-theme #12: Ageing

Ageing or getting older was mentioned frequently as a factor that influenced participants' current view of speeding. Some participants (28.57%) talked about the

relationship between maturity and speeding; they currently perceived themselves as more mature, but mentioned that they were more likely to speed in their teenage years or when they were young. For some of them, they claimed as they got older, they became more conscious about the dangers of speed:

> *"I feel that maturity definitely increases, the standard of feeling of responsibility also increases, …. Everything increases. As I have reached the age of 30, I feel that I actually drive according to the legal speed" (P1, 28)*

> *"I used to exceed the maximum speed limit during adolescence, but after an accident occurred for one of my close friends (may Allah bless his soul) who died as a result of a car accident, I decided not to exceed the maximum speed limit at all" (P3, 28)*

> *"I used to exceed the maximum speed limit more than ten years ago when I was young as I started to learn to drive a car" (P3, 28)*

> *"As a teenager, unfortunately, I was driving fast, but I know of someone close to me who died (God bless his soul) in the car accident, it is impossible, impossible I exceed speed the legal speed limit" (P5, 31)*

> *"I was travelling by car a lot, I was driving at a speed limit of 140-160 on the road, so this is the crazy speed limit I drove as a teenager, but now I've become very conscious (laughing)" (P5, 31)*

> *"I used to exceed the maximum speed limit as an adolescent (he laughs!!). It is rashness (he laughs!!)" (P8, 37)*

Sub-theme #13: Road safety enforcement and awareness of speeding harmful consequences

Road safety enforcement also has an influence on the participants. Many participants (42.85%) stated their recognition of the importance of complying with the legal speed limit and the harmful consequences of exceeding it.

"I strongly believe it is dangerous… when the government authorities decided the maximum speed limit, they didn't decide absurdly. They decided it according to deliberate considerations of the potential occurrence of accidents' (P1, 28)

"I believe that most of the accidents in SA, let us say 99% .are caused by speeding; in addition, the reason for this is because of a lack of commitment with the legal speed limit" (P1, 28)

"The spread of traffic cameras of the SAHER system and traffic fines now applied in SA made drivers to some extent abide by the regulations…. It is good to see that… may be different cultures. People used to learn and to take care. Also, the awareness campaigns of the Ministry of Health and from traffic authorities are necessary and I hope they will change behaviour in SA, as speeding in SA is the number one killer" (P6, 35)

In addition, they realised the importance of road safety enforcement which was perceived as a good initiative for increasing awareness about speeding or reducing the crash rate. For example, they claimed:

"We used to take care of the maximum speed limit and drivers became cautious only after traffic cameras were installed and after traffic fines were imposed on traffic regulation violators' (P9, 37)

"Yes of course, exceeding the legal speed limit is dangerous… the researcher: why? Participant: for example, before versus after the experience of the

SAHER system, the last statistics, I cannot remember the numbers, but was showed the number of fatalities and disabilities as a result of car accidents … so, of course speeding is dangerous and the cause of most accidents was speeding" (P11, 30)

"Yes, exceeding the legal limit is considered dangerous; the legal speed limit has been mandated only for safety purposes' (P12, 33)

"If I see the posted speed limit sign exceeded, exceeding the posted limit will be dangerous. If the camera or the sign shows the figure "100" which I consider adequate, exceeding the legal speed limit is certainly dangerous… it is certainly dangerous' (P13, 26)

A few participants (21.42%) claimed they do not speed so as to avoid being fined or to get a lower fine amount if they were to be caught speeding:

"Even if the government showed "60" as the legal speed, I should drive at 55 km/h speed to avoid traffic offence" (P1, 28)

"If the speed is exceeded by less than 25 km/h, the traffic fine will be 300SAR, and if it is more than 25 km/h, the traffic fine will be 500SAR". So, I try to remain within the first option to get 300SAR fine" (P2, 32)

"If there is no police (he laughs) …, no monitoring …" (P3, 28)

Sub-theme #14: Previous crash history

Previous involvement in crashes, either for the participants themselves or someone they knew, was mentioned by only a few participants (14.28%) as a factor which led them to view speeding as a dangerous behaviour:

"Because I had a car accident" (P1, 28)

"..because of friend's death as a result of a car accident" (P5, 31)

4.3 STUDY 1: DISCUSSION

4.3.1 Speeding definition/context

Study 1 was conducted to identify speeding scenarios from Saudi drivers' perspectives. After completing the conceptual content analysis, two main themes emerged: "legal/technical and attitudinal definitions of speeding" and "speeding factors". The theme "speeding factors" included 14 subthemes in terms of potential factors that may make speeding more or less likely. As mentioned before, the results are generally interrelated, leading to the development of four speeding scenarios.

However, it is worth mentioning that not all the data contribute to forming the speeding scenario/s below. There are some factors reviewed that are included, while others are excluded. As mentioned previously in this chapter, defining the behaviour is based on the TACT principle. The development of both an action and context for the scenarios were based on the frequency of different responses. In constructing the speed scenarios, it was important to represent a reasonable range of sub-themes while not including those which were mentioned by only a small number of participants. When the spread of the responses was considered, it was decided that only sub-themes mentioned by 5 or more participants would be included which was equivalent to 30% or more of the responses. The resulting scenarios and the factors represented within them were also supported by evidence from the previous literature on speeding. The main focus of this study was to develop the speeding scenarios to be used for subsequent studies in the program of research and to answer the research question, "How do Saudi men define speeding from their own point of view (to identify specific speeding scenario/s)". The four speeding scenarios that were developed are outlined

next including discussion about how they were devised in terms of decisions about what factors to include and exclude.

The scenarios devised for use in the subsequent study (Study 2) in the program of research included the following:

Scenario 1: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

 Scenario 2: "Assume that you are driving alone on a multi-lane, 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 3: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4: "Assume that you are driving alone on a multi-lane 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Included variables

The first theme, "Legal/technical and attitudinal definitions of speeding", resulted from the responses to the first question about the definition of speeding. The majority of participants (42.85%) gave the legal/technical definitions of speeding. They discussed exceeding the posted speed limit of a road. Only a few of them (21.42%) gave a definition from their attitude, representing a personal assessment of speeding as a behaviour. Such participants gave the definition of speeding according to their assessment of their ability to control the speed. The remaining participants (28.57 %) gave both definitions – the legal and the attitudinal definitions of speeding.

To identify the meaning of speeding according to the Saudi participants, the frequency of responses was calculated. The legal/technical definitions were frequently mentioned (42.85%). Most of the participants defined speeding in a spontaneous, clear and direct way. It seems that the participants were aware of the meaning of speeding from a legal point of view. Just over a quarter (28.57%) of participants claimed both legal and attitudinal definitions. The "exceeding the legal speed limit" was perceived as a most frequent response in terms of the definition of speeding. There are similarities between the definitions expressed by the participants in this study and the previous studies described by Horvath et al. (2012) and Silcock (2000). This finding had important implications for developing the speeding scenarios. It can explain the "action" of speeding, which was assumed to be defined as "exceeding the posted speed limit" of a road. The first part of the speeding scenario was thus developed as illustrated in the text box below:

Scenario 1: "Assume that you are driving ……….. you are exceeding the posted speed limit."

The second theme "speeding factors" included 14 subthemes that mainly shaped the context of speeding in terms of when and where it was happening. Among the 14 subthemes, six subthemes were excluded from forming speeding scenarios because mainly they were not specific enough to comply with the required TACT aspects. The excluded factors included subtheme #5 "bored from driving long distance" (35.71%), subtheme #3 "not speeding in cities or residential areas" (35.71%), subtheme #4 "speeding in emergencies" (71.42%), subtheme #8 "speeding and emotional factors" (14.28%), subtheme #9 "curiosity and taking risks" (28.57%), subtheme #12 "ageing" (28.57%), subtheme #13 "road safety enforcement and awareness of the harmful consequences of speeding" (42.85%), and subtheme #14 "previous crash history" (14.28%). In contrast, the remaining subthemes contributed to the development of the content of the speeding scenarios. The following section explains the role of the included subthemes in developing the speeding scenarios, followed by the excluded subthemes just mentioned and the justifications for removing them.

Another two subthemes were included in the speeding scenarios aside from "exceeding the speed limit". These included subtheme #1 "speeding on highways (speed zones 110 km/h or above)" and subtheme #2 "speeding on multi-lane roads (speed zones ranged from 40 km/h to 80 km/h)" which were identified by 42.85% and 28.57% of participants respectively. The participants could relate to speeding occurring on such road types. They used some phrases that reflected their reasoning for speeding on such roads, such as *"not a fatal speed",* which means that they felt it was not dangerous to speed on a highway with a 120 km/h speed zone. Another participant had a more detailed opinion about highway roads. He related his opinion

to driving a vehicle in good condition on a wide, five-lane highway with a posted speed limit of 120 km/h, outside residential areas. He also perceived exceeding the speed limit by 10 to 20 km/h above the 120 km/h limit as not causing a problem.

This finding is consistent with Al-Turki's study (2014) who focused on reviewing the application of the Road Safety Action Plan in SA. He claimed that the action plan is not adequate in terms of increasing young drivers' awareness and reducing their speeding on the highways. Furthermore, from a global perspective, this argument could be supported by speeding-focused studies from Australia (e.g., Fleiter & Watson; Horvath et al., 2012, 2006). Such studies found that drivers were more prone to speed in higher speed limit zones, such as 100 km/h zones or on highways.

For subtheme #2 "speeding on multi-lane roads (speed zones from 40 km/h to 80 km/h)", the participants mainly talked about 80 km/h speed zones. A participant stated that one can drive at 100 km/h in an 80 km/h speed zone because of the width of the road. He seemed to consider such speeding as acceptable. Furthermore, he related it to certain situations such as running late for a commitment and, in such situations and on these roads, he would drive at 90 km/h.

Another participant used the word *"unfair"* to reflect his opinion about the speed limit of 80 km/h. He said that the speed limit in these areas should be higher. A possible explanation of these results is that all speed zones mentioned in the statements shared the same road design. They were all wide, multi-lane roads for the two sub-themes. Highways (120 km/h), or "urban expressways" according to the Highway Design Manual (2005) in SA, are all multi-lane roads. Roads with speed limits from 60 km/h to 90 km/h are called urban arterial roads and can have more than two lanes. To support this assumption, speeding on highways or motorways could also be due to other road characteristics mentioned previously. According to a study in Scotland, road

characteristics such as straighter roads with fewer pedestrians and less stopping required make driving more predictable for drivers; therefore, speeding was very common and acceptable in such situations (MacMillan & Hewitt, 2008). In SA, a previous study conducted to identify the causes of crashes, found that both straight and wide roads were associated with a number of crashes (Nofal & Saeed, 1997).

It was, therefore, deduced that the width of multi-lane highways or urban arterial roads encouraged speeding. By integrating the influencing factors of speeding of the two subthemes, this approach represented the vast majority of the participants' opinions. Regardless of the percentage difference between the two subthemes of different speed zones, these factors were given more attention in developing the speeding scenarios. The highway road from the first subtheme was included in speeding scenarios and the most mentioned speed zone in the second subtheme (80 km/h) was also included in the study scenarios. The maximum speed limit on urban roads in SA, according to the WHO Global status report on road safety (2018), is 80 km/h. Thus, studying the salient beliefs of drivers about 80 km/h zones that are considered urban roads (ignoring the highways considered rural roads) would make the results of this program of research more comprehensive and relevant for Saudi drivers. Thus, two speed zones were included as a basis for two different speeding scenarios. Both shared certain factors even though the speed limit differed. Specifically, both referred to driving on wide and multi-lane roads in addition to the aforementioned definition of speeding as "exceeding the legal speed limit". Thus, these aspects were added to the scenarios which were extended from the first iteration noted earlier to read as follows:

Scenario 1: "Assume that you are driving ….. on a multi-lane highway …… you are exceeding the posted speed limit."

Scenario 2: "Assume that you are driving ….. on a multi-lane 80 km/h road…… you are exceeding the posted speed limit."

Another important finding that had implications for developing the speeding scenarios was subtheme #10 "vehicle factors". This sub-theme included 35.71% of responses. A good condition vehicle was found to encourage speeding by making drivers feel safer. They defined "a good condition vehicle" as either a new car, or a car with new tyres. The condition of a car was also considered an important factor in a number of other studies (e.g., Fleiter, 2010). A study in SA showed that a new car could encourage speeding (Nofal & Saeed, 1997). Thus, the vehicle being in a good condition was therefore added to the scenario descriptions as follows:

Scenario 1: "Assume that you are driving ….. on a multi-lane highway …….your vehicle is in good condition…..… you are exceeding the posted speed limit."

 Scenario 2: "Assume that you are driving ….. on a multi-lane 80 km/h road …….your vehicle is in good condition…..… you are exceeding the posted speed limit."

Subtheme #7 "speeding and traffic volume" was also used in devising the content of the scenarios. This subtheme represented 28.57% of the responses. The most important point was that drivers tended to adjust their speed according to the flow of traffic. Roads with heavy traffic reduced the chance of speeding. In addition, some participants stated that the flow of traffic affected their speeding decision. For example, one participant described speeding as *"uncomfortable"* if he was driving a bit slower than other cars:

It can be assumed that higher traffic volume is the opposite of free-flowing roads. As a result, it seems that free-flowing roads are a factor that leads to speeding. According to the literature, a lower density of traffic causes free-flowing roads, which

can be associated with speeding behaviour (Conner et al., 2003; Fleiter, 2010; Lewis et at., 2010; MacMillan & Hewitt, 2008). Even though this subtheme has a low percentage in terms of those who reported it or not meeting the minimum percentage, it is supported by much of the extant literature and was, therefore, considered an important factor to be included in the speeding scenarios:

Scenario 1: "Assume that you are driving ….. on a multi-lane highway and traffic is free-flowing………..your vehicle is in good condition…..… you are exceeding the posted speed limit."

 Scenario 1: "Assume that you are driving ….. on a multi-lane 80 km/h road and traffic is free-flowing………..your vehicle is in good condition…..… you are exceeding the posted speed limit."

Subtheme #6 "speeding when in a hurry" was an important factor that many participants reported (71.42%) and was included in the two speeding scenarios. The participants generally referred to their speeding as occurring in specific situations including two main types of situations; namely, being in a hurry to arrive home early and being in a hurry to make an appointment. The main appointments that were mentioned included job interviews, ceremonies, catching a flight, and making it to work on time. Reaching their destination on time seemed to be more important than the possibility of any negative consequence that may have occurred from speeding.

In addition to the high endorsement of this subtheme, various studies in the literature in SA and globally found that drivers justify speeding due to instances of time-related pressures such as being late or being in a hurry (Fleiter, 2010; Hassan, 2016; Horvath et al., 2012). Thus, including these two aspects in the speeding

scenarios seemed to be important. They were included in two separate scenarios for each road type (the highway and the 80 km/h road):

Scenario 1: "Assume that you are driving ……. on a multi-lane highway and traffic is free-flowing. ……. your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 2: "Assume that you are driving ……. on a multi-lane 80 km/h road and traffic is free-flowing. …….your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 3: "Assume that you are driving ……. on a multi-lane highway and traffic is free-flowing. ……. your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4: "Assume that you are driving ……. on a multi-lane 80km/h road and traffic is free-flowing. …….your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Weather conditions were considered an important factor that affects drivers' behaviour worldwide. Very few participants talked about weather conditions and speeding (21.42%) under subtheme #11 "weather and driving time". The low reporting of the responses might be related to the general weather conditions in SA. It is mostly clear and sunny throughout the year, except during changes in seasons which are rainy for limited time, dust storms or fog. Dust and fog were mentioned in a study on SA as

barriers to driving (Hassan, 2016). However, it was found that most crashes occurred on dry and sunny days (Nofal & Saeed, 1997). Regardless of this contradiction, it was considered important to hold constant this aspect of the driving environment in the scenarios; thus, it was noted that driving was occurring in good weather with clear vision. Good weather conditions have been indicated previously as a factor that leads to speeding (Conner et al., 2003;Lewis et at., 2010; MacMillan & Hewitt, 2008). Therefore, the scenarios were updated further to incorporate this aspect and read as follows:

Scenario 1: "Assume that you are driving ……. on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

 Scenario 2: "Assume that you are driving ……. on a multi-lane 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 3: "Assume that you are driving ……. on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4: "Assume that you are driving ……. on a multi-lane 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in

good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Driving alone or "solo driving" was found to be related to an increase in speeding behaviour (Fleiter, 2010; Horvath, 2009). It was included in some speeding scenarios in different studies that applied the TPB on speeding (e.g., Horvath, 2009). Even though this factor was not mentioned by the participants of this study, it was found to be important and thus again was considered a potentially important aspect to hold constant in the speeding scenarios. Thus, as the final factor added to the scenarios, the scenarios were devised in full as follows:

Scenario 1: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 2: "Assume that you are driving alone on a multi-lane 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 3: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4: "Assume that you are driving alone on a multi-lane 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Excluded variables

Not all sub-themes that emerged were used in developing the details of the specific speeding scenarios. Overall, there were nine sub-themes excluded (in that they were not incorporated into the speeding scenarios) and these were sub-theme #3 "not to speed inside cities or residential areas" (35.71%) subtheme #4 "speeding in emergencies" (71.42%), sub-theme #5 "bored from long distance roads while traveling", sub-theme #8 "speeding and emotional factors" (14.28%), sub-theme #9 "curiosity and taking risks" (28.57%), sub-theme #12 "ageing"(28.57%), sub-theme #13 "road safety enforcement and awareness of the harmful consequences of speeding" (42.85%), and sub-theme #14 "previous crash history" (14.28%).

Three of the subthemes represented unmodifiable factors, thus, they could not be used in developing specific speeding scenarios. They included sub-theme #12 "ageing"(28.57%), and sub-theme #13 "road safety enforcement and awareness of the harmful consequences of speeding" (42.85%), and sub-theme #14 "previous crash history" (14.28%).

For the sub-theme #12 "ageing", many participants clarified that as they have become older, they have become more concerned about adhering to the speed limit and have become more committed to abiding by the legal speed limit, unlike when they were younger. This factor is well known in the road traffic safety field. Previous studies conducted in countries such as Australia and Scotland found that young drivers

were more likely to engage in speeding or risky driving behaviour than older drivers (Horvath et al., 2012; MacMillan & Hewitt, 2008). Nevertheless, ageing is an unmodifiable risk factor. There was a similar issue with subtheme #14 "previous crash history" (14.28%). For participants who had previously been the driver of a vehicle involved in a car crash. It is also an unmodifiable factor which may keep drivers committed to legal speed limits on the road because of their bad experience.

The sub-theme #13 "road safety enforcement and awareness of the harmful consequences of speeding" reflected that there is some degree of awareness about the importance of road safety enforcement in preventing speeding and the dangerous consequences of speeding. This result is not unexpected. As discussed in Chapter 1, knowledge of road safety is common in SA. However, drivers tend not to act according to this knowledge (Al-Khaldi, 2006; Al Turki, 2014; Mansuri et al., 2015). Such awareness might explain why, in response to the interview's first question, most definitions of speeding provided were based on a legal perspective. Increasing awareness of the speed enforcement system is positive; however, it is known that speed enforcement systems impact speeding behaviour and therefore it was a given that if a scenario manipulated the presence or absence of speed enforcement, it was already known that people would report not speeding when enforcement was said to be present.

The sub-theme #3 reflected a barrier for speeding behaviour, which was not to speed in residential areas or in cities (35.71%). Participants indicated that on such roads speeding is not possible or dangerous. This subtheme was perceived as a barrier to speeding. Nonetheless, it contributed to the knowledge about speeding barriers among participants. By making use of this knowledge, it was concluded that any speeding scenarios should not use residential roads as to do so would mean that participants would most likely report low intentions to actually speed in such

circumstances. The intent of this research was to understand the factors that influence speeding, and this factor was sought to be avoided when it comes to talking about scenarios where speeding may be more likely to occur.

Regarding sub-theme #4 "speeding in emergencies" (71.42%), according to TACT principle which is "time" because of the unpredictability of an emergency situation, it was not likely to be useful to have a scenario that said someone was in an emergency in the next following weeks or months (as, as noted, the TACT principle expects more specificity including time frame and it would be unlikely, fortunately, that most people would not have to deal with an emergency situation in the next couple of weeks).

Speeding when travelling long distances (i.e., sub-theme #5 "bored from long distance roads while traveling") was reported quite commonly by participants (35.71%). However, this subtheme was excluded because travelling as a behaviour was not of particular interest in the current program of research because the specific intent was to understand speeding in SA in general and in specific contexts. As mentioned in Chapter 1, most crashes occur in urban areas (The General Authority for Statistics, 2015). Another reason for excluding this subtheme was that travelling is a very broad topic that itself would require further investigations as to how to operationalise that within a specific scenario. The participants who referred to this subtheme also claimed that they felt bored from driving very long distances and outside the cities, which led them to speed to arrive at their destination quicker. "Being bored" when driving long distance might explain why some drivers are in a hurry and exceed the legal speed limit, even when appointments or emergencies are not involved. It seems that some drivers are less patient in following the legal speed limit during long-distance trips in general, regardless of whether they were travelling or not. For

this reason, it is likely that being bored is a factor underpinning being in a hurry for no specific reason which is included in developing the speeding scenarios. In addition, it might also explain the problem of speeding on highways as per subtheme #1, as this type of road is often used for travelling. However, the current program of However, the current program of research focused on speeding inside the city for this reason it was sought to exclude travelling and being bored sub-themes.

Sub-theme #8 "speeding and emotional factors" (14.28%) may be considered associated with more aggressive driving behaviour. The participants who stated this as a reason for speeding mentioned that they were angry or emotionally upset during that time. This sub-theme, however, was reported rarely by the participants and, as such, the decision was made to exclude this subtheme.

Regarding the sub-theme #9 "curiosity and taking risks" (28.57%), this aspect could potentially be used as an outcome behaviour (i.e., risky driving behaviour more broadly or perhaps aggressive driving more specifically) to be studied among SA drivers to identify salient beliefs motivating such behaviours. The participants mentioned this aspect as a reason for speeding, which can also be considered an aggressive driving behaviour and which can include driving with negative emotions or risk-taking (Dula & Geller, 2003). "Being curious" about how they would feel when speeding or taking a challenge to reach a certain destination as fast as they could were the main points mentioned. However, some of the participants mentioned these motivations for speeding in the past or when they were young drivers. It seems that this type of behaviour may have been more relevant to younger drivers, younger than 18 years of age, the age when they were training to drive and driving was a new experience for them. Thus, the decision was made to exclude this aspect given the intent of this research to explore speeding in a wider age range cohort. However, it

would be interesting to apply the extended TPB in a study of adolescents to examine the role of curiosity and risk taking on speeding as well in future studies to examine this sub-theme.

4.4   STUDY 1: STRENGTHS AND LIMITATIONS

As with all research, this study has some strengths and limitations. Considering its strengths, it added new knowledge about how speeding behaviour is defined from Saudi men's perspectives. The raw data were also obtained in the participants' native language (Arabic) so they could fluently express their opinions, views and impressions.

Regarding the study's limitations, the participants were highly educated (i.e., mostly PhD candidates) and cannot be considered a representative sample of the driving population in Saudi Arabia (SA). The effect of a non-representative sample would lead to bias that affects the generalisability of the results. That said, however, qualitative research does not seek to be representative but provides rich insights which, arguably, this study achieved. It is also possible that the participants gave socially desirable responses, especially given that the topic of discussion, speeding, is in fact an illegal behaviour. Giving socially desirable answers would lead to one of the most common biases that affect the validity of many research results. Safeguards were in place to assure participants of their confidentiality including the deidentification of any elements from transcripts which may have otherwise identified them. Thus, for such reasons, it could be anticipated that most participants felt comfortable discussing their experiences openly with the candidate. It could be argued that the sample size is small, though again this is a common feature of qualitative research. In addition, there was a risk of gaining data from participants who remained in Australia for one year which may have affected their opinions about speeding due to forgetting what their driving

experiences in SA had been and given that their most recent driving experience was based in a different driving context within Australia. However, it is worth noting that many of the frequent responses in this study were consistent with other findings from research conducted either in SA or internationally. For instance, the key elements of the scenarios were highway speed zones and being in a hurry, which have been previously found at both the national level in SA (e.g., Al-Turki, 2014; Hassan, 2016) and the global level (e.g., Fleiter, 2010; Fleiter & Watson, 2006; Horvath et al., 2012). Therefore, the similarities in findings with previous literature provide some assurance of there being a sound degree of validity in the study's findings. The candidate also intended to examine the study's results (the four speeding scenarios) in a subsequent study (i.e., Study 2), which would offer a further opportunity to refine and verify the findings from Study 1.

4.5 STUDY 1: SUMMARY AND IMPLICATIONS IN THE NEXT CHAPTER

In summary, the results of Study 1 highlighted that there are some interrelated factors leading to speeding. The factors were categorised under different themes and subthemes. Some of the results were included for developing the speeding scenarios and others were excluded. Each one of the themes and subthemes has been assessed according to its suitability to the TPB's TACT principle, frequency, and the amount of evidence supporting it.

Eight factors were included. The "action" of speeding was determined from the first theme "legal/technical and attitudinal definitions of speeding" as exceeding the legal speed limit. The second theme "speeding factors", which has several subthemes, mostly contributed to forming the "context" of the four speeding scenarios in this

study. They included subtheme #1 "speeding on highways (speed zones 110 km/h or above)", subtheme #2 "speeding on multi-lane roads (speed zones from 40 km/h to 80 km/h)", subtheme #6 "speeding when in a hurry", subtheme #7 "speeding and traffic volume", subtheme #10 "vehicle factors", and subtheme #11 "weather and driving time". One factor was added from the literature to add more clarity to the speeding scenarios: "driving alone".

The final scenarios devised and to be included for further examination in Study 2 of this research were as follows:

Scenario 1: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 2: "Assume that you are driving alone on a multi-lane, 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 3: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4: "Assume that you are driving alone on a multi-lane, 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in

good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

In the next chapter, Study 2 as the belief elicitation study is outlined including the findings with respect to participants' salient beliefs regarding factors influencing speeding in such scenarios. These salient beliefs were then to be used to inform the development of survey items for the surveys to be implemented in Study 3. Through applying these scenarios in Study 2, the goal is to test the scenarios and identify the value of examining them in Study 3.

Chapter 5: Study 2

In Chapter 4 four specific definitions of speeding from the perspective of Saudi drivers were devised based on findings from Study 1 of this program of the research. There were 14 participants individually interviewed to answer four interview questions which were purposefully devised to identify the definition of speeding from the Saudi perspective. Consistent with the extended TPB application's protocol, speeding behaviour was defined in specific scenarios. The manipulated aspects of the scenarios were speeding on multi-lanes roads for two speed zones include 80 km/h and highways (determined as 120 km/h). For each speed zone, there were two situations for speeding which were *in a hurry for no particular reason other than you want to reach your destination quickly,* and *in a hurry because you need to make a scheduled arrangement*. The scenarios also included some factors that encouraged speeding that were frequently mentioned by the participants and which included fine weather, clear visibility, and good car condition. As a result, these factors were combined to develop the following four scenarios:

Scenario 1: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 2: "Assume that you are driving alone on a multi-lane 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to

reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Scenario 3: "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4: "Assume that you are driving alone on a multi-lane 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Another important protocol when applying the TPB is to elicit the indirect beliefs for the aforementioned specific speeding scenarios. This belief elicitation study is the focus of Study 2. Specifically, Study 2 of this program of research sought to identify the behavioural beliefs, normative beliefs, and control beliefs underpinning speeding intentions in these different scenarios. In addition to this, each scenario was examined in terms of which one of them may best represent the most relevant speeding related contexts to the participants. To elicit these beliefs in relation to these scenarios of speeding, participants were asked about such aspects as the advantages/disadvantages of speeding, whether they have significant others who agree/disagree with speeding, and facilitators/barriers of speeding in each scenario. This current chapter includes details about Study 2, which will identify the indirect beliefs (indirect predictors) that will then be used in the Study 3 survey to examine the predictors of speeding intentions and behaviour.

5.1   METHODOLOGY AND RESEARCH DESIGN

5.1.1 Study 2

Study 2 was an exploratory qualitative study involving one-on-one semi-structured individual telephone interviews. This study contributed to addressing Research Question 2, "What are the key psychosocial factors that influence speeding behaviour?". The purpose of this study was to identify the most common, salient beliefs (indirect beliefs) to be used in developing items in the survey for Study 3 (quantitative self-report study), which, in turn, plays a major role in answering the main focus of this program of research; namely, identifying the key psychosocial factors that influence speeding behaviour. To analyse the beliefs, a critical beliefs analysis was used to identify the significant beliefs influencing intention to speed in Study 3.

According to the TPB protocol, Study 2 was a qualitative study for belief elicitation and which could be conducted with participants either in a group or via individual interviews (Ajzen, 2006). Conducting focus groups for belief elicitation studies is a commonly used method to study drivers' behaviours (e.g., Fleiter, 2010; Horvath, 2009); however, as the topic of speeding, an illegal behaviour in SA, is potentially sensitive, the participants may be tempted to give socially desirable answers when discussing such a behaviour in front of others. Thus, for this reason, it was decided to avoid focus groups and hold in-depth, one-on-one interviews instead.

In-depth, one-on-one interviews were previously recommended by Nelson et al. (2014) as a better way to conduct studies in SA to avoid obtaining socially desirable answers. There was a study conducted in SA in 2016 that was a belief elicitation study examining physical activity among adolescent women (Al-Harbi and Al-Harbi, 2017). Even when not relating to an illegal behaviour like speeding, the research used the in-depth, one-on-one interviews and they found the methodology proved useful for eliciting relevant beliefs. In addition, another reason for using one-on-one telephone interviews was to save the participants' time for attending the interviews, which is discussed further in the feasibility section later in this chapter.

5.1.2 Study 2: Setting of the study

The study was conducted among Saudis working/studying in King Khalid University Hospital (KKUH) in King Saud University in Riyadh. Each interview was conducted by the candidate. As has been noted previously, Riyadh city was chosen as a location of focus as it has the highest percentage of RTCs compared to other cities in SA and had an estimated 33.78% of the nation's crashes in 2015 (The General Authority for Statistics, 2015).

5.1.3 Study 2: Participants

A convenient sample of 20 participants was recruited. Theoretical saturation guided the decision as to when to stop recruiting participants. Theoretical saturation is the point at which there is redundancy in the data collected through the interviews (Saunders et al., 2018). The mean age of the participant sample was 28.2 years and ranged from 21 to 37 years. The educational level included seven participants with post-graduate degrees, 10 undergraduate students, and 3 participants who held diplomas. Overall, there were 5 students and 15 university employees. The years of driving experience ranged from 3 to 20 years, and the mean number of years was 11.85 (SD = 4.83 years). All drivers reported driving regularly in Riyadh city and there was no previous relationship between the candidate and the participant for all qualitative studies.

5.1.4 Study 2: Design and Procedure

Participants' recruitment and ethical clearance:

Ethical approval was gained from the Human Research Ethics Committee (HREC) at Queensland University of Technology (QUT Reference Number: 1800001167) and from King Saud University (Approval of Research Thesis Subject: No. E-19-3766). All of the participants were invited to participate in in-depth one-on-one telephone interviews through email invitation. The invitations were sent by staff

within KSU on behalf of the candidate. The contact details for the candidate were clarified in the invitations, including an email address; thus, anyone interested in participating in this study was able to contact the candidate directly. After the participants contacted the candidate, the time for the interview was arranged so as to be convenient for each participant. The details of the privacy and confidentiality of the participants was clarified in the Participant Information Sheet. The information sheet also stated that the audio-recording of the interviews was optional.

The audio-recorded data was stored securely, accessible only via password. Email addresses for participants who were interested in participating in this study or any further studies were also stored securely and separately to any of the recordings to ensure confidentiality of participants to protect their confidentiality.

Interview protocol

Participants were advised that the interview would take no more than 1 hour. In practice, interviews took between about 15 to 25 minutes. Like Study 1, Study 2 also featured in-depth interviews and these were conducted to give the participants enough time to express their opinions. In some instances, the interviews were relatively short and were so for potentially different reasons. First, the interview questions were provided to participants as part of the participant information, so it is feasible that some participants had reviewed this information and already were clear on what they intended to say. Second, some participants were keen to talk more than others and,

despite prompts, if the participants had addressed the questions as intended, there was not really any need to continue the discussion any further. The data collection process and analysis occurred from April 2020 to September 2020. After each interview, the recordings were transcribed verbatim by the candidate.

The interview protocol was adapted from Farooq (2015) as a guide for the telephone interviews (i.e., the process of the interviews). The interviews started with the candidate welcoming the participant and thus seeking to build rapport with each participant. Then, the candidate provided a brief reminder about the participant Information Sheet. Verbal consent was confirmed before the interview commenced and participants were asked for their verbal approval to be audio-recorded. In this study, 13 participants agreed to be audio-recorded. For those seven interviews where the participant chose not to be recorded, each participant was advised that the interview might take longer so as to allow the candidate some time for writing their responses.

While more notes were taken when there was not a recording, the candidate took brief notes for all interviews and reviewed them with the participants at the end of each interview to confirm the accuracy of the data. The candidate listened without interruption to the participants' responses. As these interviews conducted by telephone, it was very essential to use some communicational words such as "Ah", "ok" or "yes' to show the presence and understanding of the interviewer. As this interview was semi-structured with open-ended questions, if and as required, further questions were asked

for more clarification. As the interviews included discussion of beliefs relating to four speeding scenarios, it was also important to remind the participants of their responses being made in relation to each scenario to ensure that they understood there were differences between each scenario (so as to ensure they were aware the responses were being sought in relation to different scenarios and not merely repetition of the same scenario).

5.1.5 Study 2: Materials and Measurements

The telephone in-depth one-on-one interviews were guided by a semi-structured interview schedule. The questions used in the interviews were adapted from elsewhere (e.g., Ajzen and Fishbein, 1980; Horvath, 2009) (see list of items in Appendix B). Demographic data including age, years of driving experience, occupational status, level of education, and the city of residence were obtained via a brief self-report survey. The questions used for identifying the most common beliefs were asked in relation to four specific speeding scenarios. Similar to the approach implemented in Study 1 (as mentioned in Chapter 3), the questions were translated into Arabic by the candidate and validated by an accredited translation office, Lufta, in Riyadh.

5.1.6 Study 2: Analysis

Conceptual content analysis was applied to analyse the data based on the frequency of responses. Braun and Clarke's (2006) steps of analysis were applied.

After each interview, the researcher transcribed the recording, contributing to identifying general notes under each theme. The transcription was verbatim in Arabic. To increase familiarity with the data, the transcripts were reviewed and edited for typographical errors and any potentially personally identifying information was removed. Then the candidate identified the codes. Selection of the themes in this study was theoretically-driven in accordance with the TPB, and thus included the six themes of "advantages of speeding", "disadvantages of speeding", "significant others who agree speeding", "significant others who disagree speeding", "facilitators for speeding", and "barriers for speeding". This approach was also used so as to ensure that the candidate remained open to any new data that did not necessarily fit the six themes. Tables were used to categorise themes and sub-themes. There were six tables for each theme. All the potential data were identified and categorised under each sub-theme. The approach implemented was quite manual in nature and so, for instance, to count the frequency by number and percentages, it was the number of participants for the sub-themes in all tables, they were printed out and posted to a wall to make it easier for the candidate to follow and count them. After that, all statements were translated into English, categorised under specific sub-themes, and calculated via percentages. The translation was again validated by the official translation office, Lufta, in SA. The categorisation of sub-themes was validated by the discussion with a bilingual person

before translation into English and then discussed with the supervisory team after the translation into English.

5.2   STUDY 2: RESULTS

There were six themes derived from the three salient beliefs of the TPB. Two themes for each belief were drawn for each speeding scenario. The behavioural beliefs included the two themes of "advantages of speeding", and "disadvantages of speeding", while the normative beliefs included both "significant others who agree speeding", and "significant others who disagree speeding", and the control beliefs included "facilitators for speeding", and "barriers for speeding". Each of the themes had several sub-themes which represented the participants' responses. The sub-themes were mostly similar with only a few differences found between the four different scenarios. The following sections clarified a summary of these similarities and differences followed by a detailed outline of the study's key findings.

To simplify and help remember the different factors in each scenario, the names of the scenarios were assigned a relevant abbreviation. These abbreviations are used throughout the results and the discussion sections that follow.   For the abbreviations for each scenario, the focus was on the differences between them. Scenario 1 differs in speed zone (i.e., highway), which was abbreviated as "H", and also in the speeding situation (i.e., speeding for no particular reason), which was abbreviated as "NPR"; thus, the abbreviation for Scenario 1 was stated as H-NPR:

Scenario 1 (H-NPR): "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want

to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

Speeding Scenario 2 also differs in speed zone (i.e., 80km/h) which was abbreviated as "80", but includes the same situation as Scenario 1 (i.e., "NPR"); thus, the abbreviation for this scenario was stated as 80-NPR:

Scenario 2 (scenario 80-NPR): "Assume that you are driving alone on a multi-lane 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

In speeding scenario 3, again the speeding zone was the highway which was abbreviated as "H", however, the situation (i.e., speeding to make a scheduled arrangement) is different, and was abbreviated as "MSA":

Scenario 3 (scenario H-MSA): "Assume that you are driving alone on a multi-lane highway (120 km/h) and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Scenario 4 has the same speeding situation, that is, "MSA", however, it differs in the speed zone (i.e., 80 km/h or "80") and was therefore abbreviated to 80-MSA:

Scenario 4 (scenario 80-MSA): "Assume that you are driving alone on a multi-lane 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Prior to presenting the findings, it is important to note that each quote that is presented refers to participants only via an arbitrary participant number (i.e., guided by the order of interviews) and the participant's age. For example, "P1, 28" refers to Participant 1 who was 28 years of age. This notation enabled presentation of results to respect the privacy and confidentiality of the study participants.

5.2.1 Findings' similarities between scenarios

Overall, the majority of the responses were in the form of short statements or listed points. For instance, under the "advantages of speeding" theme, participant 8, aged 32 years, responded that an advantage was, "To meet the job deadline, and appearing professional, and save time". A general or overarching finding was that there was a similar pattern of responses across the four different speeding scenarios. Indeed, many participants responded to the respective questions for different scenarios as "same", or "all answers are similar across all scenarios'. When a participant said "same", the interviewer repeated the list of the scenarios to the participant to make sure the participant's responses remained the same, thus, helping to validate such results.

5.2.2 Findings in terms of differences between scenarios

One major difference between the four scenarios was that participants perceived their being limited motivation to want to speed in some of the scenarios. For

instance, for scenarios related to speeding for no particular reasons (i.e., 80-NPR and H-NPR), more participants said that they do not speed in that context or could not see any advantages to speed in these scenarios.

Also, some participants said that on 80 km/h speed zones (i.e., scenarios 80-NPR and 80-MSA) they do not speed and find it difficult to speed due to pedestrians. These claims were sought to be counted as a sub-theme under "advantages of speeding" theme. The sub-theme was called "at 80 km/h, speeding is difficult" and it clarified how some participants responded to this interview question. Furthermore, regarding "pedestrians" as a factor that cited to prevent speeding mainly on this speed zone was classified as a sub-theme under "barrier for speeding" theme for these scenarios as clarified later in this section.

Another difference in participants' beliefs was found for speeding scenarios on highways (i.e., H-NPR and H-MSA). For these scenarios, there was a higher proportion of responses in relation to the length of trips as a facilitator of speeding (15% of participants) than on 80 km/h roads which was reported by only one (5%) participant. The length of trips was classified as a "facilitator for speeding" that will be discussed further shortly. Table 4 outlines the key results of Study 2.

Table 4: Study's 2 results (content analysis percentages)

Themes/Sub-themes	Speeding scenarios			
	In a hurry for no particular reason		In a hurry because a scheduled arrangement	
	Scenario H-NPR (Highway) n (%)	Scenario 80-NPR (80km/h) n (%)	Scenario H-MSA (Highway) n (%)	Scenario 80-MSA (80km/h) n (%)
Advantages of speeding				
No advantages or does not speed	7 (35%)*	5 (25%)	2 (10%)	1 (5%)
Save time and arrive early	12 (80%)	9 (45%)	3 (15%)	1 (5%)
Reduce stress	1 (5%)	-	2 (10%)	1 (5%)
Avoid boredom	3 (15%)	-	-	-
Avoid any potential congestion	1 (5%)	1 (5%)	-	-
At 80 km/h, speeding is difficult	-	5 (25%)	-	5 (25%)
Avoid sleep	-	2 (10%)	-	-
Arrive on time or arrive earlier	-	-	6 (80%)	14 (70%)
Appear professional at work and avoid negative consequences	-	-	3 (15%)	2 (10%)
Disadvantages of speeding				
Accidents	18 (90%)	14 (70%)	20 (100%)	15 (75%)
Loss of control	5 (25%)	3 (15%)	5 (25%)	3 (15%)
SAHER and road traffic violations	8 (40%)	7 (35%)	9 (45%)	6 (30%)
Traffic problem	1 (5%)	1 (5%)	2 (10%)	2 (10%)
Causing harm to others	8 (40%)	7 (35%)	9 (45%)	10 (50%)
Car damage	4 (20%)	4 (20%)	5 (25%)	5 (25%)
Stress	-	-	6 (30%)	6 (30%)
Significant others agree with speeding				
No one	5 (25%)	11 (55%)	3 (15%)	8 (40%)
Wife	1 (5%)	1 (5%)	1 (5%)	1 (5%)
Friends	13 (65%)	9 (45%)	13 (65%)	10 (50%)
Brothers	3 (15%)	2 (10%)	3 (15%)	2 (10%)
Parents (father)	1 (5%)	1 (5%)	3 (15%)	3 (15%)
Work managers	1 (5%)	1 (5%)	1 (5%)	1 (5%)
Relatives	1 (5%)	1 (5%)	3 (15%)	3 (15%)
Significant others disagree with speeding				
Parents	11 (55%)	10 (50%)	15 (75%)	11 (55%)
Brothers	5 (25%)	6 (30%)	6 (30%)	6 (30%)
Friends	5 (25%)	5 (25%)	6 (30%)	6 (30%)
Wife	5 (25%)	4 (20%)	6 (30%)	4 (20%)
Sister	2 (10%)	2 (10%)	3 (15%)	2 (10%)
Children	2 (10%)	2 (10%)	3 (15%)	2 (10%)
Relatives	1 (5%)	1 (5%)	2 (10%)	2 (10%)
Grandparents and the elderly	1 (5%)	-	1 (5%)	-
Facilitators for speeding				
Road Width	2 (10%)	1 (5%)	2 (10%)	1 (5%)

Trip length	3 (15%)	1 (5%)	3 (15%)	1 (5%)
Traveling	4 (20%)	2 (10%)	4 (20%)	2 (10%)
No road congestion	10 (50%)	6 (30%)	12 (60%)	7 (35%)
Road quality	1 (5%)	-	1 (5%)	-
Good vehicle condition	4 (20%)	2 (10%)	3 (15%)	1 (5%)
Multi-lanes	1 (5%)	1 (5%)	1 (5%)	1 (5%)
Good weather	1 (5%)	1 (5%)	1 (5%)	1 (5%)
Safety Barriers	1 (5%)	-	1 (5%)	-
Songs and Shelah	3 (15%)	2 (10%)	3 (15%)	2 (10%)
No SAHER	4 (20%)	4 (20%)	4 (20%)	4 (20%)
Barriers for speeding				
SAHER	13 (65%)	10 (50%)	10 (50%)	12 (60%)
Psychological factors (e.g., thinking of their parents or children, thinking of the consequences of speeding, such as injuries and accidents, having previous road injury experience, the fear of causing harm to others, and the fear of loss of control)	13 (65%)	9 (45%)	9 (45%)	10 (50%)
Bad mood	2 (10%)	-	3 (15%)	-
Road congestion	4 (20%)	5 (25%)	3 (15%)	7 (35%)
Road factors (e.g. Buildings, shops, turns, signs, and bumps)	5 (25%)	8 (40%)	5 (25%)	8 (40%)
Sudden overtaking	1 (5%)	-	1 (5%)	-
Pedestrians	1 (5%)	6 (30%)	1 (5%)	6 (30%)

* The numbers and percentages that generated for each sub-theme reflect the number of participants who stated that belief for each speeding scenario.

5.2.3 Main themes

Theme #1: Advantages of speeding:

Sub-themes found across all scenarios

Regarding the theme, the "advantages of speeding", only a few beliefs were found. There were two main sub-themes found in relation to the different speeding scenarios. These included "no advantages or does not speed", and "save time and arrive early". The sub-theme "no advantages or does not speed", was mentioned across all speeding scenarios, but the number of participants who reported this advantage varied across the different scenarios. The "no advantages or do not speed" sub-theme was mentioned more in speeding scenarios H-NPR and ٨٠-NP than the H-MSA and ٨٠-MSA scenarios (35% of participants stated that there are no advantages to speeding

for no particular reason in scenario H-NPR and 25% with the same belief for scenario 80-NPR). The participants used different phrases in their quotes that had the same general meaning such as:

"No advantages' (P1, 28)

"If you do not have a job or an appointment there is no reason for speed" (P11,37)

"There is no advantage. No matter how soon you will not arrive in time. There is nothing worth sacrificing" (P10, 32)

"There are no benefits if someone exceeds the speed limit, otherwise you have a work appointment, so you can save your time" (P14, 27)

"No, because there is no necessity to exceed the speed limit so I will adhere to the road speed or below it and enjoy driving quietly" (P15, 22)

Regarding the H-MSA and 80-MSA scenarios, fewer than 10% of participants reported "no advantages or does not speed".

Save time and arrive early were perceived to be an advantage of speeding by at least some participants in all four scenarios. In particular, 80% of participants mentioned this advantage for the H-NPR scenario and 45% for the 80-NPR scenario:

"I arrive early" (P2, 32)

"Reach a destination faster" (P4, 28)

"Shorten the time" (P5, 30)

"Save time and arrive early" (P6, 30)

For scenarios H-MSA and 80-MSA, lower proportions of responses were found in relation to this sub-theme, with only 15% and 5% of participants mentioning it, respectively. However, the time factor was important for these speeding scenarios as well, but in the form of arriving on time or arriving earlier for an appointment. Many participants mentioned this aspect spontaneously when talking about the H-MSA and 80-MSA scenarios. For example:

"I will arrive on time" (P1, 28)

"It is arriving on the specified date or never miss the appointment" (P4, 28)

"Reach work" (P6, 30)

"Getting to the appointment" (P9, 29)

Arrive early" (P10, 32)

This advantage comprised the highest percentages of responses with 80% and 70% for the H-MSA and 80-MSA scenarios, respectively. Another sub-theme mentioned in relation to these scenarios was "appear professional at work and avoid negative consequences" which was mentioned by participants who were workers. The participants clarified that speeding to make a scheduled appointment was important for their career. This sub-theme was cited by 15% of participants for the H-MSA scenario and 10% for the 80-MSA scenario:

"Appearing professional, avoiding the drawbacks at work" (P3, 29)

"Appearing professional" (P8, 32)

"..to avoid delay and do the fingerprint signature" (P11, 37)

Sub-themes found for specific scenarios

Some sub-themes resulted a low number of responses. They included "reduce stress", "avoid boredom", "avoid sleep", "avoid any potential congestion", and "at 80 km/h speeding is difficult". "Reduce stress" was cited by a few participants for speeding scenarios including the H-MSA and 80-MSA scenarios, with 10% and 5% of responses, respectively. It was also mentioned by a participant for the H-NPR scenario (5%). Participants reported that they could feel less stressed when they arrive early for an appointment. In addition, several participants (15%) mentioned that they sped to avoid boredom in their responses for the H-NPR scenario. Furthermore, there was also 10% of participants who mentioned they speed to avoid feeling sleepy in relation to the 80-NPR scenario.

In relation to the H-NPR and 80-NPR scenarios, the sub-theme "avoid any potential congestion" was mentioned by one participant (P9, 29). He meant that he may speed if the road was free-flowing, in order to avoid any possible future road congestion resulting from spending more time on the road.

Another sub-theme raised by 15% of participants was perceived difficulty in speeding at 80 km/h speed zones (i.e., the 80-NPR and 80-MSA scenarios) due to pedestrians. For this reason, a separate sub-theme was added which was called, "at 80 km/h speeding is difficult". The participants mentioned some barriers under this sub-theme. Although the barriers were mentioned in response to the first question, they were listed as sub-themes under the theme "barriers for speeding" as they seemed conceptually better suited there.

Theme #2: Disadvantages of speeding:

In terms of the theme "disadvantages of speeding", there were eight sub-themes overall in relation to responses provided to all of the scenarios. Six of the disadvantages were mentioned in all scenarios and two were mentioned for only the H-MSA and 80-MSA scenarios. The disadvantages of speeding identified as sub-themes were "accidents", "causing harm to others', "SAHER and road traffic violations', "loss of control", "car damage", and "traffic problems". The highest proportion of responses was for the sub-theme "accidents", which were mentioned in more than 70% of all responses. For the H-NPR scenario, 90% of participants mentioned accidents as a disadvantage, while 70% did so for the 80-NPR scenario, 100% for the H-MSA scenario, and 75% for the 80-MSA scenario. The sub-theme "causing harm to others' was the next most frequent disadvantage mentioned, and was included in over 35% of responses, with 40% for the H-NPR scenario, 35% for the 80-NPR scenario, 45% for the H-MSA scenario, and 50% for the 80-MSA scenario.

Another sub-theme that had a high proportion of mentions was "SAHER and road traffic violations', as many participants spoke about the monetary punishments for a speeding violation as a disadvantage of speeding. Regarding the H-NPR scenario, 40% of participants mentioned this disadvantage, while 35% mentioned it for the 80-NPR scenario, 45% for the H-MSA scenario, and 30% for the 80-MSA scenario.

"Loss of control" was a disadvantage of speeding that was less frequently cited than the aforementioned disadvantages. The frequency with which this aspect was mentioned was the same for the H-NPR and H-MSA scenarios, at 25%, and the same for the two remaining scenarios (i.e., 15%). Car problems that might result from speeding was also a concern for some participants, as presented in sub-theme "car damage", with 25% of responses for the H-NPR and 80-NPR scenarios making mention of it, and 25% of responses for the H-MSA and 80-MSA scenarios referring

to it. The "traffic problems' sub-theme was mentioned by the lowest number of participants, with only 5% for the H-NPR and 80-NPR scenarios, and 10% for the H-MSA and 80-MSA scenarios.

The main differences in the perceived disadvantages of speeding between the H-NPR and 80-NPR scenarios, and the H-MSA and 80-MSA scenarios can be noted in the sub-theme "stress". This sub-theme was found among responses to the H-MSA and 80-MSA scenarios in 30% of responses. The participants claimed this as one of the disadvantages of speeding, stating that exceeding the speed limit makes them feel stressed after arrival. Some participants (30%) also indicated that speeding in an 80km/h speed zone is more dangerous than on the highway. In total, the beliefs elicited under "the disadvantages of speeding" were more than the beliefs elicited under the "advantages of speeding" across all scenarios.

Themes #3 and 4: Significant others agree with speeding and significant others disagree with speeding

In relation to the normative beliefs, both of the themes "significant others agree with speeding", and "significant others disagree with speeding" included similar groups of people as the identified significant others. Some participants perceived that their significant others agreed with their speeding while others perceived that their significant others disagreed with their speeding. These others included "parents", "friends', "wife", and "brothers".

Generally these groups of people were mostly perceived by the participants as likely to disagree with their speeding. For instance, over 50% of participants mentioned that their parents disapproved of speeding behaviour (55% for the H-NPR and 80-MSA scenarios, 50% for the 80-NPR sceneario, and 75% for the H-MSA scenario). Very few participants claimed that parents, and especially fathers, would

agree with their speeding (5% for the H-NPR and 80-NPR scenarios, and 15% for the H-MSA and 80-MSA scenarios).

"Brothers" were also mostly mentioned as disapproving of speeding by some participants, with 25% for the H-NPR scenario, and 30% for the remaining scenarios where these normative referents were mentioned. "Wife" had similar results to "brothers" in terms of their disapproval of speeding with values of 25% for the H-NPR scenario, 30% for the H-MSA scenario, and 20% for the 80-NPR and 80-MSA scenarios. One participant mentioned that his wife agrees with speeding across all scenarios.

In contrast, "friends" and "relatives' had the opposite finding with most participants indicating that they believed some friends would agree with them speeding (i.e., 65% for the H-NPR and H-MSA scenarios, 45% for the 80-NPR scenario, and 50% for the 80-MSA scenario). "Relatives" such as uncles and cousins were almost equal in their number of mentions in terms of whether they would agree or disagree with a participant's speeding, perhaps just slightly more likely to be considered as approving. Finally, "sisters" were only mentioned as disagreeing with a participant's speeding, with of 10% to 15% of responses mentioning them as a disapproving influence. "Grandparents' were mentioned by one participant for the H-NPR and H-MSA scenarios as disapproving of their speeding.

Theme #5: Facilitators for speeding:

Regarding the "facilitators for speeding", some beliefs were found. They included sub-themes that had already been clarified in the scenarios such as driving on "multi-lanes', in "good weather", and when one's vehicle was said to be in "good condition". The sub-themes "multi-lanes' and "good weather" were mentioned by only

one or two participants across all scenarios. However, regarding sub-theme "good vehicle condition", it was mentioned by higher numbers of participants across all scenarios. The vehicle conditions or type was also mentioned in the sub-theme "good vehicle condition" which was cited by 20% of participants for the H-NPR scenario, 10% for the 80-NPR scenario, 15% for the H-MSA scenario, and 5% for the 80-MSA scenario.

There were also some other factors not included in the scenarios that were reported by the participants as potentially facilitating speeding across all of the scenarios. These facilitators included there being "no road congestion", "travelling", "songs and *Shelah*" (i.e., a kind of common song in SA), and "no SAHER". "No road congestion" was mentioned in each scenario, and was claimed as a facilitator for speeding by 50% of participants for the H-NPR scenario, 30% for the 80-NPR scenario, 60% for the H-MSA scenario, and 35% for the 80-MSA scenario. For example:

"If the road is not crowded" (P3, 29)

"Not crowded" (P4,28)

"Not busy roads' (P12, 22)

The sub-theme "traveling" was mentioned in 20% of responses for the H-NPR and H-MSA scenarios and 10% for the 80-NPR and 80-MSA scenarios. The "trip length" sub-theme was mentioned by 15% of participants, mostly for the H-NPR and H-MSA scenarios, suggesting that longer trips may increase speeding motivation on highways. Its percentages included 15% of responses for such scenarios. One participant mentioned it for the 80-NPR and 80-MSA scenarios. Listening to songs or

"S*helah*" were found to encourage speeding, with 15% of responses for the H-NPR and H-MSA scenarios, and 10% of responses for the 80-NPR and 80-MSA scenarios making mentioning of this factor as a facilitator of speeding. The absence of SAHER was described as a facilitator (i.e., "No SAHER"). The participants claimed that when there was no monitoring camera or speed enforcement system (SAHER) on the road, their omission would facilitate speeding behaviour.

There were also some other factors not included in the scenarios that participants reported may facilitate speeding and that were mentioned across the H-NPR and H-MSA scenarios. These factors included "safety barriers" and "road quality". These sub-themes comprised fewer than 10% of responses.

Theme #6: Barriers for speeding:

In the "barriers for speeding" theme, there were seven sub-themes. The highest response was in relation to "SAHER", which was mentioned again as a barrier for speeding, but this time its existence was described as a barrier rather than just as a disadvantage. To the extent that it would physically stop someone from speeding, it was considered more relevant as a barrier than a disadvantage. The number of participants who indicated SAHER was a barrier to speeding were more than those who said its absence was a facilitator. However, it is important to clarify that most of the participants who talked about SAHER mentioned it in response to both interview questions that asked about the facilitators and the barriers. Under the barries theme, "SAHER" was stated more for the H-NPR (65%) and 80-MSA (60%) scenarios than the 80-NPR and H-MSA scenarios for which it was mentioned in 50% of the responses.

The next sub-theme was related to psychological factors as a barrier for speeding. Some examples of the psychological factors that were perceived to reduce

speeding behaviour included thinking of their parents or children, thinking of the consequences of speeding such as injuries and accidents, having previous road injury experience, the fear of causing harm to others, and the fear of losing control. This theme was mentioned in 65% of responses for the H-NPR scenario, 45% for the 80-NPR and H-MSA scenarios, and 60% for the 80-MSA scenario. For instance:

"I remember my children, I remember the consequences of speed (accidents) especially as we see the consequences of speed from cases that reach the hospital" (P3, 29)

"always I remember the things that are related to the negative consequences of speed, and accidents' (P4, 28)

The barriers to speeding also included several road factors including buildings, shops, turns, signs, and bumps:

"Because the road is narrow 80, this road where there are social centres and mosques, I rarely speed up on this road because it is possible that there are people who cross the road" (P3, 29)

"The highway is safer in terms of speed, unlike a road which has a limited speed such as an 80 km/h, is a road that is difficult to speed on because it may have pedestrians, slopes, and the road has no walls around for example ... or has many intersections, so it has a high risk... Since it is residential or suburban, it is more dangerous ..." (P5, 30)

"These roads are difficult to speed on because it is more a service path, because there will be shops on it; there are also people who cross the road" (P11, 37)

The mentions of road factors were found to be higher for the 80-NPR and 80-MSA scenarios, with 40% of responses for both instances associated with such barriers. However, a lower rate of responses was cited for the H-NPR and H-MSA scenarios, which were 25% of the responses in each. Similarly, the "pedestrians' sub-theme was mentioned more frequently in the 80-NPR and 80-MSA scenarios with 30% of the responses in each. However, the values were very low for the H-NPR and H-MSA scenarios at only 5% of responses regarding barriers found for each scenario. For another sub-theme, "road congestion", the percentages of responses for the H-MSA and 80-MSA scenarios were 25% and 35% respectively. Fewer mentions of road congestion were found for the H-NPR and H-MSA scenarios which were 20% and 15%, respectively.

There were a few sub-themes which were mentioned in fewer than 10% of responses, such as "bad mood" in that being in a bad mood was considered a barrier to speeding. It was claimed by 10% of the participants for the H-NPR and H-MSA scenarios. The "sudden overtaking" sub-theme was also mentioned only for the H-NPR and H-MSA scenarios, with only 5% of responses claiming this aspect as a barrier.

5.3   STUDY 2: DISCUSSION

Study 2 of this program of research included 20 participants who were living in Riyadh city. The main aim of this study was to elicit the most common beliefs (indirect beliefs) influencing speeding in each scenario so as to use such insights to develop items for use in the Study 3 survey. This aspect included confirmation of the study scenarios to be further tested in the Study 3 survey. A conceptual content

analysis was applied. Four specific speeding scenarios were found from Study 1, which the reported beliefs were elicited for.

The discussion below starts with belief elicitation for specific speeding scenarios, followed by assessing the applicability of speeding scenarios and deciding which ones were to be included or excluded survey for the survey in Study 3. Then, the discussion ends with a section on how the elicited beliefs will be operationalised in the survey in Study 3.

Of note, as a reminder, the abbreviations for each speeding scenarios are as follows: the scenario that included speeding on highway with no particular reason was labelled as the H-NPR scenario; while speeding with no particular reason in an 80km/h speed zone was labelled as the 80-NPR scenario; while speeding to make a scheduled arrangement was identified as the H-MSA scenario on a highway; and as the 80-MSA scenario on 80km/h roads.

The belief elicitation for specific speeding scenarios

The main themes were identified in terms of the TPB's behavioural beliefs, normative beliefs, and control beliefs. Based on these beliefs, six themes were identified in accordance with the most frequent beliefs. A criterion number of responses was set in terms of confirming a belief as a salient belief. While there are no clear guidelines on setting the criterion level in consulting other speeding-related belief elicitation studies (e.g., Conner et al., 2003; Forward, 2009a; Horvath et al., 2012) these helped to inform the criterion level. To ensure a range of possible beliefs to inform the quantitative study, it was decided to select beliefs as "salient" that had been mentioned $\geq 15\%$ of the time in responses. Given that there were 20 participants,

this meant that beliefs mentioned by 3 or more participants were considered as salient beliefs.

The first question asked about the advantages of speeding in relation to each of the four given speeding scenarios. Some respondents (25%) perceived speeding on 80 km/h roads as a difficult or a high-risk behaviour. They gave some reasons that made speeding difficult in this speed zone. These reasons seemed to be more appropriate to be classified as "barriers to speeding" and, thus, are discussed later in relation to the barriers. Of note, overall, only a few beliefs were elicited regarding the "advantages of speeding" for any of the speeding scenarios. Most participants (80% for the H-MSA, and 70% for scenario 80-MSA scenarios) who identified any sort of advantage noted that it was about "arriving on time or arrive earlier". Corresponding with findings from previous studies that have elicited the indirect beliefs underpinning speeding behaviour, unsurprisingly, "arrive on time/arrive earlier" was also mentioned (e.g., Conner et al., 2003; Forward, 2009a; Horvath et al., 2012). It seems that the concept of time matters in SA as it does in other countries. The limited number of elicited beliefs for scenarios 80-MSA and H-MSA was similar to scenarios 80-NPR and H-NPR. For scenarios 80-NPR and H-NPR, indeed, the participants also mentioned they would save time and arrive early. However, the obvious difference between the 80-NPR and H-NPR and the 80-MSA and H-MSA scenarios was that more participants claimed that there were no advantages of speeding when referring to speeding for no particular reason.

Regarding the "disadvantages of speeding", for both the 80-MSA and H-MSA scenarios, there were more disadvantages than advantages cited. The disadvantage identified by most participants was the potential of speeding leading or contributing to "accidents". "Causing harm to others' was the next most commonly identified

disadvantage. Overall, the results suggested that the participants were conscious about the harms caused by speeding. Consistent with other studies, the relationship between speeding and crashes was mentioned also in the previous studies (Conner et al., 2003; Forward, 2009a; Horvath et al., 2012). Regarding the 80-NPR and H-NPR scenarios, a similar number of participants claimed the same for these disadvantages for these scenarios.

Stress, or feeling stressed after arriving for an appointment (i.e., for the 80-MSA and H-MSA scenarios), especially for work, was reported as a disadvantage by 30% of the study's participants. This result has not been previously described in the literature. This result might be due to the different speeding scenarios explored in these previous studies and them not including reference to speeding potentially being due to a reason. Supporting this potential explanation, this belief was not mentioned in relation to the 80-NPR and H-NPR scenarios. It is also possible that this finding reflects a difference between salient beliefs between Arab and western cultures.

As another disadvantage, concern for speeding to cause damage to one's vehicle or tyres was found for all scenarios. A total of 20% of the study participants noted this potential disadvantage (and which was classified into the "car damage" sub-theme). This result was also perceived to be culturally-related, as this result may not have gained enough importance to be examined in other TPB studies on speeding in western culture.

The disadvantage of being detected for speeding by speed cameras (i.e., the sub-theme "SAHER"), or road enforcement systems in general, has been found and examined in other studies (Conner et al., 2003; Forward, 2009a; Horvath et al., 2012). A relatively high proportion of participants (30%-45%) showed much concern with

possibly being fined when captured by the SAHER system or other enforcement systems.

Regarding normative beliefs in all scenarios, there were some groups of people named under the "significant others agree with speeding". They included the normative referents of wife, friends, brothers, parents, and relatives. In addition, some participants said no one would approve of them speeding in any speed zone. However, for the 80-NPR and H-NPR scenarios, only one participant said that their father would agree with speeding, unlike for the 80-MSA and H-MSA scenarios where three participants (15%) mentioned that their fathers would agree with speeding.

Regarding those others who would disapprove with speeding (i.e., "significant others disagree with speeding"), the same groups of people previously mentioned in the "approve" sub-theme, including parents, brothers, friends, relatives, and wife were mentioned for all scenarios. Overall, however, many more participants considered that these people would disapprove rather than approve. The only exception to this was "friends" who were associated with many more participants believing that friends would approve rather than disapprove of their speeding. In terms of "relatives", there seemed to be similar numbers of participants who considered that they may either approve or disapprove of their speeding.

Regarding parents, wife, brothers, and friends who were identified, as noted, these were mentioned by many participants. In comparing these findings with previous studies, both parents and brothers have not been previously found as potential normative influences of speeding among adults in western cultures; while friends, wife/partner, and family have all been found as potential normative influences on speeding intention (Conner et al., 2003; Horvath et al., 2012).

Regarding control beliefs, there were a limited number of beliefs identified as "facilitators' of speeding across all scenarios. The limited number of potential facilitating beliefs may be due to the fact that the scenarios being tested already included reference to some factors that are known to influence (encourage) speeding including free-flowing traffic, good weather, and good vehicle condition. Thus, it is possible that, beyond these aspects, the identification of other facilitators was limited. This potential explanation is supported by some of the participants' responses which included, *"There is no other than what is mentioned in the scenario"* (P4, 28), and *" …. in addition to that the road is empty as mentioned in the scenario"* (P8, 32).

The factor most reported by participants as a facilitator of speeding was there being no road congestion. It was mentioned by 60% of respondents for the H-MSA scenario and 35% in the 80-MSA scenario. Similarly, for the 80-NPR and H-NPR scenarios, 50% of respondents said that absence of road congestion was a facilitator in the highway speed zone, compared with only 30% in the 80 km/h speed zone. The differences in percentages appeared to be due to the location of the roads. The 80 km/h roads are mainly located inside the city (Highway Design Manual, n.d.) and, as a result, they may have less traffic. The issue of traffic and its relation to the intention for speeding was found in previous literature as well (Conner et al., 2003; Horvath et al., 2012).

The absence of speed cameras or enforcement (i.e., "No SAHER") was mentioned as a facilitator for speeding by 20% of participants across all scenarios. This finding suggests that, at least for some participants, the monitoring system for speeding seems to be effective to help control speeding behaviour in SA.

Another belief reported as a facilitator or speeding was "trip length" and this belief was reported more in relation to the 80km/h scenarios. This may be because

speeding is considered as reducing the time spent in the car. This finding was mentioned in Horvath (2012) but as a perceived advantage of speeding. "Traveling" behaviour was also mentioned in this study, with 20% of respondents mentioning it for highways that speeding would be encouraged when travelling. This result was also found in Study 1 of the program of research.

Lastly, regarding control beliefs and barriers to speeding, five barriers were identified across the scenarios. The most reported belief was "SAHER" (responses ranged from 50% - 65% across the scenarios) in that it was considered a barrier to speeding if it was visible on the roads. The most responses for this barrier were found in relation to the 80 km/h speed zones as urban roads. As mentioned above, the corresponding sub-theme "no SAHER" was also referred to as a facilitator of speeding. Similarly, with the sub-theme of "road congestion" (noted by 15% - 35% of participants) where "no congestion" was mentioned as a facilitator of speeding, presence of congestion was referred to as a barrier.

Several road environment characteristics were mentioned as potential barriers and these included buildings, shops, turns, signs, and bumps (captured under the sub-theme of "road factors"). These aspects were more commonly cited for roads with 80 km/h speed limits (40% of responses) than when on the highways (25% responses). These factors appeared to be more related to the road types in SA, as they were not found to be examined previously in other TPB studies.

Pedestrians were noted as a potential barrier to speeding when driving on 80 km/h roads (30% responses) and more so than in the highway (5%) scenarios. The fear of causing accidents with pedestrians and its relationship with speeding intention has been also been reported in previous research, but in those instances, it was identified as a disadvantage of speeding (Conner et al. 2003; Forward, 2009a).

The applicability of the speeding scenarios in developing the survey

Study 1 resulted in the development of the four speeding scenarios in accordance with the specific definitions of speeding. In Study 2, however, as has been noted, most of the beliefs elicited from each scenario were the same across the four speeding scenarios. Given the extent of similarity in motivating beliefs, and consistent with intent to streamline the content of the Study 3 survey as much as possible (to enhance participation and completion rates), it was decided to exclude the 80-NPR and H-NPR scenarios which were the scenarios related to speeding when there was no particular reason to do so. Supporting this decision to exclude such scenarios, the Study 2 results also showed that some participant said they do not speed and that they could see no advantages to speed in such contexts.

Development of the indirect belief items in the subsequent Study 3 survey

The basis of developing the survey was on data gaining ≥ 15% of responses for scenarios H-MSA and 80-MSA. To be theoretically consistent, both of the behavioural beliefs (advantages and disadvantages of speeding) and the control beliefs (facilitators and barriers of speeding) were measured by a *7 point-Likert scale* scored from *1 (Strongly Disagree) to 7 (Strongly Agree)*. The normative beliefs (significant others who agree or disagree with speeding) were measured by a *7 point-Likert scale* scored from *1 (Extremely Unlikely) to 7 (Extremely Likely)*; in addition to the option of *Not Applicable*, which was given number *8* on the scale.

First, the behavioural beliefs were examined. As there were very limited number of beliefs for the advantages of speeding, two items which had significant and reliable results were adapted from Horvath et al. (2012). The items were adopted for

the speeding scenarios, which resulted in "speeding will allow me to reduce the time I spend in the car" and "It is exciting to drive faster than the speed limit".

The included behavioural belief (sub-theme) from the study was "arrive on time or arrive earlier". It was divided into two aspects (i.e., "arrive on time" and "arrive earlier") that were measured by two items. There was another sub-theme with similar meaning which was also mentioned by 15% of participants in the scenario H-MSA, which was "save time and arrive early". This sub-theme was examined under the "arrival on time or arrive earlier" sub-theme. The "appear professional at work and avoid negative consequences" sub-theme had $\geq$ 15% of responses for scenario H-MSA; however, it was excluded because it was thought to be specific to workers and cannot be generalized to all.

There were many items for measuring the disadvantages of speeding for both scenarios. They included "accidents", "loss of control", "SAHER and road traffic violations", "causing harm to others", "car damage", and "stress". For the normative beliefs, the influencers groups were the main focus, as it obtained $\geq$ 15% of responses and who were mentioned in both the agree and disagree categories, with great differences in values (about double). This is an interesting finding that deserves further exploration. The influencers, or significant others, included "parents", "wife", "brothers", and "friends".

The facilitators of speeding were also limited, and another item was adapted. They included "trip length", "no SAHER", and "no road congestion". In addition, one item was adopted item from Horvath et al. (2012), which was "I would be more comfortable speeding if the road was familiar". The sub-theme "trip length" was identified to be a specific item for scenario H-MSA (i.e., highway). There were two

reasons for this. The first reason relates to the higher value that was obtained for it. The second relates to the Manual of Highways (n.d.), defines highways as long-distance roads that connect cities, which makes trip length more relevant.

Road congestion was mentioned in both the facilitators (no road congestion) and in the barriers (if there is road congestion) by the same participants. It was decided to include it as a facilitator for speeding to be measured for both scenarios, based on the higher values obtained under the facilitators than the barriers. Similarly, it was decided to include the factor of SAHER under the barriers, rather than the facilitators, as it had higher values in that category. One sub-theme, "songs and *Shelah*", was mentioned by 15% of participants, but was excluded, because listening to songs generally is controversial among the Saudi community, and some find it an inappropriate behaviour, especially on the road. The "travelling" sub-theme was also excluded as it is outside the scope of this research.

For the barriers, three sub-themes were included. These were "SAHER", "road factors", and "pedestrians". The sub-theme "road factors" had some environmental factors for speeding which were listed by many of the participants. They included buildings, shops, turns, signs, and bumps. Both themes "SAHER" and "road factors" were included on the surveys to be examined for the two speeding scenarios; however, it was decided to examine the sub-theme "pedestrians' for scenario 80-MSA only where it was frequently mentioned by the participants.

The sub-themes "psychological factors" and "bad mood" were both excluded. They were mostly considered as disadvantages for speeding which were potentially excluded on the survey because they were not related to barriers.

Based on the aforementioned findings as well as the scenarios selected for inclusion in the Study 3 survey, Table 5 summarises the belief items that were devised also for inclusion in the Study 3 survey.

Table 5: The development of the indirect beliefs in the survey for Study 3

Advantages of speeding				
Sub-themes (beliefs)	Scenario H-MSA	Scenario 80-MSA	Question form used in the survey	Scenarios
Arrive earlier	6 (80%)	14 (70%)	Speeding will help me arrive earlier.	H-MSA and 80-MSA
Arrival on time			Speeding will help me arrive on time.	H-MSA and 80-MSA
Adopted from Horvath et. al. 2012	-		It is exciting to drive faster than the speed limit. Speeding will allow me to reduce the time I spend in the car.	H-MSA and 80-MSA
Disadvantages of speeding				
Accidents	20 (100%)	15 (75%)	My speeding in this situation would likely result in a crash.	H-MSA and 80-MSA
Loss of control	5 (25%)	3 (15%)	Speeding would lead to loss of control.	H-MSA and 80-MSA
SAHER and road traffic violations	9 (45%)	6 (30%)	Speeding would cost me more money if I committed a violation.	H-MSA and 80-MSA
Causing harm to others	9 (45%)	10 (50%)	I feel that speeding is dangerous to others.	H-MSA and 80-MSA
Car damage	5 (25%)	5 (25%)	Speeding could lead to car damage or tyre damage.	H-MSA and 80-MSA
Stress	6 (30%)	6 (30%)	Speeding to make a scheduled appointment puts me under stress.	H-MSA and 80-MSA
Significant others				
Parents, wife, brothers, and friends	≥ 15%		How likely is it that the following individuals or groups of people would approve of you speeding in relation to both the 80km/h and 120 km/h speed zones once again be legally acceptable to drive?	H-MSA and 80-MSA
Facilitators				
Trip length	3 (15%)	1 (5%)	On an 120 km/h multilane road, if my trip was to take a	H-MSA

			long time, I would be motivated to speed.	
No road congestion	12 (60%)	7 (35%)	I would be more comfortable speeding if there is no traffic congestion.	H-MSA and 80-MSA
Adopted from Horvath et al. (2012)	-		I would be more comfortable speeding if the road was familiar.	H-MSA and 80-MSA
Barriers				
SAHER	10 (50%)	12 (60%)	I would be less likely to speed if there is a SAHER or any traffic monitoring system in operation.	H-MSA and 80-MSA
Road factors	5 (25%)	8 (40%)	Buildings, shops, turns, signs, and bumps would make speeding difficult for me.	H-MSA and 80-MSA
Pedestrians	1 (5%)	6 (30%)	On an 80 km/h multi-lane road, pedestrians on the road would prevent me speeding.	80-MSA

Study 2: Feasibility

Study 2 was conducted at the King Khalid University Hospital (KKUH). The hospital belongs to the King Saud University in Riyadh. It is a teaching hospital for all students and trainers in SA and a place where research can be conducted regardless of a researcher's gender (KKUH, 2017). That is, given that the candidate is female, it was a key feasibility consideration that the interviews be conducted somewhere where the candidate could, in fact, conduct them. The decision to conduct phone interviews was made for a number of reasons including helping to protect the confidentiality of the participants (given they were discussing speeding as an illegal behaviour). This approach also meant that interviews could be conducted at a time of convenience for the participants which was often after their work hours. Also, there was an external male supervisor who is a Saudi and who lives in Riyadh city and whom was available to facilitate any issues that may have arisen.

5.4   STUDY 2: STRENGTHS AND LIMITATIONS

The main strengths of Study 2 were its contribution to knowledge regarding the beliefs that motivate speeding among SA drivers. As a result of Study 2, it was found that the scenarios relating to speeding for no particular reason (i.e., H-NPR and 80-NPR scenarios) were perceived as being less relevant and as having limited advantages and, thus, were excluded from further examination in the Study 3 survey. Beyond that, the beliefs motivating speeding in other scenarios were quite similar, suggesting that the research had, at least in the sample interviewed, obtained the most salient motivating beliefs regarding speeding. This view is also supported by the fact that Study 2 was conducted in the participants' native language (i.e., Arabic), so participants could fluently express their opinions, views, and impressions.

Despite the strengths, Study 2 also had some limitations. Due to the illegal nature of speeding, it is possible that the participants may have answered dishonestly or given socially desirable responses, contributing to less accurate data. However, it is important to note that Study 2 was conducted remotely, via telephone interviews, which could be expected to encourage participants to give more honest responses given assurances of confidentiality that come with telephone interviews and not seeing the participant. In this way, it differs from Study 1, which involved face-to-face interviews, a more identifiable method that might have interfered with the honesty or social desirability of the participants' responses. In Study 2, this strength came into play when the participants gave their opinions about the SAHER speed enforcement system in SA. In Study 1 (face-to-face), fewer participants expressed their concerns about being fined when they were asked about speeding in general; however, in Study 2, most of the participants reported having financial concerns about being fined.

Study 2 also presents a limitation linked to the interviews being potentially too long, all of which included very similar speeding scenarios. The participants gave the same responses for most scenarios by saying "the same answers (as with their responses to the other scenarios)". It is possible that they had become bored with the questions; thus, they gave inaccurate answers just so as to more quickly finish. It is difficult to be certain of whether this tendency occurred. However, it is also worth noting that many of the frequent responses in this study were consistent with other studies conducted in other high-income countries similar to SA.

Another limitation of Study 2 is the potential generalisability of the results for the whole Saudi driving community. Though Study 2 included participants with more diverse educational backgrounds than Study 1 (which consisted mostly of PhD candidates), and regardless of the homogeneity of Saudi culture (Cassell &Blake, 2012), assuming this sample to be representative of the whole community might be a concern. As a non-representative sample, this impacts on the ability to generalise the findings. However, it is important to note that qualitative research does not seek to be representative but rather gain in-depth insights. Thus, the intent of this study was to gain an in-depth understanding of the beliefs influencing speeding in different scenarios.

Lastly, due to the fact that this study was conducted by telephone interviews as a more feasible approach, there was no face-to-face contact. Some studies have shown there to be little difference between them with richer information gained from in-person interviews (Johnson et al., 2019; Szolnoki and Hoffmann, 2013). Regarding interviews about speeding behaviour, whether there is any difference in responses provided by the two interview approaches is currently unclear without any published studies discussing this particular aspect. However, it is noted that similar salient beliefs

were found in the current study as in the literature more broadly. On that basis, it would seem that the use of telephone interviews did not introduce any issues and if anything perhaps invited more open responding (in the case of comments about the SAHER system) which could be considered a strength rather than limitation of the research.

5.5   STUDY 2: SUMMARY AND IMPLICATIONS IN THE NEXT STUDY

Study 2 was conducted on 20 participants, who were licensed drivers and who drove in Riyadh city in SA. Consistent with the TPB, Study 2 elicited the salient beliefs influencing speeding across the four scenarios being examined. In addition, Study 2 enabled exploration of the relevance of the given speeding scenarios (as were originally devised from the findings of Study 1) for their potential relevance and, thus, their applicability in the Study 3 survey. Based on the findings of Study 2, two of the specific scenarios were excluded (i.e., the scenarios relating to speeding for no reason). The results of Study 2 aided the development of 20 items for inclusion in the survey for Study 3. These items represent several psychosocial factors which aids in answering research question 2 " What are the key psychosocial factors that influence speeding behaviour?". The next chapter outlines details regarding Study 3 of the program of research.

Chapter 6: Study 3

In the previous chapters, the results of two studies (Study 1 and Study 2) were reported. These chapters outlined the general and specific definitions of speeding (or speeding scenarios) being assessed in the current program of research. In this chapter, each scenario was further examined so as to identify the key psychosocial factors that predict speeding intention in relation to it.

The specific definitions of speeding were determined from the findings of Study 1. They included four different speeding scenarios and it was assumed that different indirect beliefs (indirect predictors) would predict intentions to speed for each of the given specific scenarios. However, the belief elicitation study in Study 2 revealed similarities in the beliefs motivating speeding intention and participants reporting few advantages for speeding when said to be speeding for no particular reason. For this reason, the scenarios relating to speeding for no particular reasons were excluded from further examination in the Study 3 survey.

Furthermore, a general speeding was added as well. The general scenario of speeding was defined as "speeding in the future when it will once again be legally acceptable for me to drive". This was intended as a broad, overarching scenario applicable to all Saudi drivers and for which the predictors of speeding in such a context were examined in Study 3. It was abbreviated herein as the "GS" scenario.

In this chapter, in addition to the indirect predictors of speeding, the direct predictors and the additional predictors (constructs) of speeding will also be examined in terms of the extent to which they predict speeding intention across the remaining two specific scenarios that were retained following the results of Study 2. In addition to the specific scenarios, as will be discussed further, a general speeding scenario was

also included in Study 3. This chapter outlines the methods in terms of items developed for use in Study 3 survey. Furthermore, the chapter outlines the findings of Study 3 and, thus, the key psychosocial factors that predicted speeding intention in each of the given speeding scenarios. The suggestions for potential interventions based on the study's findings are discussed at the end of this chapter and in anticipation of their further assessment in Study 4 (see Chapter 7).

6.1   METHODOLOGY AND RESEARCH DESIGN

6.1.1 Study 3

Study 3 included a quantitative, online self-reported survey conducted over one point of time to measure the key predictors of intention to speed among Saudi participants. This study addressed Research Question 2, "What are the key psychosocial factors that influence speeding behaviour?". When initially devised, Study 3 had intended to measure speeding intention and behaviour over two times. However, the study was conducted during the emerging COVID-19 global pandemic. As a result, within SA, where the study was to be conducted, there were several governmental regulations to contain the spread of the infection, which included driving restrictions. Thus, consistent with these regulations, individuals in SA were not legally permitted to drive, and so it was not possible to assess participants' actual driving behaviour during that time. Consequently, the survey was revised such that the focus was just on intention to speed, and further clarification was added to account for the impact of the driving restrictions. Specifically, intentions were assessed in relation to the timeframe of, "…in the future when it will once again be legally acceptable for me to drive" instead of the two-week timeframe that had been initially intended. To

complement the research findings, especially the quantitative findings of Study 3 that measures the speeding behaviour, Study 4 was added to the program of research. Study 4 sought experts' opinions from those working in the road safety sectors in Riyadh about the key findings from the program of research. Furthermore, it aimed to identify the practical implications of the findings in terms of the feasibility of utilising the results for designing future interventions to address speeding in SA. Study 4 is outlined in the next chapter, Chapter 7.

In relation to Study 3, as noted previously, Research Question 2 "What are the key psychosocial factors that influence speeding behaviour?" was explored, and the following three hypotheses guided the investigation:

H1: The direct predictors (standard constructs) of the TPB will significantly and positively predict intention to speed, such that the more positive an individual's attitude, the more they perceive approval from significant others (subjective norms), the more they perceive the behaviour as being under their control and easy to do (PBC), the higher their intention to speed for every speeding scenarios (GS[4], 80-MSA[5], and H-MSA[6]).

This hypothesis is consistent with theoretical expectations. In addition, previous literature has shown that the direct predictors or the standard TPB constructs (i.e., attitude, subjective norms, and PBC) significantly predicted speeding intention (Elliott and Thomson, 2010; Conner et al., 2007). Thus, the current study hypothesised

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4 Speeding scenario: "Exceeding the legal speed limit" (General speeding definition)

5 Speeding scenario: "Assume that you are driving alone on a multi-lane 80 km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

6 Speeding scenario: "Assume that you are driving alone on a multi-lane 120 km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

that the TPB direct predictors would predict speeding intention to speed in all of the speeding scenarios under investigation (i.e., the GS, 80-MSA, and H-MSA scenarios).

H2: The additional predictors (extended constructs) of the extended TPB will significantly predict intention to speed over and above the direct predictors or the standard TPB constructs, such that the less an individual perceives that speeding is morally wrong (moral norms), the more they believe others engage in speeding (descriptive norms), the more they have sped in the past, the greater their intention to speed will be in each of the speeding scenarios under investigation (i.e., GS, 80-MSA, and H-MSA).

As some previous literature has found that additional predictors of extended TPB frameworks (moral norms, descriptive norms, and past behaviour) significantly predicted speeding intention over and above the direct predictors or standard predictors (Conner et al., 2007; Elliott & Thomson, 2010; Forward, 2009b), the current study hypothesised that the additional predictors of the extended TPB would significantly predict speeding intention over and above the direct predictors of the extended TPB for every speeding scenario (GS, 80-MSA, and H-MSA).

H3: is an exploratory hypothesis that will focus on identifying which behavioural, normative, and control beliefs are the significant critical beliefs predicting intentions.

6.1.2 Study 3: Setting of the study

The study was conducted among Saudis working and/or studying in King Khalid University Hospital (KKUH) in King Saud University in Riyadh. As has been noted

previously, Riyadh city was chosen as the study location as it has the highest percentage of RTCs compared to other cities in SA and had an estimated 33.78% of the nation's crashes in 2015 (The General Authority for Statistics, 2015).

6.1.3 Study 3: Participants

A convenience sample of 112 participants was recruited. As Table 6 shows, the mean age of the participant sample was 29.65 years, and ages ranged from 18 to 40 years. Convenience samples were a feasible method for data recruitment in the current program of research because the candidate was in Australia and the data collected in SA. Another important reason as well was related to the data collection timing which was at the beginning of the COVID lockdown that led to add more difficultly with sampling during that time. The participants included 72 University workers, 26 students, and two participants who indicated they were presently both studying and working. The education levels revealed 32 participants with high school degrees, 50 undergraduate students, 10 participants with diplomas, and 20 participants with post-graduate degrees. Mostly, the participants reported driving in both city/ country roads (48 participants), followed by only city (33 participants), mainly city (27 participants), only country roads (three participants), with one participant reported driving mainly on country roads. Overall, the mean average driving hours was 13.59 hours per week (SD = 14.68 hours). The mean years of holding a drivers' licence were 10.77 years, with a standard deviation of 6.40 years.

Regarding marital status, although marital status was not assessed in the initial section of the survey, it could be determined from counting the number of "non-applicable" response options that were associated with the survey item, "wife". This

demographic characteristic was considered important to the extent that wife had been

identified as such an important normative influence in Study 2. Using this method, it

was determined that the number of participants who reported having a wife was 103.

Table 6: Demographic data of Study 3 participants

Variables[a]	Frequency	Mean	SD	Missing data	Total
Age					
18-25	39	29.65	6.81	-	112
26-33	36				
34-40	37				
Working status					
Student	26	-	-	12	100
Student &Worker	2				
Worker	72				
Completed degree					
Bachelor	50	-	-	-	112
Masters	12				
PhD	8				
Diploma	10				
High school	32				
Mostly drive location					
-Both city/ country roads	48	-	-	-	112
-Mainly city	27				
-Only country roads	3				
-Mainly country roads	1				
-Only city	33				
Average driving hours per week	-	13.59	14.68	6	106
Drivers licence years	-	10.77	6.40	3	109

6.1.4 Study 3: Design and Procedure

Participants' recruitment and ethical clearance:

Ethical approval was gained from the Human Research Ethics Committee

(HREC) at Queensland University of Technology (QUT Reference Number:

1800001167) and at King Saud University (Approval of Research Thesis Subject: No.

E-19-3766). After gaining ethical approval, an online self-reported survey was administered via emails and managers of departments at KSU via WhatsApp. Qualtrics, an authorised survey tool used at QUT, hosted the survey and was distributed through a website link via emails/WhatsApp. The Participant Information Sheet was provided at the commencement of the survey.

The procedure was implemented after contacting managers from King Saud University and King Khalid University Hospital to gain ethical approval to conduct the study with staff and students at their premises. The invitations to participate in the survey were sent by a responsible person, such as secretaries working in the organisations and managers of the departments, asking for volunteers to participate. The typical time for completing the survey was estimated at 15-20 minutes. The data collection process and analysis occurred from April 2020 to May 2020. It is important to note that, during that time, there was an issue in data collection because there were only 52 participants who completed the surveys after the first round of recruitment efforts. Thus, the recruitment strategy was repeated two weeks later in order to obtain more participants by contacting more people at KSU to share the link of the surveys through snowballing via the WhatsApp work groups at KSU until the minimum number of responses (in terms of offering sufficient number to offer statistical power for analyses) was achieved. Statistical checks to confirm that the two subsamples of the two recruitments were sufficiently similar and able to be included as the one overall study sample was conducted by t-test. After comparing the demographic data (i.e., age [7] and drivers licence years[8]) and the extended TPB measures between the two samples, all of the results indicated a non-significant *P* value. As a result, the different times

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[7] Age: For the first recruitment (*M*= 29.90, *SD*= 6.75). For second recruitment (*M*=29.01, *SD*= 6.92).
[8] Drivers licence years. For the first recruitment (M= 10.85, SD= 6.46). For second recruitment (M=10.21, SD= 6.47).

and methods of recruitment did not vary in any systematic way that affected the nature of the two subsamples; thus, there was no issue in combining the two subsamples as one overall sample.

6.1.5 Study 3: Materials

Three speeding scenarios were examined in this survey. The study was a repeated measures design such that each participant provided responses to all three speeding scenarios: one general speeding scenario which was defined as "exceeding the posted speed limit" and which was abbreviated as *"GS"*, and two specific speeding scenarios which were defined as 1) "Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit." This scenario is subsequently referred to as *"H_MSA"* to capture "H" as driving on a highway with speed limit of 120 km/h and "MSA" in relation to making a scheduled arrangement, and 2) "Assume that you are driving alone on a multi-lane 80km/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit." This scenario is subsequently referred to as *"80_MSA"* to capture "80" as driving on 80 km/h speed zone and "MSA" in relation to making a scheduled arrangement.

Measures: The direct TPB constructs and the additional predictors

The survey development was in accordance with TPB protocol (Ajzen, 2006). Measures of the indirect beliefs (i.e., behavioural, normative, and control beliefs),

direct constructs (i.e., attitude, subjective norm, and PBC), and the additional predictors of moral norm, descriptive norm, and past behaviour were included. The following items were applied for predicting speeding intentions in relation to each of the speeding scenarios, GS, H-MSA, and 80-MSA. As noted previously, the new timeframe assessed (due to the COVID-19 restrictions put in place regarding driving) was "in the future when it will once again be legally acceptable for me to drive". The survey started with a section assessing some demographics, followed by the speeding scenarios and the aforementioned constructs as predictors of intentions. For measuring such constructs, *7-point-Likert scales* of *1=strongly disagree to 7=strongly agree*, were used for all constructs, except for attitude, which was measured by a *7- point semantic differential scale*. For all measures, higher scores reflected more of the construct and more positive attitudes to speeding. Appendix C includes the survey that was used to measure intentions as well as the survey that was intended to measure behaviour (but, as noted, the latter survey was unable to be implemented). The reliability for multiple-items measures was measured by Cronbach α, and included intention, attitude, and PBC, Pearson's correlation coefficient was calculated for two-items variables, which included subjective norm, moral norms, and past behaviour (Sainfort & Booske, 2000). The Cronbach α values that were above 0.7 are considered highly reliable, and the Pearson's correlation values that were above 0.4 are considered reliable. All means and standard deviations were calculated for all scenarios and clarified in Table 7.

Intention was measured by a total of three items, two items related specifically to intention, "I intend to speed in the future when it will once again be legally acceptable for me to drive" and "It is likely that I will speed in the future when it will once again be legally acceptable for me to drive" while the third item was based on

willingness, "How willing would you be to speed in the future when it will once again be legally acceptable for me to drive?". The participants provided responses on a 7-point Likert scale of 1=not at all willing to 7=very willing. For further details of why willingness was added as part of the key outcome measure of intention, see section 2.3.1 in Chapter 2. The mean for all items was averaged to create a composite scale of intention. This measure was highly reliable across all scenarios (for the GS scenario, Cronbach α = .81; 80-MSA scenario, Cronbach α = .81; H-MSA scenario, Cronbach α = .82).

The attitude towards speeding was measured by three items scored as *1=bad to 7=good; 1=unwise; 7=wise; 1=negative to 7=positive*. The question stem for these item pairs was, "For me to speed in the future when it will once again be legally acceptable to drive would be…". The mean for all items was calculated in a composite scale. The measure of attitude was highly reliable across all scenarios (for the GS scenario, Cronbach α = .94; 80-MSA scenario, Cronbach α = .92; H-MSA scenario, Cronbach α = .94)

Subjective norm was measured by two items, "Those people who are important to me would approve of me speeding in the future when it will once again be legally acceptable for me to drive" and " Those people who are important to me would want me to speed in the future when it will once again be legally acceptable for me to drive". The mean for all items was calculated. The measure of SN was reliable across all scenarios (for GS scenario, r= .62; 80-MSA scenario, r= .78; H-MSA scenario, r= .79). The Pearson's correlation values were reliable for all scenarios as they all above 0.4.

Perceived behavioural control (PBC) was measured by three items, "It would be easy for me to speed in the future when it will once again be legally acceptable for me to drive", "I am confident that I could speed in the future when it will once again

be legally acceptable for me to drive", and "Whether or not I speed in the future when it will once again be legally acceptable for me to drive is completely under my control". The mean for all items was calculated on a composite scale. The measure of PBC was highly reliable for the specific scenarios, but not for the GS scenario (for the GS scenario, Cronbach α = .45; 80-MSA scenario, Cronbach α = .78; H-MSA scenario, Cronbach α = .81). Even though the PBC measure for the GS scenario was not reliable, the decision was made to retain PBC in the analysis in order to be consistent with the other speeding scenarios where the same items had been found to be moderately to fairly reliable.

Moral norm was measured by two items, "Speeding in the future when it will once again be legally acceptable for me to drive would be wrong", and "I would feel guilty if I sped in the future when it will once again be legally acceptable for me to drive". The mean for all items was calculated in a composite scale. Similar to PBC, the measure of moral norm was reliable for the specific scenarios, but not for the GS scenario (for the GS scenario, r = .51; 80-MSA scenario, r = .71; H-MSA scenario, r = .73). The Pearson's correlation values were reliable for all scenarios as they all above 0.4.Descriptive norm was measured by one item "Regarding other drivers in general, I think they would exceed the speed limit in the future when it will once again be legally acceptable for me to drive".

Past behaviour was examined by two items, "How frequently have you sped during the past two weeks?" and "How often did you speed in the past two weeks?". The higher scores indicated more speeding in the past before the COVID-19 lockdown. The mean for all items was calculated in a composite scale. The measure of past behaviour was reliable across all scenarios (for GS scenario, r = .64; 80-MSA scenario, r = .73; H-MSA scenario, r = .76). The Pearson's correlation values were reliable for all

scenarios as they all above 0.4. The survey concluded with an open-ended question that asked if participants had any additional notes or comments that they would like to add in relation to any aspect of the study. A caution was added to not include any potentially identifying information with their response.

The indirect predictors

The indirect beliefs for the behavioural, normative, and control beliefs were developed for the specific speeding scenarios only. Their development was based on data obtained from Study 2, and included beliefs raised by $\geq 15\%$ of participants' responses for the "H-MSA" and "80-MSA" scenarios. The indirect beliefs were measured by a *7-point Likert scale* (Ajzen, 2006). Thus, both behavioural beliefs (advantages and disadvantages of speeding) and the control beliefs (facilitators and barriers of speeding) were measured by a *7-point Likert scale*, scored from *1 (Strongly Disagree) to 7 (Strongly Agree).* The normative beliefs (significant others who agree or disagree with speeding) were measured by a *7-point Likert scale* scored from *1 (Extremely Unlikely) to 7 (Extremely Likely)*, in addition to a *'Not Applicable'* choice, which was given number *8* on the scale. However, regarding behavioural beliefs, there was a very limited number of beliefs found for the advantages of speeding; thus, two items were adapted from Horvath et al.'s (2012) study. Similarly, regarding the facilitators of speeding, one item was adapted from Horvath et al. (2012).

Behavioural beliefs were measured by 10 items for both the specific scenarios of "H-MSA" and "80-MSA". Four items were used regarding the advantages of speeding and which included, "speeding will help me arrive earlier"; "speeding will help me arrive on time"; "It is exciting to drive faster than the speed limit"; and, "speeding will allow me to reduce the time I spend in the car". Additionally, six items were used for measuring the disadvantages of speeding and which included "My

speeding in this situation would likely result in a crash"; "speeding would lead to loss of control"; "speeding would cost me more money if I committed a violation"; "I feel that speeding is dangerous to others"; "speeding could lead to car damage or tyre damage"; and, "speeding to make a scheduled appointment puts me under stress".

Normative beliefs were measured by four items and which included significant others who would approve or disapprove of speeding. The participants were asked to rate their responses for the question "how likely is it that the following individuals or groups of people would approve of you speeding in relation to both the 80km/h and highway speed zones in the next two weeks?" for each significant referent group, which included parents, wife, friends, and brothers.

Control beliefs were measured by six items. Two facilitators of speeding were measured for both speeding scenarios, "H-MSA" and "80-MSA" and which included, "I would be more comfortable speeding if there is no traffic congestion", and "I would be more comfortable speeding if the road was familiar". One additional item was only used in relation to the "H-MSA" scenario and which was: "on an 120 km/h multilane road, if my trip was to take a long time, I would be motivated to speed". For the barriers to speeding, these included two items measured for both scenarios and which were, "I would be less likely to speed if there is a SAHER or any traffic monitoring system in operation", and "buildings, shops, turns, signs, and bumps would make speeding difficult for me". One additional item was measured for the "80-MSA" scenario which was: "on an 80 km/h multilane road, pedestrians on the road would prevent me speeding.".

The survey underwent survey piloting with 10 participants who were PhD candidates and spoke Arabic in order to check the clarity of the translation (from English to Arabic) and the general comprehensibility of the survey. The list of the

assessment questions used in the piloting are shown in Appendix D. All the comments received from the pilot participants were reviewed by the candidate and minor modifications made accordingly. Most of the comments were about the clarity of items, with further clarifications requested for a few of items.

6.1.6 Study 3: Analysis

The SPSS software package (i.e. SPSS statistics subscription version) was used for all analyses. First, the means and standard deviations were calculated for the study's main variables as were the bivariate correlations between the study's variables. Hierarchical regressions were conducted to determine the predictors of intentions based on the extended TPB framework (i.e., attitude, subjective norm, PBC, and the additional variables of moral norms, descriptive norms, and past behaviour). Such an analytic approach was consistent with that of other previous TPB-based studies on speeding behaviour (e.g., Conner et al. 2007; Elliott & Thomson, 2010)).

For identifying the indirect beliefs (i.e., behavioural, normative, and control beliefs) predicting intentions for each of the specific scenarios, a critical beliefs analysis was applied (Von Haeften et al., 2001). The analysis was performed by calculating the mean and standard deviation for each of indirect beliefs, and their correlation with intention. The significantly correlated variables were then used in hierarchical regressions for identifying the significant predictors based on a regression for each belief type. The final step of the analysis was run using a hierarchical regression which comprised all of the significant beliefs emerging from the preceding regressions. Such an analysis approach is consistent with that of other TPB-based belief studies (e.g., Abdul Hanan, 2014; Gauld et al., 2016; Von Haeften et al., 2001).

6.2 STUDY 3: RESULTS

6.2.1 Missing data

Screening of data accuracy for entry, missing items and the assumptions of multivariate analysis was performed before the analysis. Thus, Missing Values There were 293 surveys that were excluded because they had more than 20% missing data, which made them inadequate for conducting the regression analysis. Beyond these cases, for the included surveys, a visual inspection revealed that there were only a small number of them missing items. For some items, there were 4.5% missing responses. To ensure that the missing data were completely at random, Little's MCAR test was applied for the remaining 112 surveys and the result was not significant ($\chi^2 = 65.267$, $df = 54$, $p = .140$).

Statistical checks were also conducted to confirm that there were no differences between the demographic data of those participants who went on to complete the survey with those who opted to only complete some of the demographic items and, thus, whose surveys were not included in the analyses. To examine this, t-tests was applied to compare age and drivers licence years of these two groups (i.e., those who completed the survey and those who completed only the demographic items and thus whose surveys were not included in the analyses). The results showed that there were no significant differences between the two samples on age[9] and drivers licence years[10]. As a result, such findings indicated that there were no significant differences between at least the demographics of those participants who went on and completed the survey

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[9] Age: For the included data ($M= 29.65$, $SD= 6.81$). For the excluded data ($M=29.86$, $SD= 6.92$).
[10] Drivers licence years. For the included data ($M= 10.77$, $SD= 6.40$). For the excluded data ($M=11.01$, $SD= 6.60$)

versus those who did not (and whom had completed only some of the demographic items).

6.2.2 Assumptions of multivariate analysis

Across all speeding scenarios, there were no issues with multi-collinearity, as the test of VIF and tolerance did not indicate scores higher than 5.3 or less than 0.9 (Tabachnick & Fidell, 2007). Cooks distance test also indicated that there were no influential outliers, as none reached the cut off of 1 (Tabachnick & Fidell, 2007). The visual interpretation of the histograms of the residuals indicated a normal distribution for the regression model for specific speeding scenario 80-MSA. However, visual interpretation of the histograms of the residuals indicate a slight positive skew for the regression model for general speeding scenario and kurtosis was evident for the regression model for the specific speeding scenario H-MSA. Therefore, bootstrapping was conducted for all speeding scenarios. Bootstrapping can be used in the case of assumptions violation (Field, 2013). In SPSS, bootstrapping solved these issues by estimating the properties of the sample distribution from the original data set. For each bootstrap sample, the parameters of interest were tested (Field, 2013). This process was repeated 1000 times regarding the current study.

6.2.3 Statistical power

To apply regression analysis, it was important to ensure sufficient statistical power. The statistical power was calculated as $N \geq 104 + m$ (m= number of predictors), which was recommended by Tabachnick and Fidell (2007). It is used to examine certain predictors to identify a medium effect-size with a significance level of .05 and 80% power. Thus, in the current study, a minimum sample size of 110 was required in order to ensure sufficient power for the intention analysis. The data was cleaned and

screened. As a result, from 405 surveys (i.e., the total number of received surveys), the final 112 surveys included and featuring minimal missing data reached sufficient statistical power. The 293 excluded surveys had more than 80% missing data which were inadequate for conducting the regression analysis (see the next section for further details).

6.2.4 Results: Descriptive analysis of the data

Table 7: Means, Standard deviations for the extended TPB variables (direct predictors [Attitude, subjective norm, PBC], and the additional predictors [moral norms, descriptive norms, and past behaviour]) for intention to speed for the GS (general speeding scenario), 80-MSA (speeding on 80 km/h to make scheduled appointment), and H-MSA scenarios (speeding on 120 km/h zone to make scheduled appointment).

Variables[a]	Scenario GS[b]		Scenario 80-MSA[b]		Scenario H-MSA[c]	
	Mean	SD	Mean	SD	Mean	SD
Attitude	2.42	1.81	2.71	1.69	2.27	1.51
Subjective norm	1.68	1.16	2.33	1.61	2.26	1.74
PBC	2.76	1.30	2.89	1.75	2.72	1.62
Moral norms	5.46	1.71	4.20	2.28	4.40	2.31
Descriptive norms	4.20	1.67	4.20	1.67	4.20	1.67
Past behaviour	3.11	1.51	3.37	1.72	2.92	1.57
Intention	2.24	1.34	2.59	1.54	2.49	1.57

Note: Higher mean scores indicate more of the construct and thus more positive or favourable views towards speeding. The exception being moral norms where higher mean scores on this construct indicate less positive or favourable views towards speeding. Reliability coefficients illustrated between brackets (). PBC=perceived behavioural control. SD=standard deviation.

[*] Correlation is significant at the .05 level (2-tailed)

[**] Correlation is significant at the .01 level (2-tailed)

[a] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples. [b] N=111 for all variables. [c] N=109 for all variables.

Overall, the mean scores for speeding intention were less than the midpoint score for the three speeding scenarios, reflecting that the sample reported a generally low intention to speed in any scenario. For the direct predictors, across all speeding scenarios, the participants reported lower attitude mean scores than midpoint scores, which indicated that the participants had negative attitudes toward speeding behaviour.

Similarly, with subjective norms, the results showed lower mean scores than the midpoint which indicated that participants perceived less approval from their significant others for speeding behaviour. Regarding PBC, although the participants indicated higher means than attitude and subjective norms, the reported scores across all scenarios were still lower than the midpoint. In terms of the additional predictors, moral norms were associated with slightly higher mean scores than the midpoints across all scenarios, reflecting that the participants recognised speeding as morally wrong. With descriptive norms, the high mean scores across than the midpoint all scenarios indicated that the participants reported that other people like them would engage in speeding behaviour in such scenarios. Finally, with past behaviour, mean scores suggested low speeding incidence among the participants in the past (before the lockdown due to COVID-19) across all the scenarios.

6.2.5 Results: Predictors of intention to speed

To identify the predictors of speeding, bivariate correlation (by Pearson's correlation coefficient) was computed followed by multiple hierarchical regressions. Table 8 shows the bivariate correlations and reliability coefficients for the extended TPB variables (direct predictors [Attitude, subjective norm, PBC], and the additional predictors [moral norms, descriptive norms, and past behaviour]) with the dependent variable of intention to speed within the general GS scenario and the 80-MSA, and H-MSA specific scenarios.

Table 8: Bivariate correlations and reliability coefficients for the extended TPB variables (direct predictors [Attitude, subjective norm, PBC], and the additional predictors [moral norms, descriptive norms, and past behaviour]) with intention to speed for scenarios GS (general speeding scenario), 80-MSA (speeding on 80 km/h zone to make scheduled appointment), and H-MSA scenarios (speeding on 120 km/h zone to make scheduled appointment).

Scenarios	Variables[a]	Attitude	Subjective norm	PBC	Moral norm	Descriptive norm	Past behaviour	Intention
Scenario GS[b]	**Attitude**	(.94)	.31**	.31**	-.05	.15	.09	.21*
	Subjective norm	-	(.62**)	.45**	-.20*	.03	.05	.33**
	PBC	-	-	(.45)	-.19*	.25**	.34**	.59**
	Moral norms	-	-	-	(.51**)	.18*	-.06	-.25**
	Descriptive norms	-	-	-	-	-	.21*	.32**
	Past behaviour	-	-	-	-	-	(.64**)	.50**
	Intention	-	-	-	-	-	-	(.81)
Scenario 80-MSA[b]	**Attitude**	(.92)	.39**	.47**	-.007	.13	.30**	.45**
	Subjective norm[e]	-	(.78**)	.71**	.06	.12	.30**	.58**
	PBC	-	-	(.78)	.21*	.23*	.48**	.77**
	Moral norms	-	-	-	(.71**)	.10	-.01	.06
	Descriptive norms	-	-	-	-	-	.28**	.54**
	Past behaviour	-	-	-	-	-	(.73**)	.61**
	Intention	-	-	-	-	-	-	(.81)
Scenario H-MSA[c]	**Attitude**	(.94)	.45**	.46**	-.07	.21*	.20*	.44**
	Subjective norm	-	(.79**)	.68**	.04	.36**	.30**	.61**
	PBC	-	-	(.81)	.15	.55*	.48**	.79**
	Moral norms	-	-	-	(.73**)	.37	-.01	.04
	Descriptive norms	-	-	-	-	-	.28**	.60**
	Past behaviour	-	-	-	-	-	(.76**)	.55**
	Intention	-	-	-	-	-	-	(.82)

Note: Higher mean scores indicate more of the construct and thus more positive or favourable views towards speeding. The exception being moral norms, where higher mean scores on this construct indicate less positive or favourable views towards speeding. Reliability coefficients illustrated between brackets (). PBC=perceived behavioural control. SD=standard deviation. * Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the .01 level (2-tailed), , [a] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples, [b] N=111, [c] N=109.

The relationships between the independent variables (attitude, subjective norms, PBC, moral norm, descriptive norm, and past behaviour) and the dependent variable (intention) were similar across all scenarios. As theoretically expected, all the direct predictors were correlated with intention to speed in all the scenarios. Attitude was positively significantly correlated with intention in all the scenarios, GS ($r= .21$, $p< .05$), 80-MSA ($r= .45$, $p< .001$), and H-MSA ($r= .44$, $p< .001$). Subjective norms were also significantly and positively correlated with intention to speed, $r= .33$, $p< .001$ for the GS scenario, $r= .58$, $p< .001$ for the 80-MSA scenario, and $r= .61$, $p< .001$ for the H-MSA scenario. PBC had the strongest positive correlation with intentions across all scenarios with $r= .59$, $p< .001$ for the GS scenario, $r= .77$, $p< .001$ for the 80-MSA scenario, and $r= .79$, $p< .001$ for the H-MSA scenario.

The additional predictors were also correlated with intention to speed. For instance, moral norms were found to be significantly negatively correlated with intention to speed but only for the GS scenario ($r= -.25$, $p< .001$) and not for the specific scenarios of 80-MSA and H-MSA. However, descriptive norms and past behaviour were both positively and significantly correlated with intention to speed across all scenarios. The Pearson's correlations coefficient for the descriptive norms with intention to speed were $r= .32$, $p< .001$ for the GS scenario, $r= .54$, $p< .001$ for the 80-MSA scenario, and $r= .60$, $p< .001$ for the H-MSA scenario. For past behaviour, the Pearson's correlation coefficient between past behaviour and intention to speed were $r= .50$, $p< .001$ for the GS scenario, $r= .61$, $p< .001$ for the 80-MSA scenario, and $r= .55$, $p< .001$ for the H-MSA scenario.

For the H-MSA scenario, there was a particularly high Pearson's coefficient correlation ($r= .78$) between subjective norms and PBC which may highlight a collinearity problem. Different authors have different opinions about which r value can

be considered as being indicative of a collinearity issue. While some consider an *r* value that is more than .70 as a collinearity problem (e.g., Weiner et al., 2012), others considered it a problem when correlations are more than .80 (e.g., Katz, 2006). If the reference that considered a minimum value as a collinearity issue (0.70) is taken into consideration, the variance influencer factor (VIF) is needed to be tested in order to exclude any issue with the variables and retain them. After conducting the VIF test, the result was found to be less than 3. According to the literature, when the VIF is less than 3, it is suggested that the (highly) correlated variables may be retained for the analysis (e.g., Weiner et al., 2012). Consequently, both subjective norms and PBC were retained for analyses and, in addition, doing so is consistent with the underpinning TPB framework being tested (see Table 8).

Table 9: Hierarchical regression analysis of significant direct and additional predictors for the GS (general speeding scenario), 80-MSA, and H-MSA scenarios (speeding on 80 and 120 km/h zone to make scheduled appointment).

Scenarios	Step[a]	Predictors[b]	*B*	*β*	*t*	*Partial*	R^2	ΔR^2
Scenario GS	1	Attitude	.01	.01	.22	.02	.35	.35**
		Subjective norm	.08	.07	.79	.07		
		PBC	.57	.55**	6.19	.51		
	2	Attitude	.001	.002	.02	.002	.51	.16**
		Subjective norm	.12	.11	1.37	.13		
		PBC	.35	.34**	3.96	.36		
		Moral norms	-.14	-.18*	-2.54	-.24		
		Descriptive norms	.16	.20*	2.74	.26		
		Past behaviour	.28	.32**	4.36	.39		
Scenario 80-MSA	1	Attitude	.09	.10	1.56	.15	.60	.60**
		Subjective norm	.04	.04	.56	.05		
		PBC	.60	.68**	7.61	.59		
	2	Attitude	.06	.07	.96	.09	.69	.08**
		Subjective norm	.05	.06	1.73	.16		
		PBC	.45	.51**	4.49	.40		
		Moral norms	-.05	-.08	-.38	-.03		
		Descriptive norms	.09	.13	1.86	.18		
		Past behaviour	.24	.26**	4.06	.37		
Scenario H-MSA	1	Attitude	.07	.07	1.10	.10	.64	.64**
		Subjective norm	.09	.10	1.23	.11		
		PBC	.67	.69**	8.35	.63		
	2	Attitude	.06	.06	1.01	.10	.73	.09**
		Subjective norm	.10	.12	1.67	.16		
		PBC	.44	.46**	5.43	.47		
		Moral norms	-.09	-.13*	-2.36	-.22		
		Descriptive norms	.21	.27**	4.21	.38		
		Past behaviour	.19	.19**	3.40	.32		

Note: PBC=perceived behavioural control, * Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the .01 level (2-tailed),

[a] Collinearity Statistics value (VIF) are less than 3, [b] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples.

A hierarchical regression was conducted to identify the predictors of intention to speed for each scenario to identify the significant psychosocial factors of speeding. Consistent with other studies and TPB convention (e.g., Conner et al., 2007 and Elliott & Thomson, 2010), intention was entered as a dependent variable and all the predictors of attitude, subjective norms, PBC, moral norm, descriptive norm, and past behaviour were entered as independent variables. The independent variables were entered in the order of two steps. The first step was based on direct predictors, including attitude, subjective norms, and PBC, followed by entering the additional predictors in the next step, which included moral norms, descriptive norms, and past behaviour.

The overall direct predictors explained intentions to speed for each of the speeding scenarios, GS, 80-MSA, and H-MSA, by a significant 35%, 60%, and 64% of the variance in intention to speed, respectively. The additional predictors added further explanation in intentions to speed for each scenario GS, 80-MSA, and H-MSA by 16%, 8%, and 9%, respectively, making the overall significant variance in intention to speed as 51%, 69%, and73%, respectively. However, at the final step of analysis, the significant predictors for intentions were different across the different scenarios. For the GS scenario, at the final step of the analysis, PBC, moral norms, descriptive norms, and past behaviour were the significant predictors of intention to speed (β = .34, $p<$ .001for PBC, β = -.18, $p<$ .05 for moral norms, β = .20, $p<$ .05 for descriptive norms, and β = .32, $p<$ .001 for past behaviour). Similarly, for the H-MSA scenario the significant predictors of intention to speed at the final step included PBC (β = .46, $p<$ .001), moral norms[11] (β = -.13, $p<$ .05), descriptive norms (β = .27, $p<$ .001), and past behaviour (β = .19, $p<$ .001). Regarding the 80-MSA scenario, only two significant

[11] Please note the finding for moral norm predicting intention in the H-MSA scenario is likely spurious due to a close to zero correlation.

predictors were found at the final step, which included PBC ($\beta = .51$, $p < .001$) and past behaviour ($\beta = .26$, $p < .001$). Across all scenarios, PBC was the most important significant predictor of speeding intention (based on beta weights).

6.2.6 Results: Participants' beliefs influencing intention to speed for specific scenarios 80-MSA and H-MSA

To identify the indirect beliefs that predict intention to speed for each specific scenario (i.e., 80-MSA and H-MSA), several analytic processes were applied, which were consistent with previous studies. The analytic process was 'critical beliefs analysis' consistent with Von Haeften et al.'s (2001) critical beliefs analysis and as exemplified in Abdul Hanan (2014). This analysis includes three steps: first, the Pearson's correlation coefficient between each of the salient beliefs (i.e., behavioural beliefs, normative beliefs, and control beliefs) with intention to speed were examined for each specific scenario. After identifying the significantly correlated salient beliefs with intention to speed in each scenario, each individual salient belief was entered into a separate regression analysis for each belief type to identify the initial indirect predictors of intention again for each specific scenario. At the final step of the analysis, all the significant indirect predictors in terms of the behavioural beliefs, normative beliefs, and control beliefs for each specific scenario were entered together in a final regression model to identify the final predictors, or critical beliefs, of intention to speed (see Tables 10, 11, and 12 for indirect predictors analysis for the 80-MSA scenario and Tables 13, 14, and 15 for indirect predictors analysis for the H-MSA scenario).

Table 10: Means, Standard deviations, Bivariate correlations and reliability coefficients for the indirect variables (indirect predictors [behavioural beliefs, normative beliefs, control beliefs] and intention to speed for the 80-MSA scenario (speeding on 80 km/h zone to make scheduled appointment).

Variables[a]	Items[b]	Mean	SD	r
Intention	-	2.53	1.53	-
Behavioural beliefs (advantages)	Speeding will help me arrive earlier.	2.97	1.71	.54**
	Speeding will help me arrive on time.	2.95	1.80	.56**
	Speeding will allow me to reduce the time I spend in the car.	3.09	1.94	.50**
	It is exciting to drive faster than the speed limit.	2.93	1.95	.28**
Behavioural beliefs (disadvantages)	I feel that speeding is dangerous to others.	5.28	2.15	-.02
	Speeding to make a scheduled appointment puts me under stress.	4.82	2.17	-.15
	Speeding would cost me more money if I committed a violation.	5.52	2.13	-.08
	Speeding could lead to car damage or tyre damage.	5.28	2.04	-.07
	Speeding would lead to loss of control.	4.83	2.02	.01
	My speeding in this situation would likely result in a crash.	4.80	1.94	-.02
Normative beliefs	Parents	2.02	1.78	.23*
	Wife	2.33	1.94	.39**
	Friends	3.89	1.89	.48**
	Brothers	3.09	1.88	.50**
Control beliefs (facilitators)	I would be more comfortable speeding if the road was familiar.	3.41	2.13	.51**
	I would be more comfortable speeding if there is no traffic congestion.	3.49	2.18	.52**
Control beliefs (barriers)	I would be less likely to speed if there is a SAHER or any traffic monitoring system in operation.	5.19	2.19	-.01
	Buildings, shops, turns, signs, and bumps would make speeding difficult for me.	5.06	2.15	-.02
	On an 80 km/h multilane road, pedestrians on the road would prevent me from speeding	4.50	1.80	.26*

Note: SD=standard deviation

* Correlation is significant at the .05 level (2-tailed)

**Correlation is significant at the .01 level (2-tailed)

[a] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples, [b] N=106, [c] counted for combination of advantages of speeding items, disadvantages of speeding items, facilitators, and barriers

Table 10 shows that the Pearson's correlation coefficient between indirect beliefs (predictors) and intention to speed for the 80-MSA scenario. For this scenario,

there were 4 out of the 10 behavioural beliefs that were significantly, positively correlated with intention to speed. These beliefs included, "speeding will help me arrive earlier" ($r = .54$, $p < .001$), "speeding will help me arrive on time" ($r = .56$, $p < .001$), "It is exciting to drive faster than the speed limit" ($r = .50$, $p < .001$), and "speeding will allow me to reduce the time I spend in the car" ($r = .28$, $p < .001$). Regarding the normative beliefs for such scenarios, all of the normative beliefs were found to be significantly positively correlated with intention to speed, and included parents ($r = .23$, $p < .05$), wife ($r = .39$, $p < .001$), friends ($r = .48$, $p < .001$), and brothers ($r = .50$, $p < .001$). Furthermore, three of the five control beliefs were found to be significantly positively correlated with intention and included "I would be more comfortable speeding if the road was familiar" ($r = .51$, $p < .001$), "I would be more comfortable speeding if there is no traffic congestion" ($r = .52$, $p < .001$), and "On an 80 km/h multilane road, pedestrians on the road would prevent me speeding" ($r = .26$, $p < .05$). Then, each of the significantly correlated salient beliefs were entered in separate linear regressions.

Table 11: Regression analysis of significant indirect beliefs (predictors) for the 80-MSA scenario (speeding on 80 km/h zone to make scheduled appointment).

Variables[a]	Items[b]	B	β	t	Partial	Δ R2
Behavioural beliefs (advantages)	Speeding will help me arrive earlier.	.14	.16	1.01	.09	.33**
	Speeding will help me arrive on time.	.24	.29	1.90	.18	
	Speeding will allow me to reduce the time I spend in the car.	.11	.14	1.16	.11	
	It is exciting to drive faster than the speed limit.	.05	.07	.83	.08	
Normative beliefs	Parents	-.06	-.07	-.73	-.07	.33**
	Wife	.18	.24*	2.32	.22	
	Friends	.20	.25*	2.15	.20	
	Brothers	.20	.24	1.83	.17	
Control beliefs (facilitators)	I would be more comfortable speeding if the road was familiar.	.09	.13	.88	.08	.28**
	I would be more comfortable speeding if there is no traffic congestion.	.27	.38*	2.58	.18	
Control beliefs (barriers)	On an 80 km/h multilane road, pedestrians on the road would prevent me from speeding	.08	.09	1.14	.11	

* Correlation is significant at the .05 level (2-tailed)

**Correlation is significant at the .01 level (2-tailed)

[a] Collinearity Statistics value (VIF) are less than 10

[b] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 11 illustrates the indirect beliefs that predicted intention to speed for the 80-MSA scenario. The results showed that only three salient beliefs significantly predicted speeding intention. They included two normative beliefs which were wife (β = .24, $p< .05$), and friends (β = .25, $p< .05$), and one control belief which was, "I would be more comfortable speeding if there was no traffic congestion" (β = .38, $p< .05$). At the final step of analysis, a final regression model was run for all of the three beliefs together and found that all of them were significant predictors of speeding intention. Specifically, these were wife (β = .22, $p< .05$), friends (β = .28, $p< .05$), and "I would be more comfortable speeding if there is no traffic congestion" (β = .31, $p< .001$). Table 12 outlines the final regression comprising the critical beliefs that predict intentions for the 80-MSA scenario.

Table 12: The final regression of the critical beliefs analysis for intentions to speed in the 80-MSA scenario (speeding on 80 km/h zone to make scheduled appointment).

Items[a]	B	β	t	Partial	△ R2
Wife	.17	.22*	2.75	.25	.39
Friends	.22	.28*	3.23	.30	
I would be more comfortable speeding if there is no traffic congestion.	.22	.31**	3.62	.33	

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

** Correlation is significant at the 0.01 level (2-tailed)

a Collinearity Statistics value (VIF) are less than 10. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

The predictors of intentions regarding the 80-MSA scenario were different from those found for the H-MSA scenario, with the only exception to that being the normative belief of "wife" which was also found to be a significant predictor for intention to speed in the H-MSA scenario. The same critical beliefs analysis was performed for the H-MSA scenario. Table 13 showed the Pearson's correlation coefficient between indirect beliefs and intention to speed for the H-MSA scenario.

Table 13: Means, Standard deviations, Bivariate correlations, and reliability coefficients for the indirect variables (indirect predictors [behavioural beliefs, normative beliefs, control beliefs] and intention to speed for the H-MSA scenario (speeding on 120 km/h zone to make scheduled appointment).

Variables[a]	Items[b]	Mean	SD	*r*
Intention	-	2.42	1.53	-
Behavioural beliefs (advantages)	Speeding will help me arrive earlier.	2.80	1.83	.59**
	Speeding will help me arrive on time.	2.77	1.78	.54**
	Speeding will allow me to reduce the time I spend in the car.	2.92	1.92	.48**
	It is exciting to drive faster than the speed limit.	2.94	2.07	.21*
Behavioural beliefs (disadvantages)	I feel that speeding is dangerous to others.	5.12	2.40	-.02
	Speeding to make a scheduled appointment puts me under stress.	4.72	2.27	-.12
	Speeding would cost me more money if I committed a violation.	5.43	2.18	-.08
	Speeding could lead to car damage or tyre damage.	5.20	2.18	-.04
	Speeding would lead to loss of control.	5.33	2.07	-.02
	My speeding in this situation would likely result in a crash.	5.25	2.05	-.12
Normative beliefs	Parents	1.96	1.71	.34**
	Wife	2.31	1.93	.46**
	Friends	3.46	1.99	.37**
	Brothers	2.79	1.93	.38**
Control beliefs (facilitators)	I would be more comfortable speeding if the road was familiar.	3.10	2.12	.55**
	I would be more comfortable speeding if there is no traffic congestion.	3.38	2.23	.56**
	On an120 km/h multilane road, if my trip was to take a long time, I would be motivated to speed	3.46	1.92	.28**
Control beliefs (barriers)	I would be less likely to speed if there is a SAHER or any traffic monitoring system in operation.	5.02	2.29	-.06
	Buildings, shops, turns, signs, and bumps would make speeding difficult for me.	4.83	2.27	.00

Note: SD=standard deviation

[*] Correlation is significant at the .05 level (2-tailed)

**Correlation is significant at the .01 level (2-tailed)

[a] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples, [b] N=100, [c] counted for combination of advantages of speeding items, disadvantages of speeding items, facilitators, and barriers

Similar to the findings in relation to the 80-MSA scenario, the results of this scenario included 4 out of 10 of behavioral beliefs being significantly and positively correlated with intention to speed. These beliefs were "speeding will help me arrive earlier" ($r= .59$, $p< .001$), "speeding will help me arrive on time" ($r= .54$, $p< .001$), "It is exciting to drive faster than the speed limit" ($r= .48$, $p< .001$), and, "speeding will allow me to reduce the time I spend in the car" ($r= .21$, $p< .05$). Regarding the normative beliefs, in a similar way to the 80-MSA scenario, all the normative beliefs were found to be significantly positively correlated with intention to speed. These normative beliefs included parents ($r= .34$, $p< .001$), wife ($r= .46$, $p< .001$), friends ($r= .37$, $p< .001$), and brothers ($r = .38$, $p< .001$). Also similar was that three out of five control beliefs, for this scenario, were positively correlated with intention and included "I would be more comfortable speeding if the road was familiar" ($r= .55$, $p< .001$), "I would be more comfortable speeding if there is no traffic congestion" ($r= .56$, $p< .001$). The third significant belief did differ from that found for the 80-MSA scenario, which was "On a 120 km/h multilane road, if my trip was to take a long time, I would be motivated to speed" ($r= .28$, $p< .001$). As per the previous scenario, each of the significantly correlated salient beliefs then were entered into separate linear regressions.

Table 14: Regression analysis of significant indirect beliefs (predictors) for the H-MSA scenario (speeding on 120 km/h zone to make scheduled appointment).

Variables[a]	Items[b]	B	β	t	Partial	Δ R2
Behavioural beliefs (advantages)	Speeding will help me arrive earlier.	.33	.39*	3.00	.28	.33**
	Speeding will help me arrive on time.	.18	.21	1.59	.15	
	Speeding will allow me to reduce the time I spend in the car.	.00	.01	.07	.00	
	It is exciting to drive faster than the speed limit.	-.007	-.009	-.10	-.01	
Normative beliefs	Parents	-.02	-.02	-.22	-.02	.24**
	Wife	.27	.33**	3.09	.29	
	Friends	.11	.14	1.23	.12	
	Brothers	.10	.13	1.02	.08	
Control beliefs (facilitators)	I would be more comfortable speeding if the road was familiar.	.23	.32*	1.91	.18	.30**
	I would be more comfortable speeding if there is no traffic congestion.	.16	.23	1.32	.12	
	On an120 km/h multilane road, if my trip was to take a long time, I would be motivated to speed	.01	.02	.24	.02	

[*] Correlation is significant at the .05 level (2-tailed)

[**] Correlation is significant at the .01 level (2-tailed)

[a] Collinearity Statistics value (VIF) are less than 10

[b] Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 14 illustrates the indirect beliefs that predicted intention to speed for the H-MSA scenario. The results showed that only three salient beliefs significantly predicted speeding intention. They included one behavioural belief which was "speeding will help me arrive earlier" (β = .39, $p < .05$), one normative belief which was 'wife' (β = .33, $p < .001$), and one control belief which was "I would be more comfortable speeding if the road was familiar" (β = .33, $p < .001$). At the final step of analysis, a final regression model was run for the three beliefs together and found that all of them were significant positive predictors for speeding intention. Specifically, "speeding will help me arrive earlier" (β = .38, $p < .001$), wife (β = .18, $p < .05$), and "I would be more comfortable speeding if the road was familiar." (β = .28, $p < .001$). Table 15 clarifies the final regression of the critical beliefs that influence intentions for the H-MSA scenario.

Table 15: The final regression of the critical beliefs analysis for intentions to speed in the H-MSA scenario (speeding on 120 km/h zone to make scheduled appointment).

Items[a]	*B*	*β*	*t*	*Partial*	$\Delta R2$
Speeding will help me arrive earlier.	.32	.38**	4.41	.40	.46**
Wife	.14	.18*	2.23	.21	
I would be more comfortable speeding if the road was familiar.	.20	.28**	3.36	.32	

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

[**]Correlation is significant at the 0.01 level (2-tailed)

[a] Collinearity Statistics value (VIF) are less than 10. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

6.3 STUDY 3: DISCUSSION

Study 3 of this program of research included 112 participants as licensed drivers who were living in Riyadh city. Underpinned by Research Question 2, "What are the key psychosocial factors that influence speeding behaviour?" The main aim of the study was to identify the key psychological social factors that predicted speeding. Three hypotheses were examined under this research question (See Section 6.1.1). The psychosocial factors explored included the direct and standard TPB constructs of attitude, subjective norm, and PBC as well as the additional factors of moral norms, descriptive norms, and past behaviour. Finally, predictors of intentions were also explored in relation to the TPB indirect beliefs or, more specifically, the behavioural, normative, and control beliefs. The study was conducted by an online survey. The survey was a repeated measure design and included range of items assessed in relation to three different speeding scenarios which included one general speeding scenario (GS), and two specific speeding scenarios including the 80-MSA and H-MSA scenarios. It is also focused on identifying the role of each direct predictor and the additional predictors on intention to speed for each scenario. Any significant findings are compared with the previous literature. Furthermore, the key indirect predictors for the specific scenarios of 80-MSA and H-MSA are also identified.

The utility of the extended TPB was partially supported across the different speeding scenarios. 'Partially supported' in the current study means that not all the direct predictors were significant predictors of speeding intentions. In terms of the additional predictors, again this term means that not all the additional predictors were significant predictors of speeding intentions. Overall, the direct predictors contributed to explaining 35% of the variance in speeding intention in the GS scenario, 60% of the variance in the 80-MSA scenario, and 64% of the variance in the H-MSA scenario.

And, thus, offering partial support for Hypothesis 1 that the direct predictors will predict speeding intention.

Regarding the significant direct predictors of speeding intention, only PBC was significant across all the speeding scenarios. Such findings indicated that participants' perceptions about their ability to controlled their speed in different speed zones is a key determinant of speeding intention regardless of their attitude toward speeding or how they think significant others may think about their speeding (i.e., subjective norm). Overall, the results in relation to the significant direct predictors of intention do differ from what has been found in other studies. Even though the variance explained value was similar to that explained in other TPB-based studies about speeding, generally speaking, most studies had more than one significant direct predictor of speeding intention. In the UK, for instance, a study found that most of the TPB's constructs significantly predicted intention to speed, including (instrumental attitude, affective attitude, and self-efficacy) which together explained 55% of the variance in speeding intention (Elliott and Thomson, 2010). Another study in the UK showed that all the three direct predictors of the TPB's direct predictors significantly predicted intention to speed, explaining 53% of the variance in speeding intention (Conner et al., 2007). In Asia and in studies in Thailand, Laos, and Cambodia, the TPB explained 33% of the variance in intention with attitude as a significant predictor, 47% of the variance with subjective norm and PBC as significant predictors, and 84% of the variance with PBC as a significant predictor, respectively (Tankasem, Satiennam, & Satiennam, 2016). The result in Cambodia has been noted as the only similar result to that of the current study where PBC was the only significant predictor of intention to speed.

Regarding Hypothesis 2, which has posited that the additional predictors will predict speeding intention, the findings supported this hypothesis with the additional predictors adding further variance explained in speeding intention, with 16% of the variance in the GS scenario and 9% of the variance in the H-MSA scenario. For the 80-MSA scenario, Hypothesis 2 was partially supported given that only one additional construct was a significant predictor contributing to the further 8% of the variance explained in speeding intention in this scenario.

For the additional predictors (moral norms[12], descriptive norms, and past behaviour), all the additional predictors were found to significantly predict speeding intentions in the GS and H-MSA scenarios. In these scenarios, moral norms was a predictor of speeding intention whereby the more participants thought they ought not to speed, the less likely they were to report intention to speed. Descriptive norms was a positive predictor such that the more participants reported a perception that other drivers similar to them would speed in such scenarios, the more they reported an intention to speed. With past behaviour, it too was a positive predictor such that the more participants reported speeding in the past, the more they reported an intention to speed in the future.

However, in the 80-MSA scenario, of the additional predictors, only past behaviour was a significant predictor for speeding intention with both moral norms and descriptive norms not significant predictors of drivers' reported intention to speed. Again, past behaviour was a positive predictor such that they more they reported having sped in the past, the greater their reported intention to speed in the future.

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[12] Please note the finding for moral norm predicting intention in the H-MSA scenario is likely spurious due to a close to zero correlation

To examine Hypothesis 3 to explore the indirect beliefs, the critical beliefs analysis for the behavioural, normative, and control beliefs (i.e., indirect predictors) for both the 80-MSA and H-MSA scenarios revealed three of the indirect beliefs significantly predicted speeding intentions for each speeding scenario. The beliefs that were found to be significant critical beliefs predicting speeding intention were different between the two specific scenarios. That said, one belief was similar between the two scenarios and that was the normative belief of "wife". This finding is an important finding as it suggests this normative influence could be targeted in possible interventions to reduce speeding. Indeed, the influence of gender in motivating drivers' intention to speed was not an uncommon finding. With respect to different speeding scenarios, previous studies have found that males and females perceive more pressure to speed from other males of the same age (Forward, 2009a; Horvath et al., 2012). Regardless of gender, either males influencing females or vice versa, the current study presented similar results in that the normative influence between genders (i.e., wife) has an influence on drivers' speeding intentions. In contrast, "friends" was a significant normative belief reported in relation to just the 80-MSA scenario. With respect to previous studies, the influence of friends or peers has also been found to influence drivers' intentions to speed for male and female drivers (Conner et al., 2003; Forward, 2009a; Horvath et al., 2012).

The control belief, "No traffic congestion", as a facilitator of speeding, was a significant critical belief for the 80-MSA scenario. Such a result is meaningful as the 80 km/h speed zones usually connect the main urban centres to the regional network and bear a large traffic load in the urban area (Highway Design Manual, n.d.; Transportation Planning Guide in Saudi Cities, 2005). This information might lead the participates to expect traffic congestion and less traffic flow in this speed zones.

Previous research has also supported the association between free-flowing roads and intention to speed (Conner et al., 2003; Horvath et al., 2012).

In terms of the H-MSA scenario, "being familiar with road" was the only control belief identified as a significant critical belief predicting intention. There was also one significant behavioural belief reported for speeding intention, which was the advantage of speeding being the means of enabling an individual to arrive earlier. Such findings suggest that if the participants perceive the highway as a familiar road, they are more likely to speed. In addition, the participants believe that speeding on highways can help them to arrive more quickly. Similar findings have been found in previous studies which examined beliefs influencing speeding intentions on highways (Conner et al., 2003; Forward, 2009a; Horvath et al., 2012). Indeed, the item "being familiar with road" was adapted from the Horvath et al. (2012) study.

The analysis of the current study was able to show the ability of the extended TPB to predict speeding intention and to examine the influence of salient beliefs on speeding intention in SA. Overall, the extended TPB was a useful framework in all speeding scenarios.

6.4   STUDY 3: STRENGTHS AND LIMITATIONS

Study 3's principal strength is that it represented a theory-based application using an extended TPB framework in understanding factors influencing speeding intentions of drivers in SA. Because it is the first study of its kind covering speeding behaviour from this perspective in SA, it has also added knowledge that can be used for identifying the key psychosocial factors that predict speeding intention in the SA community. Additionally, like Studies 1 and 2, the raw data for Study 3 were gathered in the participants' native language (Arabic), so they could fluently express their opinions, views, and impressions and be expected to understand the questions as posed in the survey.

Despite these strong foundations, Study 3 does present some limitations, which must be acknowledged. First, although the survey in this study was anonymous, speeding is an illegal behaviour in SA. Therefore, participants could have given dishonest or socially desirable responses. The second limitation relates to the problem of generalising Study 3's results to the whole SA driving community. However, Study 3, like Study 2, included participants from more diverse educational backgrounds than Study 1 (which comprised mostly PhD candidates). Regardless of the homogeneity of Saudi culture (Cassell & Blake, 2012), considering this sample as representative of the entire community might be a concern. This would suggest that further studies need to be conducted with participants from various sectors within SA rather than only from a SA university. The effect of a non-representative sample would affect the generalisability of the results.

Study 3 is also limited by the absence of the actual behaviour outcome measure (or Time 2 survey), which represents one of the TPB application protocols. As noted previously, the candidate was unable to implement the survey at Time 2 as initially

planned due to the impact of the COVID-19 pandemic during the data collection process. The actual behaviour examination (which was supposed to take place two weeks after the intention measurement) was removed to remain in compliance with the disease prevention and containment procedures in SA, which included restricting driving behaviour or any unnecessary activity outside the home. Though, according to Armitage and Conner (2001), intention, as an outcome measure, can predict behaviours, the behaviour itself should be examined to be certain. However, much research attests to the fact that intentions are a consistent and reliable predictor of behaviour including in the context of speeding (Sheeran & Abraham, 2003).

Lastly, Study 3 presents a limitation related to the technical issue of displaying the surveys, which could have contributed to the extent of uncompleted surveys. Qualtrics was used to host the online survey, and the survey could be accessed on different devices, including mobile phones. However, accessing the survey platform on mobile phones may have been an issue for some participants. Indeed, the survey was designed with several items for different speeding scenarios, which included some tables with two columns that did not fully appear on mobile phone screens. This issue was minimised to a degree by displaying reminders (presented in red font to highlight the importance of the issue) to the participants who missed some items before allowing them to continue to the items on the next webpage. Consistent with ethical requirements, responses could be skipped but there was at least provision for someone to be advised when a question had been missed but a number of participant could then choose not to answer if they preferred not to answer.

It is important to note that this study was conducted during the lockdown for the COVID pandemic in SA. The impacts of the lockdown on driving and speeding in particular were not examined in the current research. In other words, the participants

may have experienced difficult feelings including fear during the lockdown and the data collection time. For this reason, the results should be validated during a period of time without driving restrictions.

6.5   STUDY 3: SUMMARY AND IMPLICATIONS IN THE NEXT STUDY

In summary, the results from Study 3 provide partial support for the utility of the extended TPB in predicting intention to speed among the Saudi community in Riyadh city. Even though the additional predictors (moral norms[13], descriptive norms, and past behaviour) were fully supported for the GS and H-MSA scenarios, the extended framework was only partially supported for the 80-MSA scenario given that only past behaviour, of the additional constructs, significantly predicted speeding.

Overall, the results revealed that the mean scores for speeding intention were less than the midpoint score for the three speeding scenarios, reflecting that the sample had reported a generally low intention to speed in any scenario. The hierarchical regression was conducted to identify the predictors of intention to speed for each scenario to identify the significant psychosocial factors of speeding.

Study 4 aims to to identify experts' opinions in road safety sectors in Riyadh city about the key findings from the program of research and the practical implications for the results. The results were presented in user-friendly form which are clarified below. Across all scenarios, PBC was the only direct predictor that was significant. Of the additional predictors, past behaviour was the only additional predictor of the extended TPB framework that was significant across all scenarios. PBC also was the most important predictor overall based on beta-weights. This finding indicated that the more participants think they can control their driving speed, the stronger their reported

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[13] Please note the finding for moral norm predicting intention in the H-MSA scenario is likely spurious due to a close to zero correlation

intention to speed. While for past behaviour, the results indicated that those who sped more in the past in a similar scenario were more likely to intend to speed in the future in the same context.

In terms of the indirect predictors, they were identified for specific scenarios for speeding in 80 km/h and 120 km/h speed zones. "Wife" was found as the only shared influencer in the two scenarios as a normative belief. "Friends" was found as an influencer for drivers' intentions to speed in 80 km/h speed zones. Such factors reflected that if participants thought their wife and friends would not approve of them speeding, they were less likely to report an intention to speed. Regarding control beliefs, while "no congestion" was reported as a facilitator for speeding intention in 80 km/h speed zones, meaning that free-flowing roads would motivate the participants to intend to speed. The belief "being familiar with road" was found to be a facilitator for speeding intention in 120 km/h speed zones which reflected that the greater familiarity with the road would increase their intention to speed. For behavioural beliefs, only the "arrive earlier" belief was a significant predictor for intention to speed for speeding in 120 km/h speed zones, meaning that if participants believed that speeding would help them to arrive at their destination earlier it would increase their intention to speed.

The current results provide much insight into the psychosocial factors underpinning intention to speed for Saudi citizens. A summary of the significant findings emerging from Study 3 was devised for use in Study 4. Study 4 sought to gain experts' opinions about the key findings particularly with respect to their practical implications for potentially informing future interventions to address speeding in SA. Study 4 is presented in the next chapter.

Chapter 7: Study 4

In Chapter 6, across all scenarios, PBC and past behaviour were found to be significant predictors of speeding. The remaining additional predictors, moral norms and descriptive norms were found to be significant for the general speeding scenario (GS scenario) and the specific speeding scenario of speeding on 120 km/h roads (i.e., H-MSA scenario). Regarding the indirect predictors, "wife" was found to be the only significant critical belief across the two specific scenarios. "Friends" were found to be a significant critical belief of drivers' intentions to speed in 80 km/h speed zones. Regarding control beliefs, while "no congestion" was reported as a facilitator for speeding intention in 80 km/h speed zones, "being familiar with the road" was found to be a significant critical belief of speeding intention in 120 km/h speed zones. For the behavioural beliefs, only the "arrive earlier" belief was a significant critical belief of intention to speed in 120 km/h speed zones. Study 4 of this program of research relates to identifying road-safety experts' opinions on these key findings from the program of research and their potential practical implications in terms of the development of future anti-speeding initiatives in SA.

7.1 METHODOLOGY AND RESEARCH DESIGN

7.1.1 Study 4

Study 4 was an exploratory qualitative study, involving an open-ended online survey. This study contributed to addressing Research Question 2. "What are the key psychosocial factors that influence speeding behaviour?", and the additional question, "What can be done to change speeding behaviour?". Once the results of Study 3 were determined, a summary of the key findings was written up and used as stimulus

material within the survey for Study 4. Study 4 sought to identify road-safety experts' opinions about the key findings from the program of research. Thus, the answers to Research Question 3, "Which psychosocial factors can be used to be used in future intervention strategies?" could be addressed after the experts' assessment and consideration of the results. This study also sought to answer Research Question 3, "Which psychosocial factors can be used to be used in future intervention strategies?". This question thus relates to the potential practical implications of utilising the key results from this program of research for designing future interventions to address speeding in SA.

7.1.2 Study 4: Setting of the study

The online self-reported survey was hosted by Qualtrics (an online application authorised by QUT). The participants were road safety experts who were nominated by Dr. Ali Al_Rasheedi, the external supervisor to this PhD project who works at the Naif Arab University for Security Sciences (NAUSS). Dr. Rasheedi has experience in the road safety issues in Riyadh and is in contact with other experts in the field in different sectors.

7.1.3 Study 4: Participants

A convenience sample of seven road safety experts working in SA was recruited. Reaching theoretical saturation in the data contributed to the determination of the final sample size (see Saunders et al. [2018] for information about theoretical saturation). The participants were selected based on their expertise in the field and their experience in SA. The mean age of the participant sample was 47.14 years (*SD= 10.91 years*) and ages ranged from 32 to 62 years. The mean number of years' experience was 25 years (*SD= 13.95 years*). All participants were holders of PhD degrees except for one with

a Bachelor's degree. They were found to be all males who have experience in road safety in SA, working in sectors including universities, research centres, and governmental sectors. There was no previous relationship between the candidate and the participant for all qualitative studies.

7.1.4 Study 4: Design and Procedure

Ethical approval was gained from the Human Research Ethics Committee (HREC) at Queensland University of Technology (QUT Reference Number: 2000000422). All participants were invited to participate through peer nomination by the candidate's external supervisor, Dr. Ali Al_Rasheedi. The candidate then invited the experts through direct approach via emails/WhatsApp. The contact details for the candidate were clarified in the invitations sent to them. The details of privacy and confidentiality of participation was clarified in the Participant Information Sheet that was attached to the approach email/or linked in the WhatsApp message. The typical time for completing the survey was estimated as 15-20 minutes. The data collection process and analysis occurred from July 2020 to August 2020.

7.1.5 Study 4: Materials and Measurements

The study was conducted in English, unlike the previous studies, because the experts were fluent in English. The participants (experts) were informed that to participate, they needed to be comfortable conversing/reading English as the study materials were in English. The findings of Study 3 were written up in a user-friendly format to be the stimulus materials provided to the experts for their review in Study 4 (see Appendix E for the details).

7.1.6 Study 4: Analysis

Conceptual content analysis was applied to analyse the data based on the frequency of responses. Braun and Clarke's (2006) steps of analysis were applied. The analysis was guided by responses provided by each of the questions asked of the This approach was considered carefully so that the candidate was also open to receiving new themes not necessarily directly related to the question under examination. Tables were used to categorise themes under each question (from the survey questions), and all the potential data were identified and categorised in relation to each question. The frequency of particular responses was determined.

7.2   STUDY 4: RESULTS

Overall, the results showed much consensus among the road safety experts with five of the experts agreeing with the interpretation of the results and that they thought the results reflected the reality of speeding behaviour among Saudi drivers in Riyadh city. Conclusions exemplified via the following quotes:

"The results significantly reflect what's going on in Saudi Arabia. The results will be useful in formulating future regulations for these kind of road users" (P1, 62)

"High up to 90%" (P2, 43)

"They are significant" (P4, 39)

"To a high extent. These results demonstrate the aspects that should be focused on changing behaviors" (P6, 59)

"The results of this study make sense to me, and I agree with the significant factors found above for each scenario although I see law enforcement such as SAHER has a bigger influence on drivers in Saudi Arabia" (P7, 32)

Some experts emphasised the importance of certain results in relation to speeding behaviour. According to one participant, the factor of being late as a reason to speed was empirically supported in the findings. This expert noted:

"...carelessness of the importance of time, for example, if the trip takes one hour from home to work or any other target destination and the driver does not put the time needed to reach there into his consideration of planning and leaves home late then he is taking a gamble to reach his destination by a specific time" (P2, 43)

In contrast, the remaining two (of the seven) experts agreed to some extent with the interpretation of the results by using words like *"Average range" (P5, 43)*, and *"Moderate" (P3, 52)*. One of them explained the reason behind his opinion was due mostly to the methods of the study. Specifically, he noted, *"Average range because of the limited recruitment places and Riyadh is a large geographic area. In addition, the study did not include electronic traffic devices and field work" (P5, 43)*. In other words, he was concerned that the recruitment approach would not have enabled many participants to be represented and that there were no objective methods used to assess speeding behaviour (i.e., all insights offered from the program of research were based on self-report methods only).

Experts were asked "how can this knowledge be used for future interventions for reducing speeding behaviour or to increase drivers' compliance with the legal speed limit" and "what are the intervention strategies that you think could be used for the intervention? ". Four participants suggested there would be value in using this

knowledge in school curriculums or educational institutions to increase public awareness of speeding.

Two participants suggested that awareness campaigns addressing speeding could be developed. They suggested including parents in such campaigns may help to increase children's awareness about speeding. One of them also suggested including a famous soccer player as a role model to be featured in a public education initiative and suggested including children and daughters in the campaigns as well. This participant stressed the importance of females in changing bad behaviours among the community and that this could be achieved by including daughters in the campaigns. The other participant stressed the need for increased public awareness campaigns that addressed specific factors relating to speeding, including "speeding for being late" and "perceived behavioural control". In other words, there was strong support for the findings informing the development of education and awareness- raising interventions:

".... [findings could inform content of] school curriculum" (P2, 43)

"Can benefit from it by adding it into the school curriculum, intensive teaching programs for the community" (P3, 52)

"The educational institutions must be involved in utilizing the outcomes of this study and should be applied for the students of the public learning." (P5, 43)

"Enrol parents and family in traffic awareness campaigns, also use of children especially daughters and motivate them to change their previous bad behaviour. Utilisation of role models and famous footballers to reach the largest group of people" (P4, 39)

"These results can be used in raising public awareness by correcting the false beliefs found in the study such as "perceived behavioral control" or "speeding

would help to arrive earlier". Educational campaigns of the danger of high speed should include these commonly incorrect beliefs. For instance, we may show drivers that speeding would not reduce significantly your arrival time" (P7, 32). The expert above was referring to the need to educate the community that speeding is not going to help them reach their destination more quickly and neither is it a behaviour that they can control. The same participant also added: *"Instead of targeting drivers during educational campaigns, we can educate and target their close relatives such as their wife, parents etc as those might have a higher impact on them as shown in the study. Also, we should educate kids in school so that they become aware at an early age, also to be an educator for their parent"* (P7, 32).

In addition to the proposed public education and awareness-raising initiatives, there were also suggestions offered by two participants as to how best to disseminate these messages:

"Only the role of new technologies in this regard" (P1, 62). For this quote, the meaning of "new technologies" included social media, SMS, and TV.

"Through TV programs, documentary movies, brochure, publications, transmission of pictures and clips of really serious road traffic accidents, interviews with (injured and sufferers) from traffic accidents" (P2, 43)

Other potential road-safety interventions mentioned included increasing the penalties for traffic violations and speeding-related problems:

" .....and in the traffic violation penalty alternatives" (P3, 52)

"Increasing the penalty and referring the violators to traffic courts to implement provisions more drastic than financial penalties" (P5, 43)

Regarding the last question, "what are the factors that you think have been not addressed, and how may these aspects be addressed/revealed in future studies?", the main factor that the participants thought had not been addressed was other potential contributors to road trauma, specifically, drug use or alcohol consumption:

"Other influences, psychotropic substances" (P3, 52)

"Drug and alcohol addiction" (P5, 43)

"Abuse of psychotropic substance" (P6, 59)

One participant gave several suggestions as to aspects needing research attention for future studies related to this topic. One of these suggestions was to apply this survey in different cities in SA, and another suggestion was to apply the survey to female drivers in SA: *"It'd be interesting to see what women drivers are different from men doing the same survey. Also, how drivers in other cities in Saudi Arabia would say if you repeat the same survey. It'd be informative if you elaborated on the variance as I see it has a large value and is increasing as we move from scenario 1 to 3" (P7, 32).* The same participant also raised different research problems to be considered for future studies which are not related to the current program of research:

> *"Automated law enforcement is a significant factor in Saudi Arabia as it has been shown in previous studies and recent applications of automated law enforcement such as using cell phones while driving, and thus it might be considered for future studies. Also, we should investigate the impact of other general factors such as having someone else in the car while exceeding the speed limit, driving a modern or old car, type of roadway: highway or arterial, rural or urban, time of day: daytime or night" (P7, 32)*

7.3   STUDY 4: DISCUSSION

Study 4 of this program of research included seven participants who were road-safety experts from SA and who had expertise in relation to the roads in Riyadh city. Underpinned by Research Question 2, "What are the key psychosocial factors that influence speeding behaviour?" and Research Question 3, "Which psychosocial factors can be used to be used in future intervention strategies?". The main aim of this study was to identify experts' opinions about the key findings from the program of research and the practical implications for the results. The results are discussed below followed by some suggestions as to potential interventions.

An important question associated with the results is to what extent do the results reflect the reality of speeding behaviour among Saudi drivers in Riyadh city? Most of the experts' opinions were consistent with the findings (in terms of the experts' thoughts as to what factors influence speeding) and, thus, to that extent, function to confirm the accuracy of the results. Indeed, none of the experts disagreed with any of the findings that emerged from Study 3. Some of them verified aspects of the results such as the relationship between speeding and the factor of being late among Saudis. Another participant also verified the influence of friends in practicing deviant behaviours, one of which is speeding.

Only a couple of them reported accepting the results just 'to some extent' and even then they do not oppose any of the specific findings. One of the main reasons underpinning some queries regarding the findings was that it was suggested that the data need to be derived from other places than just Riyadh city, given that Riyadh city has a large geographical location. The other reason for this opinion, is the lack of the objective assessment of the data and the lack of fieldwork. On the other hand, with respect to those opinions, it is also important to consider most experts' opinions which

clarified and supported the findings. For this reason, it was acknowledged that the results could be utilised to inform public awareness interventions in SA. To utilise these findings in raising public awareness, the experts provided some suggestions, which are discussed below.

Ultimately, most experts suggested that the findings would be of value to inform interventions delivered through public education initiatives and awareness campaigns. Others in SA have called for the need for more public education and awareness campaigns for road safety (Al-Hindi, and Albawardy 2013; Al-Turki, 2014). The findings of Study 4 further confirm the important need to raise road safety awareness in schools and colleges.

Other suggestions relating to public education initiatives were to undertake TV and media campaigns. It is acknowledged that new media has been considered as one of the delivery options for road safety messages in SA (Al Turki, 2014). For instance, one of the common and successful delivery modes has been identified for road safety interventions in SA is Twitter (Albalawi & Sixsmith, 2017). According to Albalawi and Sixsmith (2017), new media such as Twitter provides a paramount platform for disseminating public health messages in SA. Internationally, individual teaching regarding speeding compliance was found to be a more effective results than media and videos (Parker et al., 1996). According to Jones (2010), it was stated that individual teaching in classroom-based approaches or applying interventions through intensive computer administration may be a very successful to increase interventions regarding speeding.

It was to be acknowledged that the most common suggestions in terms of interventions that this program of research could help inform were not around enforcement but public awareness and public education initiatives. A possible

explanation for this result was that none of the results in the surveys showed any information about participants' beliefs regarding enforcement. As clarified in Study 2, the only concerns regarding enforcement that were elicited from the participants related to the SAHER system which would prevent them speeding. Such results were used as item measures and tested in Study 3. However, Study's 3 results showed no significant results for predictors relating to the impact of enforcement on the intention to speed in either specific speeding scenario.

There were also other suggestions for future interventions found in this study. Some experts suggested introducing more road violation penalties to control speeding problems. This suggestion, while relevant to speeding interventions broadly was considered out of the scope of this program, which is focused particularly on understanding speeding behaviour and public education rather than interventions relating to speed enforcement practices. Another suggestion which is also out of the scope of the study is the effects of drug use and alcohol consumption on drivers. It is acknowledged that the problems associated with drink driving or drug use can affect driving behaviours, including speeding commitment, however they are classified as a separate topic which would require further research.

7.4 STUDY 4: STRENGTHS AND LIMITATIONS

Even though Study 4 provided insight into the accuracy of findings emerging from this program of research, it also has a limitation in that the data was subjective as it is based on the views of seven individuals only. That said, however, these individuals were identified to be road safety experts in SA. Thus, representing a key strength of this study was the inclusion of the road safety experts to assess the findings of Study 3. Furthermore, the consultation with the experts on their interpretation of the results and potential interventions has enabled the researcher to have a potential influence on how speeding is addressed in SA in likely a more direct way than via research publication of findings alone.

In addition, having open-ended questions in an online survey may have impacted findings when compared with a qualitative study conducted in-person or via virtual interview methods. Even though results of this study were obtained that provided insight, qualitative research conducted via in-person interviews might lead to richer data.

7.5 STUDY 4: SUMMARY

In summary, most of the road safety experts in SA agreed with the interpretation of the results of Study 3, and a few of them agreed 'to some extent' (moderately) with the interpretation of the results. Regarding the experts' opinions about utilizing this knowledge for future interventions to reduce speeding behaviour, some major strategies were identified. These included developing road-safety education initiatives which may be delivered within school curriculums or via public health awareness campaigns. It was suggested that, within such campaigns, to include parents, who, in turn, could contribute to increasing children's awareness about speeding behaviour.

Furthermore, some delivery modes were suggested, which included media and TV. Other factors raised that related to speeding behaviour which have not been covered in this research of program were mainly issues around drug use and alcohol consumption.

Chapter 8: General Discussion and Conclusion

In this chapter, a general discussion of the program of research is provided. It starts by revisiting the objectives of the research program and introducing the key findings as they relate to the research questions. Then, the theoretical, methodological, and the practical implications of the research are discussed, and the strengths and weaknesses are considered. The chapter concludes with a discussion of future recommendations.

As its overarching objective, this program of research sought to generate knowledge regarding the psychosocial factors influencing speeding in the Saudi Arabian context. In doing so, the research addressed a relatively large omission in current evidence. Specifically, it offered one of the first theoretically-informed investigations of psychosocial factors influencing speeding in the Saudi context. Specifically, the research aims included:

١. to determine the psychosocial factors that contribute to speeding in the Saudi Arabian context (and, in doing so, address a gap in current knowledge);

2. to provide evidence which may assist in the development of culturally-relevant speed awareness interventions; and

3. to add a theoretical contribution to the road safety field via the application of an extended Theory of Planned Behaviour (TPB) and, in doing so, examine its theoretical robustness within Arab culture.

As was discussed earlier in Chapter 3, a mixed-methods approach was adopted for this program of research and a program that was underpinned by the TPB. Therefore, both qualitative and quantitative methods were applied.   A summary is given below of the four studies and the methods used.

- **Study 1:** Study 1 sought to define speeding behaviour (i.e., provide a specific definition in accordance with the TPB's TACT principle) from the Saudi perspective and, thus, answer the research question, "How do Saudis define speeding from their own point of view?". It was a qualitative study involving one-on-one individual interviews with Saudi drivers.

- **Study 2:** Study 2 was a belief elicitation study. It contributed to answering the research question, "What are the key psychosocial factors that influence speeding behaviour?". It too, like Study 1 and consistent with TPB conventions (Ajzen, 2006), was a qualitative study conducted via one-on-one telephone interviews with Saudi drivers.

- **Study 3:** Study 3 was used to examine the predictive feasibility of the extended TPB framework in identifying the psychosocial factors of speeding intention. This study played a major role in answering the research question, "What are the key psychosocial factors that influence speeding behaviour?". It was a quantitative study conducted via an online survey of Saudi drivers.

- **Study 4:** Study 4 was a qualitative study conducted by open-ended online surveys with road safety experts based in SA. It contributed to assessing the findings of the research question "What are the key psychosocial factors that influence speeding behaviour? ", and answering the research question, "Which psychosocial factors can be used to be used in future intervention strategies?".

8.1 ADDRESSING RESEARCH QUESTIONS:

The findings from the program of research that are presented in this section address particularly the first and the second research aims: namely, to determine the psychosocial factors that contribute to speeding in the Saudi Arabia context (and, in doing so, address a gap in current knowledge), and, to provide evidence which may assist in the development of culturally-relevant speed awareness interventions.

8.1.1 How do Saudis define speeding from their own point of view? (to identify the specific speeding scenario/s)

As previously discussed in Chapter 4, according to Ajzen (2006), defining a behaviour according to the TACT principle is one of the TPB's application protocols to which the current research adheres. Two major categories of speeding definitions, or scenarios, were identified for further exploration within Study 3 in this program of research. One of these scenarios was termed as the general speeding definition, abbreviated herein as the "GS" scenario. This scenario was intended as a broad, overarching scenario applicable to all Saudi drivers and for which the predictors of speeding in such a context were explored in Study 3. The other type of scenario was termed herein as the specific definitions or scenarios for speeding.

The beliefs underpinning specific scenarios were explored in Study 2 and, similar to the GS scenario, the extended TPB was applied in Study 3 in relation to such scenarios to understand the psychosocial predictors of speeding intention in these particular scenarios. For both the general and specific definitions of speeding, consistent with the TACT principle, "T" for a target was defined as 'speeding', and the other "T" as time was defined as a time in the future when it will once again be

legally acceptable to drive[14] while the Action "A" and the Context or "C" were identified through asking four interview questions (Fleiter, 2010, p. 239; Horvath, 2009) (see Figure 6). The action was determined through asking the first interview question that asked about the definition of speeding from Saudi drivers and, thus, from the SA context. Most participants in Study 1 defined speeding as "exceeding the legal speed limit" which then shaped the action component of all the specific scenarios of speeding that were explored. Finally, for identifying the context, this aspect was more complex. It required the analysis or synthesis of the responses to all the remaining interview questions used in Study 1. Mostly, identification of a context feature was based on at least 30% of responses, which was set as a minimum frequency at which something was mentioned by Study 1 participants. From there, with the TACT components, four speeding scenarios were developed and, of note, components of which were mostly supported by existing evidence (e.g., Conner et al., 2003; Fleiter, 2010; Lewis et at., 2010; MacMillan & Hewitt, 2008; Nofal & Saeed, 1997). In particular, two speed zones were mentioned more frequently among the Study 1 participants and they were 80 km/h zones as well as highways (with highways featuring speed limits of 120km/h and, thus, 120 km/h speed zones; see Figure 6). With these speed zones identified and other contextual features (e.g., type of road in terms of lanes and free-flowing traffic), the four specific speeding scenarios were developed, and all included within Study 2 to elicit beliefs underpinning speeding in each of the contexts. One important factor influencing motivation to speed was

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[14] Initially, a timeframe of 2 weeks was to be used but this was before the emergence of the global COVID-19 pandemic. Due to the pandemic and its impacts on individuals' ability to drive/leave their homes during this time (which reduced such behaviours), the timeframe was changed to "once again be legally acceptable for me to drive". Thus, Study 3 instead of featuring both intentions and follow-up behaviour, featured only intentions as an outcome measure and was based on some point in time in the future when able to drive again as opposed to a specific timeframe as would have otherwise been applied in the absence of COVID-19.

"driving alone" and, as a result, this aspect was added and held constant across all specific scenarios. Driving alone has also been found in other studies to be a factor that encourages speeding behaviour (Fleiter, 2010; Horvath, 2009).

While commencing with four specific scenarios, because of the findings from Study 2, the decision was made not to progress with further exploration of two of the scenarios in Study 3. The reason for this was that the Study 2 participants reported a low probability to speed within the circumstance of "speeding with no particular reason" and saw few advantages of speeding for no particular reason. Even though there were some beliefs still elicited in relation to such contexts, the beliefs were like those elicited in relation to the other specific scenarios where one was said to be speeding because of being in a hurry. Further details of Study 1 in terms of steps undertaken and the findings that resulted (and which informed the scenarios to be examined in the program of research) are illustrated in Figure 6.
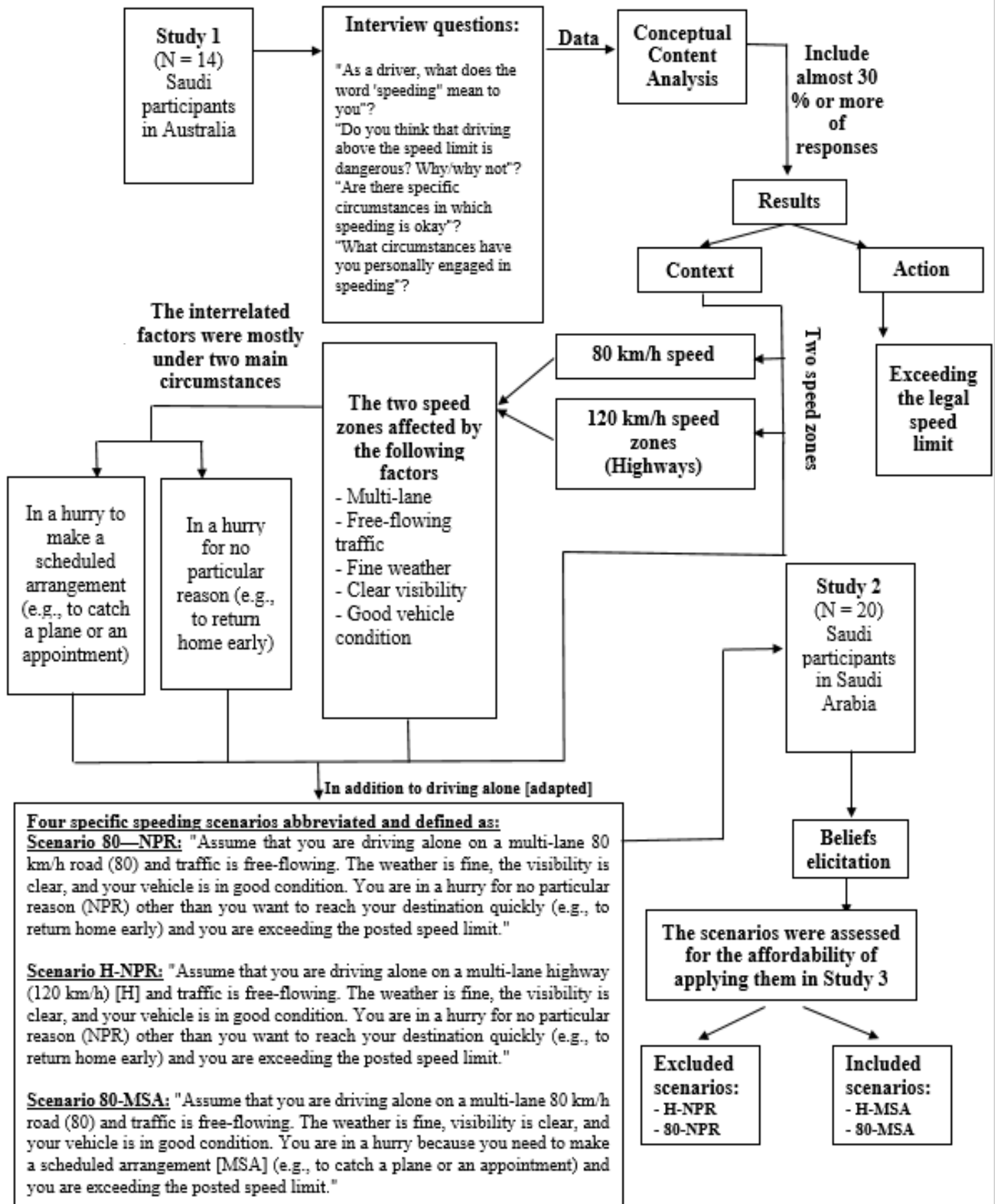
Figure 6: Study 1 steps and key findings informing Study 2

8.1.2 What are the key psychosocial factors that influence speeding behaviour?

Countermeasures that are likely to achieve behavioural change depend on there being a sound understanding of the factors that affect such behaviour across contexts. Furthermore, understanding the relative influence of factors in determining such behaviour is also critical to develop a tailored road safety intervention to the community's needs and, in doing so, optimise resources. In accordance with this view, the results of Studies 2, 3, and 4 in this program of research provided insight into the psychosocial factors that contribute to speeding in three different contexts in SA. Study 2's results also contributed to the design of content for the survey used in Study 3. While all studies provided important insights, Study 3 was certainly considered as offering some of the main findings of the program of research to the extent it was based on a larger (relative to the sample sizes of Studies 1 and 2) sample of Saudi drivers. In addition, the findings from this study were used to answer the above research question and used to develop the practical implications. Study 4 provided an assessment or validation of the findings from Study 3 by asking road safety experts from within SA of their interpretation of the results and potential implications for speeding interventions. As will be discussed in a subsequent section (see section 7.2 for more information about experts' opinions), the experts largely agreed with the findings and the importance for speeding interventions in SA. The following sections discuss the findings for each specific study within the program of research, including outlining how each contributed to answering the research questions.

Study 2: Indirect beliefs (the elicitation study)

Study 2 (as was outlined in Chapter 5) was conducted in SA via telephone interviews, which elicited the TPB's behavioural, normative, and control beliefs (i.e.,

indirect predictors) underpinning speeding in relation to each of the four specific speeding scenarios. The most common or frequently occurring beliefs (i.e., > 15% of responses) were used to then develop relevant items for the Study 3 survey and, in doing so, remain consistent with TPB conventions.

As expected, due to very similar scenarios in Study 1, the results of Study 2 were similar across all specific speeding scenarios, which contributed to the decision to focus on more relevant specific speeding scenarios to be included in Study 3. As was illustrated in Figure 7, the scenarios that related to speeding on both speed zones, 80 km/h and 120 km/h, were included for the survey (see section 5.3 for further justifications about including and excluding speeding scenarios). Overall, drivers in Study 2 believed that speeding in 80 km/h and 120 km/h speed zones was dangerous and not a favourable behaviour.

Study 2

(N = 20)

Saudi drivers in SA

→ Data →

Conceptual content analysis

→ Include 15% or more of participants →

Results

Adapted from Horvath et al. (2012)

Behavioural beliefs:

-Speeding will allow me to reduce the time I spend in the car.

-It is exciting to drive faster than the speed limit.

Control beliefs:

-I would be more comfortable speeding if the road was familiar.

Different beliefs across the two scenarios

Control belief:

-Pedestrians on the road would prevent me from speeding.

Control belief:

-If my trip was to take a long time, I would be motivated to speed.

Similar beliefs across the two scenarios:

Behavioural beliefs:

-Speeding will help me arrive earlier.

-Speeding will help me arrive on time.

Speeding will allow me to reduce the time I spend in the car.

-It is exciting to drive faster than the speed limit.

-I feel that speeding is dangerous to others.

-Speeding to make a scheduled appointment puts me under stress.

-Speeding would cost me more money if I committed a violation.

-Speeding could lead to car damage or tyre damage.

-Speeding would lead to loss of control.

-My speeding in this situation would likely result in a crash.

Control beliefs:

-I would be more comfortable speeding if the road was familiar.

-I would be more comfortable speeding if there is no traffic congestion.

-I would be less likely to speed if there is a SAHER or any traffic monitoring system in operation.

-Buildings, shops, turns, signs, and bumps would make speeding difficult for me.

Normative beliefs:

-Parents

-Wife

-Friends

Scenario 80-MSA (Make a Scheduled Arrangement on 80 km/h roads)

Scenario H-MSA (Make a Scheduled Arrangement on 120 km/h roads)

Study 3

(N = 112)

Saudi drivers in Riyadh city, Saudi Arabia

Critical beliefs analysis for each scenario

1) Apply Pearson's correlation.
2) Use the correlated beliefs for Hierarchical regression for each belief type to identify the significant beliefs for each scenario.
3) Apply Hierarchical regression for all the significant beliefs for each scenario.

Significant influences for Scenario 80-MSA:

Normative beliefs: Wife and friends

Control belief: I would be more comfortable speeding if there is no traffic congestion.

Significant influences for Scenario H-MSA:

Behavioural beliefs: Speeding will help me arrive earlier.

Normative beliefs: Wife.

Control belief: I would be more comfortable speeding if the road was familiar.

Figure 7: Study 2 steps and key findings informing Study 3

There were some beliefs that obtained high scores for frequency that were reported for both specific speeding scenarios. For instance, representing a behavioural belief and a particular advantage of speeding, "arrive earlier or on time" was mentioned by six participants and, thus, represented a salient belief influencing speeding intentions in both contexts. In fact, the belief that speeding would save time is not uncommon as a motivating factor as found in previous studies. For instance, Peer (2010) stated that time pressure can lead some drivers in certain situations to exceed the posted speed limit.

Similarly, when referring to the disadvantages, most disadvantages found in Study 2 (see Figure 8) were extensively mentioned such as the possibility of having a crash (which was mentioned by 15 participants for the 80 km/h speed zone scenario and by all participants for the 120 km/h speed zone scenario). By reporting the disadvantages (of a potential crash), the participants highlighted their awareness of the potentially dangerous consequences of speeding. Given this knowledge of such negative consequences, the questions remain as to why speeding is one of the most frequent road traffic violations in SA. A possible explanation can be drawn from Delhomme et al. (2008) who stated that even though drivers know the negative consequences of speeding, they do not really think that, it could actually happen to them. Such thinking can lead them to assume that they can escape a crash better than others (Fuller, 1991).

Regarding the normative beliefs that were found, salient referents noted included parents, wife, and brothers and they were mentioned as disapproving groups (i.e., those who would disapprove of speeding). Parents were mentioned most frequently (i.e., reported by half or more of participants across all specific scenarios). Of note, finding parents and brothers as important normative influences on speeding

for adult drivers is, indeed, unique and appear culturally-related and not commonly found in previous research. Friends were also mentioned as an aspect of normative influence; however, friends were considered more likely to approve of speeding. The influence of friends is not unexpected given that many studies have found that friends may affect drivers' speeding behaviours (e.g., Horvath et al., 2012).

Regarding control beliefs and the facilitators of speeding, the absence of road congestion was mentioned by several participants and, ultimately, this was the most common facilitator for speeding; namely, that speeding would be encouraged/easier to do if the roads were not congested or crowded. This result is consistent with other studies on speeding (Conner et al. 2003). For barriers to the behaviour, being fined by the SAHER system (i.e., the speed control system in SA) was the most frequently cited barrier serving to make speeding less likely.

From the results of Study 2, those most salient beliefs were retained and examined further in Study 3. The next section discusses the significant predictors of speeding intention as were found in Study 3. Following on from that, the results of Study 4, interviews with experts, are also provided.

Studies 3 and 4: Psychosocial factors of speeding

As previously discussed, Study 3 explored the predictors of speeding intentions in relation to three speeding scenarios: the general speeding scenario (i.e., exceeding the posted speed limit) and the two specific speeding scenarios retained from the findings of Study 2 (i.e., speeding to make a scheduled arrangement on 80 km/h and 120 km/h roads). The indirect beliefs found in Study 2 were measured only for the specific speeding scenarios. The beliefs were only explored in relation to the specific scenarios because they need to be elicited for scenarios that were defined first according to TACT principles.

Overall, the findings from Study 3 (as reported in Chapter 6) revealed that encouragingly the Saudi drivers in the study sample at least reported a low intention to speed. In terms of predicting such speeding intentions, personal, social, and situational factors were the strongest predictors. Across the scenarios, there were some similarities regarding the significant predictors across all scenarios. See Figure 8 for further information about the psychosocial factors across all speeding scenarios.
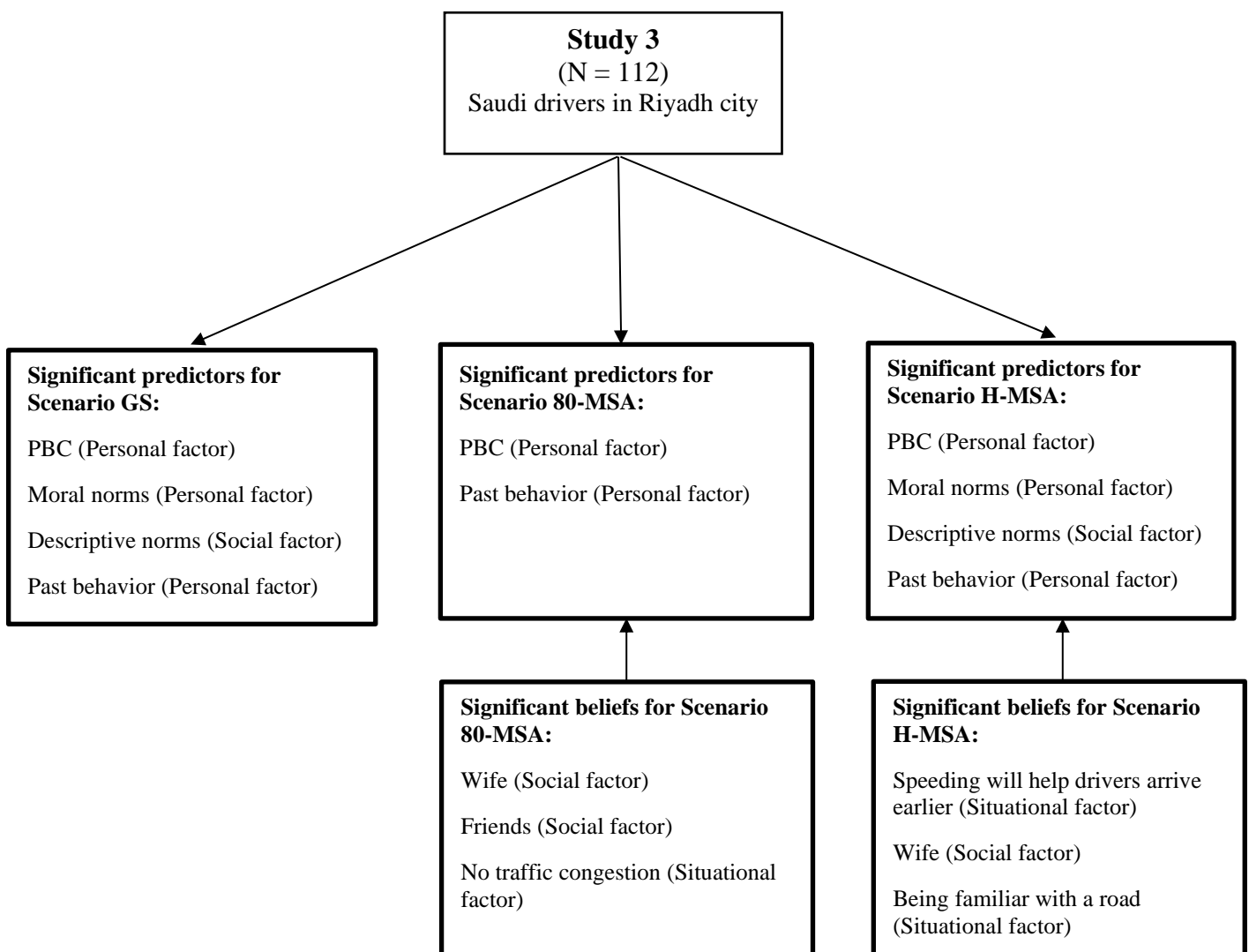
Figure 8: Study 3 steps and key outcomes[15]

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[15] Please note the finding for moral norm predicting intention in the H-MSA scenario is likely spurious due to a close to zero correlation

Personal factors as predictors of speeding were PBC (i.e., the extent to which participants believe they can control their speed with a high degree of confidence and controllability), moral norms (i.e., the belief of what one ought to do and feeling less guilty about speeding), and past behaviour (the extent to which participants had sped in the past). Importantly, not all of these factors were significant predictors of speeding in relation to all three speed zones (see Table 8 for more detailed comparative information); however, this group of factors did exert significant influence in explaining intentions to speed, principally within two of the three scenarios: namely, the general speeding scenario and the speeding scenario relating to 120 km/h speed zones.

Of note was the degree to which PBC was an important predictor of intention to speed. Drivers' beliefs about their ability and confidence in controlling speeding was found as a predictor in all scenarios examined (and thus all speed zones). In addition, past behaviour, as a personal factor, was another important predictor across all speeding scenarios. The results revealed that drivers would be more likely to intend to speed if they sped more in the past in any speed zones. Overall, the key conclusion to be drawn is that factors related to control over speeding and past decisions whether to speed are very important personal factors as predictors of speeding intentions across all the scenarios explored and, as such, must be considered in developing countermeasures.

Another personal factor found to be an important predictor at least in some contexts (i.e., the general speeding scenario and speeding in 120 km/h speed zones) is moral norms. Findings indicated that the more drivers reported feeling that speeding is something they ought not do, the less intention they reported to speed. The fact that this factor was not significant for the scenario of speeding in 80 km/h speed zones

might relate to the perceptions that the limit was too low and inappropriate. Consequently, believing the zone was incorrect and too low would see people feeling less guilty to speed on such roads (see section 6.2 for Study's 2 results [sub-theme #2 Speeding in multi-lanes]), unlike roads with 120 km/h speed limits where the drivers appeared to feel more guilty in speeding because they might acknowledge 120 km/h to be an appropriate speed limit for these kinds of road environments(i.e., multi-lanes and wide roads) (Highway Design Manual, n.d.; Transportation Planning Guide in Saudi Cities, 2005). Please note the finding for moral norm predicting intention in the H-MSA scenario is likely spurious due to a close to zero correlation.

When it came to the indirect beliefs, the behavioural, normative, and control beliefs, these were analysed by a critical belief analysis (Von Haeften et al., 2001). Such analyses found that another personal factor that was a significant predictor of intention to speed was the perceived advantage that speeding would enable one to arrive earlier. This belief was a significant predictor of speeding intentions in the specific speed scenario relating to 120 km/h speed zones. The finding suggests that drivers thought that speeding on highways could help them arrive earlier in the case they may be running late in trying to make a scheduled appointment; and, in such instances, this would increase their intention to speed on such roads. This advantage seems to be relevant just to this particular speed zone (i.e., 120 km/h) as they might be perceived as more free-flowing roads compared with 80 km/h roads.

Regarding situational factors, two control beliefs were found to be significant predictors of speeding intentions as identified by the critical beliefs analysis for the specific speeding scenarios. These beliefs were, "I would be more comfortable speeding if there was no traffic congestion" (found for the 80 km/h speed zone

scenario) and "I would be more comfortable speeding if the road was familiar" (found for the 120 km/h speed zone scenario).

For the 80 km/h speed zone scenario, the absence of other vehicles on the roads was considered a facilitator to speed when one was said to be speeding to meet a scheduled arrangement. This latter finding is different to that from the results of the critical beliefs analysis for the 120 km/hr speed zones scenario. For the latter, drivers were once again said to be speeding to meet a scheduled arrangement; however, in this scenario they believed that being familiar with road would facilitate them speeding. These differences between significant predictors of intentions suggest that motivating factors do differ across contexts. By considering this, it is important to be reminded of that which was discussed in Chapter 1 (see Table 2). Specifically, highways (i.e., urban expressways) are characterised as bearing the largest traffic load, unlike roads with 80 km/h speed zones. For this reason, it may lead drivers to perceive that there being instances of no congestion on 80km/hr roads would facilitate their speeding as they may expect more crowding in this speed zone. However, being familiar with roads appeared to be the only relevant facilitating factor of speeding intention on 120 km/hr speed zones.

Regarding social factors influencing speeding intention, descriptive norms as well as the normative referents of wife and friends were found to significantly influence drivers' intention to speed. Wives were found to influence male drivers' intentions to speed in this current study. In previous studies, passengers of the opposite sex have been found to influence drivers' speeding decisions. The influence of males as passenger/friend on female drivers that resulted in speeding has been found in the previous studies (Forward, 2009a; Regan, & Mitsopoulos, 2001). According to the results from Study 3 in the current program of research, females did influence male

drivers' decisions regarding speeding in the SA context. This finding is an important contribution to knowledge given that previous literature has not ever established the nature and extent of influence that Saudi women play in relation to being able to influence Saudi men. While the Saudi men in the study sample in Study 3 identified their wives as an important normative influence, it is unclear how much Saudi men may be prepared to change their behaviour based on what their wives may say. Further research is needed to explore this issue. However, initial indications based on the current Study 3 findings are that there may be value in featuring females in road safety awareness programs in efforts to influence male drivers. Of note, within the study's sample most of the sample, was married. Wives may have been an important normative influence when considering the contexts examined related to being late to make a scheduled appointment. While it is not possible to state with certainty, it is possible that these appointments may be related to picking up one's wife from or taking them to work, or any other appointments their wives may have. Relevant to this suggestion is the need to acknowledge the legal status of women and driving in SA. Specifically, 3 years ago women were not allowed to drive in SA but the law was changed in 2016 allowing women to drive. Thus, women in SA have only been driving for a short time and, for this reason, it seems that some women are still dependent on their husbands for transportation which may be why male drivers identify them as a normative influence on their driving decisions.

Friends were also found to influence drivers' intention to speed but just on 80 km/h and not 120 km/hr speed zones. A possible explanation for not finding friends as a predictor of speeding intention in the latter zone is that 80 km/h roads usually are located inside cities where entertainment is often located. For this reason, it seems plausible that driving with friends may be more likely on these roads. With respect to

the difference between genders and the effect of friends or peers on drivers' speeding behaviours, these associations have been reported widely in previous studies including in studies by Gheorghiu et al. (2015) and Horvath et al. (2012) who found that peers have an influnce on drivers and increase their intention to speed.

Descriptive norms (i.e., participants' belief that other drivers would speed) were an important factor predicting speeding intention for both the general speeding scenario and the specific speeding scenario regarding 120 km/h speed zones. This finding indicated that drivers believe that more speeding behaviour is committed by other drivers in all roads except for 80 km/h speed zones. This result also might refer to the nature of the 80 km/h road, which is located inside cities, thus make speeding more difficult for other drivers, as the participants expect.

Overall, in terms of the significant indirect beliefs (behavioural, normative, and control beliefs) predicting intentions in Study 3, only a few beliefs were found to be significant predictors of speeding intention. This finding is not surprising, however, given that the study involving the indirect beliefs was based on a critical beliefs analysis. The intent of the critical beliefs analysis is to identify just a specific and relatively small number of critical beliefs of intention. Based on the findings from Study 2, it was expected that the normative influence of "parents" (from normative beliefs), and the "SAHER system" (of speeding enforcement) and thus a control barrier belief would likely influence speeding intention in the analyses conducted with a larger sample of drivers in Study 3. In fact, when considering the most common/frequent beliefs mentioned in Study 2, they were claimed by more than half of the participants. However, after conducting the critical beliefs analysis in Study 3, they were not found to be significant.

A possible reason why parents were not found to be a significant normative influence in Study 3 could be simply because most of the participants in that study's sample were married. Being married could be anticipated to mean someone has a more separate lifestyle from their parents and, thus, more independent driving behaviours emerge that are no longer influenced by an individual's parents. In relation to possible reasons behind the non-significance of the enforcement of speeding by the SAHER system as a belief in Study 3, potentially two reasons may explain this finding. First, drivers may perceive there to be a low probability of being caught (Magableh et al., 2017). Second, the finding may be due to the speeding scenario itself and the part of "being late" which might be perceived by the drivers as a more important factor than being fined.

As a means of verifying the results of Study 3, at least from a most applied perspective, the road safety experts in Riyadh provided agreement with the Study 3 results via their responses obtained as part of Study 4 in the current program of research. As has been clarified previously, due to the emergence of the COVID-19 pandemic which restrained driving in SA, the scope of Study 3 had to be altered such that the follow-up assessment of drivers' actual speeding behaviour was not possible. Consequently, the main outcome measure of focus in Study 3 was on speeding intentions as opposed to speeding behaviour. The participants in Study 4, as road safety experts, were in an informed position to comment on the applicability of the Study 3 results (see section 7.1.3 for further details about the years of work experience). The experts stated that they agreed with the findings; specifically, they first reviewed the speeding scenarios that participants of Study 3 responded to and accompanying each of those scenarios was a brief description of the significant predictors influencing intentions in each of the scenarios. Thus, the experts' views on the Study 3 results were able to provide a

degree of assurance and reliability as to the extent that they may help to inform future interventions to address speeding in SA.

After identifying the psychosocial factors underpinning speeding intention, such factors could be used to help explain individuals' speeding behaviour through Michon's hierarchical level of risk taking (1979). According to Michon (1979), there are three hierarchical levels which influence individuals' on-road behaviour. These levels include strategic, tactical, and operational levels. The strategic level refers to planning by a driver based on their subjective assessment of the road, vehicle conditions, cost of the risk of engaging in the behaviour, and other road related factors. Drivers then move to the tactical level whereby they take the risk or commit the road traffic violation (in this case, speeding). Finally, the operational level relates to what a driver does to mitigate risk through their behaviour to reduce any potential danger from their driving behaviour.

The role of Michon's hierarchical levels (strategic, tactical, and operational) of the findings

From the outset of the program of the research results, it could be stated that factors including roads with speed limits at 80 km/h and 120 km/h with multi-lanes, no congestion, and dry weather, could be considered as factors existing at the strategic level. Similarly, factors including the approval from significant others and beliefs relating to moral and descriptive norms could encourage speeding behaviour in accordance with strategic level factors. Those factors more proximal to behaviour including PBC, past behaviour, and indeed intentions may be more at the tactical and operational levels of the hierarchy because they do impact directly on speeding behaviour.

8.1.3 Which psychosocial factors can be used to be used in future intervention strategies?

Overall, the key results emerging from Study 4 suggested two potential courses of action for future speeding interventions, which could be devised based on the findings from the current program of research. Specifically, these interventions were to use the findings to help inform the content of road safety education initiatives that may be delivered within school curriculums or via public health awareness campaigns. The road safety experts suggested that there was value in potentially delivering campaign interventions for promotion, via a public awareness campaign delivered at the community level, which could include parents who, in turn, could contribute to increasing children's awareness about speeding behaviours (see section 7.2 for Study's 4 results for further details). Such campaigns could be delivered using social media and television. Study 4 has also contributed to exploring the practical implications for this program of research (see section 8.4 for further details about these implications).

8.2   THEORETICAL IMPLICATIONS

The information presented in this section addresses the third research aim; namely, to add a theoretical contribution to the road safety field via the application of an extended Theory of Planned Behaviour (TPB) and, in doing so, examine its theoretical robustness within Arab culture.

From the outset, arguably, this research contributes much new knowledge in the field by being one of the first studies to apply the TPB to help understand speeding behaviours in Arabic countries. In fact, examining the direct predictors (i.e., attitude, subjective norm, and PBC) of speeding intentions in conjunction with their underpinning indirect beliefs (i.e., behavioural, normative, and control beliefs) and,

thus, a full operationalisation of the predictors within the TPB, may be considered an especially valuable addition to studies in the field of speeding in the Arab countries. Moreover, this research applied such a framework in relation to different speeding scenarios (i.e., general and specific scenarios including two speed zones, 80 km/h and 120 km/h), thus further attesting to its robustness to explain speeding in SA. In comparison, only a limited number of studies internationally have ever applied all the predictors (i.e., direct and indirect beliefs) to understand speeding. The implication of this at an international level is that this program of research adds to the growing body of research that provides support for the application of the TPB in understanding more about the motivators of speeding intentions. Further, this research adds to the growing body of research that indicates support for extended TPB frameworks to better understand drivers' speeding. Regarding risky behaviours more broadly, the current program of research adds new knowledge in terms of the TPB's ability to aid understanding of risky behaviours (e.g., speeding, alcohol consumption, smoking, and using drugs). The following sections provide support for the TPB applications in understanding speeding and support for the extended TPB in understanding speeding.

Support for the TPB in understanding speeding

The standard TPB framework in the current study accounted for a significant 35% of variance in speeding intention in the general speeding context. Overall, applying the standard TPB is partially supported for this scenarios. This result was in line with previous studies that applied the TPB framework to speeding in a general context (i.e., exceeding the posted speed limits without further details like weather or specific speed zones) in Europe (Elliott & Thomson, 2010), Vietnam, Cambodia (Tankasem, Satiennam, & Satiennam, 2016) , and Thailand (Tankasem, Satiennam, & Satiennam, 2016) found partial support for the TPB (see Table 3 in section 2.2.1 for

further details about different variance explained values in previous studies applying the TPB to speeding intentions and/or behaviours).

Regarding the specific speeding scenarios, while these have inevitably varied across countries/cultural contexts where the TPB has been applied (see section 2.3.1 for further details for different speeding scenarios in the previous studies). The results relating to the specific scenarios explored in the current research were also supported overall (i.e., 60% of the variance in intention to speed in 80 km/h speed zones, and 64% of the variance explained for 120 km/h speed zones) like the framework's application in specific contexts in both Europe (Conner et al., 2007; Forward 2009b & 2010) and Australia (Newnam, Watson, & Murray, 2004).

Examination of the hierarchical regression analysis in Study 3 found that PBC was the only construct from the standard TPB constructs that significantly predicted intention to speed within all three of the given speeding contexts that were examined. This finding is not uncommon when examining significant predictors of speeding intention with respect to different speeding contexts from various studies. For instance, PBC was found to be a significant predictor in many previous speeding-related studies but not applied within a Saudi context (Conner et al., 2007; Elliott and Thomson, 2010; Forward, 2009b and 2010; Newnam, Watson, & Murray, 2004; Warner, 2006). Similar to these other studies and consistent with theory, the current findings supported that the higher the PBC, the greater the reported intention to speed (Forward, 2010). Also, for compliance with the speed limit rather than speeding, PBC also positively predicted intention to comply (Abdul Hanan, 2014; Elliott et al., 2003). Other studies showed that perceiving greater control was correlated with more intention to speed, but the drivers who think it was easy to speed had less intention to speed (Conner et al., 2007; Forward, 2009b). Furthermore, according to Elliott and Thomson (2010), perceiving

greater control to speed and perceiving it was easy to avoid speeding was related to lower intention to speed. Similar interpretations were found for studies measuring drivers' compliance with speed limits, whereby greater perceptions of control were related to more intention to comply with speed limits (Abdul Hanan, 2014; Elliott et al., 2003).

This finding indicates that there is a relationship between speeding and the ability to control one's speed (Jones, 2010). Thus, the result is consistent with theoretical expectations (Ajzen, 2006). Furthermore, in the field of understanding risky behaviour more broadly, it appears that PBC is a key predictor influencing intentions to engage in risky behaviours. According to the review conducted by Parker et al. (1992), PBC explained a significant amount of variance in intention to engage in risky behaviours such as speeding, smoking, and drinking. Thus, the results regarding the TPB and the important role that PBC plays in influencing intention are in accordance with previous research that has applied the TPB to understand speeding, as well as risky behaviours more broadly. However, further research is required to examine the role of the TPB in predicting actual behaviour in the Saudi context given it was not possible to assess actual driving behaviour in this program of research.

The results of Study 3 indicated that attitude was not a significant predictor of intention to speed. This finding is not theoretically expected nor is it consistent with results from other studies in the field of speeding (Elliott and Thomson, 2010; Forward, 2009b; Forward, 2010; Warner, 2006; Newnam, Watson, & Murray, 2004), as well as general risky behaviours (McEachan, Conner, Taylor, & Lawton, 2011). Collectively, several studies applying the TPB to various behaviours including speeding have found both attitude and PBC are strong and relatively consistent predictors of intention. That said, however, there are some studies which have also

found that attitude does not significantly predict speeding intention (e.g., Conner et al., 2007 in a study in England as well as a study in Cambodia by Tankasem, Satiennam, & Satiennam, 2016). For the studies that found attitude to be a significant predictor of intention to speed, attitude positively influenced speeding intention such that more favourable views of speeding correlated with more speeding intention (Elliott and Thomson, 2010; Forward, 2009b and 2010). In terms of compliance with speed limits, a positive attitude towards complying with the speed limit was found to be related to greater reported intention to comply (Elliott et al., 2003). Thus, as noted previously, the results of the current program of research in finding that attitude did not significantly predict intentions to speed across contexts was largely unexpected (even considering a few studies from elsewhere that reported it was not a significant predictor). A possible explanation for this finding is that it may simply be due to the Saudi driving context and that limited research has explored what the significant predictors of speeding intentions are in that context. The results indicate that other factors are more important predictors of speeding in this context than personal assessment of favourability. Further research is needed to explore the association between attitudes and intentions to speed in SA.

Regarding subjective norms the finding that this construct was not significant as a predictor of intentions is not uncommon. It has been stated that subjective norm is a weaker predictor (relative to attitude and PBC) in explaining intentions (Elliott & Thomson, 2010; Newnam, Watson, & Murray, 2004). According to Armitage and Conner (2001), a number of studies have shown that subjective norm is a weaker predictor of intention compared with attitude and PBC in relation to a range of behaviours/contexts. When referring to speeding-related studies specifically, some studies have found subjective norm to be a significant predictor of speeding intention

(e,g., Conner et al., 2007; Warner, 2006; Forward, 2009b; Forward, 2010). Even though subjective norm was not a significant predictor in Study 3 of this program of research, inspection of the bivariate correlations revealed that it was positively (albeit not significantly) associated with intention. This result is similar to previous research (Conner et al. 2007; Forward, 2010). For this reason, it was recommended to add descriptive norms to bolster normative influences in an extended TPB framework to aid understanding of a behaviour (Alselaimi, 2010; Abdul Hanan, 2014; Jones, 2010). The effect of adding descriptive norms as an additional predictor in the extended TPB framework of the current program of research is discussed in the next section.

Support for the extended TPB

Regarding the extended TPB framework when applied to predict intention in relation to the general speeding scenario (i.e., exceeding the posted speed limit), it accounted for an additional 16% of the variance in intention to speed over and above the standard TPB. The application to the extended framework was also supported in the line with a previous study by Elliott and Thomson (2010) who used a similar speeding definition (i.e., exceeding the posted speed limit) in their study scenarios, and who applied an extended framework that included other additional predictors, such as self-identity, besides the three additional predictors in the current research.

However, in terms of specific speeding scenarios, the current program of research explained an additional 8% and 9% variance in intention to speed for the 80 km/h and 120 km/h scenarios, respectively. It is acknowledged that there were few differences on the additional predictors across previous studies. For instance, Forward (2009b) included descriptive norms, age, and past behaviour as additional predictors that were entered separately at different steps and which contributed for an additional 27% of the variance in speeding intentions. Conner et al. (2007) added moral norms,

anticipated regret, and past behaviour together within one step in their regression analysis and found these additional constructs accounted for a further 19% variance explained in intention to speed. Overall, with respect to differences on the additional predictors, and different speeding contexts used in the previous studies (e.g., Conner at al., 2003; Forward 2009b), it could be stated that applying the extended TPB is consistent with other findings in the field in that additional predictors to enhance prediction of speeding intention (see section 2.3.1 for further details for different speeding scenarios in the previous studies).

Overall, the current program of research supports the value of adding additional predictors within an extended TPB framework to help understand intentions. In this instance, the additional predictors included moral norms, descriptive norms, and past behaviour. Consistent with findings reported by a previous meta-analysis conducted on a range of health behaviours, the addition of these predictors to the TPB has consistently been shown to contribute further variance regarding intentions (Conner & Armitage, 1998; McEachan et al., 2011; Rivis et al., 2006).

In this program of research, a hierarchical regression analysis showed that past behaviour was a significant additional predictor across all speeding scenarios. Specifically, it was found that the more a driver reported having sped in the past, the greater intention to speed they reported for in the future. This result is consistent with other studies which have applied the extended TPB (Conner et al., 2007; Elliott & Thomson, 2010; Forward, 2009b). The results are also consistent with previous studies that reported past behaviour as a strong predictor of intention for general risk behaviours and physical activity (McEachan et al., 2011). Thus, by including past behaviour, it is limiting the extent to which new and different factors may be identified

because it is just such a prominent predictor that subsumes variance explained by other constructs.

The addition of descriptive norms as a separate normative construct from subjective norms is supported by others, including, for example, Forward (2009b) who studied the TPB in relation to speeding. Results from the current program of research also support the value of adding it into an extended TPB framework. Descriptive norm was found to be a significant predictor of intention to speed for both the general speeding scenario and the specific speeding scenario within 120 km/h speed zones but not within the specific scenario regarding 80 km/h speed zones. The reason for non-significance in the latter context might be related to the different context or differences in the speed zones in the Saudi context (see section 8.1.2 for further possible explanations of these differences). In terms of previous studies that have examined descriptive norms in relation to intention to speed, the results are generally consistent (Forward, 2009b and 2010). The results have indicated that drivers perceiving other drivers speed are also more likely to speed (Forward, 2009b). Even though descriptive norms were not significant for the 80km/hr speeding scenario in this research, it appears it was still important to aiding understanding of motivating factors underpinning speeding in the other two contexts, and based on the results of other studies measuring risky behaviour (Forward, 2009b; Rivis & Sheeran, 2003). Thus, the current research supports findings of other studies in relation to conclusions about the importance of adding this variable (i.e., separately to subjective norm) within extended TPB frameworks. Furthermore, it shows that the influence of others, driving decisions is important, perhaps keeping up with the flow of traffic.

Regarding moral norms, another of the normative influences added to the extended TPB in the current program of research, it was also found to be a significant

predictor of intention to speed but only for the general speeding scenario and the 120km/hr specific speeding scenario, but not within the specific scenario regarding 80 km/h speed zones. Again, this finding may be due to the different speed zones and context. The findings indicated that the more one would feel guilty or perceived speeding as a wrong behaviour, the less they reported intention to speed. The current results regarding this construct are consistent with previous studies in the field of speeding (Conner et al., 2007; Elliott & Thomson, 2010). However the addition of moral norm adds further explanation of the intention to speed. Like other additional predictors in the current program of research, the current result adds further support for adding this variable (i.e., to be measured separately from subjective norm) to extended frameworks, at least for some speeding contexts and confirmation there is a moral component to speeding decision for male drivers..

Regarding the inclusion of willingness as an outcome measure in addition to intention in the current research, it was found to be a successful contribution. Again, as with the application of the extended TPB to speeding within the Saudi context, its application in the current study was the first application in relation to speeding in SA. Previous studies have found willingness to be an important outcome measure in the field of understanding speeding behaviour and as an important predictor of speeding behaviour (Elliott et al., 2017; Preece, 2018). In the current program of research, willingness of how likely to speed in different situations or scenarios was added to intention. The results reflected that it is possible to include at least one item of willingness combined with the intention to speed as they showed reliable measures (see section 5.1.5 for further details about the reliability). In other words, by adding willingness to the key outcome measure and confirming that the intention scale was reliable, it is contributing to capturing aspects relating not just in relation to what

individuals may intend to do but what they may actually be willing to do in the scenarios provided.

8.3 METHODOLOGICAL IMPLICATIONS

There are mainly two methodological implications. First, one of the problems with the online instrument used to measure psychosocial factors in Study 3 was that the technical issue of displaying the surveys. This problem likely contributed to the high number of surveys that were not completed. As clarified in Study 3 (Chapter 6), Qualtrics hosted the online surveys, and it can be operated on different devices, including mobile phones. Nevertheless, some participants might have had an issue with a survey platform on their mobile. Continuing with this claim, as already known in Study 3, the survey included several items for different speeding scenarios, which included some tables with two columns that did not fully display on mobile phone screens. The researcher tried to minimise this issue by displaying reminders, in red, to the participants who missed some items before allowing them to continue to the items on the next webpage, but they were allowed to skip an item if they did not wish to fill it in. This issue might to be avoided in future research by place items under each other without a table, or even adding hard copies of the surveys.

Another implication is related to ask about intention "once again be legally acceptable to drive". This implication, indeed, has led to change the standard approach to cope with COVID-19. The effects of this change on the results are unknown at this time.

8.4 PRACTICAL IMPLICATIONS

The information presented in this section addresses the second research aim, namely, to provide evidence which may assist in the development of culturally-

relevant speed awareness interventions, and which addresses the research question "which psychosocial factors can be used to be used in future intervention strategies?".

To increase driver awareness of the negative consequences of speeding and, ultimately, contribute to reductions in the number of RTIs, different countermeasures are recommended to help change driver behaviour at the community level with respect to speeding. The results of this program of research have offered some important insights into the role of psychosocial factors for speeding intention among Saudis which contributed to building important knowledge in the field. The implications of this study contributed to several potential strategies for improving road safety situations for Saudi drivers (and as were confirmed by the road safety experts interviewed in Study 4). These strategies included:

- raising public awareness campaigns: the results from Study 1 that related to certain scenarios and Study 3 that included significant predictors of intention to speed could be used in developing public awareness campaign interventions. The factors included personal factors (PBC, and past behaviour, moral norms), social factors (descriptive norms, wife and friends), and situational factors (no traffic congestion, and being familiar with the roads). Some of the road safety experts suggested also including parents in such initiatives for increasing public awareness of speeding.

- introducing public education initiatives: the results of Study 1 and Study 3 again could be utilised to increase safety awareness.

- and increasing efforts via the enforcement system: the results of Study 1 suggest that there could be value in implementing further speeding surveillance and surveillance systems on 80 and 120 km/h speed zones.

The following sections outlines the road safety implications of the program of research based on Studies' 1 and 3 results followed by further details about the strategies mentioned above for enhancing road safety in light of Study's 4 results.

The road safety implications of the program of research results

The more tailored an intervention is, generally, the more successful it will be. For this reason, it is suggested to utilise the results of each study to develop some recommended countermeasures aimed at changing road users' behaviours, starting with the results found from Study 1 for developing four specific speeding scenarios. Study 1 identified specific speeding scenarios which were assessed in Study 2. After assessing them in Study 2, two specific speeding scenarios were sought to be more relevant to speeding. The scenarios included certain factors such as speeding on multi-lanes roads for two speed zones include 80 km/h and 120 km/h. The scenarios also included some factors that encourage speeding that were frequently mentioned by the participants, which included fine weather, clear visibility, and good car condition. Knowing this information about certain speeding zones, where possible speeding would be more likely, could be utilised to aid the design of road safety interventions to encourage drivers to not exceed the speed limits in these zones. For instance, two intervention strategies could be developed.

First, a stronger enforcement system, such as more speed cameras, would be applied on these speed zones which are hot spots for speeding. Second, as mentioned in Study 4, road safety experts suggested public education initiatives and raising public awareness. In fact, public education initiatives through workshops at schools, universities, institutions for all governmental and non-governmental sectors are recommended strategies in SA (Al-Hindi, and Albawardy 2013). People in the educational facilities and the public in the community need to be aware that the legal

speed limits for each speed zone are introduced by the road safety experts for a safety reason and that any exceeding of the limit can be unsafe. Some information about road purposes would be helpful, such as 80 km/h speed limits were determined because they connect the main urban centres to the regional networks and bear a large traffic load in the urban area. Thus, excessive speed can be a danger to other cars and facilities in these locations (Highway Design Manual, n.d.; Transportation Planning Guide in Saudi Cities, 2005). Thus, more awareness about these road design criteria might promote more respect for and understanding of the legal speed limits in these speed zones with such speeding factors. Regarding the public, messages that might be developed from these findings for increasing public awareness could possibly be stated as:

- "The legal speed limits on 80 km/h and 120 km/h roads have been determined by road safety experts for your safety in these roads, so please be advised to not to exceed the legal speed limits, or think that you can safely exceed them because they are multi-lanes, or you have clear visibility or a good vehicle or that the roads are free-flowing. Any speeding can lead to dangerous consequences and injuries" (this is intended to increase public awareness of not to speed when specific different factors and conditions are present on the journey).

Additionally, based on the findings from Study 3, the current program of research suggests that road safety interventions that include education and public awareness may be most successful if they focus on personal factors, especially an individual's PBC and past behaviour given that each of these constructs significantly predicted drivers' intention to speed for all speeding scenarios. Indeed, with respect to the differences of the scenarios, the two predictors seem to be related. In other words,

PBC might result from frequent past speeding behaviours (i.e., previous experiences) which in turn had led the participants to think that speeding is a common practice, under their control and safe, which makes them confident to do it. Thus, for the education initiatives, it is suggested to utilise such findings to increase public awareness about the fact the personal confidence regarding speeding control can be misguided without considering other unexpected external factors that could emerge when driving, such as other cars on the road. Additionally, again the public need to be convinced that the legal speed limits for each speed zones are introduced by the road safety experts based on services that they provide and that exceeding any can be unsafe. It is proposed that the public are educated to recognise that driving skills are not the only factor that affects driving behaviours, and that other factors can play a role, such as road types. Regarding public awareness campaigns, messages might be developed from these findings for increasing public awareness. For example:

- "Please be advised, that thinking that you can control speed, or being confident in your ability to control speeding could lead to negative consequences and injuries because all speed limits have been determined by experts for your safety and violating them could put your and others lives in danger" (PBC).

A previous intervention was applied to change drivers' opinions about speeding behaviours among 550 Scottish drivers aged 17-54, males and females. They used advertisements and clips to transfer the awareness messages targeted by utilising the TPB direct predictors. The results showed that campaign successfully influenced positive attitudes toward speeding but no change for subjective norms or PBC. For making an intervention targeting PBC in this study, they used clip ads that showed a

driver under pressure of being late for work, being in a flow of traffic, driving at 40 mph in a 30 mph speed zone, and being put under pressure by other impatient drivers behind the car. As a result, the driver hits a cyclist, and the clip ends with a statement to increase the viewers' confidence to control speeding in similar scenarios, with the catchphrase, 'Be your own man' (Stead et al., 2005, p. 39). One of the possible explanations of the intervention's failure to change PBC was that the participants might be less susceptible to changing subjective norms and PBC (Stead et al., 2005). However, the reason for this also might be related to the scenario itself which might make some drivers assume that they can control their speeding in such situations and that crashes could happen to other drivers but not themselves (Fuller, 1991). For this reason, it might be more effective in any future intervention in SA to ensure that messaging highlights that any driver can be susceptible to a crash. It would be helpful to use a real role-model story possibly of a driver with extensive driving experience and high level of confidence, who had a crash in a specific speeding scenario. Thus, the level of confidence about driving control could be challenged and more attention perhaps could be given to drive safely.

For past behaviour, it is also important to increase public awareness. Even though they may have committed speeding offences without any negative consequences in the past, this is still considered a violation and it could put their and other lives in danger if they commit them next time. Announcements could remind them each time they intend to exceed the speed limit. A message could be developed like:

- Committing speeding without negative consequences in the past does not guarantee that you can commit them again safely. It is illegal

behaviour; please respect the speed limit for your and others safety. (Past behaviour)

Continuing with PBC, there are two situational factors (i.e., control beliefs) that were found as indirect predictors for speeding intention for 80 km/h speed zones, which were "no traffic congestion", and for 120 km/h speed zones, "the familiarity with a road.". These factors could be addressed in an intervention to increase public awareness about speeding behaviour. By emphasising the same message mentioned for the PBC intervention that the external road factors can impact on drivers' ability to control the vehicle, regardless of whether there was road congestion (the predictor for 80 km/h speed zones) or if they were familiar with the road (the predictor for 120 km/h speed zones), messages might be developed from these findings for increasing public awareness, such as:

- On 80 km/h speed zones, lack of congestion does not mean it is safe to exceed the legal speed limits, even if you are late for a scheduled arrangement. Remember, the legal speed limit has been determined by experts for safety reasons. (Control belief: no traffic congestion)
- Please be advised, thinking that you can control speeding because you are familiar with 120 km/h roads could lead to negative consequences and injuries because unexpected events can still occur. (Control beliefs: the familiarity with the roads)

Moral norms (as a personal factor) and descriptive norms (as a social factor) were significant predictors only for the general scenario and for the scenario related to speeding in 120 km/h zones when in a hurry to make a scheduled appointment Such findings could be used to develop one awareness public message for all road zones,

regardless of the speeding situations. In terms of descriptive norms, as the drivers said that they expected others would exceed the speed limits, it could mean they perceived speeding as a more common and normal behaviour among the community. For this reason, the public need to be aware that speeding is not an acceptable behaviour even if it is committed by others (Forward, 2009b). The public need to be provided with some statistics and videos of RTC due to speeding by others. This, in turn, would contribute to changing that norm in the community to make feel more responsible about their lives, lead them to respect road traffic rules in general, and to perceive speeding as a non-normal behaviour.

There is no clarity in the literature about how to influence moral norms (Conner et al., 2007). However, it is thought that reinforcing the concept of perceiving speeding as a wrong behaviour may be effective. It seems that the drivers already recognise the feeling of guilt when exceeding the speed limit. Working on this by reinforcing these thoughts that make the drivers feel guilty may be useful. As a result, this would increase their confidence to follow and respect the rules. A public awareness message could be developed by using descriptive norms and moral norms for all roads. For example:

- Exceeding the legal speed limit on roads is bad behaviour. Even though it is committed by others, it could put both your and their lives in danger.

Lastly, even though the attitude and subjective norms were not significantly direct predictors for speeding intentions in all scenarios, some statistically significant salient beliefs (predictors) underpinning them were found. This finding in turn add more value to examining the indirect beliefs of the TPB. The normative predictors (i.e., social

factors) included "wife" and "friends" who were influencers for the drivers on 80 km/h speed zones. For 120 km/h speed zones, only "wife" was found as an influencer for the drivers' speeding intention. It means that speeding would be decreased if such influencers disagree with this behaviour. Such findings suggest that targeting these significant others, regardless of which zones, may contribute to more respect for the speed limits. Thus, there is a need to engage both males and females to increase their awareness about the negative consequences of speeding and emphasise their responsibility to give advice. For instance, messages could be developed as below:

- Please remember that exceeding the legal speed limit when late, in any speed zone could contribute to road traffic crashes and injuries. Each family member has a role to play in avoiding this potentially tragic event by advising their partners to avoid speeding so as to protect them, for their safety (i.e., highlighting the normative belief: wife).

- Please remember that exceeding the legal speed limit when late on 80 km/h speed zones could contribute to road traffic crashes and injuries. Each friend has a role to play in avoiding these potentially tragic events by advising their partners to avoid speeding so as to protect them, for their safety (Normative belief: friends).

The community also needs to recognise that respecting road traffic rules is a desirable norm and that drivers should have confidence to ignore others' advice to speed violate. This, in turn, would decrease the possibility of others, including friends or wives, to encourage speeding if they perceived it as an abnormal behaviour. In addition, it would be helpful to make videos, such as a video of a crash happening after listening to a friend or a partner/wife who encourages speeding. This kind of video

would lead to a decrease in the negative influence of these groups on drivers and increase public awareness by reminding them of the negative consequences of listening to others' advice on speeding.

Only one significant behavioural belief i.e., "speeding will help for arriving earlier" (i.e., personal factor) was found to underpin attitudes toward speeding on 120 km/h speed zones. This belief may be open to change by reinforcing the negative consequences of speeding, which outweigh the advantages of arriving earlier. Some examples of these messages could include:

- For your safety, exceeding the legal speed limit on 120 km/h speed zones when you are running late for a scheduled arrangement will not help you arrive earlier, instead of this, it could increase the possibility of crashes and injuries (Behavioural belief: speeding will help for arriving earlier)

Such information can be used to develop targeted interventions aimed at the community level. The suggestions for an intervention plan were identified by the experts in Study 4. Ultimately, there are two main courses of action, which are informing the content of road safety education initiatives, which may be delivered within school curriculums or via public health awareness campaigns. There are several courses of action which can be utilised for these campaigns, such as to include parents who, in turn, could contribute to increasing children's awareness about speeding behaviour, using social media, and utilising TV ads. It is important to note that the suggestions provided herein as to potential message content would need to be tested to confirm the extent to which they would be effective.

The strategies for enhancing road safety

After reviewing different studies about road safety in SA, it was noted that the strategies above ensured the importance of raising public awareness and public education initiatives in SA (Al-Hindi, and Albawardy 2013; Al-Turki, 2014; Mansuri, et al. 2015). These suggestions are consistent with the road safety experts' recommendations in Study 4 on how to utilise the current study knowledge to inform future interventions (see section 7.2 for Study's 4 results for further details).

Raising public awareness of road safety has been highlighted by others in SA as being needed (Al-Turki, 2014). According to Jamal et al. (2020), even though there are successful road safety interventions in the SA, both safety education intervention and public awareness campaigns require improvement. Continuing with this, they clarified that there is a need for campaigns to be more frequent and to be at a higher standard. Some methods that can be utilised are mentioned in the findings of Study 4, such as disseminating messages via new technology and social media, together with the use of more traditional modes of communication such as TV. It is, indeed, still important to use the traditional ways to increase public awareness in SA through TV and radio. However, more focus should be given to also utilising new technology to transfer awareness messages or clips that include social media, especially Twitter, You tube, and Facebook. Twitter, for instance, has successfully been used before for transferring road safety awareness messages in SA (Albalawi and Sixsmith, 2017). Twitter, indeed, is one of the most common social media applications in SA and the world. According to WHO (2018b), SA is the fourth country worldwide in terms of its number of Twitter users. Other social media applications, as well as Twitter, Facebook, and YouTube, have been found to be a successful mode for transferring medical

awareness messages related to promoting health behaviours among Saudis (Zowawi et al., 2015).

Regarding education initiatives, education through workshops, at schools, universities, and institutions for all governmental and non-governmental sectors were recommended by others (Al-Hindi, and Albawardy 2013). As the current program of research showed, women may have an influence on drivers' behaviours, thus, it is important to increase females' awareness about the important role they may play road safety.

8.5 ETHICAL IMPLICATIONS

Participation in all studies involved fully informed consent with voluntary participation emphasised and potential risks and benefits outlined. Reasons and goals of each study were clarified in the information sheet. The participants were assured of their confidentiality. Such information was outlined in purpose-designed participation information forms that were approved as part of the Ethics approvals granted for Study 1 (QUT Reference Number: 1800000768), Studies 2 and 3 (QUT Reference Number: 1800001167), and Study 4 (QUT Reference Number: 2000000422). Other ethical considerations for particular studies such as Studies 1 and 2 included offering audio-recording of interviews to be optional (with note taking as an alternative). Regarding the potential benefits from each study, these were clearly outlined in the participant information where it was explained that it was not expected that participation in this project would benefit them directly. However, the research may contribute significant knowledge regarding factors influencing speeding which would be beneficial in developing any future interventions to increase SA community awareness and, ultimately, may increase greater compliance with speed limits. For Study 1, given it was conducted with SA drivers currently residing in Brisbane, Australia, to be

consistent with other studies conducted in this context, a decision was made to offer participants an incentive (i.e., AU$20 Myer /Coles gift card). For all other studies, consistent with the SA context where all participants for subsequent studies resided, the decision was made not to offer any incentives.

As part of the fully informed consent, participants were made aware of the possible risks by acknowledging that the study addressed issues relating to road safety and, in particular, speeding behaviour, as an illegal behaviour. It was also clarified that there was potential for some individuals to experience discomfort when answering questions relating to speeding behaviour, particularly those who have been affected, or who knew of someone who had been affected by road trauma. Thus, if they had any concerns about being exposed to such questions, it was advised they consider not taking part in the research. Participants were also advised that in the unlikely event that they experienced discomfort when answering study questions, they could withdraw their participation without comment and/or in the case of the surveys, simply close the web browser (noting though that partially completed surveys may have been used in analysis). Moreover, the confidentiality and privacy for all data were assured and outlined in the participant information sheets. The ethical considerations underpinning the research were all considered carefully with respect for participants and confidentiality of their responses was paramount.

8.6   A SUMMARY OF THE RESARCH PROGRAM'S STRENGTHS AND LIMITATIONS

An overall strength of this research program is best represented by its application of the extended TPB. There is little research into speeding behaviours in SA, especially using psychological theories such as the TPB. While there is an increasing amount of cross-cultural research taking place in the field of road safety, the relative amount

of research being conducted in non-Western countries still remains quite low. Because the studies conducted in this program of research are the first of their kind covering speeding behaviour from this perspective, this research has contributed knowledge about the key psychosocial factors that predict speeding intention in the Saudi community. Additionally, for Studies 1, 2 and 3, the raw data were gathered in the participants' native language (Arabic), so they could fluently express their opinions, views, and impressions. Furthermore, asking road safety experts on their interpretation of the results and possible interventions in Study 4 helped the researcher to have a latent influence on how speeding is addressed in SA in a possible more direct way than via publication only. Translation of research into policy is always challenging and involving policy influencers in the research addresses this challenge in a way that promotes ownership of the problem and potential solutions.

The limitations are similar across Studies 1, 2 and 3. Even though the research program included mixed-methods (with subsequent studies enabling the researcher to examine the results of each study in the following study), and regardless of the homogeneity of Saudi culture, it is difficult to generalise the results to the entire SA driving community. Participants in SA were recruited only from within a university and limited to Riyadh city. The other main limitation relates to the illegality of the studied behaviour. This issue could lead to participants providing dishonest or socially desirable responses; however, efforts were enacted to minimise this possibility such as the anonymity of the survey (Study 3) and the conducting of telephone interviews rather than in -person/virtually (Study 2). Regarding specific limitations for each study, Study 1 was conducted in Australia among Saudi drivers who stayed in Australia for one year and less and, therefore, their memory of driving in SA was not necessarily that recent. This tendency could have impacted their responses. Study 2

did not feature face-to-face contact which may have had an impact on data detail and quality. Besides this limitation, because a number of driving scenarios were explored, the longer duration of the interview required to cover all such scenarios may have led to less accurate information as participants may have become less engaged in the interview. Study 3 had limitations associated with data collection through its timing with the COVID-19 lockdown when people could not drive as they usually would; thus, the emotional effect on data was not clear or studied. There is also a limitation specifically related to Study 3. The actual behaviour outcome measure (or Time 2 survey), which ideally comprises one of the TPB application protocols, was not possible due to the COVID-19 response restricting driving in SA.

For Study 4, it is possible that the online nature of the qualitative study may have impacted the nature of data collected. Also, the data are subjective as they are based on the views of seven individuals although it is to be noted that these individuals were road safety experts in SA.

8.7 RECOMMENDATIONS FOR FUTURE STUDIES

Further research is needed to assess the utility of the extended TPB constructs in relation to actual speeding behaviour among Saudi participants once the pandemic restrictions for driving have passed. It will also be important to conduct further studies beyond the university environment to increase the generalisability of the data. Although the research has been conducted with Saudi drivers, they were recruited via King Saud University and, thus, a University context. As such, this recruitment approach may have impacted the nature of the sample recruited and, as stated, the generalisablity of the findings. Furthermore, future research would benefit from the inclusion of more Saudi locations including cities to increase the generalisability of the findings. For instance, future studies may seek to apply the similar survey tool with

participants residing in other larger Saudi cities such as Jeddah, Mecca, and the eastern provinces with random sampling. Thereafter, its application to less metropolitan areas in SA may also be beneficial in terms of providing a more comprehensive understanding of speeding across SA.

It is also, not surprisingly, recommended that a future study seek to also measure actual speeding behaviour. And, to examine actual behaviour, while self-report measures would be most helpful in the first instance, it may also be beneficial to consider objective measures of speeding behaviour as well. For instance, Conner et al. (2007) used both self-reported measures of the TPB to examine intention to speed together with speeding behaviour as assessed within a driving simulator to examine participants' actual behaviour. The study showed there was strong correspondence between the self-report and objective measures. Future studies would also benefit from a pilot study based on a range of participants from different educational backgrounds. The clarity of the online surveys needs to be reassessed, which have been designed with tables that do not fully appear on mobile phone displays.

It is also recommended that future research could be implemented to further explore how exactly the findings may be transformed into these sorts of initiatives and to evaluate how effective they are via in person/virtual interviews may have produced richer data. Piloting would play an important role in intervention development to ensure that the intended effects of an intervention are explored prior to large-scale investment and implementation of a particular intervention. According to Thabane et al., (2019), pilot studies provide evidence-based decisions which help to inform stakeholders of what approaches to progress and invest resources into. Such studies also provide further understanding as to the mechanisms by which an intervention may work and provide an indication of its applicability and transferability. Thus, to utilise

this knowledge in a school curriculum, it would be beneficial to start with a school from each suburb in Riyadh city to evaluate the program and to make any necessary modifications. Universities could be used as well, by conducting workshops with university students. It would be also interesting to apply the extended TPB in a study of adolescents to examine the role of curiosity and risk taking on speeding as well in the future studies to examine this sub-theme.

Regarding public awareness campaigns, piloting speeding intervention messages and videos on social media such as twitter would be helpful to assess their efficacy in changing beliefs.

In addition, though Study 3 found that wives were an important normative influence on drivers' speeding, the extent of the influence that Saudi women may actually have in relation to being able to influence Saudi men is not clear in the literature. For this reason, it is important to gain more understanding on the extent of interventions suggested, including targeting the normative approval of the wives of Saudi men. To gain further knowledge about this, future studies are recommended to understand Saudi women's role in influencing male drivers' behaviour. It might also be helpful to apply the extended TPB to females who are both drivers and non-drivers to identify their beliefs for developing countermeasures related to future interventions.

The last suggestion relates to adding further understanding about speeding behaviour in SA through applying another framework such as social learning theory (SLT) with its focus around the idea that behaviour is determined by imitating others who are perceived as a model in their social environment, or by direct conditioning (learning through specific previous events in the individual's life) (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979. It might contribute also to further details about psychosocial

factors leading to speeding in SA. Thus, more tailored interventions would be developed by understanding the community perceptions about traffic rules and enforcement. While a different focus to the current program of research, a future study may be able to complement and extend the current findings by applying SLT. SLT is one of the most successful theories used to understand deviant behaviours such as speeding. SLT also would contribute to add further exploration of the association between attitudes and intentions to speed in SA.

8.8 SUMMARY

In the summary section 8.7, the results of each study's contribution were clarified and synthesised. The chapter also discussed important theoretical, methodological, practical implications emerging from the program of research. This section outlines how the research has fulfilled its main aims, which were to determine the psychosocial factors that contribute to speeding in the SA context; to provide evidence which may assist in the development of culturally-relevant speed awareness interventions; and, to add a theoretical contribution to the road safety field via the application of an extended TPB and, in doing so, examine its theoretical robustness within Arab culture. The program of research identified several psychosocial factors which included personal, social, and situational factors, as influencing speeding intentions. Such findings suggest that these factors could be used to inform the development of future public awareness interventions and educational initiatives. Moreover, in Study 4, the final study of the program of research, the results from the preceding studies were assessed by road safety experts in SA who were commenting particularly on the validity of the findings and the way in which they may inform future interventions in SA.

Overall, the program of research addressed three research questions. First, how do Saudis define speeding from their own point of view? (to identify the specific speeding scenario/s). Four specific speeding scenarios were developed, two scenarios on 80 km/h zones and two scenarios on 120 km/h speed zones. All the scenarios shared the same contextual features in that participants were asked to consider a context where they were driving alone, on multi-lane road, in free-flowing traffic, their vehicle was in good condition, and they had clear visibility. In addition, for each speed zone, two circumstances or potential reasons were also mentioned in the scenarios which were speeding with no particular reason and speeding to make a scheduled arrangement.

The second research question was what are the key psychosocial factors that influence speeding behaviour? The key psychosocial factors were examined for three speeding scenarios: the general speeding scenario (i.e., exceeding the posted speed limit) and the two specific speeding scenarios (i.e., speeding to make a scheduled arrangement on 80 km/h and 120 km/h roads). Overall, the findings from Study 3 showed that, encouragingly, the Saudi drivers in the study sample at least reported a low intention to speed. Regarding factors predicting such speeding intentions, personal, social, and situational factors were found to be significant predictors.

The third research question was which psychosocial factors could be used to be used in future intervention strategies?. Study 4 explored this particular question and the findings based on their insights suggested that the findings could help inform the content of road safety education initiatives that may be delivered within school curriculums or via public awareness campaigns delivered at the community level. They also suggested using social media to promote the dissemination of such campaigns to increase public awareness about speeding.

Thus, overall, the current program of research has offered important insights into the psychosocial factors influencing speeding, one of the most common driving violations and a major contributor to RTCs in SA. In doing so, the research may help to inform future interventions targeting speeding and, ultimately, help to contribute to improving road safety in SA.

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Appendices

Study 1: Survey

Notes: The schedule will involve open-ended questions based on questions adapted (and translated) from previous studies on speeding (Fleiter, 2010, p. 239; Horvath, 2009). The interviews will be conducted in Arabic, then transcribed and translated into English by the candidate.

Demographic data:

Age:

Working status: ○ Student ○ Worker

Educational level: ○ High school ○ Graduate ○ Post-graduate

Which city are you living in Saudi Arabia

If you are _not living_ in Riyadh city:

Have you ever drive your car in Riyadh ○ Yes ○ No

Years of experience in driving:

The interview questions include:

The interview questions are illustrated below:

"As a driver, what does the word "speeding" mean to you?"

"Do you think that driving above the speed limit is dangerous? Why/why not?"

"Are there specific circumstances in which speeding is okay?"

"What circumstances have you personally engaged in speeding?"

Appendix B

Study 2: interviews' List of Questions

Please note that the same questions as listed below will be asked in relation to each of the below-mentioned scenarios. Potentially, rather than repeat all of the questions for every scenario, the interviewer may choose to ask (after having asked the questions for at least one scenario) whether a participant believes that any of their previous responses now differ when considering the new scenario. This approach enables exploration of responses for multiple scenarios without needing to extend the duration of the interviews.

Notes:
The surveysurvey that is going to be adapted was previously designed by (Ajzen & Fishbein, 1980; Horvath, 2009), however, the speeding scenarios were be added in order to get a specific answer for that speeding context.

The speeding specific scenarios include:

"Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

"Assume that you are driving alone on a multi-lane 80 km/h road and traffic is free-flowing. The weather is fine, the visibility is clear, and your vehicle is in good condition. You are in a hurry for no particular reason other than you want to reach your destination quickly (e.g., to return home early) and you are exceeding the posted speed limit."

"Assume that you are driving alone on a multi-lane highway and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

"Assume that you are driving alone on a multi-lane 80kmm/h road and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Demographic data:

Age:
Working status: ○ Student   ○ Worker
Educational level: ○ High school   ○ Graduate   ○ Post-graduate
Which city do you live
in Saudi Arabia: ……………………….……………….…………

Have you ever driven your car in Riyadh?   ○ **Yes**   ○ **No**

                                           If no, Where have you driven (location)?

                                       …………….…………………

Years of driving experience:

The interview questions include:

Beliefs/variables	Elicitation questions
Behavioural belief	➢ What do you think would be the advantages of speeding while driving in this context? ➢ What do you think would be the disadvantages of speeding while driving? ➢ Prompts: - Is there anything else that you associate with speeding?
Normative belief	➢ When considering the people important to you who would approve of you speeding? ➢ Who would disapprove of you speeding? ➢ Prompts: - Are there particular groups among those your age that approve or disapprove of you speeding? ➢ Are there any other groups/people that come to mind when talking about you engaging in speeding?

Control belief	➢ Can you think of anything that might help or encourage you to speed?
	➢ Can you think of anything that might discourage or prevent you from speeding?
	➢ Prompts:
	  - What are the things that would make it easier for you to speed?
	  - What about the things that would make it harder?

Study 3: Survey

DEMOGRAPHIC INFORMATION

This survey asks questions relating to your beliefs about speeding behaviour. Given the current Coronavirus pandemic, we recognise that life and driving at present will not be the same as usual. At this stage, we continue with this research for which we welcome your input given that we believe that this research will be relevant to the future after the current unprecedented crisis God willingness. It follows that we ask about your past behaviour prior to the pandemic and when it had been legally acceptable for you to drive. Similarly, we also ask about your future driving intentions in terms of when it will once again be legally acceptable to drive.

The following questions relate to your demographic information. Please indicate the response most applicable to you (by ticking the box or typing your response in the space provided):

1. **Have you driven in the past, prior to the pandemic, when it had been legally acceptable to drive?**

   ○ No *(If "No" Thank you for your interest in the survey. Unfortunately, at this time, we are looking for drivers who have driven in the past, prior to the pandemic, when it had been legally acceptable to drive)*

   ○ Yes *(Survey continues)*

2. **Age:** ……… (in years)

3. **Working status:**
(You can select more than one option)

   ☐ Student   ☐ Worker   ☐ Other: ………………

   If you are studying, what are you **studying?**

   ○ Bachelor   ○ Masters   ○ PhD
                    ○ Other:
   ○ Diploma   ……………….

4. What is the **highest level of education that you have completed?**

   ○ High school   ○ Bachelor   ○ Masters

   ○ PhD   ○ Diploma   ○ Technical/trade certificate

5. Prior to the pandemic, in the past when it was legally acceptable to drive, how many hours of   …….. hours

---

driving would you
have done in a
typical week?

6. How long have you
   had your driver's
   licence?   …………
7. When you are able to
   drive, where do you
   mostly drive?   ☐ Only city   ☐ Mainly city   ☐ Both city/ country roads
   *(You can select more than
   one option)*   ☐ Mainly   ☐ Only country
                           country roads   roads
8. In which city do you
   live in Saudi Arabia?   …………….…………………….…………………….………………

9. Please indicate below which answer applies to you for a speeding behaviour. You will find some items for general speeding behaviour followed by items asking you about speeding in two speed zones including 80 km/h and 120 km/h as will be clarified later.

Please note that the following question is for general speeding behaviour. General speeding behaviour is defined as exceeding the posted speed limit, which is given on roadside signs. Based on this definition, please indicate your answers by circling one number on each line for the questions below (for example, on the first line a 1 means you think speeding is definitely bad, a 7 means you think it is definitely good, while the numbers in between allow you to indicate an answer somewhere between these endpoints). As noted earlier, we ask that you consider your responses in terms of the future when it will once again be legally acceptable to drive:

A. Please select the number on each line that best represents your response:

For me to speed in the future when it will once again be legally acceptable to drive would be:							
Bad	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Good
Unwise	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Wise
Negative	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Positive

B. Please select the number on each line that best represents your response:

How frequently have you sped in the past, prior to the pandemic, when it was legally acceptable to drive?	Not at All	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Very Often
Those people who are important to me would	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

approve of me speeding in the future when it will once again be legally acceptable for me to drive									
Those people who are important to me would want me to speed in the future when it will once again be legally acceptable for me to drive	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
It would be easy for me to speed in the future when it will once again be legally acceptable for me to drive	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
I am confident that I could speed in the future when it will once again be legally acceptable for me to drive	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
Whether or not I speed in the future when it will once again be legally acceptable for me to drive would be completely under my control	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
Speeding in the future when it will once again be legally acceptable for me to drive would be wrong	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
I would feel guilty if I sped in the future when it will once again be legally acceptable for me to drive	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
Regarding other drivers in general, I think they would exceed the speed limit in the future when it will once again be legally acceptable for them to drive	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

C. Please be reminded the following items are assessing your beliefs about speeding in general in the future when it will once again be legally acceptable for me to drive:

I intend to speed in the future when it will once again be legally acceptable for me to drive	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

It is likely that I will speed in the future when it will once again be legally acceptable for me to drive	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
How willing would you be to speed in the future when it will once again be legally acceptable for you to drive	Not at all willing	1	2	3	4	5	6	7	Very willing

	Never	Rarely	Not often	Sometimes	Slightly often	Often	Very often
How often did you speed, prior to the pandemic, when it was legally acceptable to drive?	1	2	3	4	5	6	7

10. We now would like to know your responses in relation to specific driving scenarios based on two different speed zones (i.e., 80 km/h and 120 km/h zones) in the future when it will once again be legally acceptable for you to drive:

"Assume that in the future when it will once again be legally acceptable for you to drive, you are driving alone on a multi-lane road, with a speed limit of either 80 km/h OR 120 km/h. Traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment)."

A. Based on this scenario, please select the number on each line that best represents your response in relation to both the 80km/h and 120km/h speed zones:

For me to speed in this scenario **in the 80km/h** speed zone *in the future when it will once again be legally acceptable for me to drive* would be:									For me to speed in this scenario **in the 120km/h** speed zone *in the future when it will once again be legally acceptable for me to drive* would be:								
Bad	1	2	3	4	5	6	7	Good	Bad	1	2	3	4	5	6	7	Good
Unwise	1	2	3	4	5	6	7	Wise	Unwise	1	2	3	4	5	6	7	Wise
Negative	1	2	3	4	5	6	7	Positive	Negative	1	2	3	4	5	6	7	Positive

B. Based on this scenario, please select the number on each line that best represents your response in relation to both the 80km/h and 120km/h speed zones:

How frequently have you sped in the past, prior to the pandemic, in a speed zone of **80 km/h,** when it was legally acceptable to drive?									How frequently have you sped in the past, prior to the pandemic, in a speed zone of **120 km/h,** when it was legally acceptable to drive?								
Not at all	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Very often	Not at all	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Very often

Those people who are important to me would approve of me speeding in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									Those people who are important to me would approve me speeding in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

Those people who are important to me would want me to speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									Those people who are important to me would want me to speed in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

It would be easy for me to speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									It would be easy for me to speed in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

I am confident that I could speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									I am confident that I could speed in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

Whether or not I speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive would be completely under my control									Whether or not I speed in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive would be completely under my control								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

Speeding in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive would be wrong									Speeding in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive would be wrong								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

I would feel guilty if I sped in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									I would feel guilty if I sped in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
Regarding other drivers in general, I think they would exceed the speed limit in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for them to drive									Regarding other drivers in general, I think they would exceed the speed limit in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for them to drive								
False	*1*	*2*	*3*	*4*	*5*	*6*	*7*	True	False	*1*	*2*	*3*	*4*	*5*	*6*	*7*	True

C. Please be reminded the following items are assessing your beliefs about speeding in general in the future when it will once again be legally acceptable for me to drive God willingness:

I intend to speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									I intend to speed in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
It is likely that I will speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for me to drive									It is likely that I will speed in a speed zone of **120 km/h** in the future when it will once again be legally acceptable for me to drive								
Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree
How willing would you be to speed in a speed zone of **80 km/h** in the future when it will once again be legally acceptable for you to drive?									How willing would you be to speed in a speed zone of **١٢0 km/h** in the future when it will once again be legally acceptable for you to drive?								
Not at all willing	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Very willing	Strongly disagree	*1*	*2*	*3*	*4*	*5*	*6*	*7*	Strongly agree

		Never	Rarely	Not often	Sometimes	Slightly often	Often	Very often
How often did you	On an 80 km/h road	*1*	2	*3*	4	5	6	7

speed, prior to the pandemic, when it was legally acceptable for you to drive?	On an 120 km/h road	1	2	3	4	5	6	7	

11. For each statement below, please select the number on each line that best represents your response in relation to both the 80km/h and 120km/h speed zones (we are aware that your response might be different for the different speed zones):

		Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
Speeding will help me arrive earlier.	On an 80 km/h road	1	2	3	4	5	6	7
	On an 120 km/h road	1	2	3	4	5	6	7
Speeding will help me arrive on time.	On an 80 km/h road	1	2	3	4	5	6	7
	On an 120 km/h road	1	2	3	4	5	6	7
Speeding will allow me to reduce the time I spend in the car.	On an 80 km/h road	1	2	3	4	5	6	7
	On an 120 km/h road	1	2	3	4	5	6	7
It is exciting to drive faster than the speed limit.	On an 80 km/h road	1	2	3	4	5	6	7
	On an 120 km/h road	1	2	3	4	5	6	7
I feel that speeding is dangerous to others.	On an 80 km/h road	1	2	3	4	5	6	7
	On an 120 km/h road	1	2	3	4	5	6	7
Speeding to make a scheduled appointment puts me under stress.	On an 80 km/h road	1	2	3	4	5	6	7
	On an 120 km/h road	1	2	3	4	5	6	7
Speeding would cost me more money if I	On an 80 km/h road	1	2	3	4	5	6	7

committed a violation.	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Speeding could lead to car damage or tyre damage.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Speeding would lead to loss of control.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
My speeding in this situation would likely result in a crash.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I would be more comfortable speeding if the road was familiar.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I would be more comfortable speeding if there is no traffic congestion.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I would be less likely to speed if there is a SAHER or any traffic monitoring system in operation.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Buildings, shops, turns, signs, and bumps would make speeding difficult for me.	On an 80 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	On an 120 km/h road	*1*	*2*	*3*	*4*	*5*	*6*	*7*

12. How likely is it that the following individuals or groups of people would **approve of you** speeding **in relation to both the 80km/h and 120km/h speed zones** in the future when it will once again be legally acceptable for me to drive?

Please selection one option on each line that best represents your response in relation to 80km/h and 120km/h roads		Extremely Unlikely	Quite Unlikely	Slightly Unlikely	Neither Likely or Unlikely	Slightly Likely	Quite Likely	Extremely Likely	Not Applicable
Parent	On an 80 km/h road	1	2	3	4	5	6	7	8
	On an 120 km/h road	1	2	3	4	5	6	7	8
Wife	On an 80 km/h road	1	2	3	4	5	6	7	8
	On an 120 km/h road	1	2	3	4	5	6	7	8
Friends	On an 80 km/h road	1	2	3	4	5	6	7	8
	On an 120 km/h road	1	2	3	4	5	6	7	8
Brothers	On an 80 km/h road	1	2	3	4	5	6	7	8
	On an 120 km/h road	1	2	3	4	5	6	7	8

13. On an120 km/h multilane road, if my trip was to take a long time, I would be motivated to speed:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

14. On an 80 km/h multilane road, pedestrians on the road would prevent me from speeding:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
1	*2*	*3*	*4*	*5*	*6*	*7*

Thank you for the responses you have provided in this survey.

15. Is there anything else that you would like to note about this study or survey? As this survey is anonymous, please be sure not to write any information here that could identify you.

……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
…………………………………………….

Appendix D

List of Questions to Examine Validity

The list of questions to be asked for assessing the validity of the survey include:

1) "Are any items ambiguous or difficult to answer?" (Francis et al., 2004, p. 27)
2) "Does the questionnaire feel too repetitive?" (Francis et al., 2004, p. 27)
3) "Does it feel too long?" (Francis et al., 2004, p. 27)
4) "Does it feel too superficial?" (Francis et al., 2004, p. 27)
5) "Are there any annoying features of the wording or formatting?" (Francis et al., 2004, p. 27)
6) "Are there inconsistent responses that might indicate that changes in response endpoints are problematic for respondents who complete the questionnaire quickly?" (Francis et al., 2004, p. 27)

Open-ended survey question

Understanding influences of speeding in Saudi Arabia

This is an open-ended survey which includes four questions about the results of this program of research. The following sections include a brief background of the current research, followed by the summary of results and, finally, the survey questions. It is asked that you please review the brief background and summary of results prior to responding to the survey questions.

Background

This program of research focused on the influence of psychosocial factors on speeding behaviour with the aim to understand or predict a driver's engagement in this behaviour. There were three speeding definitions or scenarios in which the theory was applied, as follows:

Definition 1: "Exceeding the legal speed limit" (General speeding definition)

Definition 2: "Assume that you are driving alone on a multi-lane **120 km/h road** and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

Definition 3: "Assume that you are driving alone on a multi-lane **80km/h road** and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

The following sections will include a brief justification of why this theory has been used and a brief explanation of the main variables of this theory, followed by the summary of results from this program of research.

- ## **Why was the Theory of Planned Behaviour (TPB) chosen?**

 The TPB has been applied extensively to help understand and predict speeding and has been shown to offer valid and reliable results in explaining speeding in different countries (e.g., Elliott & Thomson, 2010; Horvath, Lewis, & Watson, 2012). Another advantage that has been noted for applying the TPB is that the TPB can be extended by adding additional constructs/predictors. For these reasons, the TPB was selected for application to study speeding behaviour in Saudi Arabia (DeNicola et al., 2016).

- ## **What is the Theory of Planned Behaviour (TPB)?**

The TPB asserts that behavioural intention is the most important predictor of behaviour (Godin & Kok, 1996). Intention refers to the extent to which an individual intends or plans to engage in a certain behaviour (Ajzen & Fishbein, 1980).

The TPB includes three standard constructs which are each proposed as directly influencing intention (see Figure below), namely, attitude (i.e., how favourably you feel about speeding), subjective norms (i.e., whether people important to you approve of you speeding) and perceived behavioural control (i.e., how much control you think you have over your speeding behaviour). The Indirect variables include behavioural beliefs (i.e., advantages and disadvantages of the behaviour) which influence attitude, normative beliefs (i.e., important people who approve or disapprove of your speeding) that influence subjective norms, and control beliefs (i.e., facilitators and barriers of speeding) that influence perceived behavioural control.

In an extended model of the TPB, the additional variables in this study included moral norms (i.e., perceptions whether the behaviour is right or wrong), descriptive norms (i.e., perceptions of whether other people would perform the behaviour), and past behaviour (i.e., previous experience of the behaviour).
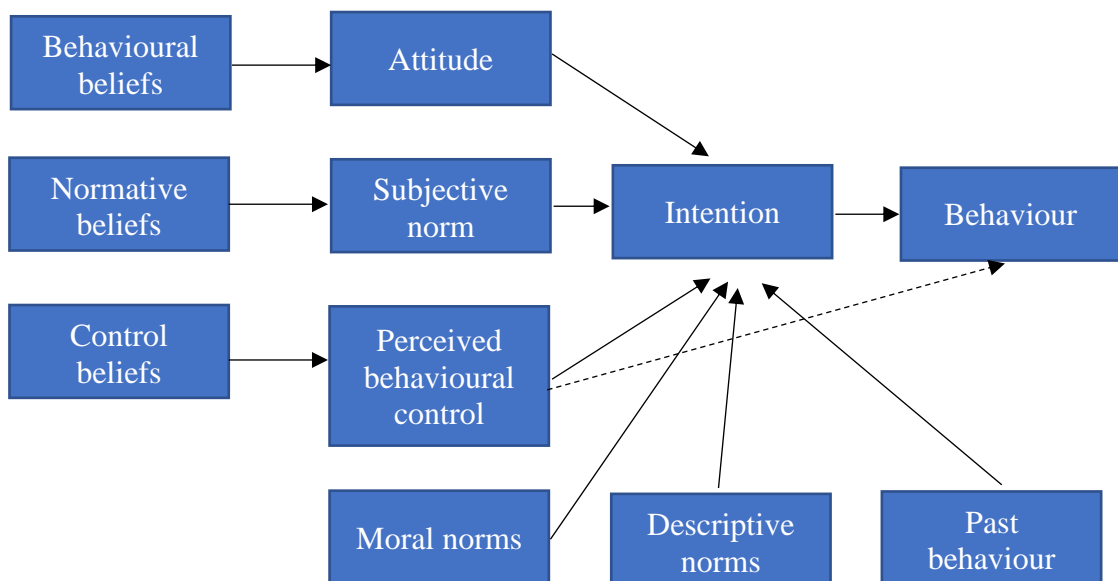
- **How was this study conducted?**

The variables from the extended TPB were examined within an online survey with N = 112 Saudi male drivers, aged 18-40 years who regularly drive in Riyadh city. During the period of data collection there were some restrictions due to COVID-19 for driving in Riyadh city. For this reason, only factors influencing intentions to speed were examined, and not actual speeding behaviour.

- **What are the significant extended TPB variables for each speeding definition?**

Overall, participants reported a generally low intention to speed across all speeding scenarios. Regression analyses showed that, across all scenarios, perceived behavioural control and past behaviour were the significant predictors of intention to speed with perceived behavioural control the strongest predictor. The significant results (predictors for intention to speed) for each speeding scenario include:

1) **Definition 1:** "Exceeding the legal speed limit".

   - **The significant results and interpretations:**

     1. Perceived behavioural control indicating the more participants think they can control their driving speed in different speed zones, the stronger their intention to speed.

     2. Moral norms meaning that the more participants feel guilty about speeding, the less likely they will intend to speed.

     3. Descriptive norms reflecting that that the more participants think other drivers would speed in such scenarios, the stronger their intention to speed.

     4. Past behaviour meaning that those who sped more in the past, were more likely to intend to speed in the future.

   - **The variance of the extended TPB explains speeding intention:**

     Overall, the extended TPB explained 51% of the variance in speeding intention which is considered a substantial amount of variance based on other TPB-based studies of speeding.

2) **Definition 2:** "Assume that you are driving alone on a multi-lane **80 km/h road** and traffic is free-flowing. The weather is fine, visibility is clear, and your

- **The significant results and interpretations:**

1. Perceived behavioural control indicating the more participants think they can control their driving speed in this scenario, the stronger their intention to speed.

2. Past behaviour meaning that those who sped more in the past in a similar scenario, were more likely to intend to speed in the future in the same context.

- **The variance of the extended TPB explains speeding intention:**

Overall, the extended TPB explained 69% of the variance in speeding intention which is considered a substantial amount of variance based on other TPB-based studies of speeding.

3) Definition 3: "Assume that you are driving alone on a multi-lane **120 km/h road** and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

- **The significant results and interpretations:**

1. Perceived behavioural control indicating the more participants think they can control their driving speed in this scenario, the stronger their intention to speed.

2. Moral norms meaning that the more participants feel guilty about speeding in this scenario, the less likely they will intend to speed.

3. Descriptive norms reflecting that that the more participants think other drivers would speed in this scenario, the stronger their intention to speed.

4. Past behaviour meaning that those who sped more in the past in a similar scenario, were more likely to intend to speed in the future in the same context.

- **The variance of the extended Theory of Planned Behaviour explains speeding intention:**

Overall, the extended TPB explained 73% of the variance in speeding intention which is considered a substantial amount of variance based on other TPB-based studies of speeding.

● **What are the significant indirect TPB beliefs which influence intention to speed in 80 km/h and 120 km/h speed zones?**

1) **Definition 2:** "Assume that you are driving alone on a multi-lane **80 km/h road** and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

  - **The significant results and interpretations:**

    1. Normative beliefs: "wife" and "friends" – if participants thought their wife and friends would not approve of them speeding, they were less likely to intend to speed.

    2. Control beliefs: "no traffic congestion" – free-flowing roads would motivate the participants to intend to speed.

2) **Definition 3:** "Assume that you are driving alone on a multi-lane **120 km/h road** and traffic is free-flowing. The weather is fine, visibility is clear, and your vehicle is in good condition. You are in a hurry because you need to make a scheduled arrangement (e.g., to catch a plane or an appointment) and you are exceeding the posted speed limit."

  - **The significant results and interpretations:**

    1. Behavioural beliefs: "speeding will help to arrive earlier" – if participants believed that speeding would help them to arrive at their destination earlier it would increase their intention to speed.

    2. Normative beliefs: "wife"– if participants thought their wife would not approve of them speeding, they were less likely to intend to speed.

    3. Control beliefs: "familiarity with the road" – greater familiarity with the road would increase their intention to speed.

Based on this background information, we would like to know your valuable opinion regarding the following questions:

Demographic data:	
Age	…………
Gender	…………
Educational background	…………
Type of workplace (e.g., Government, University)	…………
Years of experience	…………

1) With respect to your experience in road safety, to what extent do you think the results reflect the reality of speeding behaviour among Saudi drivers in Riyadh city**?**

2) How can this knowledge be used for future interventions for reducing speeding behaviour or to increase drivers' compliance with the legal speed limit**?**

3) What are the intervention strategies that you think could be used for the intervention **?**

4) What are the factors that you think have been not addressed? And how may these aspects be addressed/revealed in future studies**?**
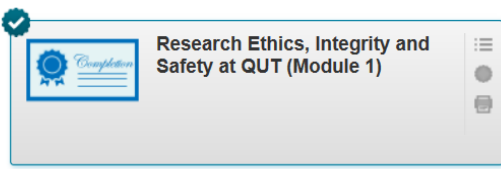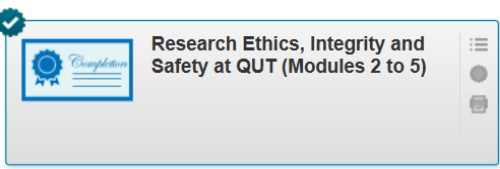
Appendix F

My Achievements

Raniya Jamalaldeen S Alsafar
You have 0 new achievement(s)

All Achievements   Earned Achievements   Unearned Achievements

Research Ethics, Integrity and Safety at QUT (Module 1)

Research Ethics, Integrity and Safety at QUT (Modules 2 to 5)

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	61-62
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	61-62
Occupation	3	What was their occupation at the time of the study?	61-62
Gender	4	Was the researcher male or female?	61-62
Experience and training	5	What experience or training did the researcher have?	61-62
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	67
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	250-251
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	59 and 61-62
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	71
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	67
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	68-69
Sample size	12	How many participants were in the study?	67
Non-participation	13	How many people refused to participate or dropped out? Reasons?	58
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	66-67
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	68-69
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	67
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	60-61 and 71
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	58
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	69
Field notes	20	Were field notes made during and/or after the inter view or focus group?	69-70
Duration	21	What was the duration of the inter views or focus group?	69-70
Data saturation	22	Was data saturation discussed?	67
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	70
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	71-72
Description of the coding tree	25	Did authors provide a description of the coding tree?	72-79
Derivation of themes	26	Were themes identified in advance or derived from the data?	71-72
Software	27	What software, if applicable, was used to manage the data?	NA
Participant checking	28	Did participants provide feedback on the findings?	70
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	72-79
Data and findings consistent	30	Was there consistency between the data presented and the findings?	98-108
Clarity of major themes	31	Were major themes clearly presented in the findings?	72-79
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	108-112

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	61-62
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	61-62
Occupation	3	What was their occupation at the time of the study?	61-62
Gender	4	Was the researcher male or female?	61-62
Experience and training	5	What experience or training did the researcher have?	61-62
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	67
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	250-251
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	59 and 61-62
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	125
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	121
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	122-123
Sample size	12	How many participants were in the study?	121
Non-participation	13	How many people refused to participate or dropped out? Reasons?	58
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	122-123
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	122-123
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	121
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	60-61 and 71
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	58
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	121-124
Field notes	20	Were field notes made during and/or after the inter view or focus group?	121-124
Duration	21	What was the duration of the inter views or focus group?	121
Data saturation	22	Was data saturation discussed?	121
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	121-124
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	124-126
Description of the coding tree	25	Did authors provide a description of the coding tree?	124-126
Derivation of themes	26	Were themes identified in advance or derived from the data?	124-126
Software	27	What software, if applicable, was used to manage the data?	NA
Participant checking	28	Did participants provide feedback on the findings?	121-124
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	126-142
Data and findings consistent	30	Was there consistency between the data presented and the findings?	98-108
Clarity of major themes	31	Were major themes clearly presented in the findings?	143-148
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	148

Appendix I

The COREQ for Study 4

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	61-62
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	61-62
Occupation	3	What was their occupation at the time of the study?	61-62
Gender	4	Was the researcher male or female?	61-62
Experience and training	5	What experience or training did the researcher have?	61-62
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	67
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	250-251
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	59 and 61-62
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	199
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	200
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	200-201
Sample size	12	How many participants were in the study?	200
Non-participation	13	How many people refused to participate or dropped out? Reasons?	58
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	200-201
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	NA
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	200
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	NA
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	NA
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	NA
Field notes	20	Were field notes made during and/or after the inter view or focus group?	NA
Duration	21	What was the duration of the inter views or focus group?	NA
Data saturation	22	Was data saturation discussed?	200
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	NA
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	201
Description of the coding tree	25	Did authors provide a description of the coding tree?	NA
Derivation of themes	26	Were themes identified in advance or derived from the data?	201
Software	27	What software, if applicable, was used to manage the data?	NA
Participant checking	28	Did participants provide feedback on the findings?	NA
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	201-206
Data and findings consistent	30	Was there consistency between the data presented and the findings?	207-208
Clarity of major themes	31	Were major themes clearly presented in the findings?	201-206
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	207-208