

ASSOCIATION OF RISKY DRIVING  
BEHAVIOR WITH ATTENTION BIAS ,  
EMOTION REGULATION AND SENSATION  
SEEKING



by

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DEPARTMENT OF PSYCHOLOGY  
Faculty Of Management And Social Sciences  
Islamabad  
January 2024

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Reg. No. BSP201038

A Research Thesis submitted to the  
DEPARTMENT OF PSYCHOLOGY  
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**CERTIFICATE OF APPROVAL**

It is certified that the Research Thesis titled "Association of risky driving behavior with attention bias, motion regulation and sensation seeking among drivers" carried out by Zarmeena Naeem , Reg. No. BSP201038, under the supervision of Dr. Sabahat Haqqani. Capital University of Science & Technology, Islamabad, is fully adequate, in scope and in quality, as a Research Thesis for the degree of BS Psychology.

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Association of Risky Driving Behavior with Attention Bias, Emotion Regulation and Sensation Seeking

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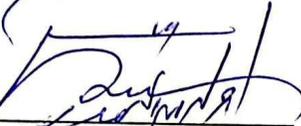
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**DEDICATION**

*To my family, your unconditional love, support and sacrifices helped to  
make this dream possible.*

**DECLARATION**

It is declared that this is an original piece of my own work, except where otherwise acknowledged in text and references. This work has not been submitted in any form for another degree or diploma at any university or other institution for tertiary education and shall not be submitted by me in future for obtaining any degree from this or any other University or Institution.

**Zarmeena Naeem**

**BSP201038**

**January 2024**

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## Abstract

This study investigated association of risky driving behavior with attention bias, emotion regulation and sensation seeking. Gender related difference were also calculated. The study utilized a correlational study design and collected data from 300 drivers of Rawalpindi and Islamabad. Risky Driving Behavior Scale (RDBS) , Barratt Impulsiveness Scale-Revised 21 (BIS-R21), Emotion Regulation Questionnaire (EQR) and Sensation Seeking Scale (SSS).IBM SPSS 21 was used for statistical analyses. Spearman correlation and Mann-Whitney tests were executed due to non-normal distribution of data. The results showed a positive association between risky driving behavior and attention bias (  $r = 0.134$ ), positive association (  $r = 0.367$ ) between risky driving behavior and emotion regulation, positive correlation between risky driving behavior and sensation seeking (  $r = -0.060$ ). There was no gender difference on risky driving behavior , attention bias and emotion regulation. The findings have important implications for addressing factors that predict risky driving behavior. One of the limitations is that it's a self administered test which will cause biases. Future research can conduct study on other cities of Pakistan .

***Keywords;*** *risky driving behavior , attention bias , emotion regulation , sensation seeking.*

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## Chapter 1 Introduction

According to World Health Organization (2021), risky driving behavior is a major cause of traffic accidents and fatalities worldwide, resulting in approximately 1.35 million deaths and 20-50 million non-fatal injuries each year (Redelmeier & Tibshirani, 2018). The World report on road traffic accident prevention has indicated that worldwide, an estimated 1.2 million people die in road traffic accident each year and as many as 50 million are being injured (WHO, 2009). Majority of traffic accidents, approximately 90%, across both developed and developing countries, stem from the presence of aggressive driving behavior and risky driving behavior (Bener et al., 2007, Damsere-Derryet al., 2010, De Oña et al., 2014). In Pakistan, like other countries, risky driving behavior is a significant problem (Ghulam Hussain et al 2019). Pakistan Bureau of Statistics (2020) reported 6,598 traffic accidents, 6,872 fatalities, and 17,162 injuries. Along with human lives, risky driving also impacts economy of country causing health care cost, property damage, legal and insurance cost and other relevant issues (Ministry of Finance, 2015). Hence there is a need to explore risky driving behavior.

### **Risky Driving Behavior**

Risky driving behavior is global major health concern as mention above, therefore various researches in western countries has been conducted on road accidents and risky driving behavior (Oltedal & Rundmo, 2006; Ulleberg & Rundmo, 2003). Road traffic injury is one of the persistent public health challenges in most regions of the world, representing substantial human and economic losses. Annually, about 1.25 million lives are lost, whereas 50 million suffer from road traffic injuries globally. It has been shown that over 60% of the reasons for traffic injuries are a risky driving behavior (RDB). In

context of risky driving behavior, it is important to address psychological and personality traits for this research the three psychological factors will be examine to predict risky driving behavior which are attention bias, emotion regulation and sensation seeking. Investigators have identified several factors that underpin the involvements in risky driving behaviors. For instance, studies have explored that drivers' gender importantly influences the experiences of risky driving behavior (Rhodes N et.al, 2011, Chumpawadee et.al, 2015). Excessive speed is a significant contributor to road accidents. Drivers who exceed speed limits or drive too fast for road conditions have reduced reaction time and increased stopping distances, elevating the risk of collisions (Kloeden et.al, 2001).

### **Attention bias**

Attention bias refers to the tendency of individuals to focus on certain stimuli while neglecting others (Fadardi & Ziaee, 2010; Williams et al., 1996). Attention bias, which refers to the selective allocation of attention resources toward specific aspects of stimuli (Williams et al., 1988). In the context of driving, attention bias can lead to a heightened risk of accidents if drivers focus on specific aspects of the environment while ignoring others. Emotions can also influence attention bias and cause distortion (Bertsch et al., 2009; Smith & Waterman, 2003, 2005; Williams et al., 1996). Attention bias refers to selective focus of attention on certain aspects of a stimulus. Attention is paid selectively to maintain limited cognitive resources at the early stages of processing environmental information in a way that is compatible with personal goals. This is an automatic process that occurs outside of conscious awareness (William et.al, 1988). Attention bias can influence the occurrence of road traffic injuries (Sani et.al). Attention

bias may arise when drivers become distracted by various stimuli inside or outside the vehicle. Distractions such as mobile phones, in-car entertainment systems, or external events can divert attention away from crucial aspects of driving, increasing the likelihood of risky behaviors (Young et.al, 2015). Emotional states, such as stress, anxiety, or anger, can also contribute to attention bias in driving. When individuals are emotionally distressed, their attention may be selectively focused on the source of distress, potentially leading to impaired awareness of other critical elements on the road. numerous studies were conducted on attentional bias toward emotional information, especially the negative affect (MacLeod et al., 1986, Williams et al., 1996, Fox et al., 2001, Yiend, 2010), which are generally linked to emotional disorders (Van et al., 2014). It was then observed that attentional bias also occurs in the case of some other categories of stimuli. Evidence shows that individuals with particular psychological characteristics (Teachman et al., 2007) or behaviors (Cohen et al., 1998, Brevers et al., 2011, Veenstra et al., 2010) display attentional bias toward specific stimuli or cues.

### **Emotion regulation**

Emotion regulation encompasses the various methods individuals employ to manage the emotions they feel, control the timing of these emotions, and determine how they experience and convey them (Gross, 1998). It plays a crucial role in promoting psychological well-being, facilitating social interactions, and supporting physical health (Gross & Thompson, 2007). Studies have demonstrated that specific emotion regulation strategies, such as cognitive reappraisal and expressive suppression, can profoundly impact emotional experiences and behavioral responses (Gross & John, 2003). Difficulties in emotion regulation are associated with poorer self-regulation leading

to maladaptive behaviors such as substance abuse, binge eating and the tendency to risk taking (Cooper, Shaver & Collins, 1998; Haves, Wilson, Gifford, Follette, & Strosahl, 1996; Whiteside et al., 2007). Related to driving behavior, these findings could suggest that difficulties in emotion regulation may influence on maladaptive driving behaviors (e.g., aggressive, risky) and, conversely, the ability to regulate emotions may be involved in more adjusted driving behaviors (e.g., careful).

### **Sensation seeking**

The final variable considered in this research is sensation seeking. It refers to a personality trait characterized by a strong inclination towards seeking out new and exhilarating experiences (Zuckerman, 1994). Sensation seeking, in the context of risky driving, refers to a personality trait characterized by an individual's desire for novel, thrilling, and exciting experiences. It involves seeking out activities or situations that provide a high level of sensory stimulation and arousal. In the context of driving, sensation seeking manifests as a tendency to engage in risky driving behaviors to experience excitement, thrill, and a sense of adventure (Ouimet et al., 2010).

In context of risky driving behavior, it is important to address psychological and personality traits however, in Pakistan very limited research is found on association of risky driving behavior with other psychological and personality traits. So, this research explores association of psychological factors such as attention bias, emotional regulation and sensation seeking with risky driving behavior in Rawalpindi and Islamabad.

## **Literature review**

In this section theoretical and empirical evidence related to attention bias, emotion regulation, sensation and risky driving behavior will be illustrated.

### **Risky Driving Behavior**

Risky driving behavior is a significant public health concern (WHO, 2018). risky driving behavior refers to actions that increase the chances of a traffic accident, such as speeding, reckless driving, and distracted driving (Atombo ,2017). This study investigated the impact of personality factors on risky driving behavior, and the potential mediating role of intention and attitude in this relationship. The data for the study was gathered from a sample of 354 Ghanaian drivers who owned public vehicles. The findings revealed that drivers who had strained relationships with their families were more likely to experience negative emotions, which in turn increased their likelihood of engaging in risky driving behavior. As a future recommendation, the study suggested exploring drivers' intentions regarding adherence to traffic rules (Attombo, 2017).

There is a large number of literature that highlights the importance of addressing risky driving behavior. it is one of major cause of death and accidents worldwide (WHO 2021). Risky driving behavior can have a significant impact on passengers, pedestrians as well as on the environment (Romano et al., 2015). This study examined the involvement of children in road accidents and injuries and the factors contributing in risky driving. The data was collected from report of GES 2002-2011 and police reports for motor vehicle crashes. This study links with this study as risky driving behavior and children involvement which is a major problem. The study resulted in 46 to 102 million

drunk-driving trips annually featuring children under 15. Daily, three children under 15 are killed and 469 injured in motor-vehicle crashes, making it a leading cause of death in this age group. The research revisits alcohol-related fatalities and introduces a focus on reckless driving, emphasizing the vulnerability of children aged 5 or younger.

Numerous studies have extensively investigated the factors contributing to risky driving behavior, encompassing demographic, cognitive, affective, and environmental aspects (Jafarpour et al., 2014). Among these factors, demographic variables, including age, gender, and socioeconomic status, have emerged as significant predictors of risky driving behavior (Bener et al., 2008). Younger drivers and males exhibit a higher propensity for engaging in risky driving behavior compared to older individuals and females (Scott-Parker et al., 2013). Additionally, individuals from lower socioeconomic backgrounds are more prone to risky driving due to factors such as limited access to education and resources (WHO, 2018). Numerous studies, such as, (Cordellieri et al., 2016) consistently demonstrate a notable association between gender differences and risky driving behavior. The findings consistently indicate that males exhibit a greater inclination towards taking risks compared to females in the context of driving.

Overall, demographic factors play a crucial role in predicting risky driving behavior. In addition to demographics, drivers may also engage in risky driving behaviors such as speeding or tailgating as a response to traffic congestion or other environmental stressors (WHO, 2018).

Personality traits are major predictors for risky driving behavior (Pearson et al., 2013). The found that personality traits, such as sensation-seeking, aggression, and impulsivity, were significantly associated with risky driving behavior (Reason et al.,

1990). The study involved a total of 353 participants, consisting of licensed drivers aged 17 to 73 years. The participants were recruited from various sources, including driving schools, local businesses, and personal contacts. The study utilized a combination of self-report questionnaires and observational measures to assess driving behavior and personality traits. The study's findings showed a clear distinction between errors and violations in driving behavior. Errors were characterized as lapses or mistakes, while violations were deliberate and rule-breaking actions. The results also revealed significant relationships between personality traits, such as sensation seeking, and engagement in both errors and violations. The study acknowledged certain limitations, including the reliance on self-report measures, which could be subject to recall bias or social desirability bias. Additionally, the sample consisted of predominantly male participants, limiting the generalization of the findings to the wider population.

Another study found that personality traits, such as hostility and neuroticism, were associated with aggressive driving behaviors through increased levels of driving anger and anxiety (Šukys et al., 2012). The study found significant associations between certain personality traits and aggressive driving behavior. Specifically, traits such as hostility, neuroticism, and low agreeableness were positively correlated with engaging in aggressive driving behaviors. The participants were drivers recruited from various locations, including driving schools, social media platforms, and public events. The sample consisted of both male and female drivers across different age group. The study had several limitations, including: The reliance on self-report measures introduced the possibility of social desirability bias or inaccuracies due to participants' subjective perceptions of their driving behavior and personality traits , Future research could benefit

from incorporating objective measures, such as naturalistic driving data or observer ratings, to provide a more comprehensive understanding of the relationship between personality traits, emotions, and aggressive driving behavior. The study relied on self-report measures, which may be subject to biases or inaccuracies and sample was limited to drivers from Greece, which may affect the generalization of the findings to other populations or cultural contexts. The study focused on psychological factors and did not consider other factors that may contribute to traffic accidents, such as environmental or situational factors.

Another study on the psychology Factors influencing drivers' risk taking and crash involvement" found that drivers' risk-taking behavior was influenced by various psychological factors, including sensation seeking, impulsivity, aggression, and anger. These factors were positively associated with risky driving behaviors (Trimpop & R. M. (1994). The study utilized a questionnaire-based survey to collect data on various psychological variables, including sensation seeking, impulsivity, aggression, and anger. Participants were asked to rate their tendencies or experiences related to these factors. The sample consisted of 301 German drivers, including both males and females, ranging in age from 18 to 70 years. The participants' crash involvement history was also assessed. The limitation of study is the study relied on self-report measures, which may be subject to biases or social desirability effects. Self-report measures may not always accurately reflect individuals' actual behaviors or emotions. The sample used in the study was relatively small and consisted of German drivers. This limits the generalization of the findings to other populations or cultural contexts. The study focused primarily on the

psychological factors related to risk taking behavior and crash involvement, and did not explore other potential factors, such as environmental or situational factors.

Many interventions aimed at reducing risky driving behavior have been shown to be effective in reducing the incidence of traffic accidents and fatalities (R Brookland, et al., 2014) conducted a graduated driver licensing program which restrict driving privileges for new drivers which have been shown to reduce the incidence of traffic accidents. The study examined assess of how parental knowledge, support, management of adolescent driving, and parental driving behavior impact adolescent compliance with GDL conditions and crash rates as restricted license drivers. The sample of study was 3992 newly licensed New Zealand's drivers. The study resulted that almost 72% of 15 to 16 and half adolescence who are restricted for licensed are involve in risky driving as their parents have low knowledge of traffic rules. The gap of study is to make program and make new policies to address parental knowledge for GDL condition.

#### **Attention bias and risky driving behavior:**

Attention bias has been identified as a major contributor to risky driving behavior, as it can hinder driver performance and lead to inattentiveness while driving (National Highway Traffic Safety Administration, 2010; Zhang et al., 2014; Wickens et al., 2003). A study was conducted to examine the impact of two primary types of distractions, visual-manual and cognitive-audio distractions, on both operational and tactical driving performance. The study compared the effects of these distractions and highlighted the need for further research on strategic control in driving contexts (Zhang et al., 2014). Another study focused on cognitive failure and its association with risky driving behavior. It specifically found a significant link between cognitive failure, particularly override

failure, and driving behavior, indicating that difficulties in attention regulation and impulse control contribute to driving errors and violations. However, it is important to note that this study conducted with undergraduate students from a large urban university did not account for potential confounding variables, such as participants' driving experience or the presence of other cognitive impairments, which could have influenced the observed associations (Wickens et al., 2003).

Further study has investigated the phenomenon of driver distraction caused by engaging in secondary tasks while driving (Stavrinos et al., 2015). The study examined the impact of cell phone use and texting while driving on teenagers with and without ADHD, finding no significant differences in overall driving performance between the two groups except for the time taken to complete the scenario while texting. However, texting had the greatest negative impact on driving performance, particularly in terms of lane position variability. Future research could focus on developing interventions to address the specific challenges associated with distracted driving, especially for teenagers with ADHD. Similarly in another study participants who are engage in cell phone conversation showed an increased probability of missing stimulated traffic signals and slower reaction time as compared to those who were not on the phone. The study also found that the type of phone (handheld or hands free) did not significant affect the dual-task deficits. These finds indicate that attention bias (engaging in self-phone) while driving can lead to increased risk including missed traffic signals and slower reaction time (Stavrinos et al., 2015).

In a study conducted by (Seni et al., 2017), the relationship between various psychological factors, including emotion regulation, attention bias, and cognitive

inhibition, was examined to predict risky driving behavior. The findings revealed that attention bias played a significant role in predicting risky driving behavior. This suggests that drivers who demonstrate attention bias may be more prone to engaging in risky driving behaviors. The study also recommended that future research should delve into the underlying mechanisms of attention bias and its interaction with other psychological factors, such as sensation seeking, to further understand their combined influence on risky driving behavior.

Further study examined that there are positive correlations between attention bias and risky driving behavior (Barati et al., 2020). The study showed significant positive correlation, driving behavior and attention impulsiveness, motor impulsiveness, non-planning impulsiveness, spontaneous decision-making style. The study employed a descriptive correlational design, the participants were 117 male drivers aged 20-30 years in Tehran. The limitation was the sample was relatively small and restricted to male drivers only. And secondly the cross-sectional design limited the ability to build casual between cognitive factor and risky driving behavior, longitudinal design could provide more insights in temporal association between these variables. Overall, a positive relationship was observed between risky driving behavior and attention bias,

Recently research have examined relationship between attention bias and emotion strop interference impact on risky driving behavior (Brodsky, 2002; Pêcher et al., 2009). The study says that happy music had most significant distracting effect on drivers' behavior. In this study in this study seventeen participant with license and driving experience took part and the study demonstrated that emotion valence of the music can influence drivers' behavior, happy music distracted the driver most while sad music led to

slower driving which highlights the link between emotion and attention and their impact on driving performance (Pêcher et al., 2009).

### **Emotion regulation and risky driving behavior:**

In context of risky driving behavior certain studies suggest that emotion state such as anger, sadness or happiness have the potential to divert attention and contribute to risky driving behavior (Chan and Singhal, 2013; Neale et al., 2005). A study investigated the impact of emotion distraction presented on roadside bill boards on driving performance. The study employed a driving stimulator and recruited thirty participants were subjected in various driving condition including a control condition without bill board distraction and experiment featuring emotion and negative words on billboard. The finding of the study revealed that driving performance was influenced by the content on bill board (Chan and Singhal, 2013). Further the study has found that due to text messaging while driving increases the emotion regulation which leads toward risky driving (feldman et al., 2011). The study aimed to examine the potential mediating role of emotion regulation and attention bias motives in explaining risky driving. The study involved 231 undergraduate students from small private college of Massachusetts. All participants were female with in an average age of 19. The result indicating that individuals who used to regulate their negative emotion were more likely to engage in text while driving and pay attention to text while neglecting another stimulus,

Emotional self-regulation involves employing strategies to effectively manage one's current emotions, express them appropriately, and adaptively experience them in social situations (Gratz and Roemer, 2004; Sani et al., 2017). It encompasses a range of skills, including emotional awareness, accepting and acknowledging emotions, impulse

control, modulating emotions to guide behavior, and utilizing various emotion regulation strategies. The goal of emotional self-regulation is to navigate and regulate emotions in a manner that fosters social harmony, personal well-being, and adaptive functioning (Robertson et al., 2012; Gratz and Roemer, 2004).

This study suggests that difficulties in emotion regulation may contribute to the occurrence of maladaptive driving behaviors, such as aggression and risky driving. Conversely, individuals who possess effective emotion regulation skills may exhibit safer and more cautious driving behaviors. These premises are supported by previous research (Wilson, Gifford, Follette, & Strosahl, 1996; Whiteside et al., 2007).

Moreover, research has consistently demonstrated that challenges in emotion regulation significantly impact driver behavior and driving style (Trogo et al., 2014). The study included 137 participants, consisting of 80 men and 57 women, ranging in age from 18 to 65 years. The findings suggest that higher levels of difficulties in emotion regulation are correlated with risky, angry, dissociative, and anxious driving behaviors, whereas lower levels of difficulties in regulating emotions are associated with reduced distress and careful driving.

Numerous studies have examined the link between emotion regulation and risky driving behaviors. For instance, one study revealed that individuals with difficulties in emotion regulation were more likely to engage in risk-taking behaviors while driving (Kinnear & Gray, 2019). Similarly, poor emotion regulation skills were found to be associated with higher incidence and severity of road rage incidents (Parker et al., 2016).

In addition to investigating the relationship between emotion regulation and risky driving behaviors, some studies have examined the effectiveness of interventions that target emotion regulation in reducing risky driving behaviors, a study found that a mindfulness-based intervention was effective in reducing risky driving behaviors among young drivers (Wang et al.,2020). Similarly, a study found that a cognitive-behavioral intervention that targeted emotion regulation was effective in reducing aggressive driving behaviors (Dobie & Kuhlmann 2019).

Furthermore, studies have highlighted the mediating role of difficulties in emotion regulation in the relationship between sensation seeking and driving behavior (Li et al., 2022). The findings revealed that individuals with high levels of sensation seeking were more prone to experiencing difficulties in emotion regulation, which subsequently contributed to engaging in risky driving behaviors. Overall, the literature consistently indicates that difficulties in emotion regulation are linked to heightened risk-taking behaviors while driving, encompassing actions such as speeding, aggressive driving, and driving under the influence of alcohol.

### **Sensation seeking and risky driving behavior.**

Cognitive and affective factors, including sensation seeking, have been identified as significant predictors of risky driving behavior (Jonah et al., 1997). The study revealed a positive association between sensation seeking and risky driving, indicating that individuals with higher levels of sensation seeking are more likely to engage in risky behaviors such as traffic violations and accidents. The research also examined the role of sensation seeking in alcohol use and driving violations. It was observed that individuals

with high levels of sensation seeking were more prone to using alcohol as a coping mechanism, consequently increasing the risk of driving while intoxicated.

The existing evidence suggests that individuals with high levels of sensation seeking are more prone to overestimate their driving abilities and engage in risky driving behavior, driven by a desire for excitement and stimulation (Arnett, 1994; Zuckerman, 2007). Numerous studies have demonstrated that sensation seeking is a significant predictor of various risky driving behaviors, including speeding, tailgating, and driving under the influence of alcohol (Jonah, Thiessen & McAteer, 2001). Further research has explored the relationship between sensation seeking and risky driving behaviors, particularly among young drivers. High sensation seeking young drivers were found to be more inclined to engage in risky driving behaviors, such as speeding, driving under the influence of alcohol, and neglecting to wear a seat belt (Arnett, 1994; Donmez & Boyle, 2008). In one study, the Social Sensation Seeking questionnaire was used to assess different facets of thrill-seeking behavior and ego centrism in high school students. Interestingly, students who admitted to driving while intoxicated scored higher on the sensation seeking questionnaire, indicating a stronger inclination toward thrill-seeking behavior. These students also displayed more egocentric thinking, perceiving themselves as less likely to be involved in accidents or receive traffic tickets. This suggests that individuals with high Social Sensation Seeking have an optimistic bias concerning the consequences of risky behavior.

Overall, the Social Sensation Seeking questionnaire provides a reliable measure of sensation-seeking tendencies and ego centrism among high school students, aiding in the identification of individuals who are more prone to engaging in risky behaviors

(Arnett, 1994) Similarly, sensation seeking was a significant predictor of risky driving behaviors among college (Donmez & Boyle ,2008). They found that sensation-seeking tendencies (SS) tend to be higher in males than females, and SS increases with age until around 16 years old and then declines. SS scores also tend to increase with higher education and occupational status.

A recent study by Li et al. (2022) aimed to explore the relationship between sensation seeking, difficulties in emotion regulation, and risky driving behavior. The researchers recruited a sample of Chinese drivers to participate in their study and administered self-report measures to assess sensation seeking, difficulties in emotion regulation, and risky driving behavior. The findings revealed a positive association between sensation seeking and risky driving behavior, with difficulties in emotion regulation partially mediating this relationship. These results suggest that interventions targeting both sensation seeking and emotion regulation could be effective in reducing risky driving behavior. However, further research is needed to gain a deeper understanding of the underlying mechanisms of this relationship and to determine if these findings extend to other cultures and populations.

Another study conducted by Zhang et al,2016) examined the mediating effects of risk perception and expected benefit on the association between sensation seeking and risk-taking behavior. The results indicated that both expected benefit and risk perception mediated the influence of sensation seeking on risk-taking behavior across various domains. Additionally, the study found that sensation seeking indirectly affected risk-taking behavior through the mediating effects of expected benefit and risk perception.

Based on a comprehensive review of the existing literature on risky driving behavior and its psychological determinants, this study employs a theoretical framework that integrates attention bias, emotion regulation, sensation seeking, and risky driving behavior. This framework provides a conceptual basis for investigating the relationships between these factors and sheds light on the complex interplay that contributes to risky driving behavior.

### **Theoretical framework**

The Gray Theory of Reinforcement, developed by Jeffrey Gray (1982), offers a framework that helps us understand the connection between attention bias, sensation seeking, emotion regulation, and risky driving behavior. In this theory, behavior is influenced by two neural systems: the Behavioral Activation System (BAS) and the Behavioral Inhibition System (BIS). The BAS is responsible for reward sensitivity, approach behavior, and the inclination towards seeking sensations and excitement. On the other hand, the BIS is associated with punishment sensitivity, avoidance behavior, and the regulation of emotions. This theory suggests that individuals with a higher activation of the BAS may exhibit a stronger sensation seeking tendency, leading them to engage in risky driving behaviors to pursue excitement and thrills. Conversely, individuals with a more active BIS may be more inclined to regulate their emotions, resulting in cautious and careful driving practices. By considering the interplay between these neural systems and their impact on attention bias, sensation seeking, emotion regulation, and ultimately, risky driving behavior, the Gray Theory provides valuable insights into the complex factors underlying driver behavior.

#### **1. Attention Bias**

Attention bias involves selectively focusing attention on certain stimuli. Gray's theory proposes that individuals with an active Behavioral Activation System (BAS), which is linked to reward sensitivity and approach behavior, may display attention biases toward driving-related cues. These individuals are more likely to pay heightened attention to stimuli associated with excitement, speed, or thrill, potentially leading to an increased propensity for risky driving behaviors.

## **2. Sensation Seeking**

Sensation seeking is intricately connected to the operation of the Behavioral Activation System (BAS). Gray's theory proposes that individuals with a highly active BAS have a strong desire for new and thrilling experiences, driven by their need for stimulation. In the context of driving, these individuals may be inclined to engage in risky behaviors, as they actively seek excitement and adrenaline rushes on the road.

## **Emotion Regulation**

Emotion regulation plays a crucial role in the functioning of the Behavioral Inhibition System (BIS). When individuals struggle with regulating their emotions, the BIS can become overactive, making it challenging for them to effectively manage and control their feelings. This difficulty in emotion regulation can contribute to impulsive and reckless behaviors, including engaging in risky driving practices. Individuals with poor emotion regulation skills may resort to risky driving as a maladaptive coping mechanism to deal with negative affect (Avila, 2021).

**Rationale**

According to the Pakistan bureau of statistic (2020), there are ,598 traffic accidents, 6,872 fatalities, and 17,162 injuries every year. This study aims to explore association of risky driving behavior with attention bias, emotion regulation and sensation seeking. Since Pakistan has a high rate of road accident, it is a major problem in Pakistan (M.A. khurshid and S.A. khan, 2008). The study aims identify attention bias, emotion regulation difficulties, and sensation seeking as potential risk factors for engaging in risky driving behavior. By establishing these associations, the research can contribute to the identification of specific individual characteristics and cognitive processes that increase the likelihood of engaging in risky driving behaviors. This can inform targeted interventions and prevention strategies aimed at addressing these risk factors. The findings of this research can have practical implications for designing interventions and programs to reduce risky driving behavior, by addressing the specific risk factors that are attention bias, sensation seeking and emotion regulation, identified through research, it is possible to develop comprehensive strategies that effectively tackle the problem of road accidents. Additionally it has also been noted that majority of the study on risky driving behavior and its factors have been carried out in western countries, although in Pakistan, there are limited studies conducted on risky driving behavior and their associating factors but there are no much evidence on association of risky driving behavior with all three factors attention bias, emotion regulation and sensation seeking (S.N.Shah et al., 2019; M.T . azeem et al., 2015). This research can contribute to the theoretical understanding of the complex factors that influence risky driving behavior in Pakistan.

## **Objectives**

1. To examine association between attention bias and risky driving behavior among drivers.
2. To investigate the association between emotion regulation difficulties and risky driving behavior.
3. To explore the relationship between sensation seeking and risky driving behavior among drivers.
4. To study the demographic characteristics among risky driving behavior, attention bias and sensation seeking among drivers

## **Hypothesis**

H1: There will be positive association between attention bias and risky driving behavior among drivers.

H2: There will be positive association between emotional regulation and risky driving behavior among drivers.

H3: There will be positive association between sensation seeking and risky driving behavior among drivers.

H4: There will be significant gender differences on risky driving, attention bias, emotional regulation among drivers.

## **Chapter 2 Methodology**

### **Research Design**

A correlational research design was carried out on drivers of Rawalpindi and Islamabad.

### **Locale**

The data was collected from the drivers of Rawalpindi and Islamabad.

### **Ethical considerations**

As far ethics are concern, this study worked according to ethics provided by American Psychological Association (APA). The ethical approval for current study was taken from Capital University of Science and Technology, Islamabad. Informed consent was signed from all participants. Confidentiality of participants was maintained and responses have kept anonymous.

### **Population and Sample**

The proposed targeted population for this research study consist of male and female drivers, aged 18 years and above, residing in Rawalpindi and Islamabad and sample size was 300.

### **Sampling procedure**

Convenient sampling was used.

### **Inclusion Criteria**

Two inclusion criteria were considered

1. The participant must have at least 1 year of experience of driving.
2. Participant must understand english language.

### **Exclusion Criteria**

Following exclusion criteria were considered

1. Participants who are currently undergoing treatment for any medical or psychiatric condition.

### **2. Measurements /instruments**

Following instruments were used in research study.

### **Demographic sheet**

Demographic sheet included general information about participants age, gender, qualification, occupation, medical condition (if any), socioeconomic status. demographic sheet also contained question regarding driving which were about driving license, years of driving and any major accident during driving year\

### **Risky driving behavior scale**

Risky driving behavior scale is developed by Reesi et.al, in 2018. It consists of 39 items. The risky driving behavior scale has been used in various studies (Fergusson et al.2003) (Tarlochan et al. 2022). Respondents rate statement on Likert scale of 1 to 5, with1 indicating never and 5 indicating always. The test reliability coefficient was 0.927.

### **Barratt Impulsiveness Scale Revised (BIS-R-21)**

The original version of Barratt Impulsiveness Scale was developed by Barratt in 1995 consisted of 30 items. Barratt Impulsiveness Scale Revised (BIS-R-21) consist of 21 items formulated by (Foveny et al., 2020). This scale is divided into three dimensions: cognitive impulsivity, behavioral impulsivity and impatience/restlessness. Cognitive impulsivity has high reliability with alpha value 0.80, behavioral impulsivity reliability coefficient was 0.74 and sub scale impatience/restlessness has alpha value 0.69. respondent rate statement n Likert scale of 1 to 4, with 1 indicates never and 4 indicates almost / always.

### **Emotion Regulation Questionnaire**

The Emotion Regulation Questionnaire (ERQ) is a valuable tool developed by James J. Gross and John J. John in 2003, aimed at assessing individual differences in emotion regulation strategies. The questionnaire comprises two subscales that measure distinct strategies: Reappraisal and Suppression. Reappraisal evaluates the extent to which individuals engage in cognitive reappraisal as a means of regulating their emotions, involving the process of reframing thoughts about a situation. On the other hand, Suppression measures the extent to which individuals inhibit the outward expression of their emotions, using expressive suppression as a regulation strategy. The ERQ consists of a total of 10 items, with 6 items dedicated to the Reappraisal subscale and 4 items to the Suppression subscale. Participants provide ratings for each item using a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability of the scale

is reported to be 0.73, indicating a satisfactory level of internal consistency. The ERQ serves as a valuable instrument in understanding and assessing the various strategies individuals employ to regulate their emotions.

### **Sensation Seeking Scale**

The sensation Seeking Scale (SSS) is an established self-report revised measure created by (Zuckerman et al., 2010) to assess individual differences in sensation seeking, a personality trait characterized by a strong inclination for diverse, novel, complex, and intense experiences. The SSS encompasses sub scales, each capturing different facets of sensation seeking:

**Thrill and Adventure Seeking:** This sub scale gauges the individual desire for exciting, adventurous, and physically stimulating experiences. The alpha value of thrill and adventure seeking sub scale is 0.81.

**Experience Seeking:** This sub scale focuses on the individual preference for new and varied encounters, encompassing both intellectual and sensory stimulation. test reliability coefficient of this subscale was 0.927

**Dis inhibition:** This subscale measures the tendency toward impulsivity and lack of restraint in behavior, test reliability coefficient of this subscale was 0.73.

**Boredom:** This subscale focuses on susceptibility to boredom and impulsivity; this subscale assesses individual process to seeking stimulation and engaging in impulsive actions when faced with monotony. Test reliability coefficient of this subscale is 0.65. Sensation Seeking Scale consisted of 40 items, with 10 items allocated to each subscale. Participants provide their responses on a Likert scale to indicate the extent to which they agree or disagree with the statements. The Sensation seeking scale demonstrates a commendable reliability, with a reported scale reliability coefficient of 0.88, indicating good internal consistency. By utilizing the SSS, researchers can gain valuable insights into individuals' propensities for seeking thrilling and diverse experiences, facilitating a deeper understanding of the sensation-seeking personality trait sensation seeking.

### Chapter 3 Data analysis

The data was carried out using the latest version of IBM SPSS 21. Descriptive analysis was done for demographics, variables. Frequencies and percentages were calculated for categorical variables and mean median, mode standard deviation, skewness, and Kolmogorov Smirnov test was used for continuous variables. Histograms are presented for pictorial representation of distribution of data. Spearman correlation analysis was conducted to measure the relationship between the variables: risky driving behavior, attention bias, emotion regulation and sensation seeking. Reliability analysis by using Cronbach's alpha. Maan Whitney for the differences for demographic variables. The present study was aimed to analyze the association between risky driving behavior, attention bias, emotion regulation and sensation seeking This chapter presents the result pf study along with descriptive and inferential statistics.

#### Demographic

**Table 1**

*Descriptive analyses of demographic variables of the study participants (N=300)*

<b>Demographic categories</b>	<b><i>f</i></b>	<b>%</b>
<b>characteristic</b>		

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Age	18	3	.9
	19	10	2.9
	20	36	10.5
	21	58	16.9
	22	41	12.0
	23	27	7.9
	24	19	5.5
	25	12	3.5
	26	14	4.1
	27	8	2.3
	28	11	3.2
	29	6	1.7

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30	5	1.5
31	1	.3
32	5	1.5
33	3	.9
34	2	.6
35	8	2.3
36	2	.6
37	1	.3
38	2	.6
39	2	.6
40	2	.6
41	1	.3

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42	1	.3
43	1	.3
44	1	.3
45	2	.6
46	1	.3
48	2	.6
50	3	.9
51	1	.3
52	1	.3
54	3	.9
55	1	.3
56	2	.6

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	58	1	.3
	60	1	.3
<b>Gender</b>	Male	204	59.5
	Female	96	28.0
<b>Qualification</b>	Bachelor	1	.3
	graduate	39	12.0
	intermediate	22	6.8
	LLB	2	.6
	M Phill	5	1.5
	masters	51	15.7
	PHD	2	.6

	postgraduate	1	.3
	undergraduate	177	54.6
<b>Occupation</b>	accountant	6	1.9
	agriculture	1	.3
	ass software	1	.3
	Assistant Director	1	.3
	Assistant education	1	.3
	banker	3	.9
	business	20	6.2
	CEO	3	.9
	Content moderator	1	.3
	Educational manage.	1	.3

employ	1	.3
engineer	10	3.1
freelancer	2	.6
gov employee	4	1.2
housewife	6	1.9
Internee	1	.3
IT	1	.3
job	2	.6
labour	1	.3
lawyer	1	.3
Mali	1	.3
manager	4	1.2

no	62	19.1
private job	2	.6
professor	5	1.5
programmer	2	.6
Real state	1	.3
sales job	1	.3
self-employed.	4	1.2
senior consultancy	1	.3
shift in charge.	1	.3
shopkeeper	1	.3
Software developer	7	2.2
student	118	36.4

	taxation manager	1	.3
	Taxi Driver	1	.3
	Teacher	21	6.5
<b>Medical condition</b>	asthma	3	.9
	diabetes	1	.3
	hemophilia	1	.3
	high BP	1	.3
	no	292	90.1
	vertigo	1	.3
	yes	1	.3
<b>City</b>	Islamabad	196	60.5
	Rawalpindi	104	32.1

<b>Socio economic status</b>	lower class	22	6.8
	middle class	116	35.8
	upper middle class	120	37.0
	upper class	42	13.0
<b>Accident</b>	No	228	70.4
	yes	70	21.6
<b>Driving years</b>	1	25	7.7
	1	1	.3
	2	3	.9
	2	43	13.3
	3	34	10.5
	4	20	6.2

5	52	16.0
6	19	5.9
7	14	4.3
8	19	5.9
9	8	2.5
10	21	6.5
11	1	.3
12	10	3.1
13	1	.3
14	1	.3
15	3	.9
17	1	.3

	18	7	2.2
	19	1	.3
	20	3	.9
	23	3	.9
	25	1	.3
	30	6	1.9
	40	2	.6
<b>License</b>	Yes	228	70.4
	No	72	22.2

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*Note: f=frequency, %= Percentage*

Table 1 displays the frequency distribution of demographic characteristics in the study sample. The male group (204) exhibits a higher frequency than the female group (96). The majority of drivers reside in Islamabad, comprising 196 individuals (60.5%). The age group of 21 years stands out with the highest frequency of 58 individuals, accounting for 16.9% of the total, surpassing other age categories. The majority of

individuals in the driver occupation were students, with a high frequency of 118, constituting 36.5% of the total. The most common qualification among the sampled individuals was undergraduate, with a high frequency of 177 and a percentage of 54.6%. A significant proportion of the sample, 292 individuals (90.1%), reported not having any medical conditions. The highest frequency in terms of socioeconomic status is observed in the upper-middle-class category, encompassing 120 individuals (37%). A majority of the drivers, 228 individuals (70.4%), possess a valid driver's license. Further analysis in the table indicates that most drivers have 5 years of driving experience, representing the highest percentage at 16.0%. Additionally, the majority of drivers report no history of accidents, with a frequency of 228 individuals and a percentage of 70.5%.

## Descriptive Statistics for Instruments Used in Study

The descriptive statistics for Risky Driving Behavior, Attention Bias, Emotion Regulation and Sensation Seeking. the results are presented in Table 2.

**Table 2**

*Descriptive Statistics for Risky Driving Behavior, Attention Bias, Emotion Regulation and Sensation Seeking. (N=300)*

<b>Variables</b>	<b>M</b>	<b>Median</b>	<b>Mode</b>	<b>SD</b>	<b>SK</b>	<b>K</b>	<b>K-S</b>	<b>p</b>
<b>RDBS</b>	95.71	98.05	97.08	23.31	-.174	-.346	.080	.000
<b>BIS-R21</b>	47.53	47.19	47.14	7.06	.325	1.548	.070	.001
<b>ERQ</b>	41.38	41.50	45.40	9.53	.057	-.546	.054	.037
<b>SSS</b>	101.56	102.07	103.08	12.44	-.116	.684	.061	.011

*Note: RDBS=Risky Driving Behavior Scale, BIS-R21= Barratt Impulsiveness Scale-Revised 21, ERQ= Emotion Regulation Questionnaire, SSS= Sensation Seeking Scale, M= Mean, SD= Standard Deviation, SK=Skewness, K=Kurtosis, K-S= Kolmogorov-Smirnov test, p= Significance*

Table 2 showed the descriptive statistic of scale (RDBS=Risky Driving Behavior Scale, BIS-R21= Barratt Impulsiveness Scale-Revised 21, ERQ= Emotion Regulation Questionnaire, SSS= Sensation Seeking Scale). RDBS of the respondent shown in table

k-s=.080, p=.000. for BIS-R21 k-s 0.70. p=.001, for EQR of k-s =0.50, p=.037. Similarly, for SSS of k-s =.061 and p=0.11

Figure 1

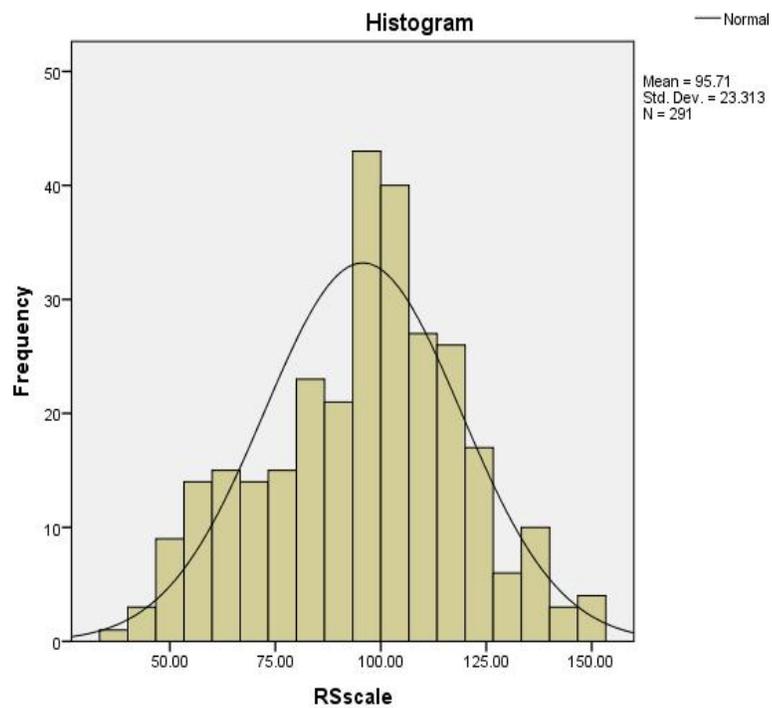


Figure 2

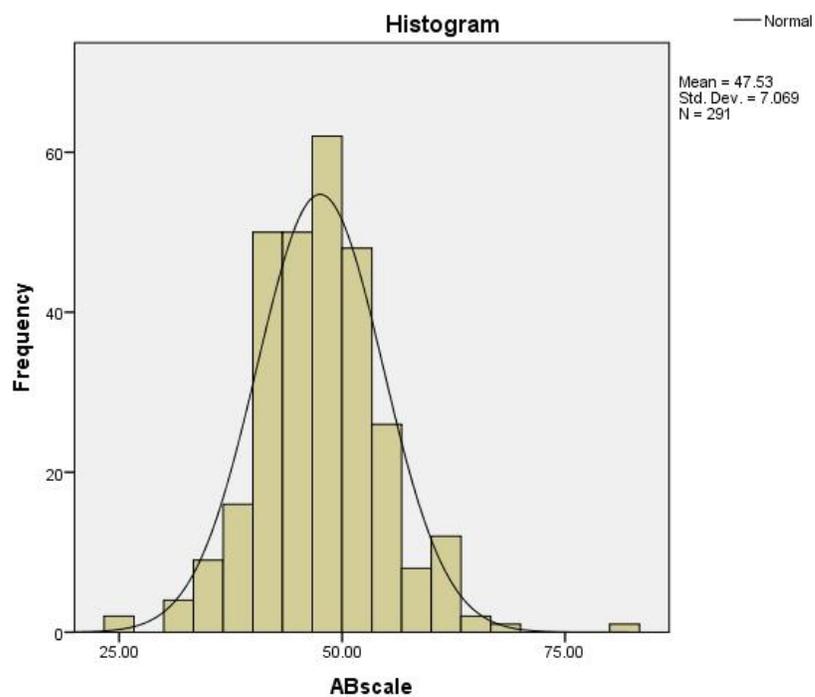


Figure 3

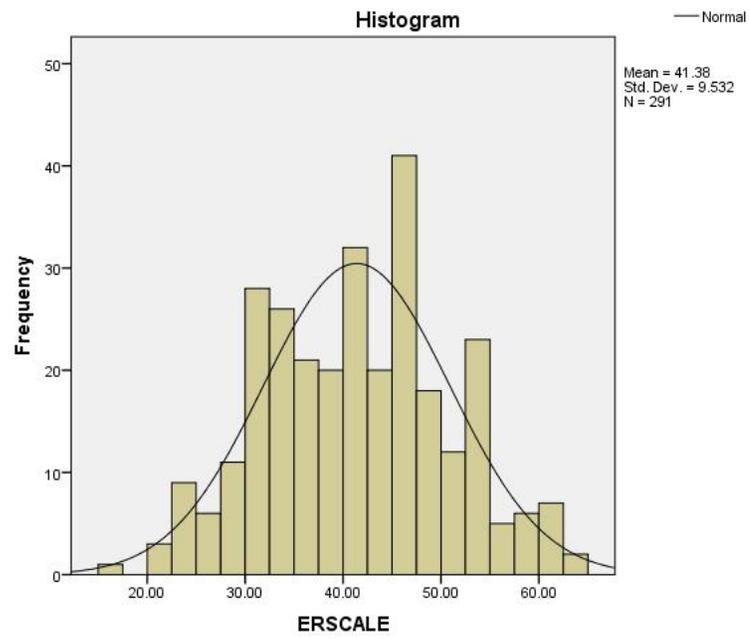
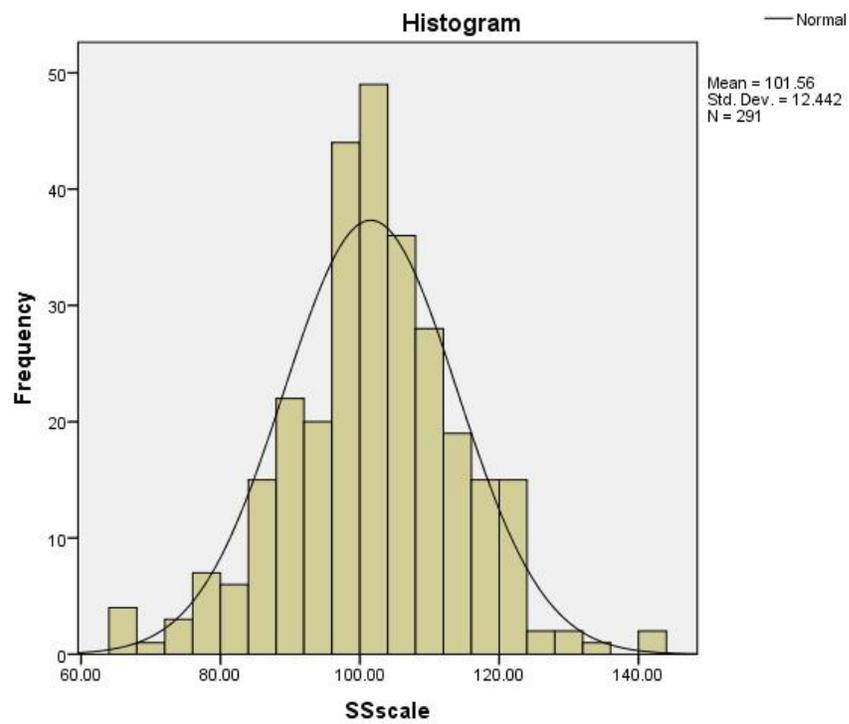


Figure 4



### Reliability Analyses for Instruments

To find out reliability of scales used in current study, alpha reliability was calculated. The results of the reliability analyses are presented in table 3.

**Table 3**

*Cronbach's Alpha Reliability Coefficients with Means and Standard Deviations of Risky Driving Behavior, Attention Bias, Emotion Regulation and Sensation Seeking (N=300)*

Variables	Items	M	SD	Range		<i>a</i>
				Potential	Actual	
<b>RDBS</b>	39	95.71	23.31	39-195	37-150	.929
<b>BIS-R21</b>	21	47.53	7.06	21-84	25-80	.681
<b>ERQ</b>	10	41.38	9.53	10-70	9-63	.735
<b>SSS</b>	40	101.56	12.44	40-160	66-142	.777

*Note: RDBS=Risky Driving Behavior Scale, BIS-R21= Barratt Impulsiveness Scale-Revised 21, ERQ= Emotion Regulation Questionnaire, SSS= Sensation Seeking Scale, M= Mean, SD= Standard Deviation, a= Alpha Reliability*

Table 3 the reliability of scales, it shows the strongest reliability for RDBS as  $\alpha$  .929, BIS-R21 as  $\alpha$  .681, EQR as  $\alpha$  .735 and SSS as  $\alpha$  .777 which considered as good reliability.

### Positive association between attention bias and risky driving behavior

A correlation analysis was conducted to investigate positive association between attention bias and risky driving behavior. Spearman rho correlation test was used for the variables due to non-normal distribution. Results are shown in table 4

Table 4

#### Spearman rho correlation between *Risky Driving Behavior, Attention Bias(N=300)*

Variables	1	2
<b>BIS-R21</b>	-	.134*
<b>RDBS</b>	.134*	-

*Note: 1=Risky Driving Behavior Scale, 2= Barratt Impulsiveness Scale-Revised 21*

Table 5 shows the correlation coefficient (r) between BIS-R21 and RDBS is 0.134, and the asterisk suggests that this correlation is statistically significant.

### Positive association between sensation seeking and risky driving behavior

A correlation analysis was conducted to investigate positive association between sensation seeking and risky driving behavior. Spearman rho correlation test was used for the variables due to non-normal distribution. Results are shown in table 5

**Table 5**

**Spearman rho correlation between *Risky Driving Behavior*, and *Sensation Seeking***  
(*N=300*)

<b>Variables</b>	<b>1</b>	<b>2</b>
<b>RDBS</b>	-	-.060
<b>SSS</b>	-.060	-

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*RDBS=Risky Driving Behavior Scale and SSS= Sensation Seeking Scale*

Table 5 indicates the correlation coefficient (r) between RDBS and SSS is -0.060.

### Positive association between emotion regulation and risky driving

A correlation analysis was conducted to investigate positive association between sensation seeking and risky driving behavior. Spearman rho correlation test was used for the variables due to non-normal distribution. Results are shown in table 6

**Table 6**

Spearman rho correlation between *Risky Driving Behavior*, and *Emotion Regulation*( $N=300$ )

Variables	1	2
<b>RDBS</b>	.	.367
<b>EQR</b>	-.020	.

*Risky Driving Behavior Scale, ERQ= Emotion Regulation Questionnaire*

Table 6 indicates correlation coefficient (r) between RDBS and EQR is .367.

**Significant gender differences on risky driving, attention bias, emotional regulation among drivers.**

To study the gender wise difference among study variables (risky driving, attention bias, emotional regulation among drivers). Mann Whitney U-test was used for the scales due to non-normal distribution (see table 3 for values of normality test). Results are shown in table 7.

**Table 7**

Variables	Male		Female		U	Z	P
	N	Mean rank	N	Mean Rank			
ERS	204	152.99	96	145.21	9284.0	-.725	.469
BIS	203	145.38	96	159.78	8805.5	-1.345	.179
SSS	201	144.72	96	157.96	8787.5	-1.243	.214
RDBS	198	152.68	96	136.82	8479.0	-1.500	.134

*Note: N= number of participants, U= Mann Whitney test value, RDBS=Risky Driving Behavior Scale, BIS-R21= Barratt Impulsiveness Scale-Revised 21, ERQ= Emotion Regulation Questionnaire, SSS= Sensation Seeking Scale*

The table 7 shows the results of Mann-Whitney U tests comparing two groups (male and female) for three different variables; ERS, BIS, SSS and SAS\_MU. Table 7z shows the results of Mann-Whitney U tests comparing two groups (male and female) for three different variables; IAS, FQS, and RDBS. The Mann-Whitney U test for ERS yields the

U statistic of 9284, and the corresponding Z statistic is -725 with a p-value of .469. The Mann-Whitney U test for BIS yields a U statistic is 8805.5, and the corresponding Z statistic is -725 with a p-value of .179. The Mann-Whitney U test for SSS yields a U statistic is 157.96, and the corresponding Z statistic is -1.243 with a p-value of .134. The Mann-Whitney U test for FQS yields a U statistic is 136.82, and the corresponding Z statistic is -1.500 with a p-value of .134.

## Chapter 4. Discussion

The present study aims to investigate association between risky driving behavior, attention bias, emotion regulation and sensation seeking among drivers of Rawalpindi and Islamabad. Another objective of the study is to find the gender difference among 4 variables. This study also investigate association of risky driving behavior with attention bias , emotion regulation and sensation seeking. . The study utilizes correlational study design with the sample of 300 drivers of Islamabad and Rawalpindi. Convinent sampling was used to select the sample of the study.

**H1:** There will be a positive association between risky driving behavior and attention bias. The finding of the current study showed a positive association between risky driving behavior and attention bias. (Barati et al., 2020) conducted a study 117 male drivers in Tehran to examine association of risky driving behavior with impulsiveness, attention bias, and decision-making styles. The study indicated positive association between attention bias and risky driving behavior. Furthermore, Hassen et al. (2011) reported positive achievements in reducing risky driving behaviors through interventions targeting peer pressure among young drivers (Hassen et al., 2011). Additionally, Anderson et al. (2016) suggested that attention bias may predispose individuals to impulsive and risky behaviors, including substance abuse and risky driving (Anderson et al., 2016). These findings align with the notion that attention bias plays a role in influencing risky driving behaviors. are interrelated, changes in any one of them can affect the others. Like previous studies the result of this study also indicates positive association between risky driving behavior and attention bias.

**H2:** The study shows strong positive association between risky driving behavior and sensation seeking. This finding aligns with the hypothesis that there will be a

positive association between sensation seeking and risky driving behavior. Akbari et al. (2019) conducted a meta-analysis that confirmed a significant positive relationship between sensation-seeking and risky driving behaviors. This finding aligns with the notion that individuals high in sensation-seeking may be more inclined to engage in risky driving behaviors. Schwebel et al. (2006) highlighted the moderate correlations between self-reported sensation-seeking and crash involvement, indicating a potential link between sensation-seeking and risky driving behavior. Additionally, Sween et al. (2017) implicated greater sensation-seeking tendencies as a predictor of risky driving behaviors, such as driving while intoxicated, speed limit violations, and reckless driving. In conclusion, the synthesis of the referenced studies suggests that there is a substantial body of evidence supporting the notion that sensation seeking is positively associated with risky driving behavior.

**H3:** There will be a positive relationship between risky driving behavior and emotion regulation. The finding of the study showed a weak positive association between risky driving behavior and emotion regulation. Li et al. (2022) found that difficulties in emotion regulation mediate the effect of sensation seeking on driving behaviors, indicating a link between emotion regulation and risky driving. Šeibokaitė et al. (2017) confirmed the important role of emotion regulation skills in maladaptive behavior, providing further evidence for the association between difficulties in emotion regulation and risky driving. Additionally, Liu et al. (2021) examined the moderating effects of driving emotions on the relationship between individual traits and actual risky driving behaviors, further highlighting the influence of emotions on driving behavior. Moreover, Baltruschat et al. (2021) demonstrated the close relationship between emotion regulation skills and risky driving, indicating the potential impact of interventions

targeting emotion regulation on driving behavior. These studies collectively provide robust evidence for the positive association between risky driving behavior and emotion regulation, indicating that difficulties in emotion regulation may contribute to engaging in risky driving behaviors.

**H4:** There will be gender differences on risky driving behavior, attention bias, emotion regulation and sensation seeking. The finding of the current study shows that there was no gender difference on any of these variables. Lyu et al. (2017) The study investigated the driver's cognitive workload and driving performance under traffic sign information exposure in complex environments. The results indicated that workload was highly related to the amount of information on traffic signs, while driving experience and gender effect were not gender differences in risky driving behavior. The study by Zhao & Yamamoto (2020) found that there was no significant difference in risky driving behaviors between different vehicle groups, which may include gender differences. Additionally, the study by Skaar & Williams (2005) reported that while there were gender differences in aggressive and risky driving, males reported higher levels of this type of driving than females, but both genders reported comparable amounts of dangerous driving and negative emotions while driving. These findings collectively suggest that gender differences in risky driving behaviors may not be significant, particularly in relation to attention bias. It's important to note that the observed gender differences are often small in magnitude and can be influenced by various contextual factors, including cultural, social, and environment

In the present study, the theoretical framework based on the Gray Theory of Reinforcement by Jeffrey Gray (1982) provided a comprehensive understanding of the interconnected factors influencing risky driving behavior. The findings align with the

proposed framework, revealing a positive association between attention bias, sensation seeking, and risky driving behavior. The theory suggests that individuals with an active Behavioral Activation System (BAS) may exhibit attention biases towards stimuli associated with excitement, leading to an increased propensity for risky driving behaviors. Additionally, results support the notion that those with a heightened BAS, indicative of strong sensation-seeking tendencies, may engage in risky driving to fulfill their need for stimulation and excitement. Furthermore, the study indicates a weak positive association between emotion regulation and risky driving behavior, consistent with Gray's framework, wherein difficulties in emotion regulation, influenced by the Behavioral Inhibition System (BIS), contribute to impulsive and reckless driving practices. This integration underscores the utility of the Gray Theory of Reinforcement in explaining the complex dynamics of driver behavior and provides valuable insights for interventions aimed at mitigating risky driving practices.

### **Conclusion**

This study revealed a positive correlation between risky driving behavior and attention bias, emotion regulation, and sensation seeking. Notably, no gender disparities were identified in risky driving behavior, attention bias, sensation seeking, or emotion regulation. Overall, the findings underscore the significance of addressing and understanding risky driving behavior and its predictive factors in the Rawalpindi and Islamabad population. This is particularly crucial given the limited research in this region, and considering that risky driving behavior stands as a leading cause of global fatalities, as reported by the World Health Organization (WHO).

### **Limitations**

1. The use of purposive sampling may limit the generalizability of the study's findings. The selected sample may not accurately represent the entire population of drivers in Rawalpindi and Islamabad, introducing potential bias
2. The reliance on self-reported data through a questionnaire may introduce response bias. Participants might provide socially desirable responses, leading to an overestimation or underestimation of certain behaviors.
3. The cross-sectional design of the study allows for the identification of associations but doesn't establish causation. Longitudinal studies would be needed to better understand the temporal relationships between variables.

### **Implications**

1. The study highlights the need for further research in the region, especially regarding risky driving behavior. Future studies could explore additional factors and employ diverse methodologies to provide a more comprehensive understanding of driver behavior in Rawalpindi and Islamabad.
2. The study highlights the need for further research in the region, especially regarding risky driving behavior. Future studies could explore additional factors and employ diverse methodologies to provide a more comprehensive understanding of driver behavior

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**Appendix A: Consent form**

## Well Being of Pakistani Drivers

This study is carried out as a bachelor's thesis by Zarmeena Naeem under supervision of Dr. Sabahat Haqqani from the Psychology Department at Capital University of Science and Technology Islamabad .This determine relationship between emotional regulation, mood states, cognitive function, sensation seeking and attention bias with risky driving behavior. The data will be kept confidential and privacy will be maintained. The data collected will be used for research purpose only. The participation in this study is purely voluntary. You may withdraw anytime point and it will not incur any penalty on the part of the participant. Your participation will be highly appreciated. We invite you to take part in this research Please carefully read each instruction and ensure that each information is understood. You may ask if any query. Please confirm that you want to participate in this study by providing your consent below.

Date: \_\_\_\_\_

Sign: \_\_\_\_\_

## Appendix B: Demographic sheet

### Part 1

#### Demographics

<b>Age</b>	
<b>Gender</b>	
<b>Qualification</b>	
<b>Occupation</b>	
<b>Medical Condition ( If any)</b>	
<b>City</b>	
<b>Socioeconomic Status:</b>	<ul style="list-style-type: none"> <li>• Lower class</li> <li>• Middle class</li> <li>• Upper middle class</li> <li>• Upper class</li> </ul>
<b>Do you have Driving License?</b>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
<b>From how many years you are driving? Please Explain</b>	
<b>Any major accident in your driving period? Yes or No Please explain</b>	

## Appendix C: Emotion Regulation Questionnaire ( EQR)

### Instructions and Items

We would like to ask you some questions about your emotional life how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem like one another, they differ in important ways. For each item, please answer using the following scale:

1-----2-----3-----4-----5-----6-----7  
 Strongly Disagree                      neutral                      strongly agree

1	When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	<p>1-----2-----3-----4-----5-----6-----7            Strongly Disagree                      neutral                      strongly agree</p>
2	I keep my emotions to myself.	<p>1-----2-----3-----4-----5-----6-----7            Strongly Disagree                      neutral                      strongly agree</p>
3	When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.	<p>1-----2-----3-----4-----5-----6-----7            Strongly Disagree                      neutral                      strongly agree</p>
4	When I am feeling positive emotions, I am careful not to express them.	<p>1-----2-----3-----4-----5-----6-----7            Strongly Disagree                      neutral                      strongly agree</p>
5	When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay	



<b>1</b>	<b>I plan tasks carefully</b>	1	2	3	4
<b>2</b>	<b>I plan trips well ahead of time</b>	1	2	3	4
<b>3</b>	<b>I do things without thinking</b>	1	2	3	4
<b>4</b>	<b>I “squirm” at plays or lectures</b>	1	2	3	4
<b>5</b>	<b>I am self-controlled</b>	1	2	3	4
<b>6</b>	<b>I concentrate easily</b>	1	2	3	4
<b>7</b>	<b>I say things without thinking</b>	1	2	3	4
<b>8</b>	<b>I change residences</b>	1	2	3	4
<b>9</b>	<b>I save regularly</b>	1	2	3	4
<b>10</b>	<b>I act “on impulse”</b>	1	2	3	4
<b>11</b>	<b>I buy things on impulse</b>	1	2	3	4
<b>12</b>	<b>I am a careful thinker</b>	1	2	3	4
<b>13</b>	<b>I get easily bored when solving thought problems</b>	1	2	3	4
<b>14</b>	<b>I change hobbies</b>	1	2	3	4
<b>15</b>	<b>I plan for job security</b>	1	2	3	4
<b>16</b>	<b>I act on the spur of the moment</b>	1	2	3	4
<b>17</b>	<b>I spend or charge more than I earn</b>	1	2	3	4
<b>18</b>	<b>I am a steady thinker</b>	1	2	3	4
<b>19</b>	<b>I often have extraneous thoughts when thinking</b>	1	2	3	4
<b>20</b>	<b>I am future oriented</b>	1	2	3	4
<b>21</b>	<b>I am restless at the theater or lectures</b>	1	2	3	4

**Appendix e: Sensation seeking scale (sss)**

<b>Statements</b>	<b>Strongly disagree</b>	<b>Somewhat Disagree</b>	<b>Somewhat Agree</b>	<b>Strongly disagree</b>
<b>I enjoy the sensation of speeding in car.</b>				
<b>I would like to take off on trip with no preplanned or definite routes or timetables.</b>				
<b>I will try anything once.</b>				
<b>I prefer friends who are excitingly unpredictable.</b>				
<b>I like some physical activities that are somewhat risky.</b>				
<b>I enjoy getting into new situations where you can't predict how things will turn out.</b>				
<b>I like 'wild' uninhibited parties.</b>				
<b>I get restless if I have to stay around home for any length of time.</b>				
<b>I prefer fast moving activities or sport</b>				
<b>I would like the kind of life where one is on the move and traveling a lot, with a lot of change and excitement.</b>				

<b>I like to let myself go and do impulsive things just for fun.</b>				
<b>I enjoy spending time with familiar surroundings of my home or apartment.</b>				
<b>I would like to fly an airplane.</b>				
<b>I would like to travel to foreign lands where people are quite different from people of my country.</b>				
<b>I go to parties to meet exciting and stimulating people,</b>				
<b>I am polite and attentive to someone even if I don't find their conversation interesting.</b>				
<b>I think I would enjoy being free fighter.</b>				
<b>I like people who are unusual or different from most of the people.</b>				
<b>I don't try to restrain my urges to have exciting experience.</b>				
<b>I have reserved and cautious attitude toward life.</b>				
<b>If I were in army, I might volunteer for exciting but dangerous duties.</b>				
<b>I enjoy many types of loud, intense and rock music.</b>				
<b>I prefer quiet parties where one can have good conversation.</b>				
<b>Do you drop things?</b>				
<b>My thinking is usually cautious and sensible.</b>				

<b>I don't like to engage in sports or activities in which there is significant risk of getting hurt,</b>				
<b>I am not interested in having new experiences just for the sake of having new sensation.</b>				
<b>I don't like to start a project until I know how to proceed.</b>				
<b>I don't think I would like flying in a small plane.</b>				
<b>I don't like people behave in uncontrolled and unconventional way</b>				
<b>I enjoy quite, melodic popular or classical music.</b>				
<b>I tend to value and follow a rational and moderate approach to things.</b>				
<b>Given a choice I would never volunteer for any activity that is physically risky.</b>				
<b>I am comfortable with familiarity of a fixed daily routine.</b>				
<b>One should not go too far in physical intimacy until one gets to know the other one.</b>				
<b>I usually make up my mind through careful reasoning.</b>				
<b>I would never travel to another country where there is unrest and threat of violence.</b>				
<b>I would prefer to travel to other countries where people speak my language and have same customs</b>				
<b>One of goal of my life is to</b>				

<b>experience intense and pleasurable sensation</b>				
<b>Before I get into the new situation would like to find out what to expect from it.</b>				

### Appendix F : Risky Driving Behavior Scale (RDBS)

In the last twelve months, how often have you done the following behaviors while driving?"

in a 5-point Likert-type scale ranging from 1 (never) to 5 (Always).

Statements	Never	Rarely	Sometimes	often	Always
Attempt turning without ensuring road is devoid of pedestrians or cyclists,					
Cross a junction knowing that the traffic lights have already turned red.					
Turn right/left into the path of another vehicle putting it at a risk or making it breaks suddenly (blind spot)					
Turn using an illegal U-turn.					
On entering a roundabout or intersection, you pay such close attention to the mainstream of traffic that you nearly hit the car in front'					
Attempt to overtake a row of cars in a traffic jam from right hand side					
Get involved in 'drifting.'					
Enter the road in front of another vehicle which forces it to break suddenly					
Attempt to overtake another car in an area where overtaking prohibited					

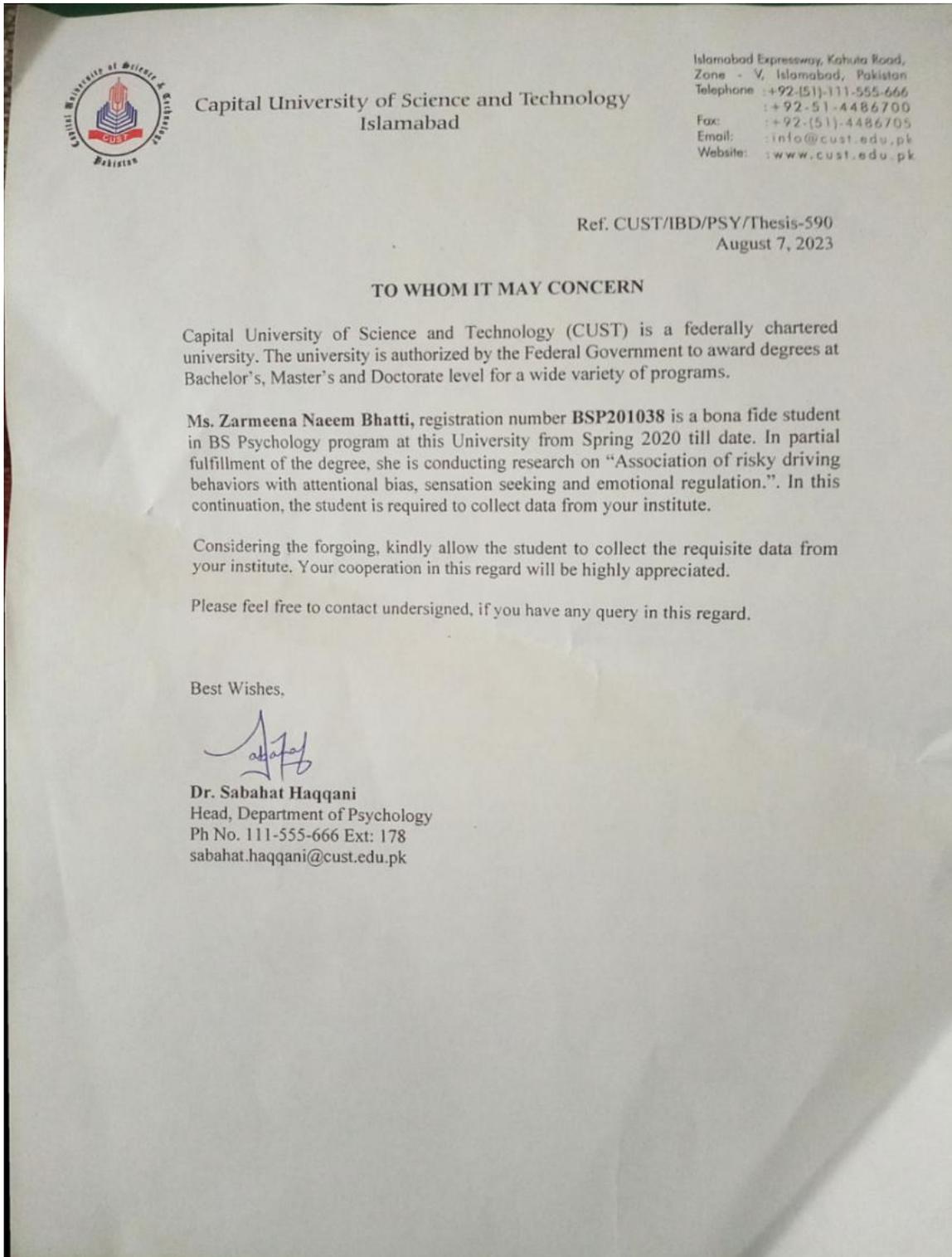
<b>Get involved with unofficial ‘races’ with other drivers on the roads</b>					
<b>Attempt to overtake a car that you hadn’t noticed to be signaling a left/right turn.</b>					
<b>Attempt to overtake a row of cars, stopped on roads, for any reason.</b>					
<b>Exceed the posted speed limit when you drive in a bad road conditions (i.e. working zone, slippery roads.)</b>					
<b>Misjudge the stopping distance you needed which forces you to suddenly use the breaks</b>					
<b>Cross a junction knowing that the traffic lights have already turned yellow.</b>					
<b>Turn right/left, without signaling the turn</b>					
<b>Get angered by other slow drivers.</b>					
<b>Watching views or events happened on roads while driving.</b>					
<b>Joking with my friends while driving</b>					
<b>Using horn to indicate my anger from another driver’s behavior.</b>					
<b>Listening to a specific radio program while driving</b>					
<b>You’re driving affected by negative emotions like anger or frustration.</b>					
<b>Drive faster if you were in a bad mood.</b>					

<b>Exceed the posted speed limit when you drive on open roads or roads with low traffic</b>					
<b>Exceed the posted speed limit when you drive in areas where it was unlikely there was a radar or speed camera.</b>					
<b>Exceed the posted speed limit by more than 15 km/hr. (e.g. 120 km/hr. – I drive with 135 km/hr. or more).</b>					
<b>Exceed the posted speed limit by less than 15 km/hr. (e.g. 120 km/hr. – I drive with 121-134 km/hr.)</b>					
<b>Attempt to overtake a car in front even when it keeps the appropriate speed</b>					
<b>Keep driving while you feel tired</b>					
<b>Keep driving while you feel sleepy</b>					
<b>Driving for long distances without taking breaks</b>					
<b>using a hand-held mobile phone (Call or reply) while driving)</b>					
<b>Using mobile phones for texting or chatting while driving</b>					
<b>Ingestion while driving</b>					
<b>putting seat belt on only in the presence of traffic police</b>					
<b>Driving without putting the seat belt on.</b>					

<b>Drive close to the car in front in traffic jam.</b>					
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## Appendix G

### Support letter for data collection



**Appendix H:****Permissions from Barratt Impulsiveness Scale-Revised 21 ( BIS-21R)**