THE EFFECTS OF PSYCHOLOGICAL INOCULATION ON DRIVERS' SPEEDING BEHAVIOR

A THESIS SUBMITTED
TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
THE MIDDLE EAST TECHNICAL UNIVERSITY

BY

BERFİN SERENAT SİMSER

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
THE DEPARTMENT OF PSYCHOLOGY

OCTOBER 2019

Approval of the Graduate School of Social Sciences

_____

Prof. Dr. Yaşar Kondakçı

Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

_____

Prof. Dr. Sibel Kazak Berument

Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

_____

Prof. Dr. Türker Özkan

Supervisor

Examining Committee Members

Assoc. Prof. Dr. Bahar Öz	(METU, PSY)	_____
Prof. Dr. Türker Özkan	(METU, PSY)	_____
Assist. Prof. Yeşim Üzümcüoğlu Zihni	(TOBB Uni, PSY)	_____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name: Berfin Serenat SİMSER

Signature :

ABSTRACT

THE EFFECTS OF PSYCHOLOGICAL INOCULATION ON DRIVERS' SPEEDING BEHAVIOR

Simser, Berfin Serenat

M.S., Department of Psychology,

Supervisor: Prof. Dr. Türker Özkan

October 2019, 121 pages

Speeding is a widespread problem which can cause life threatening outcomes in traffic settings. The present study was aimed at measuring whether psychological inoculation (PI) based on an integrated model of Theory of Planned Behavior (TPB) and Prototype Willingness Model (PWM) can be used to reduce speeding behaviors of drivers. 95 male drivers aging between 19 and 30 took part in the study. As part of the PI intervention, all participants were given challenging sentences as exaggerated forms of their attitudes and beliefs regarding speeding and asked to refute these statements by developing counterarguments against these beliefs. Before, immediately after and 2 weeks after the implementation of interventions, drivers' speeding related attitudes, subjective norms, perceived behavioral control (TPB constructs); willingness and prototype perceptions (PWM constructs) as well as intention to speed and their

speeding behaviors were assessed via questionnaires. To investigate the effectiveness of PI method, ANOVA was conducted for each construct of the model. Moreover, mediation and regression analyses for three different time points were performed in order to investigate how well this model works. The results revealed that drivers' speeding related cognitions, intentions and behaviors measured before the intervention were significantly decreased both immediately and 2 weeks after the PI intervention. Furthermore, for each time point, the measured constructs were shown to predict intention and behavior, except for perceived behavioral control and prototype favorability. The current study is, therefore, can provide some insight on which constructs to tackle with and how to reduce speeding behavior of drivers.

Keywords: Speeding, Psychological Inoculation, Theory of Planned Behavior, Prototype Willingness Model

ÖZ

PSİKOLOJİK AŞILAMANIN SÜRÜCÜLERİN HIZ DAVRANIŞI ÜZERİNDEKİ ETKİLERİ

Simser, Berfin Serenat

Yüksek Lisans, Psikoloji Bölümü

Tez Yöneticisi: Prof. Dr. Türker Özkan

Ekim 2019, 121 sayfa

Hızlı araç kullanma trafik ortamında hayati tehlike oluşturan sonuçlara yol açabilecek yaygın bir sorundur. Bu çalışmada, Planlanmış Davranış Teorisi (PDT) ve Prototip/İsteklilik Modeli (PİM)'nin bütünleştirilmiş modeli esas alınarak oluşturulan Psikolojik Aşılamanın (PA) sürücülerin hız davranışını azaltmakta kullanılıp kullanılamayacağının ölçümü amaçlanmıştır. Yaşları 19-30 arasında değişen 95 erkek sürücü çalışmaya katılmıştır. PA müdahalesi kapsamında, bütün katılımcılara hız davranışına yönelik tutum ve inançlarının abartılmış biçiminde zorlayıcı cümleler verilmiş ve bu cümleleri karşıt-sav geliştirerek çürütmeleri istenmiştir. Müdahalenin öncesinde, hemen sonrasında ve 2 hafta sonrasında katılımcıların hız davranışına yönelik tutum, öznel norm, algılanan davranışsal kontrol (PDT); isteklilik ve prototip algıları (PİM) ile hız yapma niyeti ve davranışları anket yardımıyla ölçülmüştür. PA yönteminin etkililiğini araştırmak üzere, modeldeki her bir yapı için ANOVA yapılmıştır. Ayrıca, bu modelin ne kadar iyi çalıştığını ölçmek üzere, üç farklı veri

toplama dönemi için regresyon analizleri yapılmıştır. Sonuçlar, sürücülerin müdahale öncesinde ölçülen hız davranışına yönelik biliş, niyet ve davranışlarının PA müdahalesinden hemen sonra ve 2 hafta sonra yapılan iki ölçümde de anlamlı derecede düştüğü ortaya çıkarmıştır. Bulgular, psikolojik aşılamanın sürücülerin hız davranışını azaltmakta faydalı bir yöntem olabileceğini ortaya koymuştur. Bunun yanı sıra, her bir veri ölçümünde, algılanan davranış kontrolü ve prototip lehteliği dışında ölçülen diğer tüm yapıların niyet ve davranışı yordadığı görülmüştür. Bu çalışmanın, dolayısıyla, sürücülerin hız davranışlarını azaltmak üzere hangi yapılarla ve nasıl başa çıkılması gerektiğine dair içgörü sağlayabilir.

Anahtar Kelimeler: Hız Davranışı, Psikolojik Aşılama, Planlı Davranış Teorisi, Prototip İsteklilik Modeli

To my beloved family,

ACKNOWLEDGMENTS

The completion of this thesis would not have been possible without the kind support, patience and hard work of many individuals. I wish to express my sincere appreciation to all of them.

First and foremost, I wish to express my gratitude to my supervisor Prof. Dr. Türker Özkan for his invaluable guidance, comments and feedback on the study, and consistent patience throughout this study.

I am especially indebted to Prof. Dr. Yori Gidron for his crucial assistance and his faith in the completion of this study. His knowledge and expertise on the subject have become critical in the process, for which I am deeply thankful for. I also wish to offer my sincere regards to Prof. Dr. Timo Lajunen for his appreciated guidance and immense knowledge regarding the subject.

I would like to thank to Assoc. Prof. Dr. Bahar Öz and Assist. Prof. Dr. Yeşim Üzümcüoğlu Zihni, for their invaluable assistance and their presence as part of the examining committee.

I would also like to extend my appreciation to my colleagues, Elif Manuoğlu, Yıldız Burcu Atılgan, İbrahim Öztürk, Şerife Yılmaz, Burcu Arslan and Derya Azık for their assistance and encouragement.

I want to express my deepest gratitude to my beloved family, my mother Nilgün Aslan, my father Alaattin Simser, and my big sister İlayda Simser for their great patience and their unconditional love and support throughout my life.

I would also like to give special thanks to my dear friends Yılmaz Köylü, Duygu Hazal Simser, Karel Ročejdl, Çağlayan Arslan, Seda Sucu, Zeynep Öztürk, Nil Aybike Gündü, and Nihan Yılmazer, for their precious comments and their faith in my achievements.

I also wish to thank the band Khruangbin, for providing me the focus I needed, with their delightful music, during the writing process.

Lastly, I would like to express my gratitude to everyone else whom I have not mentioned but helped me along the process, academically or otherwise.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Although the investigation is growing on the subject of traffic safety, it is still a major concern across the globe as road traffic users are consistently increasing. The importance of human factors on traffic crashes and road injuries was established in early research. It was found that human factors are involved in 90% of road traffic crashes and 65% of these crashes are entirely attributed to human factors (Sabey, 1983). Speeding is a serious offence and a major human factors element that contributes to road traffic crashes and injuries and it is believed that drivers should internalize why they should comply with speed limits instead of refraining from speeding when they perceive there is a possibility of formal punishment. Therefore, it is believed that a cognitive based intervention is needed to decrease speeding violations.

1.1. Speeding

Speeding, defined as "the driver behavior of exceeding the posted speed limit or driving too fast for conditions", is one of the top factors associated with crashes (World Health Organization [WHO], 2008). The number of road traffic crashes and the severity of these crashes have been shown in several studies to be the result of

exceeding the speed limit in these cases (Taylor, Lynam, & Baruva, 2000; Aarts & van Schagen, 2006; Fitzpatrick, Rakasi, & Knodler Jr., 2017). It was shown that speeding is the predominant factor responsible for approximately 30% of traffic fatalities (McDonald, Ingham, Hall, & Rolls, 1991). A more recent survey conducted in 2016 revealed that 27% all fatal traffic crashes include at least one speeding driver, which was 4% higher than the previous year (NHTSA, 2016); meaning that even though the issue is being tackled by researchers and policy makers, it still remains a major concern. It was noted that speeding affects traffic safety as the control of the vehicle is harder at higher speeds. Drivers may also fail to predict imminent dangers in time. Moreover, they could misdirect and panic other road users when they are trying to regain the control of their vehicles (WHO, 2008). The reaction time to initiate breaking in a risky situation on the road increases with higher speeds, as well (Matsunaga, Kito, Kitomura, Shidoji, & Yanagida, 1990). In his meta-analytic report Elvik (2009), stated that drivers underestimate the accident risk associated with speeding as well as the severity of injuries caused by high speeds. Furthermore, a small margin of change in speed can have vitally important effects on fatality due to traffic crashes. It was revealed that 1% increase in speed results in an increased fatality risk between 4% - 12%; whereas a 3% reduction in speed reduces this risk by 13% (Evans, 2004).

In short, a consistently growing body of research demonstrates that speeding is a serious health-risk behavior and thus, an interventional method to decrease speeding behavior is believed to be crucial for road safety.

1.1.1. Non-compliance with Speed Limits

Exceeding the speed limits is an often occurring violation on the road. However, drivers usually choose to speed in certain situations more frequently than others. Road type is one factor associated with speeding behavior. Several studies have concluded that speeding is more often on rural roads where the speed limits are higher than built-up areas where they're lower (Møller & Haustein, 2014; Stephens et al., 2017). SARTRE 3 (Social Attitudes to Road Traffic Risks in Europe) survey revealed that the prevalence of speeding violations is observed the most in road types where the limits are higher such as motorways (28 %) and main roads between towns (19 %). The extent of the speeding violation is thought to be influenced by the road type, as well. In their study conducted in Australia, Stephens et al. revealed that half the drivers exceeded the speed limits up to 10 km/h on a 100 km/h speed zone (Stephens, Nieuwesteeg, Page-Smith, & Fitzharris, 2017).

Another factor is argued to be the probability of being fined. A study investigating risky driving behaviors of young drivers revealed that the majority of noncompliant drivers reported that they break the speed limits when they expect not to get caught (Scott-Parker, Watson, King, & Hyde, 2014a). Accordingly, Bautista et al. revealed that fear of a legal punishment could influence abiding by the speed limits. However, they concluded that this is only a moderate effect and drivers' own moral judgements with regard to speed limits play a vital role in their decision to break them. Furthermore, they mentioned that a high proportion of drivers are in the opinion that speed limits should be less strict which implies that their own judgements regarding these limits may be another factor their noncompliance (Bautista, Sitges, & Tirado,

2015). Legal enforcement, therefore, fails to be a convincing solution enough to reduce speeding violations.

1.1.2. Factors associated with Speeding

1.1.2.1. Individual Differences

One reason associated with speeding lies within individual differences. It can be argued that some individuals or groups are more likely to engage in speeding violations than others. The most outspoken of these are age, gender and certain psychological traits.

The first one deserving attention is age. A vast amount of research concluded that especially young drivers engage in speeding violations more often than older drivers. A study investigating self-reported speeding behavior of novice drivers aged 18 to 20 have found that, at least occasionally, the majority of drivers admitted they exceed the posted speed limits up to 10 km/h; the half exceed them by 10–20 km/h; and almost one third reported they break the speed limits by more than 20 km/h, (Scott-Parker et al., 2014a). In 2016, the highest proportion of traffic fatalities due to speeding involved 15- to 20-year-old male drivers with 32% of fatal crashes (NHTSA, 2016). In another study conducted with drivers aging between 20-24 years revealed that most of these young drivers (58%) reported that they drive in high speeds when they are in a hurry and 70% of these drivers are involved in a traffic crash. Moreover, out of those who admit they drive at high speeds even when they are not in a hurry, 70% of them

found to be involved in a crash (Rasool et al., 2015). These results indicate that, especially for young drivers, speeding and crash involvement show a clear association.

Another factor is the gender of the driver which is one of the most consistently mentioned aspect associated to speeding behavior. Generally, it has been shown that males more likely to engage in speeding violations (Harré, Field, & Kirkwood, 1996; Bener et al., 2013; Freeman, Kaye, Truelove, & Davey, 2017; Stephens et al., 2017). To illustrate, a study conducted in Scotland revealed that 29% of all speeders are 18-24 year old males (Campbell & Stradling, 2003). It is argued that, compared to women, men are more inclined to taking risks on the road (Taubman-Ben-Ari & Findler, 2003) which might be a result of a possibility that males internalize risk-taking cognitions and behaviors more strongly (Fischer,).

One reason is thought to be related to risk taking tendencies among males. Nieboer (2015) revealed that the level of risk taking is predicted most predominantly by gender and accordingly, women have found to be more risk averse than men. This is especially apparent in driving context. In a study investigating risk taking attitudes and behaviors indicated that those who engage in speeding violations also demonstrated other risk-taking behaviors on the road, including refraining from seat belt use, reckless driving, and driving under the influence of alcohol (Iversen, 2004). Horvath et al. indicated that male drivers aged 17-24 years perceive speeding is not likely to result in a traffic crash (Horvath, Lewis, & Watson, 2012). Another reason might be related to the social context of driving. A recent study revealed that especially young male drivers reported that, when driving with male friends they perceive as fun and excited, show dangerous driving behaviors such as speeding, are less patient, due to the thrill they experience. Young female drivers, however, found to exert better

abilities at moderating risky driving behaviors and a more profound sense of safe driving which they perceive to be linked to responsibility (Guggenheim & Taubman – Ben-Ari, 2015). A preliminary study comparing males and females in their perceptions of punishment regarding speed offences has revealed that males are less likely to regard legal sanction threats that speeding violations bring (Freeman et al., 2017). Lastly, why males exert more risky driving behaviors might derive from an affect-based decision making. A study, investigating age and gender differences on risk taking tendencies of drivers, revealed that positive affect was a strong predictor of risk-taking behaviors on the road for especially young male drivers (Rhodes & Pivik, 2011). Therefore, it is plausible to assume that males could benefit from a more psychosocial approach aimed at reducing their speeding offences rather than enforcement.

Yet another factor includes psychological traits such as sensation seeking tendencies. Sensation seeking is defined as the intense need and willingness to search for experiences which induce risks on different domains of life such as physical, psychological, or legal, just for the sake of feelings of thrill accompanying those experiences (Zuckerman, 1994). It has been argued by many that these risk taking tendencies and reasons heavily depend on individual differences. Sensation seeking and risky driving have been studied extensively by traffic safety researchers. Sensation seeking trait was tested to predict speed choice of drivers by numerous studies via self-report measures (Sümer, 2003; Jonah et al., 2001); in a simulated driving environment (McKenna, 2004) and in studies using a combination of both (McKenna & Horswill, 2006) and found to be a significant predictor in all of these studies.

While there seems to be other traits depending on individual disposition, thrill seeking is still a crucial trait. Musselwhite (2006) revealed that while some drivers engage in speeding violations due to time pressure, some do so to gain self-esteem, improve their image or simply because of the thrill they experience when speed. This thrill feeling may be activated by the danger of the act itself or the excitement induced by breaking a law. For those who are aware of the risks of speeding, the risk factor might be the very reason for such a behavior. Feelings of excitement during fast driving may encourage adrenalin seeker drivers to do so. Another study revealed that the relationship between thrill seeking tendencies and risk-taking behaviors are mediated through attitudes. Those who score high on sensation seeking trait also found to be holding negative attitudes towards traffic safety and engage in risky driving behaviors such as fast driving and other rule violations (Ulleberg & Rundmo, 2003).

Therefore, it is important to challenge sensation seekers' attributions and attitudes towards fast driving by leading them to generate other activities or ways to meet their need for thrill. In the present study, motivating drivers to find their own ways to relieve their thrill needs is aimed at.

1.1.2.2. Attitudinal and Normative Factors

Driving is more often than not a social experience for most. Therefore, what speeding means in the social context for drivers has an important value on understanding and reducing speeding behavior. Although individual or group differences in their speeding tendencies seem to be highly relevant, speeding behavior has attitudinal and normative roots, as well. The ones to be concentrated on in this

study includes peer influence, time saving purposes and attributions regarding speeding.

Peer pressure and peer influence are, especially among young drivers, associated with speeding behavior. In one study, it was found that the prevalence of risky driving among teenagers was 67% lower with the presence of adult passengers, whereas it was 109% higher when travelling with risky friends (Simons-Morton et al., 2011). Regardless of the driver's gender, the highest risk of a crash occurs when male passengers present in the vehicle; whereas the risk is reduced when young male teens drive with female passengers (Williams, 2003). Young male passengers might increase the perceived peer pressure although the relationship is noted to be unclear regarding these results. Horvath et al. argued, the belief that speeding is a way of gaining approval from males is common among female drivers (Horvath, Lewis, & Watson, 2012). Another study, conducted in Denmark, aimed at comparing 18 year-old and 28 year-old male drivers in terms of their speeding attitudes and behaviors, revealed that the most important factor predicting speeding behavior for both age groups is found to be the perception of how often their friends exceed the limits while driving (Møller & Haustein, 2014). This finding indicates that descriptive subjective norms regarding speeding is an essential component of TPB. The same study have concluded that speeding due to peer pressure is observed in male teen drivers more than those who are at their late twenties, indicating that social factors might be more relevant for younger drivers (Møller & Haustein, 2014).

A good number of studies have emphasized that saving time is another concern by road users. Drivers reported that they chose to speed when in a hurry or to decrease time spent on the road (Gabany, Plummer, & Grigg, 1997; Peer, 2011), this need to

shorten journey time is found to be mostly associated with feelings of frustration experienced when they need to slow down (Tarko, 2009). Moreover, in one study, 33% of drivers who caught exceeding the limits revealed that they committed a speeding felony due to time pressure (McKenna, 2005). However, the growing body of research has shown that drivers make systematic judgement errors regarding the results of their speeding behavior and overestimate the time they saved by disregarding the speed limits (Svenson, 2008; Elvik, 2009; Peer, 2010; Svenson & Salo, 2010).

There could be other normative factors leading drivers to engage in speeding violations. For instance, speeding is not considered as a dangerous driving behavior by many. In one study, participants have reported that they prefer drivers engaging in speeding due to their confidence rather than slow drivers (Watters & Beck, 2016). It is possible that driving slowly is viewed to be related to insecurity and risk-taking behaviors such as speeding are associated with skillful driving in the eyes of some drivers. Therefore, speeding violations could be an opportunity to present a certain image to others on the road, to the passengers travelling with, and even to themselves.

In conclusion, drivers may have various reasons to break the speed limits, depending on the context, the goal, or their personal traits. Therefore, it is crucial to develop a comprehensive intervention method that can yield generalizable results. In order to achieve a behavioral change with regard to speeding, biases and attributions mentioned up to this point are targeted in the present study. The next chapter includes the behavioral models used in the current study and the intervention method developed on the basis of these models to better grasp the essential constructs needed to be targeted so as to reduce speeding behavior.

1.2. Speeding and Theory of Planned Behavior

Theory of Planned Behavior (TPB) is a behavioral model introduced by Ajzen (1991) stating that a behavior is most predominantly determined by behavioral intention which is influenced by one's attitudes, subjective norms and perceived behavioral control, which is another variable directly influencing behavior (see figure 1). In other words, if one's attitudes are favorable towards performing the behavior, the perceived social pressure is in accordance with it and the person anticipates that s/he has the ability to do it, they will most likely to intend to and as a result perform the behavior in question. TPB is tested extensively in driving context among others since it has been first proposed. Especially violations on the road, including speeding, has been a focus of road safety researchers applying TPB. Furthermore, most of the evidence supports application of this model for risky driving behaviors such as speeding. In their study, for instance, Elliott and Thomson found that TPB was successful at accounting for 55% of the variance in speeding intention and 47% of the variance in speeding behavior (Elliott & Thomson, 2010).

1.2.1. Attitudes

Attitudes are defined by Ajzen (1991) as how much negative or positive appraisal a person has toward performing a certain behavior.

A study conducted with a Turkish sample revealed that the most distinct predictor of driver behavior is the traffic safety attitudes they hold (Nordfjærn, Şimşekoğlu, Can, & Somer, 2015). In another study, Lheureux (2012) stated that

drivers attribute different attitudes towards their choice of speed at various speed limits. Unsurprisingly, the drivers who break the limits to the greatest extent, the fastest drivers, happen to be the ones holding negative attitudes towards the speed limits and positive attitudes towards speeding. Similarly, Nordfjærn et al. concluded that drivers who hold safer attitudes with regard to speeding and other traffic rules reported fewer violations and speeding behaviors (Nordfjærn, Jørgensen, & Rundmo, 2012). Moreover, compliers and noncompliant drivers found to hold divergent attitudes towards respecting the speed limits. Stephens et al. (2017) revealed that, drivers engaging in speeding reported do so because of their attitudes towards speeding, that is, exceeding the limits is acceptable and less likely to result in a crash. The reasons for withholding from speeding for noncompliant drivers, who have the highest level of exceeding the speed limits in the sample, is the fear of undesirable legal consequences, such as getting a ticket; whereas compliers, who stated they drive within the posted speed limit mostly and across different speed zones, refrain from speeding mostly because they are concerned about crash involvement (Stephens et al., 2017).

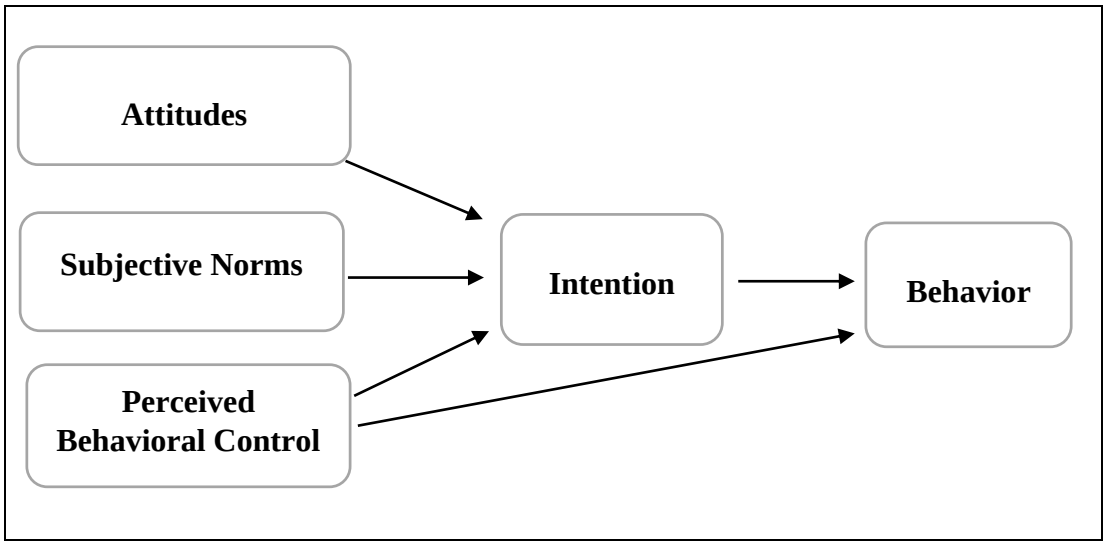

Figure 1. Theory of Planned Behavior (TPB)

Attitudes can be explicit (consciously accessed) or implicit (introspectively unidentified). The latter has been found to have more influence on risky driving behaviors as they are not consciously identified and therefore, more likely to remain unchanged. Martinussen et al. (2015) studied implicit attitudes towards risky driving and revealed that drivers who hold negative implicit attitudes are also the ones who report committing more traffic violations. One possible explanation for this is argued to be macho gender roles. In other words, those who believe that deviant behavior is a result of masculinity show greater risky driving behaviors and traffic violations to prove their driving skills and the trait associated with it; masculinity, regardless of their gender (Martinussen, Sømhovd, Møller, & Siebler, 2015). Unsurprisingly however, it has been found that men, compared to women, express gender-stereotypical "macho" driving attitudes at a greater extent (Harré, Field, & Kirkwood, 1996). Therefore, it is crucial that these implicit attitudes to be uncovered and made conscious so that they can be changed. One target of the present study is to make such attitudes conscious and challenge them.

1.2.2. Subjective norms

Subjective norms (SN), is defined as the degree of social pressure of performing or not performing a behavior (Ajzen, 1991). In other words, it is a behavior's perceived acceptability by others. In speeding context, it is how one perceives the prevalence and acceptability of driving at speeds higher than the posted limit. Certain groups might be more susceptible to subjective norms. For instance, in terms of their intention to speed, young male drivers, compared to female drivers, were more likely to be influenced by normative beliefs, referring to what one perceives what others think of one's behavior, when they are driving by themselves (Conner, Smith, & McMillan, 2003).

Perceived social condemnation by others including family members, friends, other road users and the police is suggested to be one reason for refraining from speeding for motorcycle users (Chorlton et al., 2012). In other words, some road users prefer not to engage in speeding violations if they think others will not approve this behavior. Similarly, in one study, it was revealed that for young novice drivers, the expectation that their speeding behavior would not be approved or cared by their friends has a slightly higher predictive power than other components of TPB (Møller & Haustein, 2014).

Normlessness is found to be another factor influencing drivers' speeding attitudes and behaviors. One study revealed that those having low barriers towards socially disapproved behaviors such as driving faster than the speed limits may exert more speed violations in traffic (Ulleberg & Rundmo, 2003). In other words, if they

lack motivation to care about what others think of their behavior, they will be less likely to refrain themselves from engaging in a certain behavior they prefer doing.

1.2.3. Perceived Behavioral Control

According to TPB, there are two factors directly predicting behavior, namely, perceived behavioral control (PBC) and intention. The former refers to the individual's perception of how easy or difficult it would be to perform the behavior in question. This decision is made based on one's perception of whether one has enough resources and opportunities to perform a particular behavior (Ajzen, 1991). In other words, it refers to the perceived ability over a self-performed action. It is argued that this component is useful in predicting the behavior both directly and indirectly via intentions.

A large body of research found a strong association between PBC and speeding intention and behavior. While some of these studies have shown that PBC was able to significantly predict intentions but failed to reveal a significant direct relationship with behavior (Dinh & Kubota, 2013; Jovanović, Šraml, Matović, & Mićić, 2017); others found that it has the power to predict behavior independently (Elliott, Armitage, & Baughan, 2003; Paris, & Van den Broucke, 2008). Moen (2007) stated that higher levels of perceived control relate to reduced behavioral intentions, motivation and priorities regarding safety on the road. Elliott et al. (2003) have applied TPB to drivers' compliance with speed limits and found that PBC is the strongest predictor of intention regarding speeding behavior; therefore, argued that road safety interventions should focus on this construct for better success in reducing dangerous speeding behavior.

1.2.4. Intention

Intention is defined by Ajzen (1991) as the extent to which a subject's readiness and perceived likelihood to engage in a certain behavior or action. Along with perceived behavioral control, intention is a variable directly predicting behavior. In fact, TPB declares that intention is the predominant and the most immediate factor predicting a behavior (Ajzen, 1991). It is suggested to be the motivational component of TPB model and reflects the amount of effort people are willing to exert to perform a particular behavior. According to TPB model, intentions are believed to be shaped by the three components mentioned, attitudes, subjective norms and perceived behavioral control. Specifically, if the person has positive attitudes towards a certain behavior, believes that it is socially accepted, and has the ability to perform that behavior, s/he is likely to *intend* to do so. It is an essential construct of TPB as it signifies the "planning" segment of the model. Furthermore, it involves a conscious decision making process where one decides whether or not to put effort on perform a behavior.

A considerable amount of research investigated the possible predictors of speeding intentions with TPB constructs. Elliott (2010) revealed that affective attitudes (a behavior's emotional evaluation, such as it being "fun") and perceived controllability significantly predicts motorcyclists' speeding intentions.

TPB is tested in terms of risk taking on the road (Chorlton, Connor, & Jamson, 2012; Wang, Rau, & Salvendy, 2015) as well as speeding behavior in a plethora of studies which supported its predictive validity in this context (Elliott & Thomson,

2011; Dinh & Kubota, 2013; Elliott, Thomson, Robertson, Stephenson, & Wicks, 2013; Jovanović, Šraml, Matović, & Mićić, 2017).

In conclusion, TPB is a useful model in understanding and changing health-risk behaviors. It is however believed that not all behaviors include planning, especially those behaviors which are conducted without much thinking, like driving. Therefore, a prototype / willingness model of behavior is also integrated in the present study.

1.3. Prototype / Willingness Model

Prototype Willingness Model (PWM) is a behavioral model proposed by Gibbons et al., which states that behaviors can be predicted via prototype perceptions, mediated by behavioral willingness (Gibbons, Gerrard, Blanton, & Russell, 1998) (see figure 2). This is a cognitive dual process model aimed at understanding social behaviors especially risky in nature. P/W model states that in addition to a deliberate decision making path, such as in TPB, involving evaluations of the behavior in question, a reactive one that is less rational is also involved when deciding whether or not to perform a behavior (Gibbons et al., 1998). They argue that some behaviors are nonintentional in nature, but rather has a significant reactional component. In other words, it was proposed that although intention is a strong factor in predicting behavior, individuals may follow a more automatic and unplanned route in performing a behavior which includes the components of the P/W model (Gibbons et al., 1998).

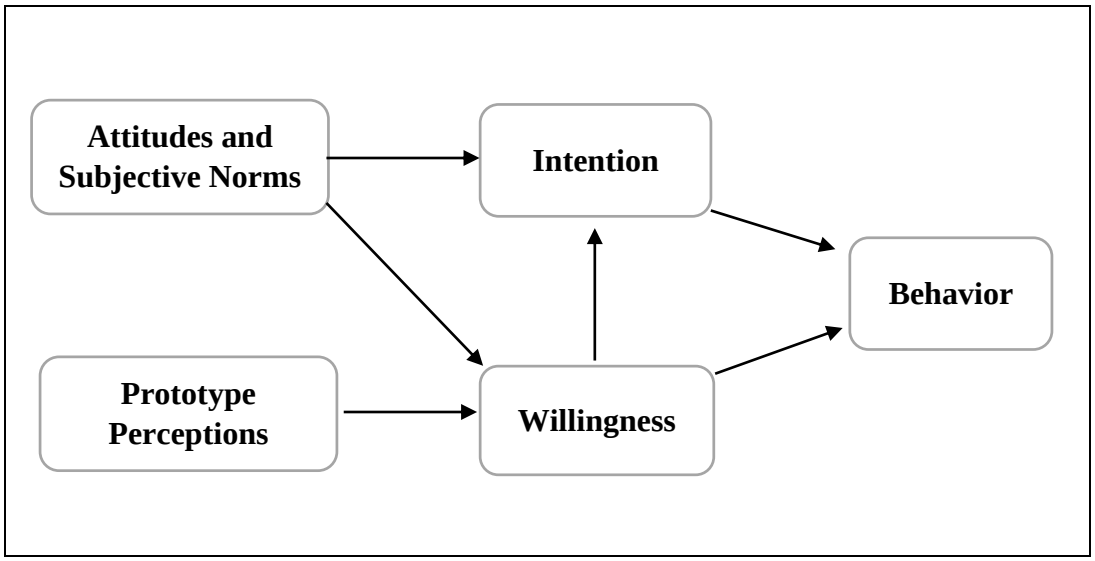

Figure 2. Prototype / Willingness Model (PWM)

As driving is more of an automatic task where conscious awareness of one's every move is rarely activated, involving such a "reactive" decision making path is thought to be crucial. Prototype Perceptions and willingness will be further clarified in more elaboration in the following section.

1.3.1. Prototype Perceptions

Prototypes refer to the "representative of a visible and easily identifiable group of people" (Gibbons & Gerrard, 1995); in the present study for example, the prototypical group refer to those who engage in speeding violations. P/W model separates the influence of prototypes in two constructs, namely prototype similarity and prototype favorability. It is claimed that the extent to which the individual believes the image of this representative group is favorable and similar to his/her self-identity, s/he will be as much likely to perform that behavior if an opportunity to do so presents itself. Especially for young novice drivers, prototype perceptions are crucial in

determining their driving style. In their study, Scott-Parker et al. have found that having peers perceived as risky drivers predicts one's engaging in and patterning risky driving themselves, especially if they are novice drivers. Another finding of the same study was that a same-sex parent can act as a role model for driving behavior. That is, boys' risky driving can be influenced by the perception of their fathers' risky driving. They argued that the effect of both peer and same-sex parent risky driving perceptions is rather a cumulative one than an interactive effect (Scott-Parker, Watson, King, & Hyde, 2014b). Therefore, it is possible that young novice drivers are affected by other drivers whom they perceive as the prototype in this context. In other words, they might mimic the risky modelling patterns of those who think are similar and/or favorable to them. The finding that both peers and same-sex parents are negatively influencing young novice drivers' risky driving behaviors is thought to be associated with prototype perceptions for they perceive the behaviors of their role models and their friends represent favorable social images.

The two components of prototype perceptions will be explained in detail, next.

1.3.1.1. Prototype Similarity

Prototype similarity refers to overlap between the person and his/her perception of the typical person who represents a particular group. For instance, how much an individual views himself similar to "a typical smoker" (prototype) is argued to be strongly associated with his willingness to smoke himself (Gibbons et al., 1998). Moreover, Rivis et al. revealed that in prediction of the behavior, prototype similarity

perceptions explain additional 6 % of the variance over predictive validity of intentions (Rivis, Sheeran, & Armitage, 2011).

A study comparing 18 and 28-year-old male drivers with regard to the role of peer influence on their speeding behaviors revealed that the expectation that their friends exceed the speed limits was the strongest predictor of their speeding behaviors (Møller and Haustein, 2014). Young male drivers' speeding behaviors were almost the same with their perception of how often their friends violate the speed limits.

Another research investigated the role of the reference group, which somewhat refers to prototype similarity, on obedience with traffic laws revealed that social influence by the group of people closest to him/her is a determining element in engaging in traffic violations (Bautista, Sitges, & Tirado, 2015).

1.3.1.2. Prototype Favorability

Prototype favorability refers to how much one approves or thinks positively regarding the prototype (Gibbons et al., 1998). They can be referred to as favorable social images of a certain group. A number of studies yielded contradicting results regarding prototype perceptions. The predictive power of this construct was supported by several studies in various health and safety related fields, such as smoking (Andrews, Hampson, & Barckley, 2008; Farshidi, Aghamolaei, Hosseini, Nejad, & Hosseini, 2018) and road safety (Demir, Özkan, & Demir, 2019). However, not all data support the predictive power of prototype perceptions. In one study, it was concluded that prototypes have a predictive effect on intentions, only when the prototypes include performing risky behaviors (Howell, & Ratliff, 2017). In their

study investigating the effectiveness of P/WM and TPB on drivers' speeding behavior, Elliott et al. found that prototype similarity has an independent predictive power over speeding behavior, whereas prototype favorability is not a significant predictor of behavior (2017).

These contradicting results suggest that prototype perceptions are complex constructs in predicting intention, willingness and behavior. However, as they represent a crucial component in the P/W model, and it is arguably believed that they could have a stronger predictive power under certain circumstances, prototypes are investigated in the current study.

1.3.2. Willingness

Behavioral willingness, different from behavioral intention which indicates what one plans to do, outlines what one is willing to do without engaging in any former planning. The differentiation between willingness and intention includes intention being deliberate, whereas willingness being reactive in nature (Gibbons et al., 1998). According to P/W model, willingness directly influences behavior as intention does in TPB model. In fact, a good number of studies demonstrated that the predictive power of willingness outweighs that of intention (Farshidi et al., 2018; Demir et al., 2019; Mirzaei-Alavijeh et al., 2019), especially for risky behavior that follows a reactive path rather than a planned one which is often taken for performing healthy behaviors. One concern in the literature was whether P/WM was whether the constructs overlap with those of TPB. Gibbons et al. argue that P/WM constructs have a direct impact on behavior without relation to intention which has a mediating effect on behavior in TPB

(Gibbons et al., 1998). Moreover, as mentioned earlier, the two models of behavior focus on different paths of decision making as regards to performing a behavior. In this study, an integrated model will be used (see figure 3). Although, combining the two conceptual frameworks, the model formed has subjective norms as a predictor of willingness, this integrated model did not have such a path since the measurement of subjective norms targets a more deliberate decision-making path. It is believed that peer pressure or peer influence could involve rather a reactive decision making whereas, others' behaviors and reflections on what others think of their own behaviors could involve a more planned decision-making process. The present study measures subjective norms construct with the latter. Therefore, it was only involved as part of theory of planned behavior model.

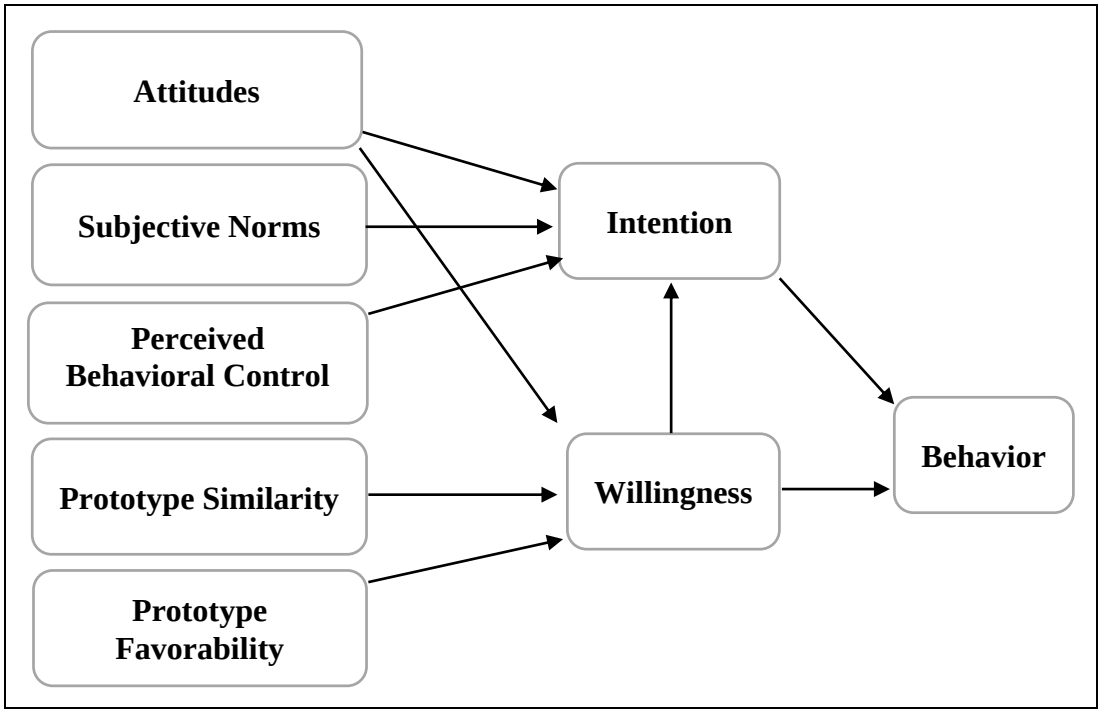

Figure 3. The Integrated Model of TPB and PWM

Some studies surmise that the association between willingness and behavior might be influenced by certain variables greatly. For instance, Gibbons et al. claimed that age is a moderator between willingness and behavior association (1998). They argued that, for especially young individuals, willingness to perform a behavior is a stronger predictor than behavioral expectation (BE), which Shephard, Hartwick, & Warshaw (1988) indicated to be the perceived likelihood of a person's performing the behavior. More specifically, as an individual gets older, he or she depends more on their behavioral expectation, which is affected by constructs such as attitudes, subjective norms, past behavior. However, when these are less available and shaped vaguely, as they are usually for young people, the person might incline more on reactive decision-making tools, which includes how willing they are to engage in a particular behavior.

1.4. Psychological Inoculation

Inoculation theory, first proposed by McGuire (1961a), is a strategy attempting an attitude change in a similar manner one’s immune system working against viral attacks. In depth, it has been argued that if one’s attitudes are challenged, or attacked by a strong form of the same attitudes and the person is asked to overcome this attack by fighting against this new idea introduced by developing a counterargument against it; s/he will be expected to become immune to their initial unhealthy attitudes. These counterarguments are arguably the cognitive antibodies that are produced prior to a potential counter-attitudinal attack that may be faced with later. It has been argued that individuals adopt a “selective exposure” system in which facing with any challenging

counterargument is avoided. This way, the beliefs seem strong since the defense is not activated properly. When their unhealthy attitudes are challenged by weaker arguments and overcome easily, it may even strengthen the initial unhealthy beliefs (McGuire, 1961a). Inoculation method is aimed at activating a defense system by presenting a more extreme version of their unhealthy beliefs which they are unable to overcome. By asking them to refute these ideas with counterarguments, they are expected to develop an active defense system which fights against internal and external social pressures. The aim is to activate such a system whenever they encounter a cue supporting these initial beliefs and disregard them. McGuire proposed that an effective psychological inoculation (PI) intervention should have a challenging aspect which both induces awareness on their beliefs' vulnerability and provides motivation to produce counterarguments to acquire healthier beliefs (1961b). He tested this argument on various behaviors such as teeth brushing, doctor visitation, and penicillin effectiveness and found that when refutational defense mechanisms are activated against extreme forms of the arguments introduced, people are the most resistant to persuasion. In other words, when individuals encounter and attack strong forms of a belief with counterarguments, they become resilient to the very arguments refuted.

Allowing individuals to come up with their own arguments is another vital benefit of this method. Instead of merely giving them the reasons to comply with speed limits, allowing them to produce their arguments is thought to boost an attitude change. The idea that how high personal involvement can increase persuasion more effectively than a low involvement is supported in considerable amount of research (Sherif & Hovland, 1961; Newman & Dolich, 1979; Petty, Cacioppo, & Goldman, 1981) In

these studies it is argued that when the individuals are personally involved with an issue, they initiate a cognitive process that allows them to engage in considerable thinking and evaluation.

A plethora of experiments included inoculation to reduce various health risk behaviors. It was revealed that it is an effective method to increase aversion towards smoking and other tobacco use (Duryea, Ransom, & English, 1990; Grevor, 2010). Moreover, its effectiveness has been proven in withdrawing from unprotected sexual intercourse. HIV positive women who received a PI intervention have shown to decrease cognitive barriers against condom use whereas no such decline is observed among their counterparts who only received a health education (Olley, Abbas, & Gidron, 2011). Further support has been gained regarding the effectiveness of inoculation on several other areas; namely physical activity increase (Dorling, Blervacq, & Gidron, 2018); persuasion in marketing context (Szybillo & Heslin, 1973); diabetes management (Duryea et al., 1990); and reducing binge drinking behavior (Richards & Banas, 2015).

Various other models investigating attitudes and behaviors have been proposed. One of them is a MODE (motivation and opportunity as determinants) model, explaining the attitude-to-behavior process of automated actions (Fazio, 1986, 1990). This model suggests that if attitudes are activated, the attitude and, consequently, the behavior change could be possible. In other words, making individuals aware of their attitudes towards a rather automatic behavior, such as driving, enables them to change their behaviors, provided that they are motivated and have the opportunity to do so.

A set of studies conducted by Gidron et al. investigated the effects of psychological inoculation in reducing young male drivers' road hostility and accident

involvement tendencies and yielded convincing results. In detail, it was revealed that PI is an effective method for altering cognitive distortions they have with regard to risky driving and for inducing social resistance to unhealthy beliefs and attitudes regarding unnecessary risk taking on the road by training people to resist social pressures. In other words, they have found empirical evidence that PI can be a beneficial tool in reducing risk taking and resistance to social pressure in driving context results (Gidron, Slor, Toderas, Herz, & Friedman, 2015). Their research points out the significance of targeting psychological factors in traffic safety interventions to extend their effectiveness for inducing awareness on the subject matter.

Elliott et al. have applied a similar strategy to speeding and found that as the drivers' attitude accessibility, the process of attitudes being activated automatically, increased, the correspondence between their attitudes and behaviors with regard to speeding increased, as well (Elliott, Lee, Robertson, & Innes, 2015).

These studies provide some indication for the effectiveness of PI method which aims to make automatic attitudes and beliefs regarding unhealthy behaviors conscious and change them.

1.5. Rationale and the Aim of the Study

The aim of the current study is to develop an intervention method targeting drivers' attitudes and beliefs which encourage speeding behavior. Cognitive dissonance theory is a major contributor to the content development of the present study. The theory, proposed by Festinger (1957), states that individuals generally try to avoid a discrepancy between cognition and behavior. In case of such a conflict

between attitudes and behavior, the person is thought to be motivated to change one or the other to eradicate the mental discomfort felt as a result. Therefore, it is critical to both decode exactly which aspects of cognition should be targeted for a behavior change and promote a strong enough mechanism that allows them to outweigh the behavior. It has been suggested by traffic safety researchers that interventions and human factors campaigns targeting psychological safety components such as risk culture, attitudes and beliefs are needed (Nordfjærn, Jørgensen, & Rundmo, 2012). More specifically, Ulleberg (2002) studied young drivers' responses to traffic safety campaigns and concluded that letting these drivers come up with their own reasons and conclusions would be an effective method in reducing their risk taking tendencies. Furthermore, it is argued that to change future risky driving behavior, implementing interventions that focuses on examining and understanding which dimensions of attitudes towards speeding could be beneficial as challenging attitudes is considered a key element of behavior change (Iversen, 2004).

The intervention method used in this study targets TPB and PWM constructs, namely speeding related attitudes, subjective norms, perceived behavioral control, willingness, prototype perceptions and eventually intention to speed and speeding behavior. In the present study, one of the focal points is to apprehend specifically which constructs should be focused to discourage drivers from speeding. It is suggested that to decrease drivers' engagement in risky behaviors on the road, different aspects of their subjective beliefs should be targeted for intervention purposes (Wang et al., 2015). Therefore, to understand these beliefs and tackle them, a PI training within the framework of an integrated model combining TPB and PWM will be tested on drivers' speeding related cognitions and behavior.

CHAPTER 2

METHOD

2.1. Participants

The participants are comprised of 95 young male drivers whose ages range between 19-30 years old (*M*= 25.02, *SD*= 2.85). No dropout occurred as the data collection was completed via face-to-face interviews. All participants are consisted of only male drivers due to the fact that a considerable amount of research shows that men are more inclined to risk taking, compared to women in driving context, as previously mentioned (Taubman-Ben-Ari & Findler, 2003; Elliott, Shope, Raghunathan, & Waller, 2006). Similarly, since 18-30 year-old drivers are found to have the most prevalence of risky driving compared to older drivers (Campbell & Stradling, 2003), the participants for the current study are chosen from this age group. On average, the annual mileage of participants is 7787.64 km (*SD*= 8292.28, range = 150-60000) with a mean of driving experience of 5.8 years (*SD*= 2.74, range = 1-12). Total mileage of drivers ranges between 250 and 240000 km (*M*= 38250.68, *SD*= 42182.98). The participants' preferred speed on roads with 82 km/h speed limit is 91.61 on average (*SD*= 11.02) and their expected speed on these roads is 91.26 on average (*SD*= 10.72).

2.2. Research Design

In the current study a pretest posttest design was implemented with three different assessments in total. The participants filled out several questionnaires, 2 weeks apart. Time 1 assessment included questionnaires measuring basic demography, Driver Skill Inventory (DSI), the constructs established by the TPB and the PWM with regard to speeding, and lastly a PI intervention with open ended questions. Following the intervention, participants were asked to complete the questionnaire assessing the TPB and the PWM constructs once again. In Time 2, participants' subsequent speeding intentions and behaviors were assessed, 2 weeks after the intervention. The timeline of data collection process is presented in Figure 4.

2.3. Procedure

Prior to data collection, brief exploratory interviews were held with 10 young male drivers for the development of the context of PI intervention. They were asked about their reasons for exceeding the speed limits. The reasons revealed in the interviews, concerning why drivers speed, have matched the literature. The main reasons were found to be to save time on the road, sensation seeking or risk taking tendencies, social factors such as peer pressure. Accordingly, a PI intervention is developed. Later, ethical approval was acquired prior to starting the data collection process from METU Human Subjects Ethics Committee. The data collection lasted from May 01, 2019 to July 02, 2019. Participants were recruited via social media announcements and snowball sampling and given 20 Turkish Liras each, for their

participation in the study. They were given an appointment prior to take part in the study. When they arrive at the lab, they were informed regarding the process both verbally and in a written form and they were asked to sign the inform consent clarifying they understand and accept the requirements of the study and that their participation is voluntary.

In the first session of the study, they were given “Demographic Information Form” and “Planned Behavior and Prototype Willingness Scale on Speeding Behavior”, respectively. Upon completing these instruments, they were lastly asked to fill out the intervention measure which is “Psychological Inoculation on Speeding Instrument” They were then asked to complete “TPB and PWM Scale on Speeding” once more as a post-measure, immediately after the intervention. They were reminded that is was crucial for them to answer this questionnaire with their present state without trying to remember their initial answers.

Participants were then thanked and given a second interview appointment for a follow-up measure for two weeks later. When they arrived they were asked once again to fill out the post-measurement scale, Planned Behavior and Prototype Willingness on Speeding for the last time. Lastly, they were thanked and informed about the aims and expected results of the study, both written and verbally.

2.4. Instruments

The present study focuses one speeding behavior occurring on roads that have a speed limit of 82 km/h. This road type is chosen as a basis for speeding behavior as it is thought to be the most convenient for this study. Speeding occurs on residential

areas, the least as the speed limits are reported be disregarded on roads that have a higher speed limit (Møller & Haustein, 2014); whereas motorways with a speed limit higher than 90 km/h are not used by most drivers sampled in this study, on a regular basis.

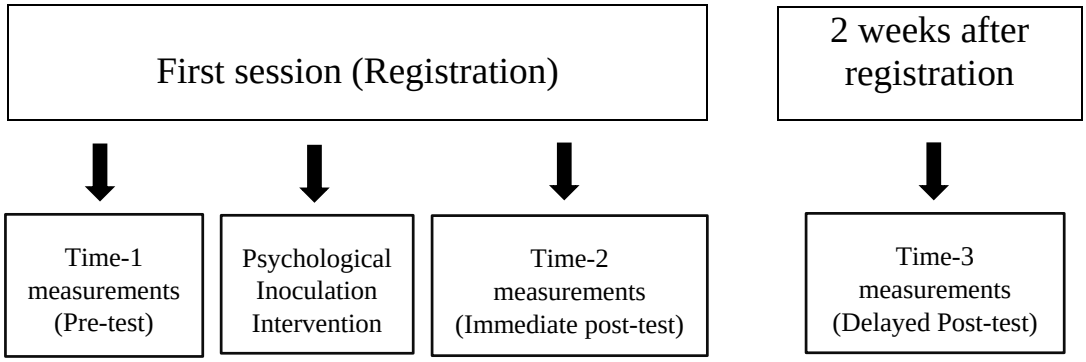

Figure 4. The Data Collection Timeline

2.4.1. Demographics

The participants' demographic information was assessed with a basic scale involving questions asking their age; for how long they hold a driver's license; their mileage for the past year; their overall mileage; their choice of average speed and their expected speed on average for the next 2 weeks on 82 km/h speed zones.

2.4.2. Measurements of TPB and PWM Constructs

The items measuring the TPB and PWM constructs used in the current study are based on a study Elliott conducted in 2017, combining both models as it’s done in the present study. The scale is named TPB and PWM on Speeding Instrument (T-PSI).

2.4.2.1. Attitudes

To measure participants' attitudes the following item was used; "For me, driving faster than the speed limit over the next month would be…' They were then asked to complete this sentence using two differential scales; "extremely dull (scored 1) to extremely fun (scored 9)"; and "extremely unenjoyable (scored 1) to extremely enjoyable (scored 9)". Cronbach's alpha of attitudes for Time-1, Time-2, and Time-3 measurements were $\alpha = 0.93$, $\alpha = 0.96$, $\alpha = 0.95$, respectively.

2.4.2.2. Subjective Norms

Subjective norms construct was measured with three items, namely, "How acceptable do you think driving faster than the speed limit is (1 = extremely unacceptable to 9 = extremely acceptable"; "How often do the people important to you drive faster than the speed limit (1 = never to 9 = very often)"; and "Of the people you know, how many do you think drive faster than the speed limit (1 = none of them to 9 = all of them)". Cronbach's alpha of subjective norms was $\alpha = 0.63$ for all Time-1, Time-2, and Time-3 measurements. Although these scores are acceptable, reliability analyses also revealed that if first item is removed, the new cronbach scores would be $\alpha = 0.71$ for Time-1 measurements; and $\alpha = 0.80$ for both Time-2 and Time-3 measurements.

2.4.2.3. Perceived Behavioral Control

Perceived behavioral control was measured with a single item, by asking participants to rate the following sentence, “For me, avoiding exceeding the speed limit over the next month would be… (1 = extremely difficult to 9 = extremely easy)”.

2.4.2.4. Willingness

The two items measuring willingness were: “Suppose you were late (e.g., for work, university or an appointment) over the next month. How willing would you be to drive faster than the speed limit? (1 = not at all willing to 9 = very willing)”; “Would you be willing to drive faster than the speed limit if you were in a hurry over the next month? (1 = definitely no to 9 = definitely yes)”. Cronbach’s alpha of willingness for Time-1, Time-2, and Time-3 measurements were $\alpha = 0.93$, $\alpha = 0.96$, $\alpha = 0.94$, respectively.

2.4.2.5. Prototype Perceptions

2.4.2.5.1. Prototype Similarity

The three items measuring Prototype Similarity were “Do you resemble the typical person your age that regularly drives faster than the speed limit? (1 = definitely no to 9 = definitely yes)”; “How similar or different are you to the type of person your age that regularly drives faster than the speed limit (1 = very different to 9 = very

similar)"; "I am comparable to the typical person my age that regularly drives faster than the speed limit (1 = strongly disagree to 9 = strongly agree)". Cronbach's alpha of prototype similarity for Time-1, Time-2, and Time-3 measurements were $\alpha = 0.96$, $\alpha = 0.95$, $\alpha = 0.95$, respectively.

2.4.2.5.2. Prototype Favorability

Prototype Favorability was measured with six items by asking participants to rate their views on the prototypical speeder with following sentence "think about the typical person your age who regularly drives faster than the speed limit" by indicating the extent to which they felt (s)he possessed three positive attributes (lively, cool, important) and three negative attributes (careless, childish, dull), rating on scales from no extent at all (scored 1) to a great extent (scored 9). Negative items were then reversed for the analyses. The reliability scores of the positive items on the scale had a cronbach's alpha scores that are $\alpha = 0.72$, $\alpha = 0.69$, $\alpha = 0.70$, for Time-1, Time-2, and Time-3 measurements, respectively. The reliability scores of the negative items on the scale had a cronbach's alpha scores that are $\alpha = 0.64$, $\alpha = 0.64$, $\alpha = 0.72$, for Time-1, Time-2, and Time-3 measurements, respectively. The reliability analyses revealed that if the first positive item and the last negative item on the scale were to be removed, the scale would have had higher reliability.

2.4.2.6. Behavioral Intention

Intention was measured with three items, "I [plan/intend/would like] to drive faster than the speed limit over the next month" on scales from totally disagree (scored 1) to totally agree (scored 9). Cronbach's alpha of intention for Time-1, Time-2, and Time-3 measurements were $\alpha = 0.90$, $\alpha = 0.94$, $\alpha = 0.96$, respectively.

2.4.2.7. Behavior

Speeding behavior was measured by asking participants their average speed in the past two weeks on roads with 82 km/h speed limit. The Time-1 measurement of behavior is considered as drivers' past behavior. The Time-3 measurement of behavior is considered as their post-intervention behavior.

Overall T-PSI scale reliability analyses revealed high cronbach's alpha scores with $\alpha = 0.84$ for Time-1 measurements; $\alpha = 0.85$ for Time-2 measurements; and $\alpha = 0.86$ for Time-3 measurements.

2.4.3. Psychological Inoculation for Speeding Instrument

Psychological Inoculation for Speeding Instrument (PI-SI) was used as the intervention in the current study. As mentioned before, it is based on psychological inoculation technique. This is an open-ended question scale with 17 sentences that the participants were requested to refute by generating counter-arguments against these sentences. As this scale is qualitative in nature, it was scored as yes or no, based on

whether the participant received the intervention or not and since all of the participants received this intervention, it was not included in the analysis. The sentences used were targeted at each construct of TPB and P/W models and for every construct at least two sentences were formed. First, the participants were asked to read two sample sentence/counter-argument pairs, which were out of speeding context. Then, each sentence in the intervention was read to the participants and they were asked to refute them by giving personal and detailed reasons and write them down. They are provided with feedback until they produce valid counterarguments. The sentences were exaggerated further when a participant failed to create a counter-argument. One challenging attitude sentence was "The only way to arrive somewhere on time is by speeding" and an example received as a counter-argument was "No, if I can make better time management, I can arrive at my destination on time". A challenging sentence for subject norms was "The people important to me don't care if I speed or not" and its usual refutation argument was "No, my family would not want me to drive too fast". Another exaggerated sentence aimed at changing PBC was "As I am the driver, I have the entire control while driving" and its most common counter-argument example was "No, the traffic setting is too complicated for just one person to be in total control, there are other drivers, pedestrians, and animals on the road with us". As for an example for willingness sentence would be "While driving, the only thing I want is to speed" and its counter-argument example would be "No, there are other activities I enjoy while I'm driving, like listening to my favorite music". A challenging sentence aimed at changing prototype similarity was "All the guys around me who are at my age drive above the speed limits". This particular sentence was especially challenging for many of the participants as they had a hard time thinking of a peer who

was not speeding. However, when this was the case, they were pushed a little bit more. They were given a more exaggerated form of this sentence, such as “So, all of your male friends or acquaintances speed regularly, more times than they obey the limits?”, until they think of someone complying with speed limits at least more often than violating them and an example of their responses was “No, my roommate usually does obey the speed limits”. As for an example challenging sentence of prototype favorability was The only way guys like me can impress a woman is by speeding” and an example of a refutational response was “No, I have many other qualities that would impress a woman, like my intellectual conversation skills or my taste in music”. This sentence was easily refuted by most of the participants. It is likely that it was not a good fit for the sample used in the study, due to their educational and social background or their age. Lastly, one of the sentences aimed at challenging participants’ intention to speed was “My primary and essential goal when I’m driving is to speed” and the most common counter-argument response received was “No, my primary goal when I’m driving is getting somewhere safe and sound”. All of the sentences used and their targeted construct is given in Table 1. These statements were formed by searching the literature for relevant speeding reasons tailored for the sample, brief interviews conducted prior to data collection, and with the guidance of Prof. Dr. Yori Gidron who studied PI technique in reducing road hostility and accident involvement (Gidron et al., 2015).

Table 1. PI-SI Sentences Used in Psychological Inoculation Intervention

Attitudes	The only way to arrive somewhere on time is by speeding.	There is no harm in exceeding the speed limits in order to save time on every journey I have.	Even though driving fast is risky, the risk s worth the adrenaline and euphoria I feel.	A woman travelling with me will definitely be impressed if I speed.
Subjective Norms	While I'm driving, if a passenger asks me to speed up there is nothing I can do or say.	The people important to me don't care if I speed or not.		
Perceived Behavioral Control	Since I can decrease my speed to a safe range whenever I want to, even if I exceed the speed limits, a traffic crash is not possible.	As I am the driver, I have the entire control while driving.		
Intention	My primary and essential goal while driving is to speed.	If I am the driver, I always intend to speed before departing.		
Willingness	The fact that I'm late to my destination justifies the need I feel to speed up.	While driving, the only thing I want is to speed.		
Prototype Similarity	All the guys around me who are at my age drive above the speed limits.	The only thing I can to fit in with my friends who like driving fast is if I drive fast myself.		
Prototype Favorability	The best way to prove I have excellent driving skills is to speed.	I have to speed in order to look cool when I'm driving with my friends.	The only way guys like me can impress a woman is by speeding.	

CHAPTER 3

RESULTS

3.1. Bivariate Correlation Coefficients

Correlations between demographics (age, driving experience in years, annual mileage, total mileage, preferred speed on roads with 82 km/h, expected speed for the next 2 weeks on roads with 82 km/h), Time-1 measurements of attitudes, subjective norms, perceived behavioral control, willingness, prototype similarity, prototype favorability, intention, and past behavior (average speed on 82 km/h speed zones before the intervention) are listed in Table 2.

According to the correlation coefficient analyses of Time-1 measurements, attitudes was positively related to preferred speed (r = .36, p < .01) and expected speed (r = .36, p < .01). Subjective norms was positively related to preferred speed (r = .39, p < .01), expected speed (r = .35, p < .01) and attitudes (r = .22, p < .05). Time-1 measurements of PBC was found to be positively related to driving experience (r = .21, p < .05) and negatively related to attitudes (r = -.25, p < .05). Willingness was positively related to preferred speed (r = .39, p < .01), expected speed (r = .36, p < .01), attitudes (r = .53, p < .01) and subjective norms (r = .62, p < .01). Prototype similarity was found to be positively associated with preferred speed (r = .52, p < .01), expected speed (r = .48, p < .01), attitudes (r = .70, p < .01), subjective norms (r = .46,

$p < .01$) and willingness ($r = .56$, $p < .01$); and negatively associated with PBC ($r = -.24$, $p < .05$). Time-1 measurements of prototype favorability was only found to be negatively related to PBC ($r = -.24$, $p < .05$). In addition, Intention to speed was revealed to be positively related to preferred speed ($r = .54$, $p < .01$), expected speed ($r = .54$, $p < .01$), attitudes ($r = .71$, $p < .01$), subjective norms ($r = .54$, $p < .01$), willingness ($r = .63$, $p < .01$) and prototype similarity ($r = .75$, $p < .01$); and negatively associated with PBC ($r = -.21$, $p < .05$). Lastly, past behavior was positively related to preferred speed ($r = .90$, $p < .01$), expected speed ($r = .91$, $p < .01$), attitudes ($r = .32$, $p < .01$), subjective norms ($r = .40$, $p < .01$), willingness ($r = .39$, $p < .01$), prototype similarity ($r = .52$, $p < .01$) and intention ($r = .47$, $p < .01$).

Correlations between demographics, Time-2 measurements of attitudes, subjective norms, perceived behavioral control, willingness, prototype similarity, prototype favorability, intention, and past behavior (average speed on 82 km/h speed zones before the intervention) are listed in Table 3.

Preferred speed was positively related to Time-2 measurements of attitudes ($r = .36$, $p < .01$), subjective norms($r = .36$, $p < .01$), willingness ($r = .45$, $p < .01$), prototype similarity ($r = .40$, $p < .01$), intention ($r = .55$, $p < .01$) and past behavior ($r = .90$, $p < .01$); and negatively related to PBC ($r = -.21$, $p < .05$). Similarly, expected speed was positively related to attitudes ($r = .39$, $p < .01$), subjective norms ($r = .40$, $p < .01$), willingness ($r = .45$, $p < .01$), prototype similarity ($r = .38$, $p < .01$), intention ($r = .55$, $p < .01$) and past behavior ($r = .91$, $p < .01$). Time-2 attitudes was positively related to subjective norms ($r = .28$, $p < .01$), willingness ($r = .64$, $p < .01$), prototype similarity ($r = .67$, $p < .01$), intention ($r = .76$, $p < .01$) and past behavior ($r = .32$, $p < .01$); and negatively related to PBC ($r = -.23$, $p < .05$). Also, subjective norms was

negatively related to PBC (r = -.22, p < .05) and positively related to willingness (r = .47, p < .01), prototype similarity (r = .43, p < .01), intention (r = .47, p < .01) and past behavior (r = .54, p < .01). PBC was found to be negatively related to prototype similarity (r = -.28, p < .01) and intention (r = -.25, p < .01).

Table 2. *Correlations, Means and Standard Deviations of Demographics and Time-1 Measurement Variables.*

Variable	**Mean**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1. Age	25.02	2.85	1													
2. Driving Exp	5.80	2.74	.84**	1												
3.Ann Km	7787.64	8292.28	.06	.13	1											
4. Total Km	38250.68	42182.98	.34**	.43**	.88**	1										
5. Pref Km/h	91.61	11.02	-.01	.10	-.02	.06	1									
6. Exp Km/h	91.26	10.72	-.02	.09	.03	.07	.95**	1								
7. T1_Att	5.72	1.63	-.17	-.14	.01	-.04	.36**	.36**	1							
8. T1_SN	5.31	1.34	-.04	-.00	-.06	-.01	.39**	.35**	.22*	1						
9. T1_PBC	7.22	1.79	.17	.21*	-.16	-.04	-.15	-.19	-.25*	.04	1					
10. T1_Will	6.97	1.69	-.12	-.10	-.07	-.07	.39**	.36**	.53**	.62**	-.17	1				
11. T1_PS	3.78	1.86	-.19	-.15	-.03	-.06	.52**	.48**	.70**	.46**	-.24*	.56**	1			
12. T1_PF	4.49	.94	.03	-.04	.03	-.06	-.01	.03	-.02	-.08	-.24*	-.05	-.01	1		
13. T1_Int	4.76	2.11	-.11	-.05	.05	.02	.54**	.54**	.71**	.54**	-.21*	.63**	.75**	-.03	1	
14. Past Beh	91.43	10.25	-.09	-.01	-.11	-.08	.90**	.91**	.32**	.40**	-.19	.39**	.52**	-.02	.47**	1

*Note. Driving Exp = Driving experience (number of years of holding a driver's license); Ann Km = Annual Mileage in Km; Total Km = Total Mileage in Km; Pref Km/h = Preferred Speed in Km/h; Exp Km/h = Expected Speed in Km/h; T1_Att = Time-1 Attitudes; T1_SN = Time-1 Subjective Norms; T1_PBC = Time-1 Perceived Behavioral Control; T1_Will = Time-1 Willingness; T1_PS = Time-1 Prototype Similarity, T1_PF = Time-1 Prototype Favorability; T1_Int = Time-1 Intention; Past Beh = Past Behavior * Correlation significant at the .05 level (2-Tailed). **Correlation significant at the .01 level (2-Tailed).*

Willingness was positively related to prototype similarity (r = .57, p < .01), intention (r = .76, p < .01) and past behavior (r = .39, p < .01). Moreover, Time-2 measurements of prototype similarity were positively related to intention (r = .68, p < .01) and past behavior (r = .52, p < .01). Intention to speed was revealed to be

positively related to preferred speed (r = .54, p < .01), expected speed (r = .54, p < .01), attitudes (r = .71, p < .01), subjective norms (r = .54, p < .01), willingness (r = .63, p < .01) and prototype similarity (r = .75, p < .01); and negatively associated with PBC (r = -.21, p < .05). Lastly, intention was positively related to past behavior (r = .47, p < .01).

Correlations between demographics, Time-3 measurements of attitudes, subjective norms, perceived behavioral control, willingness, prototype similarity, prototype favorability, intention, and average speed on 82 km/h speed zones (during two weeks after the intervention) are listed in Table 4.

Table 3. *Correlations, Means and Standard Deviations of Demographics and Time-2 Measurement Variables*

Variable	**Mean**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1. Age	25.02	2.85	1													
2. Driving Exp	5.80	2.74	.84**	1												
3.Ann Km	7787.64	8292.28	.06	.13	1											
4. Total Km	38250.68	42182.98	.34**	.43**	.88**	1										
5. Pref Km/h	91.61	11.02	-.01	.10	-.02	.06	1									
6. Exp Km/h	91.26	10.72	-.02	.09	.03	.07	.95**	1								
7. T2_Att	4.82	1.73	-.06	-.06	.14	.10	.36**	.39**	1							
8. T2_SN	4.53	1.21	-.12	.07	.11	.12	.36**	.40**	.28**	1						
9. T2_PBC	7.72	1.46	.17	.15	-.27**	-.20	-.21*	-.17	-.23*	-.22*	1					
10. T2_Will	5.31	1.96	.07	.09	.02	.05	.45**	.45**	.64**	.47**	-.13	1				
11. T2_PS	2.83	1.50	-.20	-.17	.05	-.01	.40**	.38**	.67**	.43**	-.28**	.57**	1			
12. T2_PF	4.45	.77	.05	-.03	-.01	-.05	-.20	-.18	.09	-.13	.01	.00	.05	1		
13. T2_Int	3.93	2.02	-.05	-.01	.14	.12	.55**	.55**	.76**	.47**	-.25**	.76**	.68**	.08	1	
14. Past Beh	91.43	10.25	-.09	-.01	-.11	-.08	.90**	.91**	.32**	.40**	-.19	.39**	.52**	-.02	.47**	1

*Note. Driving Exp = Driving experience (number of years of holding a driver's license); Ann Km = Annual Mileage in Km; Total Km = Total Mileage in Km; Pref Km/h = Preferred Speed in Km/h; Exp Km/h = Expected Speed in Km/h; T2_Att = Time-2 Attitudes; T2_SN = Time-2 Subjective Norms; T2_PBC = Time-2 Perceived Behavioral Control; T2_Will = Time-2 Willingness; T2_PS = Time-2 Prototype Similarity, T2_PF = Time-2 Prototype Favorability; T2_Int = Time-2 Intention; Past Beh = Past Behavior * Correlation significant at the .05 level (2-Tailed). **Correlation significant at the .01 level (2-Tailed).*

Preferred speed and expected speed were positively related to attitudes (r = .49, p < .01; r = .44, p < .01), subjective norms (r = .26, p < .05; r = .28, p < .01), willingness (r = .44, p < .01; r = .40, p < .01), prototype similarity (r = .50, p < .01; r = .48, p < .01), intention (r = .54, p < .01; r = .54, p < .01), and Time-3 measurement of behavior (r = .70, p < .01; r = .73, p < .01), respectively. Time-3 measurements of attitudes were positively related to subjective norms (r = .39, p < .01), willingness (r = .68, p < .01), prototype similarity (r = .69, p < .01), intention (r = .76, p < .01), past behavior (r = .43, p < .01) and post-intervention behavior (r = .41, p < .01). Time-3 measurements of subjective norms were positively related to willingness (r = .55, p < .01), prototype similarity (r = .46, p < .01), intention (r = .53, p < .01), past behavior (r = .32, p < .01) and post-intervention behavior (r = .40, p < .01). Time-3 PBC measurements was positively related to age (r = .36, p < .01), driving experience (r = .28, p < .01) and prototype favorability (r = .21, p < .05). Time-3 willingness measurements were positively related to prototype similarity (r = .56, p < .01), intention (r = .71, p < .01), past behavior (r = .42, p < .01) and post-intervention behavior (r = .51, p < .01). Moreover, prototype similarity was found to be positively related to intention (r = .68, p < .01), past behavior (r = .47, p < .01) and post-intervention behavior (r = .45, p < .01). Intention measured in Time-3 was positively related to past behavior (r = .50, p < .01) and post-intervention behavior (r = .51, p < .01). Lastly, past behavior and post-intervention behavior was found to be positively related (r = .69, p < .01).

In addition, correlation coefficient analyses were run for variables measured in Time-1, 2, and 3 (Table 5).

3.2. Main Analyses

3.2.1. Analysis of Variance for TPB and PWM Constructs

A one-way repeated measures analysis of variance (ANOVA) is conducted to measure each TPB and PWM variable namely attitudes, subjective norms (SN), perceived behavioral control (PBC), intention, willingness, prototype similarity (PS), prototype favorability (PF) and behavior, throughout three different measurement times, Time 1, 2, and 3 in order to see whether these variables are influenced by PI intervention.

For attitudes variable, Mauchly's Test of Sphericity indicated that the assumption of sphericity was not violated, $\chi^2(2) = 5.751$, $p = .056$. Therefore, it can be concluded that the PI intervention had a statistically significant effect on attitudes towards speeding ($F(2,188) = 28.858$, $p < .001$, $\eta_p^2 = .235$). Comparing the three different time points, the results indicated that speeding attitudes in Time-1 measurements ($M = 5.72$, $SD = 1.63$) were significantly decreased in Time-2 measurements ($M = 4.82$, $SD = 1.73$) ($p < .001$); and in Time-3 measurements ($M = 4.91$, $SD = 1.59$) ($p < .001$) Summary of ANOVA results for attitudes can be seen in Figure 5.1.

Table 4. *Correlations, Means and Standard Deviations of Demographics and Time-3 Measurement Variables.*

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	25.02	2.85	1														
2. Driving Exp	5.80	2.74	.84**	1													
3.Ann Km	7787.64	8292.28	.06	.13	1												
4. Total Km	38250.68	42182.98	.34**	.43**	.88**	1											
5. Pref Km/h	91.61	11.02	-.01	.10	-.02	.06	1										
6. Exp Km/h	91.26	10.72	-.02	.09	.03	.07	.95**	1									
7. T3_Att	4.91	1.59	-.00	.04	.09	.08	.49**	.44**	1								
8. T3_SN	4.64	1.13	-.07	-.07	-.06	-.04	.26*	.28**	.39**	1							
9. T3_PBC	7.31	1.78	.36**	.28**	-.12	-.05	.13	.18	-.18	-.01	1						
10. T3_Will	5.65	1.77	.13	.15	.05	.12	.44**	.40**	.68**	.55**	.04	1					
11. T3_PS	2.88	1.40	-.12	-.10	.02	.02	.50**	.48**	.69**	.46**	-.20	.56**	1				
12. T3_PF	4.27	.69	.16	.12	.09	.08	-.08	-.07	-.06	-.13	.21*	-.06	.13	1			
13. T3_Int	3.99	1.90	-.01	.05	.11	.13	.54**	.54**	.76**	.53**	.01	.71**	.68**	.05	1		
14. Past Beh	91.43	10.25	-.09	-.01	-.11	-.08	.90**	.91**	.43**	.32**	.12	.42**	.47**	-.15	.50**	1	
15. T3_Beh	89.18	8.11	-.06	.05	.10	.14	.70**	.73**	.41**	.40**	.01	.51**	.45**	-.14	.51**	.69**	1

*Note. Driving Exp = Driving experience (number of years of holding a driver's license); Ann Km = Annual Mileage in Km; Total Km = Total Mileage in Km; Pref Km/h = Preferred Speed in Km/h; Exp Km/h = Expected Speed in Km/h; T3_Att = Time-3 Attitudes; T3_SN = Time-3 Subjective Norms; T3_PBC = Time-3 Perceived Behavioral Control; T3_Will = Time-3 Willingness; T3_PS = Time-3 Prototype Similarity, T3_PF = Time-3 Prototype Favorability; T3_Int = Time-3 Intention; Past Beh = Past Behavior; T3_Beh = Post intervention behavior * Correlation significant at the .05 level (2-Tailed). **Correlation significant at the .01 level.*

Table 5. *Correlation Coefficients for Time-1, Time-2 and Time-3 measurements of TPB and PWM Constructs*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. T1_Att	1																					
2. T1_SN	.22*	1																				
3. T1_PBC	-.25*	.04	1																			
4. T1_Will	.53**	.62**	-.17	1																		
5. T1_PS	.70**	.46**	-.24*	56**	1																	
6. T1_PF	-.02	-.08	-.24*	-.05	-.01	1																
7. T1_Int	.71**	.54**	-.21*	.63**	.75**	-.03	1															
8. T2_Att	.79**	.19	-.23*	.43**	.59**	.13	.66**	1														
9. T2_SN	.24*	.83**	-.08	.57**	.40**	-.05	.55**	.28**	1													
10. T2_PBC	-.20	-.06	.50**	-.15	-.31**	-.27**	-.19	-.23*	-.22*	1												
11. T2_Will	.58**	.41**	-.10	.72**	.51**	.06	.67**	.64**	.47**	-.13	1											
12. T2_PS	.69**	.37**	-.28**	.51**	.85**	.11	.68**	.67**	.43**	-.28**	.57**	1										
13. T2_PF	-.10	-.17	-.11	-.18	-.11	.67**	-.08	.09	-.13	.01	.00	.05	1									
14. T2_Int	.67**	.37**	-.19	.55**	.65**	.07	.87**	.76**	.47**	-.25*	.76**	.68**	.08	1								
15. T3_Att	.65**	.28**	-.29**	.50**	.52**	.07	.59**	.68**	.38**	-.44**	.65**	.54**	-.12	.68**	1							
16. T3_SN	.29**	.73**	-.02	.59**	.30**	-.04	.52**	.31**	.83**	-.07	.57**	.33**	-.04	.47**	.39**	1						
17. T3_PBC	-.10	.04	.26*	-.06	-.09	-.05	.05	-.05	-.08	.57**	.10	-.18	.16	.02	-.18	-.01	1					
18. T3_Will	.49**	.44**	-.10	.66**	.43**	-.04	.54**	.54**	.44**	-.16	.83**	.42**	-.07	.60**	.68**	.55**	.04	1				
19. T3_PS	.64**	.45**	-.15	.52**	.69**	.15	.67**	.63**	.49**	-.32**	.62**	.75**	-.01	.69**	.69**	.47**	-.20	.56**	1			
20. T3_PF	.09	-.07	-.04	-.21*	.12	.54**	.07	.22*	-.14	-.05	.09	.15	.55**	.11	-.06	-.13	.21*	-.06	.13	1		
21. T3_Int	.64**	.38**	-.18	.50**	.54**	.05	.76**	.75**	.45**	-.22*	.71**	.53**	.01	.85**	.76**	.53**	.01	.71**	.68**	.05	1	
22. T3_Beh	.28**	.48**	-.03	.45**	.45**	-.04	.48**	.40**	.49**	-.15	.45**	.33**	-.15	.49**	.41**	.40**	.01	.51**	.45**	-.14	.51**	1

*Note. T1_Att = Time-1 Attitudes; T1_SN = Time-1 Subjective Norms; T1_PBC = Time-1 Perceived Behavioral Control; T1_Will = Time-1 Willingness; T1_PS = Time-1 Prototype Similarity, T1_PF = Time-1 Prototype Favorability; T1_Int = Time-1 Intention; T2_Att = Time-2 Attitudes; T2_SN = Time-2 Subjective Norms; T2_PBC = Time-2 Perceived Behavioral Control; T2_Will = Time-2 Willingness; T2_PS = Time-2 Prototype Similarity, T2_PF = Time-2 Prototype Favorability; T2_Int = Time-2 Intention; T3_Att = Time-3 Attitudes; T3_SN = Time-3 Subjective Norms; T3_PBC = Time-3 Perceived Behavioral Control; T3_Will = Time-3 Willingness; T3_PS = Time-3 Prototype Similarity, T3_PF = Time-3 Prototype Favorability; T3_Int = Time-3 Intention; T3_Beh = Post intervention behavior * Correlation significant at the .05 level (2-Tailed). **Correlation significant at the .01 level*

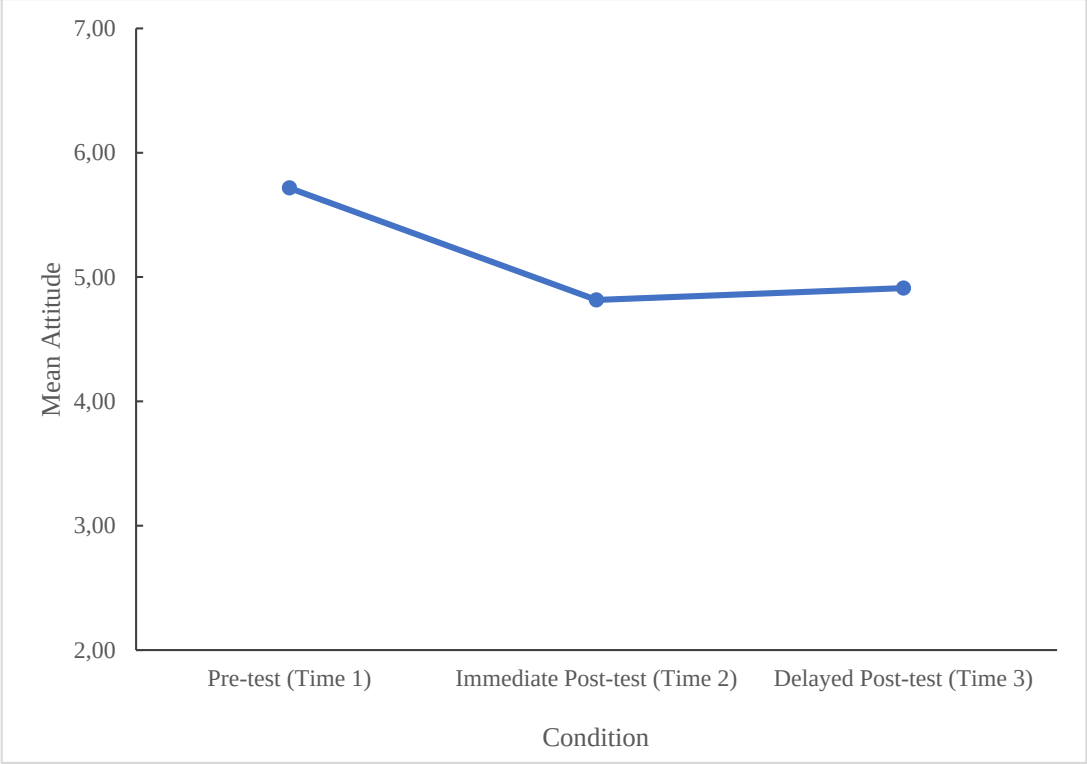

Figure 5.1. Summary of ANOVA Results for Attitudes

Regarding the effects of PI intervention on subjective norms, Greenhouse-Geisser correction determined that there was a statistically significantly difference between time points ($F(1.751, 164.598) = 52.740$, $p < .001$, $\eta_p^2 = .359$). Further analyses indicated that subjective norms measured in Time-1 ($M = 5.31$, $SD = 1.34$) were significantly reduced in Time-2 ($M = 4.53$, $SD = 1.21$) ($p < .001$); and in Time-3 ($M = 4.64$, $SD = 1.13$), ($p < .001$). Summary of ANOVA results for subjective norms can be seen in Figure 5.2.

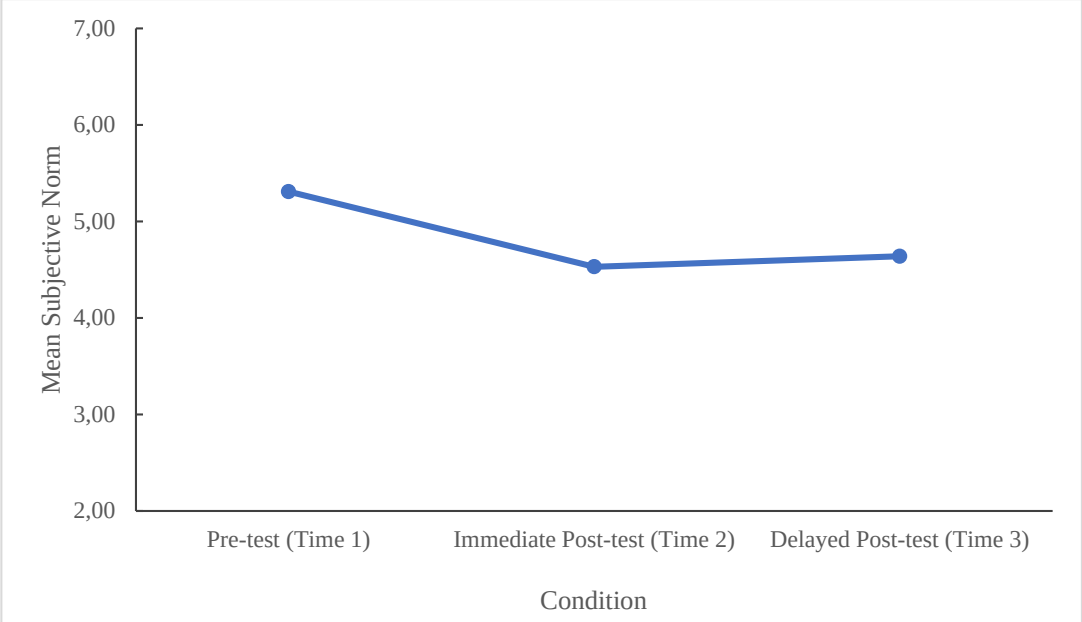

Figure 5.2. Summary of ANOVA Results for Subjective Norms

Greenhouse-Geisser correction revealed that PBC regarding speeding was significantly differed between three time points ($F(1.663, 156.305) = 4.080$, $p = .025$, $\eta_p^2 = .042$). Moreover, the results indicated that perceived control of speeding behavior obtained in Time-1 measurements ($M = 7.22$, $SD = 1.79$) were significantly increased in Time-2 measurements ($M = 7.72$, $SD = 1.46$), ($p = .004$); and the scores obtained in Time-2 measurements ($M = 7.72$, $SD = 1.46$) were significantly decreased in Time-3 measurements ($M = 7.31$, $SD = 1.78$), ($p = .011$). Summary of ANOVA results for perceived behavioral control can be seen in Figure 5.3.

In terms of willingness to speed, Greenhouse-Geisser correction indicated a significant difference between time points ($F(1.849, 173.808) = 84.371$, $p < .001$, $\eta_p^2 = .473$). Comparing the mean differences between the time points, willingness scores

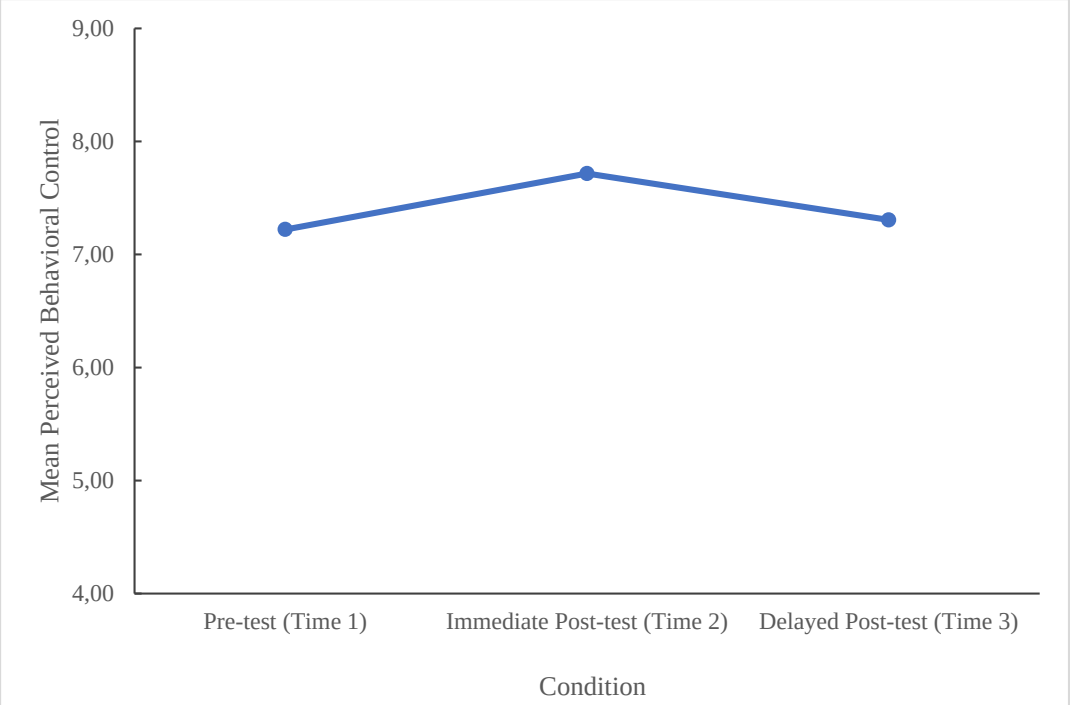

Figure 5.3. Summary of ANOVA Results for Perceived Behavioral Control

obtained in Time-1 measurements (M = 6.97, SD = 1.69) were significantly reduced in Time-2 measurements (M = 5.31, SD = 1.96, p < .001); however, Time-2 measurements of willingness were significantly increased in Time-3 measurements (M = 5.65, SD = 1.77, p < .001). Nevertheless, Time-3 measurements of willingness were significantly less than Time-1 measurements. Summary of ANOVA results for willingness can be seen in Figure 5.4.

Greenhouse-Geisser correction made for prototype similarity revealed that the time points were significantly different (F(1.698, 159.628) = 42.141, p < .001, η_p^2 = .310). Further analyses indicated that prototype similarity scores obtained in Time-1 measurements (M = 3.78, SD = 1.86) were significantly reduced in Time-2 measurements (M = 2.83, SD = 1.50), (p < .001); similarly, Time-1 measurements of prototype similarity were significantly decreased in Time-3 measurements (M = 2.88,

SD = 1.40), (*p* < .001). Summary of ANOVA results for prototype similarity can be seen in Figure 5.5.

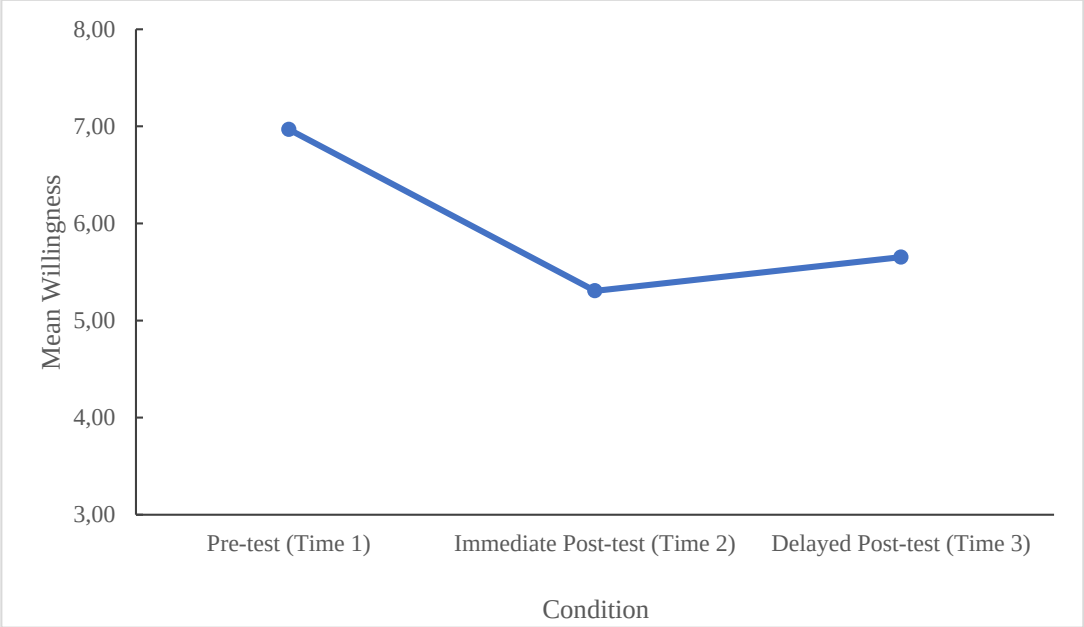

Figure 5.4. Summary of ANOVA Results for Willingness

Mauchly's Test of Sphericity revealed that the assumption of sphericity was not violated for prototype favorability, $\chi^2(2) = 3.891$, $p = .143$. The results indicated that PI training had a significant effect on prototype favorability scores ($F(2, 188) = 4.786$, $p = .009$, $\eta_p^2 = .048$). Comparison between time points revealed that prototype favorability measured in Time-1 (*M* = 4.49, *SD* = .94) was significantly decreased in Time-3 (*M* = 4.27, *SD* = .69). Moreover, Time-3 measurements (*M* = 4.27, *SD* = .69) of prototype favorability was significantly decreased after Time-2 measurements (*M* = 4.45, *SD* = .77), (*p* < .001). Summary of ANOVA results for prototype favorability can be seen in Figure 5.6.

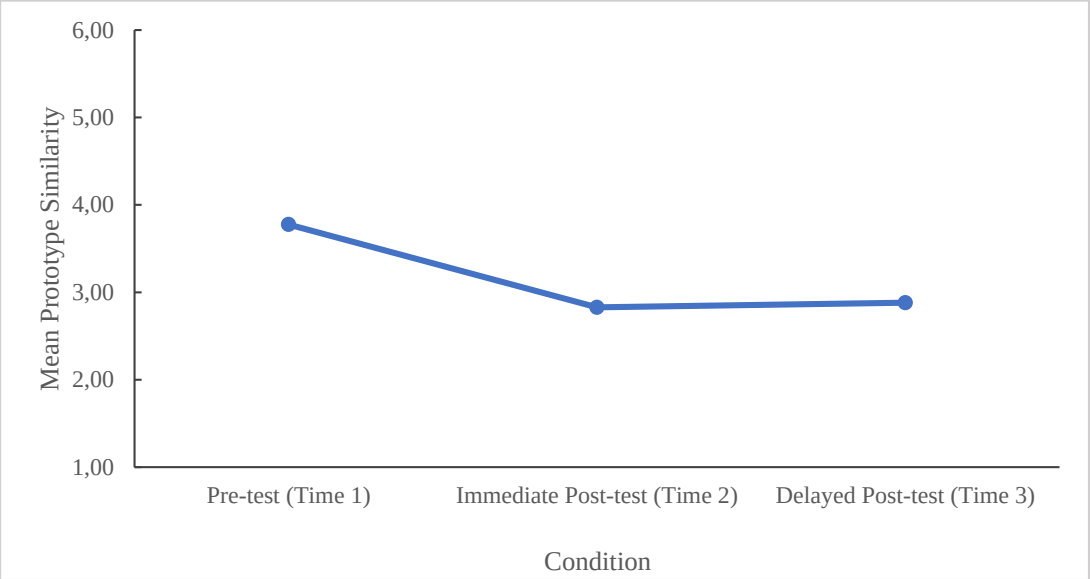

Figure 5.5. Summary of ANOVA Results for Prototype Similarity

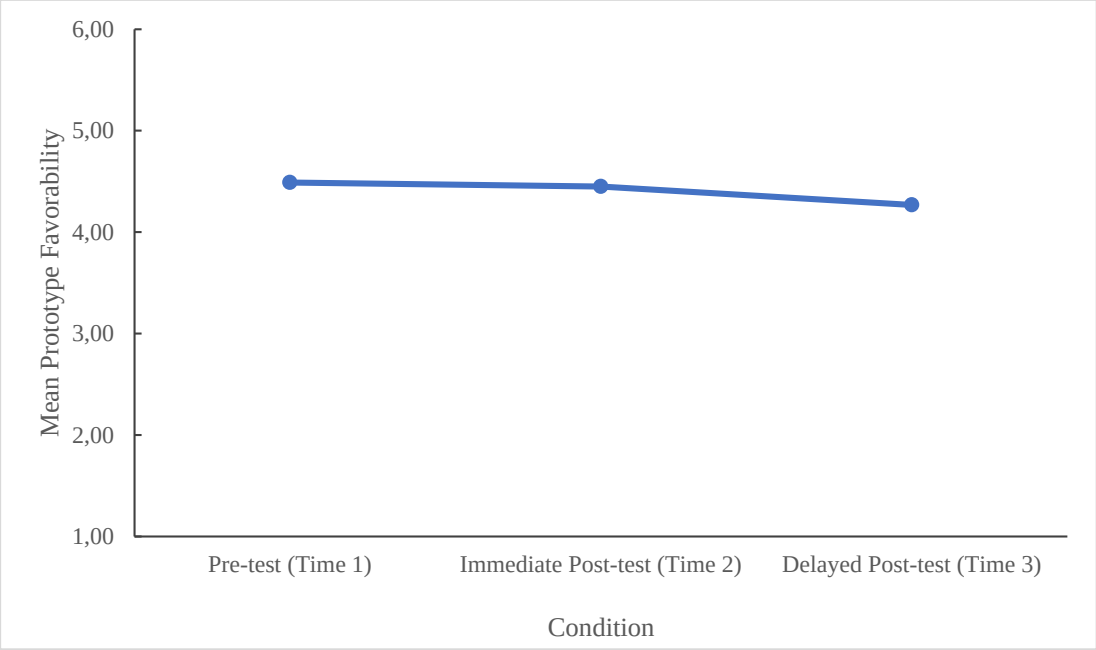

Figure 5.6. Summary of ANOVA Results for Prototype Favorability

With regard to intention to speed, Greenhouse-Geisser correction indicated a significant difference between time points ($F(1.739, 163.490) = 28.851$, $p < .001$, η_p^2

= .235). Furthermore, intention scores obtained in Time-1 measurements (*M* = 4.76, *SD* = 2.11) were significantly decreased in Time-2 measurements (*M* = 3.93, *SD* =2.02), (*p* < .001); similarly, Time-1 measurements (*M* = 4.76, *SD* = 2.11) of intention significantly decreased in Time-3 measurements (*M* = 3.99, *SD* =1.90), (*p* < .001). Summary of ANOVA results for intention can be seen in Figure 5.7.

The analysis revealed that there was a statistically significant effect of PI training on speeding behavior, $F(1,94) = 8.592$, $p = .004$, $\eta_p^2 = .084$. The average reported speed measured before the intervention (*M* = 91.43, *SD* = 10.25) was significantly decreased when measured 2 weeks after the intervention (*M* = 89.18, *SD* = 8.11) Summary of ANOVA results for speeding behavior can be seen in Figure 5.8. The differences between means for each variable can be seen in Table 6.

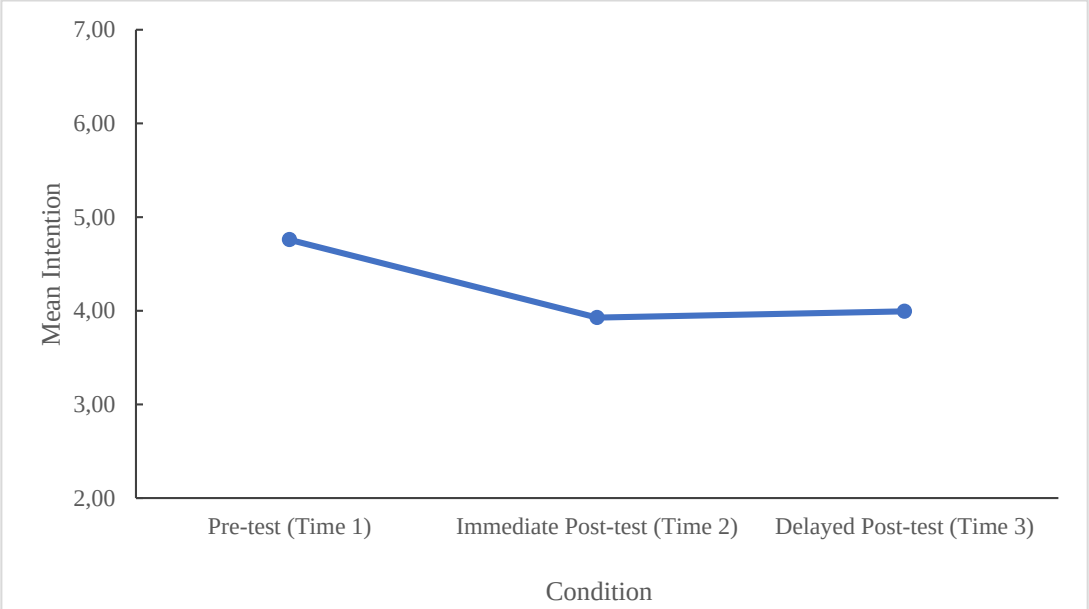

Figure 5.7. Summary of ANOVA Results for Behavioral Intention

3.2.2. Regression and Mediation Analyses

Regression analyses were run to investigate direct and indirect effects of the integrative model constructs on speeding behavior. It was assumed that intention and willingness had mediating effects on behavior. The results were analyzed for each time point separately and reported in the next section.

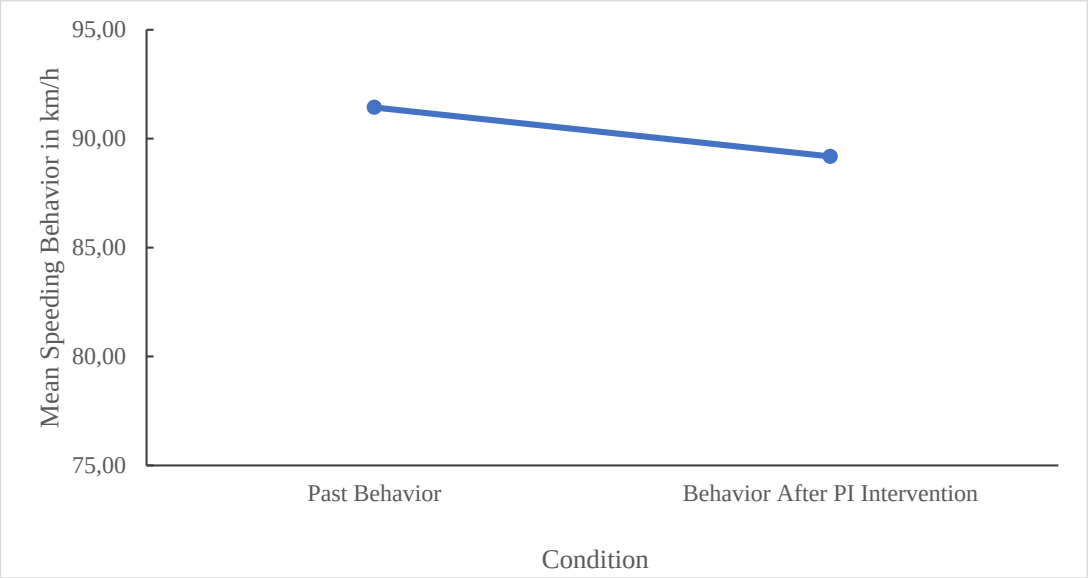

Figure 5.8. Summary of ANOVA Results for Speeding Behavior

3.2.2.1. Mediation Analysis for Time-1 Measurements

A mediation analysis was performed to investigate which constructs had an effect on participants' intention, willingness and behavior prior to take part in the study, which were measured as a pre-test and referred to as Time-1 measurements. To test the associations between constructs of TPB and P/W models, a mediation analysis made using PROCESS investigated the relationship

Tablo 6. *Comparisons of Mean Scores of All Variables and Models*

	(I) Measurement	(J) Measurement	Mean Difference (I-J)	Std. Error	Sig.[b]
Attitudes	Time-1	Time-2	.900*	.113	.000
		Time-3	.805*	.138	.000
	Time-2	Time-1	-.900*	.113	.000
		Time-3	-.095	.138	.494
Subjective Norms	Time-1	Time-2	.779*	.078	.000
		Time-3	.670*	.096	.000
	Time-2	Time-1	-.779*	.078	.000
		Time-3	-.109	.071	.127
Perceived Behavioral Control	Time-1	Time-2	-.495*	.169	.004
		Time-3	-.084	.223	.706
	Time-2	Time-1	.495*	.169	.004
		Time-3	.411*	.157	.011
Willingness	Time-1	Time-2	1.663*	.143	.000
		Time-3	1.316*	.146	.000
	Time-2	Time-1	-1.663*	.143	.000
		Time-3	-.347*	.114	.003
Prototype Similarity	Time-1	Time-2	.947*	.101	.000
		Time-3	.895*	.138	.000
	Time-2	Time-1	-.947*	.101	.000
		Time-3	-.053	.106	.619
Prototype Favorability	Time-1	Time-2	.040	.073	.585
		Time-3	.221*	.083	.009
	Time-2	Time-1	-.040	.073	.585
		Time-3	.181*	.071	.013
Intention	Time-1	Time-2	.832*	.107	.000
		Time-3	.765*	.143	.000
	Time-2	Time-1	-.832*	.107	.000
		Time-3	-.067	.112	.552
Behavior	Time-1	Time-2	2.253*	.682	.001

Note. Time-1 = pre-test; Time-2 = immediate post-test; Time-3 = delayed post-test
Based on estimated marginal means
*. The mean difference is significant at the ,05 level.
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

between attitudes, subjective norms, perceived behavioral control, and willingness on behavior with intention as the mediator; as well as the relationship between attitudes, prototype similarity, and prototype favorability on behavior with willingness as the mediator for time-1 measurements. Lastly, the direct effects of willingness and intention on past behavior were investigated. The results revealed that attitudes variable was positively related to behavioral intention and explained 51% of variance in the model (R^2 = .51, F(1,93) = 96.65, p < .001). According to the findings, attitudes variable was a significant predictor of behavioral intention, b = .92, t(93) = 9.83, p < .001, indicating that for one unit decrease in attitudes would result in 0.9 of a unit decrease in intention to speed. The mediation model was revealed to be statistically significant, as well and explained 22% of variance (R^2 = .22, F(2,92) = 13.11, p < .001). The analysis revealed that within this model intention was able to predict behavior, b = 2.37, t(92) = 3.72, p < .01. Moreover, the total effect of attitudes on behavior was significant (R^2 = .10, F(1,93) = 10.87, b = 2.03, t(93) = 3.30, p < .01), as well as the indirect effect, ab = 2.19, %95 CI [.99, 3.48]. Total, direct and indirect effects of variables on behavior, measured in Time-1 with intention as the mediator can be seen in Table 7.1.

The analysis conducted to explore the relationship between subjective norms and behavior through intention revealed that subjective norms were significantly positively associated with intention to speed, explaining 29% of variance in the model (R^2 = .29, F(1,93) = 38.62, p < .001,). Subjective norms found to be able to predict intention to speed (b = .85, t(93) = 6.21, p < .001). The mediation model was statistically significant, as well and explained 25% of variance (R^2 = .25, F(2,92) = 15.54, p < .001). The findings showed that, within this model, intention and behavior

had a significant positive relationship, $b = 1.73$, $t(92) = 3.33$, $p < .01$. As for the total effect of subjective norms on behavior, the model was found to be significant, with a positive relationship between these two variables ($R^2 = .16$, $F(1,93) = 18.02$, $b = 3.08$, $t(93) = 4.25$, $p < .001$), as well as the indirect effect of subjective norms on behavior through intention, $ab = 1.48$, %95 CI [.35, 3.45] (Table 7.1.).

There was a significant negative relationship between perceived behavioral control and behavioral intention, ($R^2 = .04$, $F(1,93) = 4.22$, $p < .05$). The size of the relationship between the two was found to be fairly high, $b = -.25$, $t(93) = -2.05$, $p < .05$, which means that as perceived behavioral control over not speeding increases by one unit, intention to speed will likely to decrease by one quarter of a unit. For the mediation model, there was a significant effect of PBC on behavior through intention ($R^2 = .23$, $F(2,92) = 13.83$, $p < .001$). The analysis also revealed that within this model, intention and behavior had a significant positive relationship, $b = 2.18$, $t(92) = 4.81$, $p < .001$. In other words, as intention decreases by one unit, behavior is likely to decrease by roughly one fifth of a unit. Moreover, the total effect of PBC on behavior was not significant ($F(1,93) = 3.64$, $p = .06$), the indirect effect, however, was significant, $ab = -.54$, %95 CI [-1.18, -.06] (Table 7.1). The mediation path for Time-1 measurements of TPB model constructs can be seen in Figure 6.1.

Further analysis were run to investigate the mediator role of willingness on behavior. The results indicated that attitudes was positively related to willingness ($F(1,93) = 35.71$, $p < .001$, $R^2 = .28$). The size of the relationship between the two was found to be moderately high, $b = .55$, $t(93) = 5.98$, $p < .001$. In other words, one unit decrease in attitudes is likely to result in more than half a unit decrease on willingness. As for the mediation model, a significant positive association was revealed ($R^2 = .17$,

$F(2,92) = 9.64$, $p < .001$). The analysis revealed that within this model, willingness and behavior had a significantly positive relationship, $b = 1.87$, $t(92) = 2.76$, $p < .01$. Moreover, the total effect of attitudes on behavior was significant ($R^2 = .10$, $F(1,93) = 10.87$, $b = 2.03$, t(93) = 3.30, $p < .01$), as well as the indirect effect, $ab = 1.02$, %95 CI [.39, 1.65]. Total, direct and indirect effects of variables on behavior, measured in Time-1 with willingness as the mediator can be seen in Table 7.2.

The results revealed that prototype similarity was also positively related to willingness, explaining 31% of variance in the model ($R^2 = .31$, $F(1,93) = 41.82$, $p < .001$). Prototype similarity was found to predict willingness, significantly ($b = .51$, $t(93) = 6.47$, $p < .001$), indicating that one unit increase in prototype similarity perceptions is likely to result in more than half a unit increase on willingness. Although the mediation model was found to be significant ($R^2 = .28$, $F(2,92) = 18.02$, $p < .001$), the effect of willingness on behavior in this model was not significant, $b = .93$, $t(92) = 1.45$, $p = .15$. Since the direct effect of prototype similarity on behavior was significant ($b = 2.36$, $t(92) = 4.03$, $p < .001$), as well as the total effect ($R^2 = .27$, $F(1,93) = 33.54$, $b = 2.84$, t(93) = 5.79, $p < .001$), it can be assumed that the effect of prototype similarity on behavior was attributable without regard to the effect of willingness. Similarly, the indirect effect was not significant (Table 7.2.).

The relationship between prototype favorability perceptions of drivers and willingness to speed were found to be nonsignificant ($F(1,93) = .27$, $p = .60$). Even though the overall mediation model was significant ($R^2 = .15$, $F(2,92) = 8.40$, $p < .001$), the effect was most likely to be explained by the significant relationship between willingness and behavior in this model ($b = 2.38$, $t(92) = 4.09$, $p < .001$), as the total

effect of prototype similarity on behavior was not significant, ($F(1,93) = .04$, $p = .84$), neither was the indirect effect (Table 7.2.).

Furthermore, the results showed that willingness was positively related to behavioral intention and explained 40% of variance in the model ($R^2 = .40$, $F(1,93)$ 60.73, $p < .001$). The size of the relationship between the two was found to be quite high, $b = .79$, $t(93) = 7.79$, $p < .001$, suggesting that for unit increase in willingness, behavioral intention was likely to increase by four fifth of a unit. With respect to the mediation model, there was a significant positive effect of willingness on behavior through intention ($R^2 = .24$, $F(2,92) = 14.30$, $p < .001$). The analysis revealed that within this model, intention and behavior had a significant relationship, $b = 1.79$, $t(92) = 3.16$, $p < .01$. In addition, the total effect of willingness on behavior was significant ($R^2 = .15$, $F(1,93) = 16.99$, $b = 2.38$, t(93) = 4.12, $p < .001$), as well as the indirect effect, $ab = 1.41$, %95 CI [.46, 2.67] (Table 7.1.). The mediation path for Time-1 measurements of PWM constructs can be seen in Figure 6.2.

Lastly, a simple linear regression analysis was performed to investigate the relationship between intention and behavior, as well as between willingness and behavior. The results showed that intention and past behavior had a significantly positive relationship, while intention explained 22% of variance in behavior ($R^2 = .22$, $F(1,93) = 26.46$, $p < .001$). It was revealed that intention was a significant predictor of behavior ($\beta = .47$, $t = 5.14$, $p < .001$). As for the relationship between willingness and behavior, it was found to be statistically significant, as well and willingness explained 15% of variance in the model ($R^2 = .15$, $F(1,93) = 16.99$, $p < .001$). The findings showed that willingness significantly predicted behavior ($\beta = .39$, $t = 4.12$, $p < .001$).

3.2.2.2. Regression Analysis for Time-2 Measurements

A linear regression analysis was conducted to investigate which constructs had an effect on participants' intention and willingness immediately after the intervention, which were measured as an immediate post-test and referred to as Time-2 measurements. Since participants' behavior relied on self-report for this study, behavior measurement was left out during this post-test and thus, only intention and willingness were measured as dependent variables. According to the integrated model, intentions were predicted by attitudes, subjective norms, perceived behavioral control, and willingness; whereas willingness was believed to be affected by attitudes, prototype similarity and prototype favorability. Therefore, these the mentioned variables were measured together in predicting intentions and willingness, respectively.

Table 7.1. Total, Direct, and Indirect Effects of Independent Variables on Behavior with Intention as the Mediator for Time-1 Measurements

Variable	Effect	Unstandardized Coefficients	95.0 % Confidence Intervals LLCI	ULCI
Attitudes	Total	2.03*	.81	3.26
	Direct	-.16	-1.80	1.48
	Indirect	2.19	.99	3.48
Subjective Norms	Total	3.08**	1.64	4.52
	Direct	1.60	-.03	3.23
	Indirect	1.48	.35	3.45
Perceived Behavioral Control	Total	-1.11	-2.27	.05
	Direct	-.57	-1.64	.49
	Indirect	-.54	-1.18	-.06
Willingness	Total	2.38**	1.24	3.53
	Direct	.97	-.44	2.38
	Indirect	1.41	.46	2.67

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

Table 7.2. Total, Direct, and Indirect Effects of Independent Variables on Behavior with Willingness as the Mediator for Time-1 Measurements

Variable	Effect	Unstandardized Coefficients	95.0 % Confidence Intervals LLCI	ULCI
Attitudes	Total	2.03*	.81	3.26
	Direct	1.01	-.38	2.41
	Indirect	1.02	.39	1.65
Prototype Similarity	Total	2.84**	1.86	3.81
	Direct	2.36**	1.20	3.53
	Indirect	.47	-.22	.98
Prototype Favorability	Total	-.23	-2.46	2.01
	Direct	.01	-2.06	2.07
	Indirect	-.23	-1.67	.53

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

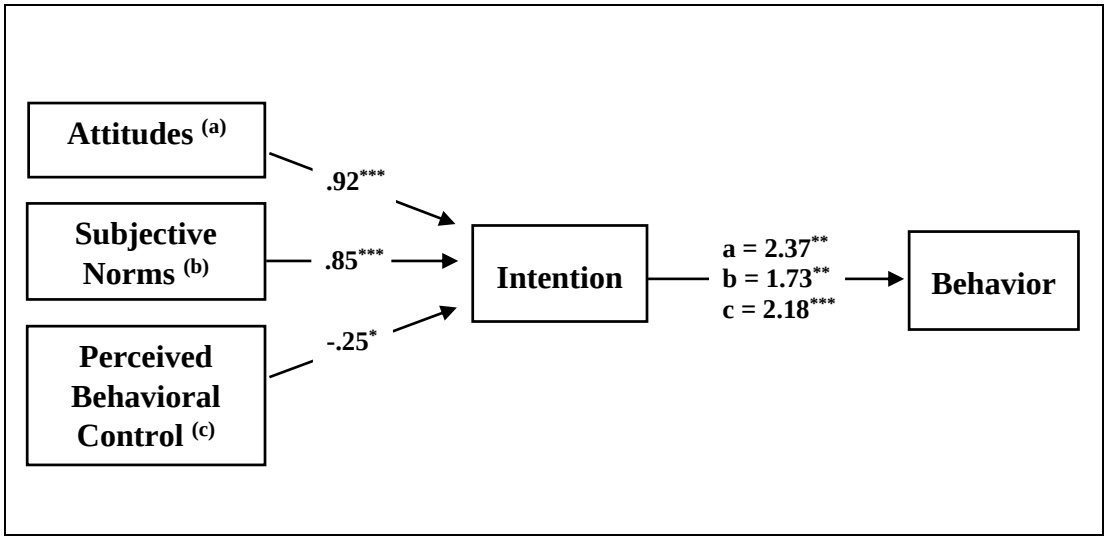

Figure 6.1. Mediation Path of TPB Model for Time-1 Measures

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

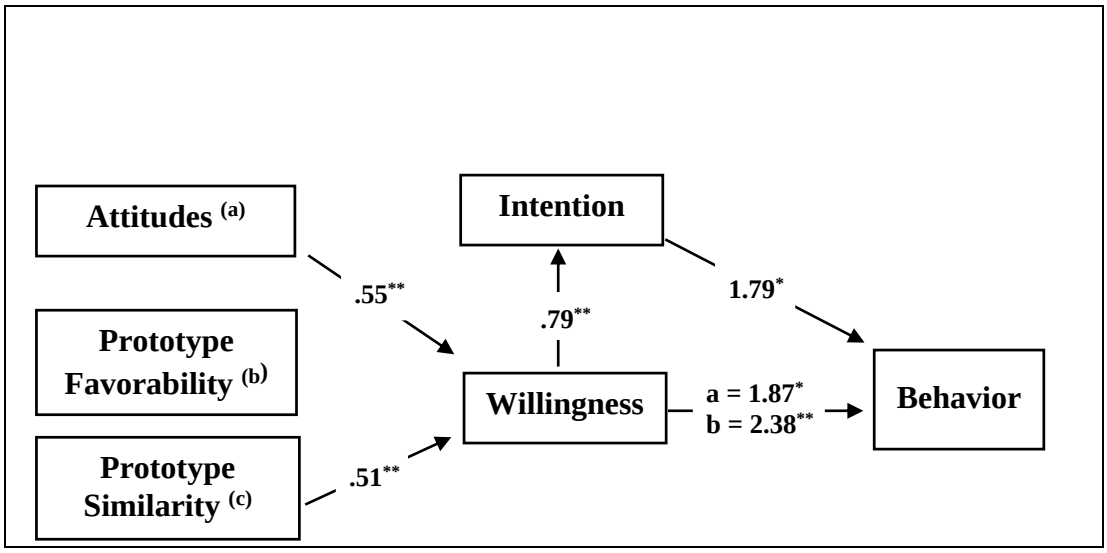

Figure 6.2. Mediation Path of PWM for Time-1 Measures

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

In order to determine the predictive power of TPB branch of the integrated model, the effects of participants' attitudes, subjective norms, perceived behavioral control and willingness on their intention to speed immediately after they received a PI training, a multilinear regression was performed. The results showed that attitudes, subjective norms, perceived behavioral control, and willingness accounted for 73% of variance in intention (R^2 = .73, F(4,90) = 59.42, p < .001). It was found that within this model, attitudes significantly predicted intention to speed (β = *.46, t = 6.25, p* < .001). The analysis also revealed that subjective norms were able to significantly predict intention to speed (β = *.15, t = 2.30, p* = .02). The analysis performed revealed that PBC failed to predict intention, significantly (β = *-.07, t = -1.12, p* = .27). Moreover, the results indicated that willingness to speed was a significant predictor of intention (β = *.38, t = 4.86, p* < .001). As for the PWM branch of the model, attitudes, prototype similarity and prototype favorability were added to the analysis where willingness was the outcome. The regression analysis revealed that, in total, attitudes, prototype similarity and prototype favorability have explained 45% of variance in willingness to speed (R^2 = .45, F(3,91) = 24.60, p < .001). The results also showed that, within this model, attitudes found to be a significant predictor of willingness (β = *.48, t = 4.57, p* < .001). Furthermore, the findings indicated that prototype similarity was a significant predictor of willingness (β = *.25, t = 2.33, p* = .02). Prototype favorability, on the other hand, was not found to be significantly associated with willingness to speed (β = -.05, *t = -.66, p* = .51). Coefficients table of time-2 measurements analysis can be seen in Table 8.

3.2.2.3. Mediation Analysis for Time-3 Measurements

A mediation analysis was conducted to investigate which constructs had an effect on participants' intention, willingness and behavior 2 weeks after the PI intervention, which were measured as a delayed post-test and referred to as Time-3 measurements. To test the associations between constructs of TPB and P/W models, a mediation analysis made using PROCESS investigated the relationship between attitudes, subjective norms, perceived behavioral control, and willingness on behavior with intention as the mediator, as well as the relationship between attitudes, prototype similarity, and prototype favorability on behavior with willingness as the mediator for Time-3 measurements. Lastly, the direct effects of willingness and intention on post-test behavior were investigated.

Table 8. Coefficients for Time-2 Measurement Regression Analysis

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Intervals	
Outcome Variable	Predictive Variable	B	Std. Error	Beta	t	p value	Lower Bound	Upper Bound
Intention	Attitudes	.54	.09	.46	6.25	.00	.37	.71
	Subjective Norms	.25	.11	.15	2.30	.02	.03	.46
	PBC	-.09	.08	-.07	-1.12	.27	-.25	.07
	Willingness	.39	.08	.38	4.86	.00	.23	.56
Willingness	Attitudes	.55	.12	.48	4.57	.00	.31	.79
	Prototype Similarity	.32	.14	.25	2.33	.02	.05	.59
	Prototype Favorability	-.13	.20	-.05	-.66	.51	-.53	.26

The analysis conducted for this time point revealed that attitudes had a significantly positive relationship with behavioral intention, explaining 58% of variance in the model (R^2 = .58, F(1,93) = 128.55, p < .001). Attitudes found to predict intentions, b = .91, t(93) = 11.34, p < .001. The mediation model was found to be significant as well and explaining 26% of variance (R^2 = .26, F(2,92) = 16.03, p < .001). The findings revealed that, within this model, intention and behavior had a significantly positive relationship, b = 1.94, t(92) = 3.29, p < .01, indicating that for one unit decrease in intention, driving speed is likely to decrease by almost 2 km/h. Moreover, the total effect of attitudes on behavior was significant (R^2 = .10, F(1,93) = 19.20, b = 2.10, t(93) = 4.38, p < .001), as well as the indirect effect, ab = 1.77, %95 CI [.49, 2.88]. Total, direct and indirect effects of variables on behavior, measured in Time-3 with intention as the mediator can be seen in Table 9.1.

The findings of Time-3 measurement showed high resemblance to Time-1 measurement results regarding the relationship between subjective norms and behavior, which revealed a significant positive association between subjective norms and intention, with subjective norms explaining 28% of variance in the model (R^2 = .28, F(1,93) = 36.96, p < .001). This positive relationship between subjective norms and intention to speed was found to be very strong (b = .90, t(93) = 6.08, p < .001). The mediation model was found to be statistically significant, as well (R^2 = .28, F(2,92) = 18.02, p < .001). The results indicated that, within this model, intention and behavior had a significant positive relationship (b = 1.73, t(92) = 3.89, p < .001). With regard to the total effect of subjective norms on behavior, the model was found to be significant (R^2 = .16, F(1,93) = 18.11, b = 2.90, t(93) = 4.26, p < .001), as well as the

indirect effect of subjective norms on behavior through intention, *ab* = 1.56, %95 CI [.42, 3.25] (Table 9.1).

The relationship between perceived behavioral control and behavioral intention was not significant for this time point ($F(1,93) = .00$, $p = .96$). While intention and behavior had a significant relationship in this model, explaining 26% of variance in the model ($R^2 = .26$, $F(2,92) = 15.88$, $b = 2.16$, $t(92) = 5.63$, $p < .001$), the total effect of PBC on behavior was not significant ($F(1,93) = .01$, $p = .91$), neither was the indirect effect of PBC on behavior through intention (Table 9.1). The mediation path for Time-3 measurements of TPB model constructs can be seen in Figure 7.1.

The mediation analysis also showed that willingness was positively related to behavioral intention and explained 50% of variance in the model ($R^2 = .50$, $F(1,93) = 93.36$, $p < .001$). The findings showed that willingness can significantly predict intention, $b = .76$, $t(93) = 9.66$, $p < .001$, suggesting that for unit decrease in willingness to speed, intention was likely to decrease by three quarters of a unit. As for the mediation model, there was a significant positive effect of willingness on behavior through intention ($F(2,92) = 20.04$, $p < .001$, $R^2 = .30$). The analysis revealed that within this model, intention and behavior had a significant relationship, $b = 1.23$, $t(92) = 2.35$, $p < .05$. Moreover, the total effect of willingness on behavior was significant ($R^2 = .26$, $F(1,93) = 32.95$, $p < .001$), indicating that willingness can predict behavior regardless of the effects of intention ($b = 2.35$, $t(93) = 5.74$, $p < .001$). The indirect effect was revealed to be significant, as well, *ab* = .94, %95 CI [.01, 2.17] (Table 9.1.).

Table 9.1. Total, Direct, and Indirect Effects of Independent Variables on Behavior with Intention as the Mediator for Time-3 Measurements

Variable	Effect	Unstandardized Coefficients	95.0 % Confidence Intervals LLCI	ULCI
Attitudes	Total	2.10**	1.15	3.06
	Direct	.34	-1.06	1.74
	Indirect	1.77	.49	2.88
Subjective Norms	Total	2.90**	1.55	4.25
	Direct	1.34	-.15	2.83
	Indirect	1.56	.42	3.25
Perceived Behavioral Control	Total	.06	-.88	.99
	Direct	.05	-.77	.86
	Indirect	.01	-.47	.40
Willingness	Total	2.35*	1.53	3.16
	Direct	1.41	.28	2.53
	Indirect	.94	.01	2.17

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

The relationship between attitudes and behavior with willingness as the mediator was investigated, as well. The findings revealed that attitudes was positively associated with willingness, with attitudes explaining 47% of variance (R^2 = .47, F(1,93) = 81.30, p < .001). It was revealed that attitudes can predict willingness significantly (b = .76, t(93) = 9.02, p < .001), indicating that one unit decrease in favorable attitudes towards speeding is likely to result in three quarters of a unit decrease on willingness to speed. As for the mediation model, a significant positive association was revealed (R^2 = .27, F(2,92) = 16.96, p < .001). The analysis revealed that within this model, willingness and behavior in Time-3 measurement had a significantly positive relationship, b = 1.97, t(92) = 3.52, p < .001. In addition, the total effect of attitudes on behavior was significant (R^2 = .17, F(1,93) = 19.20, b = 2.10, t(93) = 4.38, p < .001), as well as the indirect effect, ab = 1.49, %95 CI [.87,

2.10]. Total, direct and indirect effects of variables on behavior, measured in Time-3 with willingness as the mediator can be seen in Table 9.2.

The analysis conducted also revealed that prototype similarity was positively related to willingness and explained 31% of variance (R^2 = .31, F(1,93) = 42.72, p < .001). The results indicated that prototype similarity was a significant predictor of willingness (b = .71, t(93) = 6.54, p < .001), indicating that one unit increase in prototype similarity perceptions is likely to result in almost three quarters of a unit increase on willingness. Furthermore, the mediation model was found to be significantly positive (R^2 = .30, F(2,92) = 19.89, p < .001,). Within this model, the effect of willingness on behavior was significant, b = 1.72, t(92) = 3.57, p < .001. The total effect of prototype similarity was significant (R^2 = .21, F(1,93) = 24.03, p < .001), meaning that prototype similarity can predict behavior regardless of the mediating effect of willingness (b = 2.62, t(93) = 4.90, p < .001). The indirect effect of prototype similarity on behavior through mediation was also found to be significant, ab = 1.22, %95 CI [.69, 1.91] (Table 9.2).

For Time-3 measurements, the findings also revealed that prototype favorability perceptions of drivers and willingness to speed were found to be nonsignificant (F(1,93) = .32, p =.57), similar to Time-1 measurements. Although the mediation model was found to be significant (R^2 = .28, F(2,92) = 17.30, p < .001), the effect was most likely to be explained by the significant relationship between willingness and behavior in this model (b = 2.32, t(92) = 5.67, p < .001), as the total effect of prototype favorability on behavior was not significant, either F(1,93) = 1.80, p = .18), neither was the indirect effect, ab = -.35, %95 CI [-1.97, 1.18] (Table 9.2.).

Table 9.2. Total, Direct, and Indirect Effects of Independent Variables on Behavior with Willingness as the Mediator for Time-3 Measurements

Variable	Effect	Unstandardized Coefficients	95.0 % Confidence Intervals LLCI	ULCI
Attitudes	Total	2.10***	.81	3.26
	Direct	.61	-.62	1.85
	Indirect	1.49	.87	2.10
Prototype Similarity	Total	2.62***	1.56	3.69
	Direct	1.40*	.19	2.61
	Indirect	1.22	.69	1.91
Prototype Favorability	Total	-1.62	-4.02	.78
	Direct	-1.27	-3.35	.81
	Indirect	-.35	-1.97	1.18

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

The mediation path for Time-3 measurements of PWM constructs can be seen in Figure 7.2.

To investigate the relationship between intention and post-intervention behavior, a linear regression analysis was performed. The findings revealed that there was a significant positive relationship between intention and behavior and intention explained 26% of variance in the model (R^2 = .26, F(1,93) = 32.08, p < .001). It was revealed that intention to speed significantly predicted speeding behavior (β = *.51, t = 5.67,* p < .001). Similarly, the relationship between willingness and behavior was significantly positive, with willingness explaining 26% of variance in the model, as well (R^2 = .26, F(1,93) = 32.95, p < .001). Willingness to speed was found to be a significant predictor of speeding behavior after the PI intervention (β = *.51, t = 5.74,* p < .001).

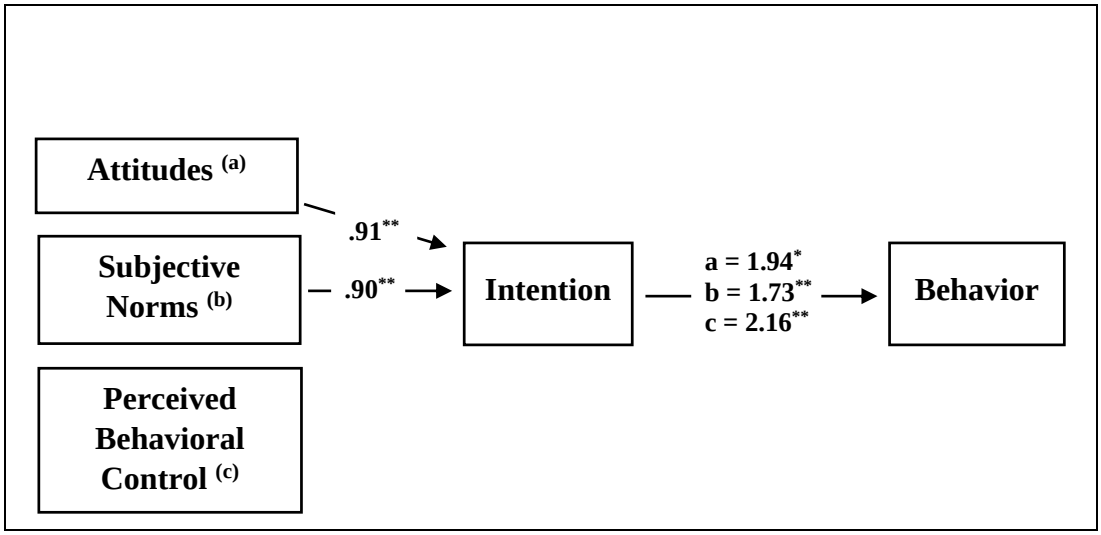

Figure 7.1. Mediation Path of TPB Model for Time-3 Measures

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

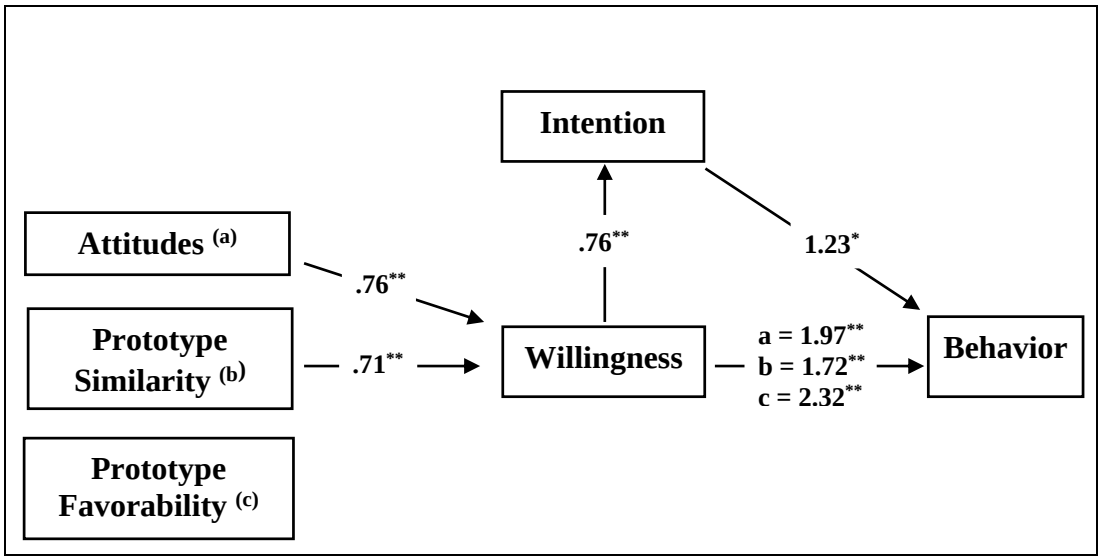

Figure 7.2. Mediation Path of PWM for Time-3 Measures

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

CHAPTER 4

DISCUSSION

The current study is conducted in order to investigate whether psychological inoculation technique can be used to reduce drivers' speeding intentions and behaviors. It is believed that road users engage in both deliberate (TPB) and reactive (PWM) decision making depending on the conditions. Başar et al. (2019) tested a similar integrative model to pedestrian violations and concluded that a social-reactive decision making path is a better predictor than a mechanism targeting on a single path, for such risk taking behaviors. Therefore, a comprehensive research exploring the effects of PI on speeding intentions and behavior is believed to be beneficial. Each construct of an integrative model of TPB and PWM is measured and analyzed. Interpretations of the findings will be discussed next.

4.1. Evaluations of the Findings

4.1.1. Evaluations of Correlation Results

Correlation coefficient analyses were made in order to investigate which of the variables measured are correlated with each other. The results revealed that, not surprisingly, age was found to be positively correlated with driving experience and total mileage. In addition, the correlation between total mileage and driving

experience, as well as annual mileage was found to be significantly positive. Preferred speed on 82 km/h speed zones and expected speed for the next 2 weeks on same speed zones were found to be positively correlated, as well. Moreover, these two variables had significant positive correlations with attitudes, subjective norms, willingness, prototype similarity and intention that were measured in all three time points and, not surprisingly, past behavior and post-intervention behavior. As for the TPB and PWM constructs, first of all, past behavior had a significant relationship with attitudes, subjective norms, willingness, prototype similarity and intention which were measured in Time 1 (T1), Time 2 (T2), and Time 3 (T3), and post-intervention behavior. Similarly, post-intervention behavior which was measured in Time 3 was revealed to have a positive relationship with every TPB and PWM constructs, except for PBC and prototype favorability variables measured in all three time points. T1 intention and T1 attitudes were positively correlated with every TPB and PWM variable, except for T1, T2 and T3 prototype favorability; and T2 and T3 PBC; and negatively correlated with T1 PBC. Similarly, T2 intention and T3 intention variables had a positive significant relationship with every TPB and PWM construct, except for T1, T2, T3 prototype favorability; and T1 and T3 PBC; and negatively correlated with T2 PBC. Moreover, T1 subjective norms had a significantly positive relationship with every TPB and PWM variables, except for T2 attitudes, T1, T2, T3 prototype favorability and T1, T2 and T3 PBC. T1 PBC had a significantly negative relationship with T1, T2, T3 attitudes, prototype similarity, prototype favorability, willingness and T1 intention, T2 prototype similarity; and a positive relationship between T2 and T3 PBC. As for T1 willingness, a significant positive relationship with every TPB and PWM construct except for any of the PBC variables measured, and T1 and T2

prototype favorability; and a negative relationship with T3 prototype favorability was revealed. Furthermore, T1 prototype similarity was found to have a negative significant relationship with T1 and T2 PBC; and a positive relationship between all of the other TPB and PWM construct except for T1, T2, T3 prototype favorability and T3 PBC.

T2 attitudes had a significantly negative relationship with T1 and T2 PBC; and a positive relationship with all other TPB and PWM construct, except for T1 subjective norms, T3 PBC, T1, T2, and T3 prototype favorability. Similarly, T2 subjective norms and T3 prototype similarity were both negatively correlated with T2 PBC and positively correlated with every other TPB and PWM variables, except for T1, T2, T3 prototype favorability and T1 and T3 PBC. T2, T3 willingness and T3 subjective norms, on the other hand, both had a significantly positive relationship with every TPB and PWM construct except for T1, T2, and T3 PBC and prototype favorability. Lastly, Time 2 prototype similarity and Time 3 attitudes were both found to have a significantly negative relationship with T1 and T2 PBC; and a positive relationship with other TPB and PWM variables, except for T1, T2, T3 prototype favorability and T3 PBC.

4.1.2. Evaluations of ANOVA Results

The findings drawn from ANOVA results showed that PI training had a significant effect on each variable, with varying effect sizes. For example, compared to their initial state, participants' favorable attitudes were significantly reduced immediately after the intervention and these effects, although slightly diminished,

prolonged after two weeks. This means that drivers' attitudes towards speeding were less positive after they were challenged, compared to their initial levels. Similarly, compared to their pre-state, drivers had less favorable subjective norms regarding speeding immediately after PI and this effect was sustained 2 weeks later, although it was slightly decreased with time; meaning, after they were pushed to reflect on and create counterarguments regarding their subjective norms of speeding, drivers were less inclined to regard speeding behavior as normative. The analysis regarding PBC displayed interesting results. The findings indicated that participants' perceived behavioral control levels increased immediately after PI intervention; however this increase decreased significantly when measured 2 weeks after the intervention. In other words, participants regarded their control over not speeding as higher compared to their pre-intervention state, suggesting that PI might have been an effective method for increasing drivers' perceived control on refraining from speeding right after they are asked to reflect on and challenge these perceptions. Nevertheless, the effect of PI training seems to be significantly lessened after a few weeks. This may be interpreted as the driving experience itself may be affecting this construct. Since PBC is an important factor on the deliberate decision making mechanism of TPB, when drivers are spending time on the road with other road users their reactive decision making process might intervene and drivers find it challenging to not speed. Perhaps the factors mentioned earlier such as saving time on the road or seeing other road users speeding might interfere with the effects of PI, suggesting that such an intervention is not very effective for constructs like PBC. Another explanation might be the fact that the PBC content in PI training was aimed at decreased control. The participants were asked to refute the idea that they are in total charge of their journey. Challenging this

idea served the traditional association between PBC and intention which is feeling more in control is likely to result in higher intention to speed. However, the measurement of PBC was based on feeling control over not speeding. In other words, the intervention was aimed at decreasing drivers' personal control on the road, whereas the measurement was how much control they feel to have over not speeding. Therefore, a better match of intervention context and its measurement might be required and future studies are advised to do so.

As for willingness to speed, when measured both immediately after and 2 weeks after the PI intervention, drivers' initial state was found to be decreased significantly, though this effect was slightly less in the delayed post-measurement. In other words, drivers were less willing to violate the speed limits after their willingness was put to test with a PI intervention. However, it is unclear whether the obtained willingness to speed score will continue to increase to its initial level or not. Regarding prototype similarity perceptions of the participants, compared to their state before receiving PI, were less favorable immediately after the intervention and this effect was still significant when measured 2 weeks later. That is, participants were less likely to perceive themselves as similar to the typical speed violator, after they were challenged to cognitively disengage themselves from such a prototype. Changes in prototype favorability indicated that initially more favorable prototype perceptions were decreased only after 2 weeks, but not right after the intervention. The change can also be seen between both post-tests. These results suggest that how much favorable the typical speeder is considered changes with time, after these perceptions were challenged. Reflecting on and observing other drivers might be another explanation for this effect. Right after receiving a PI intervention, drivers may not have changed

their perceptions on these typical speeders, but after spending time on the road these perceptions might have been questioned in real life and were seen as less favorable, as a result. Intention to speed decreased both immediately after the intervention and these effects persisted for the next two weeks. These results indicate that drivers' intentions are challenged as well as other constructs thought to be related to intentions, they were less likely to intend to speed. Lastly, speeding behavior decreased significantly 2 weeks after the PI training. In other words, having certain cognitive constructs been challenged, drivers decreased their average speed for the two weeks following this intervention, as a result. As behavior is not challenged directly, it is believed that the challenged constructs, attitudes, subjective norms, PBC, prototype perceptions and willingness, led to a behavior change. At the end of two weeks, the drivers reduced their speed by 2,25 km/h on average, from 91,43 km/h before the intervention to 89,18 two weeks after the intervention. This finding is critical as the change is a decrease from an average that is above the speed limit to an average within the 10% toleration of the speed limit violation.

4.1.3. Evaluations of Regression Analyses

Regression analyses were conducted in order to find out more regarding which constructs of the model is prominent on changing behavior. For time-1 and time-3, behavior measurement was involved, in the form of self-reports. Therefore, a mediation analysis was performed for both measurements. Since time-1 measurement, PI intervention and time-2 measurement were completed immediately after one another, it was not possible to measure speeding behavior in time-2. Hence, linear

regression analyses were performed, where intention and willingness were the dependent variables.

4.1.3.1. Evaluation of Time-1 Measurements

The results of the mediation analysis conducted for Time-1 measurements, supporting the existing research in the literature, indicated that attitudes, subjective norms, PBC, and willingness, were able to predict their behavior through and beyond the mediating effect of intention (Elliott et al., 2003; Dinh & Kubota, 2013; Mirzaei-Alavijeh, 2019). This finding indicates that, as attitudes towards speeding, related subjective norms and willingness to speed decreased, intention to speed would decrease as well, and this was likely to result in decreased speeding behavior. PBC found to have a reverse predictive effect of behavior, meaning that as drivers' perceived behavioral control increases their intention to speed and consequently their speeding behaviors decreased. One explanation for this could be that as participants believe they can refrain themselves from speeding, that they are in control, they were more likely to choose not to. Moreover, these attitudes, subjective norms, PBC, and willingness were able to predict speeding behavior beyond the effects of intention. In addition, attitudes were able to predict behavior through willingness, as well, indicating that as favorable attitudes towards speeding decreased, willingness to engage in speeding violations and therefore their speeds would decrease. As for prototype similarity, it was able to predict behavior by itself, but not through willingness. This finding indicates that for speeding behavior prototype similarity does play a role, in which when drivers perceive themselves as similar to the typical speeder

they are likely to speed, but not because their willingness increases this speeding tendency. It is possible that another factor might lead them to change their speeding behavior. Prototype favorability, on the other hand, was found not to be a related factor in drivers' willingness to speed or their behaviors. It is likely that the typical speeder was not regarded as particularly favorable by most drivers. Possible explanations in elaboration will be explained later, at the end of evaluation of all regression analyses. Lastly, intention to speed found to have a strong predictive power of behavior. As intention to speed decreased, drivers' average speed decreased, as well.

4.1.3.2. Evaluation of Time-2 Measurements

Time-2 measurements included attitudes, subjective norms, perceived behavioral control, prototype perceptions, willingness and intention but not behavior as there was no time for a behavior measurement at this point. Therefore, the relationship between these constructs were measured as willingness and intention as the dependent variables. The immediate post-test findings indicated that attitudes can significantly predict intention. The more the drivers regard driving on high speeds as enjoyable, the more likely they are to plan on speeding. Moreover, attitudes and willingness were also found to be associated, indicating that decreased favorable attitudes towards speeding is likely to result in decreased willingness to speed. In other words, if drivers perceive attitudes as unenjoyable and not particularly fun, they are more likely to drive at lower speeds. As for subjective norms, the findings indicated it to be a significant predictor of intention to speed. This means that as drivers' perceptions of speeding behavior being normative increases, they are more likely to

intend to speed. In addition, prototype similarity was found to be a significant predictor of willingness, indicating that as drivers perceive themselves as similar to the typical speeder, they are more likely to be willing to drive at higher speeds. Lastly, willingness and intention to speed were found to be significantly associated. This finding indicates that as individuals become less willing to drive at higher speeds, they are, consequently, less likely to intend to speed.

These findings are in line with the literature, as mentioned earlier, and with time-1 measurement results.

Perceived behavioral control, on the other hand, was found to be unrelated to speeding intentions, contrary to time-1 measurement and literature findings. Possible explanations of this finding will be made in elaboration at the end of time-3 measurement evaluations.

Prototype favorability was failed to predict willingness to speed, as well. This might be due to, as mentioned earlier, prototype favorability might have been an irrelevant construct for this sample, in speeding context, as it was revealed not to be associated with behavior or intention in any of the measurements.

As for the model evaluations, even though some variables failed to be associated with speeding intention and willingness, the integrated model of TPB and PWM found to be working, meaning that, in overall, these constructs have predictive power over intention and willingness to speed, when evaluated together.

4.1.3.3. Evaluation of Time-3 Measurements

To investigate the relationship between TPB and PWM constructs and behavior, a mediation path for each construct was examined, separately. The findings revealed that, when measured 2 weeks after the intervention, drivers' attitudes towards speeding was able to predict their speeding behavior, through intentions and through willingness. The measurement of attitudes was focused on how much they think speeding is enjoyable and fun. Therefore, according to the findings, the more the drivers enjoy speeding, the more likely they intend to and are willing to drive in high speeds and consequently they become more likely to do so. Moreover, attitudes were able to predict behavior by itself, meaning as the enjoyment one gets from speeding increases, their driving speed increases too. These findings are in line with time-1 and time-2 measurements, as well as with the findings in the literature, as mentioned earlier.

The findings indicated that, subjective norms can predict behavior via intentions, as well. As mentioned earlier, in the current study, subjective norms refer to how normative the individual thinks speeding is. This construct was measured by what the person thinks of how much others speed and what they think of his own speeding. Therefore, according to the findings, as one's evaluation of how much others engage in speeding becomes more normative, they are likely to intend to speed more and eventually, increase their speed. Furthermore, their speeding behavior is found to be affected by their subjective norms alone, without the effects of intentions.

The findings revealed that perceived behavioral control was failed to predict intentions and behavior. This might be related to the fact that in the present study, PBC

and behavior measurements have clashed. The traditional relationship between PBC and behavior focuses on engaging in said behavior. However, in the present study, PBC measurement was aimed at drivers' perceptions of how much control they have over not speeding but later they were asked to rate their speeding behaviors. Furthermore, the relationship between PBC and behavior was found to be significant before the intervention but not after. Therefore, although the PI intervention was failed to be proved as an effective method for changing behavioral control perceptions in the long run, the fact that the PBC and behavior measurements were in contrast may also have neutralized PBC's effects. Therefore, future studies are advised to take this matter into account and apply a more accurate measurement of TPB constructs and related behavior.

The analysis regarding prototype similarity revealed that it was a relevant predictor of willingness and behavior. In other words, individuals who rate themselves as similar to the typical speeder are more willing to speed, which is likely to result in subsequent speeding behavior. The findings also indicated that the effects of prototype similarity measured after PI intervention go beyond the mediating effects of willingness and predict behavior alone, meaning that as drivers regard themselves as similar to their perceptions of a typical speeder, they are likely to speed, whether their willingness to do so is increased or not. These findings are supported by the existing research in the literature (Mirzaei-Alavijeh et al., 2019).

Prototype favorability results indicated that how favorable the typical speeder is regarded was found to be unrelated to willingness to speed and speeding behavior. As discussed earlier, this might be the fact that the typical speeder was not perceived to have favorable qualities, at least not for the sample in the current study. On the

contrary, during the interviews, a considerable number of participants have mentioned or implied that the typical speeder has an unfavorable image, and often referred to as a “bozo” by the participants. Although the findings were not significant, the tendency was towards a negative relationship which is considered to lead to a valuable interpretation; that is, for such a sample, in the intervention, focusing on the typical speeder through the eyes of participants might be an effective method for decreasing speeding behavior. The intervention used in the study has focused on disengaging participants’ favorable views of the typical speeder by indirectly asking them to focus their favorable qualities without regard to being a regular speeder. However, a more appropriate method to decrease speeding behavior could be exaggerating how unfavorable traits the typical speeder has or how similar they would be to them if they speed, in the intervention context. Moreover, participants were sometimes confused about the items measuring prototype favorability or commented that these items are irrelevant. Therefore, future studies examining prototype perceptions in speeding context in a similar sample are advised to using a better measurement. Perhaps, the perceptions of what kind of favorable qualities the typical speeder has could be investigated with a pilot study.

The results also revealed that willingness is an effective construct to predict behavior, through and beyond intention. In other words, as drivers become less eager and willing to speed, their intention to do so decreases, and so do their average speed. Furthermore, such a decreased willingness was found to result in decreased speed, directly, regardless of drivers’ intentions, as well. Not surprisingly, intention measured in this time point was revealed to be a significant predictor of behavior, indicating that as a driver’s intention to speed lessens, their average speed is likely to decrease as a

result. These results are also in line with time-1 measurement findings and with the literature, as well.

The overall findings of regression analyses indicated that, not surprisingly, intention was the most immediate factor predicting behavior, which was in line with the current literature (Elliott et al., 2003; Jovanović et al., 2017). However, as helpful as TPB framework is in understanding and predicting behavior, it is not the sole model for doing so. As many actions follow a reactive path than a planned one, PWM was argued to be an insightful model in explaining behavior, along with TPB constructs (Ajzen, 2011).

4.2. Limitations

Certain drawbacks of the current study will be discussed in this section. First of all, the design of the study does not include a control group. Implementing the PI intervention to as many people as possible was regarded as critically important to test its effectiveness and holding face-to-face interviews decreased the ease of finding participants. Therefore, a control group was eliminated and a within-subjects design was constructed. However, it is believed that comparing the PI group results with those of a control group would yield a better understanding of the effects of PI technique on speeding.

Another limitation was the fact that the behavior measurement relied on self-reports. Social desirability is a problematic factor with self-report studies, more often than not. Even though other constructs besides behavior were measured as well, a more realistic measurement of speeding behavior might have generated more reliable results

in this regard. However, measuring the intervention through a behavioral model is one way of making behavior prediction. Therefore, it is assumed that, if a model predicting behavior through a set of cognitive constructs is found to be working, and these constructs are found to change significantly, a change in behavior can be assumed.

Lastly, some of the sentences presented in PI intervention were not applicable or relatable to many of the participants. They often had a hard time refuting these sentences because they couldn't understand or relate to the arguments. When this was the case, they were provided with feedback either to make them clear or the items were accustomed in accordance with the participant's viewpoint. This might have been the result of the fact that the reasons for speeding of the target sample, for which the PI intervention was based on, and the sample recruited in the study did not match entirely. Since those who violate the speed limits were usually young novice drivers, the intervention content was prepared according to their reasons; nevertheless, as findings participants is a difficult process, the ideal sample was compromised and older drivers were recruited, as well. Several of the participants admitted that the reason why they speed was because of the fact that they consider the existing speed limits to be too low, rather than to impress a female passenger or their peers, for instance. Moreover, the sample consisted of participants who were novice drivers, with a total mileage of as less as 250 km. For these participants, driving is assumed not to be an automatic behavior yet. In conclusion, if better resources are available, future studies should take these matters into account and conduct a more elaborate research, covering these limitations.

4.3. Conclusion

Speeding is a serious traffic violation because of which numerous and fatal traffic crashes occur on the roads. Even though enforcement through traffic tickets are helpful in decreasing speed violations, it is believed that the enforcement should be supported with a cognitive change, since monetary fines fail to reduce speeding behavior when drivers know there is no policeman or a radar detector on their way. One technique aimed at cognitive and behavioral change is called Psychological Inoculation (PI), which basically is believed to work as a psychological vaccine, where individuals are faced with exaggerated version of their very own beliefs and attitudes and are forced to refute them. The present study was conducted to examine the effects of PI on decreasing drivers' speeding intentions and behavior, through an integrated model of TPB and PWM frameworks. Pre-test and post-test results have shown that PI intervention can induce lasting effects for most of the variables measured regarding speeding. While attitudes, subjective norms, prototype similarity, willingness, and intention seem to be affected by PI intervention immediately and the results last for at least two more weeks. Specifically, PI intervention can be argued to reduce drivers' favorable attitudes towards speeding, related subjective norms, similarity perceptions with the typical speeder, willingness and intention to speed. The immediate effects of PI on perceived behavioral control, on the other hand, seem to decrease with time. While perception of control over complying with speed limits increases immediately after PI, the effects disappear in two weeks. Therefore, it can be assumed that PI is ineffective over PBC in the long run. As for prototype favorability, the effects of PI can be observed only two weeks after the intervention. Drivers' perceptions regarding

the favorable image of the typical speeder was not affected by the PI intervention immediately. However, these perceptions were lessened in two weeks. Perhaps, the act of driving or another possible variable might have been influential over this change. Lastly, it can be argued that PI technique is an effective method in reducing speeding behavior. The average speed of participants were dropped from 91.4 to 89.2 km/h. It can be claimed that this change is one of the most important findings of this study since due to a 10% tolerance rate of the speed zones 89.2 km/h speed can be regarded as within the legal limit on 82 km/h speed zones.

The present study also concluded that with regard to speeding behavior, an integrated model of TPB and PWM is working for the most part, except for PBC and prototype favorability constructs, which may have been found irrelevant partly due to certain faults in the design of this study.

As a last remark, this study is believed to be an important contribution to the literature. Not only PI method's effects on speeding were limited in the existing literature, but such an integrated behavioral model had never been studied together with a specific technique for changing speeding behavior. This study, has given some insight on which constructs should be focused on and when to change speeding behavior. Furthermore, these constructs can be targeted for prospective drivers before speeding behavior becomes a habit for them. Such a cognitive change is truly believed to be in support of existing methods for reducing traffic violations. For instance, one way PI can be implemented as a road safety intervention could be giving a mandatory PI training to those whose driver's licenses are seized due to speeding and other similar traffic violations. This intervention can also be given to those who were involved in a traffic crash and found responsible due to speeding. Drivers can be motivated to take

part in such an implementation by increasing the traffic credit scores of drivers who do not participate to the PI intervention. Another way of implementing PI could be via billboards that could write PI statements such as “saving time on the road / being on time is more important than being alive”. It is believed that, once the drivers’ implicit cognitions made explicit, they will reflect on such statements, challenge these cognitions and hopefully change their behaviors, as a result.

REFERENCES

Aarts, L. & van Schagen, I. (2006). Driving speed and the risk of road crashes: A review. *Accident, Analysis and Prevention, 38*, 215-224.

Ajzen, I. (1991). Theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology and Health, 26*(9), 1113-1127.

Andrews, J.A., Hampson, S., & Barckley, M. (2008). The effect of subjective normative social images of smokers on children's intentions to smoke. *Nicotine & Tobacco Research, 10*(4), 589-597.

Bautista, R., Sitges, E., & Tirado, S. (2015). Psychosocial predictors of compliance with speed limits and alcohol limits by Spanish drivers: Modeling compliance of traffic rules. *Laws, 4*, 602-616.

Bener, A., Dafeeah, E.E., Verjee, M., Yousafzai, M.T., Al-Khatib, H., Nema, N., Mari, S., Choi, M.K., Özkan, T. & Lajunen, T. (2013). Gender and age differences in risk taking behaviour in road traffic crashes. *Advances in Transportation Studies an international Journal Section B, 31*, 53-62.

Campbell, M., & Stradling, S.G. (2003). Factors influencing driver speed choices. In *Behavioural Research in Road Safety XIII*. London: Department for Transport

Cauzard, J.-P. (2004). SARTRE 3, *European drivers and road risk*; *Part 1: Report on principal results.* INRETS, Paris.

Chrolton, K., Conner, M., & Jamson, S. (2012). Identifying the psychological determinants of risky riding: An application of an extended Theory of Planned Behaviour. *Accident Analysis and Prevention, 49,* 142–153.

Conner, M., Smith, N., & McMillan, B. (2003). Examining normative pressure in the theory of planned behaviour: Impact of gender and passengers on intentions to break the speed limit. *Current Psychology: Developmental, Learning, Personality, Social, 22*(3), 252-263.

Demir, B., Özkan, T., & Demir, S. (2019). Pedestrian violations: Reasoned or social reactive? Comparing theory of planned behavior and prototype willingness model. *Transportation Research Part F, 60,* 560-572.

Dinh, D.D., & Kubota, H. (2013). Speeding behavior on urban residential streets with a 30 km/h speed limit under the framework of the theory of planned behavior. *Transport Policy, 29,* 199-208

Dorling, H., Blervacq, J., & Gidron, Y. (2018). Effects of psychological inoculation versus health education on physical activity: Two randomized controlled studies. *Journal of Physical Activity and Health, 15,* 295-302.

Duryea, E.J., Ransom, M.V., English, G. (1990). Psychological immunization: theory, research, and current health behavior applications. *Health Education and Behavior, 17*(2), 169-178.

Elliott, M.A. (2010). Predicting motorcyclists' intentions to speed: Effects of selected cognitions from the theory of planned behaviour, self-identity and social identity. *Accident Analysis & Prevention, 42,* 718-725.

Elliott, M.A., Armitage, C.J., & Baughan, C.J. (2003). Drivers' compliance with speed limits: An application of the theory of planned behavior. *Journal of Applied Psychology, 88*(5), 964-972.

Elliott, M.A., & Thomson, J.A. (2010). The social cognitive determinants of offending drivers' speeding behaviour. *Accident Analysis and Prevention, 42,* 1595–1605.

Elliott, M.A., Lee, E., Robertson, J.S., & Innes, R. (2015). Evidence that attitude accessibility augments the relationship between speeding attitudes and speeding behavior: A test of the MODE model in the context of driving. *Accident Analysis and Prevention, 74*, 49-59.

Elvik, R. (2009). "The Power Model of the relationship between speed and road safety, Update and New Analyses." Report 1034/2009, *Institute of Transport Economics*, Oslo, Norway.

Evans, L. (2004). *Traffic Safety*. Bloomfield Hills, MI: Science Serving Society.

Farshidi, H., Aghamolaei, T., Hosseini, Z., Nejad, A.G., & Hosseini, F.A. (2018). Cigarette smoking based on prototype willingness model in male high school students. *International Journal of High Risk Behaviors and Addiction, 7*(1): e63209.

Fazio, R.H. (1986). How do attitudes guide behavior? In: Sorrentino, R.M., Higgins, E.T. (Eds.), *The Handbook of Motivation and Cognition: Foundation of Social Behavior*. New York, NY: Guilford Press.

Fazio, R.H. (1990). Multiple processes by which attitudes guide behavior: the MODE model as an integrative framework. In: Zanna, M.P. (Ed.), *Advances in Experimental Social Psychology, 23*. Academic Press, New York.

Festinger, L. (1957). *The theory of cognitive dissonance.* New York, NY: Harper.

Fischer, P., Kubitzki, J., Guter, S., & Frey, D. (2007). Virtual driving and risk taking: Do racing games increase risk-taking cognitions, affect, and behaviors? *Journal of Experimental Psychology: Applied, 13*(1), 22-31.

Fitzpatrick, C.D., Rakasi, S., & Knodler Jr., M.A. (2017). An investigation of the speeding-related crash designation through crash narrative reviews sampled via logistic regression. *Accident Analysis & Prevention, 98,* 57-63.

Gabany, S.G., Plummer, P., & Grigg, P. (1997). Why drivers speed: The speeding perception inventory. *Journal of Safety Research, 28*(1), 29-36.

Gibbons, F.X., Gerrard, M., Blanton, H., & Russell, D.W. (1998). Reasoned action and social reaction: Willingness and intention as independent predictors of health risk. *Journal of Personality and Social Psychology, 74,* 1164-1180.

Gidron, Y., Slor, Z., Toderas, S., Herz, G., & Friedman, S. (2015). Effects of psychological inoculation on indirect road hostility and simulated driving. *Transportation Research Part F, 30,* 153-162.

Grevor, A. (2010). "Truth" lies in the eyes of the beholder: Evaluating smokers and nonsmokers receptivity of the truth campaign *Academy of Health Care Management Journal, (7)*2, 89-102.

Guggenheim, N., & Taubman – Ben-Ari, O. (2015). Can friendship serve as an impetus for safe driving among young drivers? *Transportation Research Part F, 30,* 145-152.

Harré, N., Field, J., & Kirkwood, B. (1996). Gender differences and areas of common concern in the driving behaviours and attitudes of adolescents. *Journal of Safety Research, 27,* 163-173.

Horvath, C., Lewis, I., & Watson, B. (2012). The beliefs which motivate young male and female drivers to speed: A comparison of low and high intenders. *Accident Analysis and Prevention, 45,* 334-341.

Howell, J.L., & Ratliff, K.A. (2017). Investigating the role of implicit prototypes in the prototype willingness model. *Journal of Behavioral Medicine, 40,* 468-482.

Iversen, H. (2004). Risk-taking attitudes and risky driving behaviour. *Transportation Research Part F, 7,* 135-150.

Jovanović, D., Šraml, M., Matović, B., & Mićić, S. (2017). An examination of the construct and predictive validity of the self-reported speeding behavior model. *Accident Analysis and Prevention, 99,* 66-76.

Lheureux, F. (2012). Speedıng or not speedıng? When subjective assessment of safe, pleasurable and risky speeds determines speeding behaviour. *The European Journal of Psychology Applied to Legal Context, 4*(1), 79-98.

Martinussen, L.M., Sømhovd, M.J., Møller, M., & Siebler, F. (2015). A Go/No-go approach to uncovering implicit attitudes towards safe and risky driving. *Transportation Research Part F, 30,* 74-83.

Matsunaga, K., Kito, T., Kitamura, F., Shidoji, K., & Yanagida, T. (1990). Reaction Time Variability and Type of Personality of Accident-Prone Drivers. In J. Misumi, B. Wilpert and H. Motoaki (Eds.), *Proceedings of the the 22th International Congress of Applied Psychology vol. 1, Organization and Work Psychology.* (p. 323). East Sussex: Lawrence Erlbaum.

McDonald, M., Ingham, R., Hall, R. D., & Rolls, G. W. P. (1991). *Accident risk and behavioural patterns of younger drivers.* Hampshire, UK: AA Foundation for Road Safety Research.

McGuire, W.J. (1961a). Resistance to persuasion conferred by active and passive prior refutation of the same and alternative counterarguments. *Journal of Abnormal and Social Psychology, 63*(2), 326-332.

McGuire, W.J. (1961b). The effectiveness of supportive and refutational defenses in immunizing and restoring beliefs against persuasion. *Sociometry, 24*(2), 184-197.

McKenna, F.P. (2005). What shall we do about speeding – Education? In G. Underwood (Ed.), *Traffic and Transport Psychology* (pp. 521–528). Oxford: Elsevier.

McKenna, F.P., & Horswill, M.S. (2006). Risk taking from the participant's perspective: The case of driving and accident risk. *Helath Psychology, 25*(2), 163-170.

Mirzaei-Alavijeh, M., Babakhani, M., Jalilian, F., Vaezi, M., Jalilian F., Khashij, S., & Hamzeh, B. (2019). Socio-cognitive determinants of safe road-crossing behaviors: An application of the prototype willingness model. *Journal of Injury & Violence Research, 11*(1), 93-100.

Moen, B.E. 2007. Determinants of safety priorities in transport – The effect of personality, worry, optimism, attitudes and willingness to pay. *Safety Science 45*, 848–63.

Musselwhite, C. (2006). Attitudes towards car driving behaviour: Categorising and contextualising risk. *Accident Analysis and Prevention, 38*, 324-334.

National Center for Statistics and Analysis. (2018, March, revised) Speeding: 2016 data (Traffic Safety Facts. DOT HS 812 480). Washington, DC: National Highway Traffic Safety Administration

Newman, L. M., & Dolich, I.J. (1979). An examination of ego-involvement as a modifier of attitude changes caused from product testing. *Advances in Consumer Research, 6,* 180-183.

Nieboer, J. (2015). Group member characteristics and risk taking by consensus. *Journal of Behavioral and Experimental Economics, 57,* 81-88.

Nordfjærn, T., Şimşekoğlu, Ö., Can, S., & Somer. O. (2015). Social cognition and personality traits related to risky driving in a Turkish sample. *Journal of Risk Research, 18*(4), 452-466.

Nordfjærn, T., Jørgensen, S.H., & Rundmo, T. (2012). Safety attitudes, behaviour, anxiety and perceived control among professional and non-professional drivers. *Journal of Risk Research, 15*(8), 875-896.

Olley, B., Abbas, M., & Gidron, Y. (2011). The effects of psychological inoculation on cognitive barriers against condom use in women with HIV: A controlled pilot study. *SAHARA-J: Journal of Social Aspects of HIV/AIDS, 8*(1), 27-32.

Paris, H., & Van den Broucke, S. (2008). Measuring cognitive determinants of speeding: An application of the theory of planned behaviour. *Transportation Research Part F, 11,* 168-180.

Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. A., Jarawan, E., & Mathers, C. (2004). *World report on road traffic injury prevention.* Geneva, Switzerland: World Health Organization.

Petty, R.E., Cacioppo, J.T., & Goldman, R. (1981). Personal involvement as a determinant of argument-based persuasion. *Journal of Personality and Social Psychology, 41*(5), 847-855.

Rasool, F.A.A., Alekri, F.A., Nabi, H.A., Naiser, M.J., Shamlooh, N.M., Alnashaba, S.A., Alherz, Z.A., Almosawi, Z.S.A., & Al-Sayyad, A.S. (2015). Prevalence and behavioral risk factors associated with road traffic accidents among medical students of Arabian Gulf University in Bahrain. *International Journal of Medical Science and Public Health, 4*(7), 933-938.

Rhodes, N., & Pivik, K. (2011). Age and gender differences in risky driving: The roles of positive affect and risk perception. *Accident Analysis and Prevention, 43*, 923-931.

Richards, A.S., & Banas, J.A. (2015). Inoculating against reactance to persuasive health messages. *Health Communication, 30*, 451-460.

Rivis, A., Sheeran, P., & Armitage, C.J. (2011). Intention versus identification as determinants of adolescents' health behaviours: evidence and correlates. *Psychology and Health, 26*, 1128-1142.

Sabey, B. F. (1983). Road Safety in the 80's. In *Proceedings of the Symposium on Recent Developments and Research in Road Safety Remedial Measures*. Manchester, UK: University of Salford.

Scott-Parker, B., Watson, B., King, M.J., & Hyde, M.K. (2014a). "I drove after drinking alcohol" and other risky driving behaviours reported by young novice drivers. *Accident Analysis and Prevention, 70*, 65-73.

Scott-Parker, B., Watson, B., King, M.J., & Hyde, M.K. (2014b). Young novice drivers and the risky behaviours of parents and friends during the Provisional (intermediate) licence phase: A brief report. *Accident Analysis and Prevention, 69*, 51-55.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research, 15*, 325-343.

Sherif, M., & Hovland, C. I. (1961). *Social judgment: Assimilation and contrast effects in communication and attitude change.* New Haven, CT: Yale University Press.

Simons-Morton, B.G., Ouimet, M.C., Zhang, Z., Klauer, S.E., Lee, S.E., Wang, J., Chen, R., Albert, P., & Dingus, T.A. (2011). The effect of passengers and risk-taking friends on risky driving and crashes/near crashes among novice teenagers. *Journal of Adolescent Health, 49*, 587-593.

Stephens, A.N., Nieuwesteeg, M., Page-Smith, J., & Fitzharris, M. (2017). Self-reported speed compliance and attitudes towards speeding in a representative sample of drivers in Australia. *Accident Analysis and Prevention, 103*, 56-64.

Svenson, O. (2008). Decisions among time saving options: when intuition is strong and wrong. *Acta Psychologica, 127*, 501-509.

Svenson, O., & Salo, I. (2010). Effects of speed limit variation on judged mean speed of a trip. *Accident Analysis and Prevention, 42*, 704-708.

Tarko, A.P. (2009). Modeling drivers' speed selection as a trade-off behavior. *Accident Analysis and Prevention, 41*(3), 608-616.

Taubman-Ben-Ari, O. & Findler, L. (2003). Reckless driving and gender: an examination of a terror management theory explanation. *Death Studies, 27*, 603-618.

Taylor, M.C., Lynam, D.A., & Baruya, A. (2000). The effect of drivers' speed on the frequency of road accidents. *Transport Research Laboratory, 421*. Crowthorne, England.

Ulleberg, P. (2002). Personality subtypes of young drivers. Relationship to risk-taking preferences, accident involvement, and response to a traffic safety campaign. *Transportation Research Part F, 4*, 279-297.

Ulleberg, P. & Rundmo, T. (2003). Personality, attitudes and risk perception as predictors of risky driving behaviour among young drivers. *Safety Science, 41*, 427-443.

Wang, P., Rau, P-L.P., & Salvendy, G. Effect of information sharing and communication on driver's risk taking. *Safety Science, 77*, 123-132.

Watters, S.E. & Beck, K.H. (2016). A qualitative study of college students' perceptions of risky driving and social influences. *Traffic Injury Prevention, 17*(2), 122-127.

World Health Organization. (2008). *Speed management: a road safety manual for decision-makers and practitioners.* Geneva, Global Road Safety Partnership.

Williams, A.F. (2003). Teenage drivers: Patterns of risk. *Journal of Safety Research, 3*, 5-15.

Zuckerman, M. (1994). *Behaavioural Expressions and Biosocial Bases of Sensation Seeking*, Cambridge: University of Cambridge Press.

APPENDICES

A: Approval Of METU Human Subjects Ethics Committee

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

DUMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TURKEY
T: +90 312 210 22 91
F: +90 312 210 79 59
ueam@metu.edu.tr
www.ueam.metu.edu.tr

Sayı: 28620816 / 135

26 MART 2019

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Türker ÖZKAN

Danışmanlığını yaptığınız Berfin Serenat SİMSER'in **"The Effects of Psychological Inoculation on Drivers' Speeding Behavior"** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **124-ODTÜ-2019** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız

Prof. Dr. Tülin GENÇÖZ
Başkan

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

Prof. Dr. Yaşar KONDAKÇI (4.)
Üye

Doç. Dr. Emre SELÇUK
Üye

Doç. Dr. Pınar KAYGAN
Üye

Dr. Öğr. Üyesi Ali Emre TURGUT
Üye

B: INFORMED CONSENT FORM FOR PARTICIPANTS

Gönüllü Katılım Formu

Bu araştırma, ODTÜ Psikoloji Bölümü öğretim elemanlarından Prof. Dr. Türker Özkan ve Psikoloji Bölümü yüksek lisans öğrencilerinden Berfin Serenat Simser tarafından yürütülen bir çalışmadır. Bu form, araştırma koşulları hakkında size bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir? Araştırmanın amacı sürücülerin hız davranışını azaltmaya yönelik bir program geliştirmektir.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz? Çalışmaya katılmayı kabul ederseniz sizden beklenen araç kullanırken hız yapma davranışlarınıza dair bir anket doldurmanız; ardından hız ihlali ile ilgili bir dizi cümle sunulacak ve sizden bu cümleleri karşıt-sav geliştirerek çürütmeniz istenilecektir. Çalışma iki aşamadan oluşmaktadır ve ilk aşama yaklaşık olarak 30-45 dakika; ikinci aşama ise 15 dakika sürmektedir. İkinci aşamaya, ilk aşamadan 2 hafta sonra katılmanız beklenmektedir.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız? Ankette, sizden kimlik veya kurum belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamamıyla gizli tutulacak, sadece araştırmacılar tarafından değerlendirilecektir. Katılımcılardan elde edilecek bilgiler toplu halde değerlendirilecek ve bilimsel yayımlarda kullanılacaktır. Sağladığınız veriler gönüllü katılım formlarında toplanan kimlik bilgileri ile eşleştirilmeyecektir.

Katılımınızla ilgili bilmeniz gerekenler Anket, genel olarak rahatsız edici türden sorular içermemektedir. Ancak, çalışmaya katılımınız tamamen gönüllülük esasına dayalı olup katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakıp çıkmakta serbestsiniz. Böyle bir durumda çalışmayı uygulayan kişiye, çalışmadan çıkmak istediğinizi söylemek yeterli olacaktır. Çalışma sonunda, bu araştırmayla ilgili sorularınız cevaplanacaktır.

Araştırmayla ilgili daha fazla bilgi almak isterseniz: Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Araştırma hakkında daha fazla bilgi almak için Psikoloji Bölümü yüksek lisans öğrencilerinden Berfin Serenat Simser (e-posta: berfinserenatsimser@yahoo.com) veya öğretim üyelerinden Prof. Dr. Türker Özkan (E-posta: ozturker@metu.edu.tr) ile iletişim kurabilirsiniz.

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

(Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad Tarih İmza

----/----/-----

C: DEMOGRAPHIC INFORMATION FORM

KİŞİSEL BİLGİLER FORMU

Lütfen, aşağıdaki soruları sizin için doğru olan cevabı yazarak cevaplayınız.

1. Yaşınız:

3. Ne kadar süredir ehliyet sahibisiniz**?** yıl

4. **Geçen yıl** kaç km araç kullandınız**?** Km

5. **Ehliyetinizi aldığınızdan bu yana** kaç km araç kullandınız? Km

6. **82 km/s hız sınırının olduğu yollarda** ortalama kaç kilometre hızla gitmeyi tercih ediyorsunuz? Km/s

7. Önümüzdeki iki hafta boyunca, **82 km/s hız sınırının olduğu yollarda** ortalama kaç kilometre hızla gideceğinizi düşünüyorsunuz? Km/s

D: TPB AND PWM SCALE ON SPEEDING

HIZ İHLALİ ÜZERİNE PLANLI DAVRANIŞ TEORİSİ VE PROTOTİP İSTEKLİLİK ÖLÇEĞİ

Aşağıda belirtilen her bir madde için sizden istenen bu durumların **hız sınırının 82 km/s olduğu yollarda** araç kullanırken sizi ne kadar yansıttığını düşünerek cevaplandırmanızdır.

Lütfen değerlendirmelerinizi **sizi en çok yansıttığını düşündüğünüz** seçeneği daire içine alarak belirtiniz.

1. Önümüzdeki ay hız limitlerinin üzerinde araç kullanmayı planlıyorum.

1 2 3 4 5 6 7 8 9

Kesinlikle hayır ***Kesinlikle evet***

2. Hız limitlerinin üzerinde araç kullanmak bana şu şekilde hissettirir:

1 2 3 4 5 6 7 8 9

Son derece sıkıcı ***Son derece eğlenceli***

3. Önümüzdeki ay içinde gitmeniz gereken bir yere (okula veya bir randevuya vs.) geciktiğinizi düşünün. Hız limitlerinin üzerine çıkmaya ne kadar istekli olacağınızı düşünüyorsunuz?

1 2 3 4 5 6 7 8 9

Son derece isteksiz ***Son derece istekli***

4. Sizin yaşlarınızda, genellikle hız limitlerinin üzerinde araç kullanan tipik bireye benzediğinizi düşünüyor musunuz?

1 2 3 4 5 6 7 8 9

Kesinlikle hayır ***Kesinlikle evet***

5. Hız limitlerinin üzerinde araç kullanmak sizin için ne kadar kabul edilebilir bir davranıştır?

1 2 3 4 5 6 7 8 9

Kesinlikle kabul edilemez ***Kesinlikle kabul edilebilir***

6. Önümüzdeki ay içinde aceleniz olduğu durumlarda hız limitlerinin üzerinde araç kullanmaya istekli olacağınızı düşünüyor musunuz?

1 2 3 4 5 6 7 8 9

Kesinlikle hayır ***Kesinlikle evet***

7. Sizin için önemli kişiler ne sıklıkta hız limitlerinin üzerinde araç kullanır?

1 2 3 4 5 6 7 8 9

Asla ***Çok sık***

8. Önümüzdeki ay hız limitlerinin üzerinde araç kullanmaya niyetim var.

1 2 3 4 5 6 7 8 9

Kesinlikle hayır ***Kesinlikle evet***

9. Hız ihlali yapmaktan kaçınmanın zorluğu benim için şu derecedir:

1 2 3 4 5 6 7 8 9

Son derece zor ***Son derece kolay***

10. Tanıdığınız kişilerden sizce ne kadarı hız limitlerinin üzerinde araç kullanır?

1 2 3 4 5 6 7 8 9

Hiçbiri ***Hepsi***

11. Sizin yaşlarınızda, genellikle hız limitlerinin üzerinde araç kullanan kişilere ne kadar benzediğinizi düşünüyorsunuz?

1 2 3 4 5 6 7 8 9

Hiç benzemiyorum ***Tamamen benziyorum***

12. Hız limitlerinin üzerinde araç kullanmak bana şu şekilde hissettirir:

1 2 3 4 5 6 7 8 9
Son derece keyifsiz ***Son derece keyifli***

13. Önümüzdeki ay hız limitlerinin üzerinde araç kullanmak isterim.

1 2 3 4 5 6 7 8 9
Kesinlikle hayır ***Kesinlikle evet***

14. Benim yaşlarımda, genellikle hız limitlerinin üzerinde araç kullanan kişilere benzer olduğumu düşünüyorum.

1 2 3 4 5 6 7 8 9
Kesinlikle hayır ***Kesinlikle evet***

15. Sizin yaşlarınızda, genellikle hız limitlerinin üzerinde araç kullanan tipik bireyi düşünerek aşağıdaki özelliklere ne derece sahip olduklarını düşündüğünüzü işaretleyin.

	Hiçbir şekilde								***Tamamen***
Canlı	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Havalı	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Önemli	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Umursamaz	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Çocukça davranan	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Sıkıcı	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*

16. Geçtiğimiz iki hafta boyunca 82 km/s hız sınırının olduğu yollarda ortalama kaç kilometre hızla gitmeyi tercih ettiniz? **Km/s**

E: PSYCHOLOGICAL INOCULATION FOR SPEEDING INVENTORY

HIZ DAVRANIŞI KAPSAMINDA PSİKOLOJİK AŞILAMA ÖLÇEĞİ

Bu bir Psikolojik Aşılama Ölçeği'dir. Sizden istenilen aşağıdaki her bir cümleyi sizin için geçerli bir karşıt-sav sunarak çürütmenizdir. Bunu yaparken her bir cümleye "**Hayır**" diyerek başlamanız ve devamında mantıklı bir karşıt-sav sunmanız çok önemlidir. Aşağıda size yardımcı olması için bazı örnekler verilmiştir, bunları inceleyerek sizden de diğer cümleleri benzer şekilde çürütmeniz beklenmektedir.

Örnek

Cümle:

- Çevremdekiler benden bir ricada bulunduğu zaman onları reddedersem beni eskisi kadar sevmeyeceklerdir

Karşıt-sav:

- *Hayır, zaman zaman sevdiklerime benden istediklerini sunamayabilirim ve bu durumda kendi ihtiyaç ve sınırlarımın önemini vurgularsam bana daha çok saygı duyacaklardır.*

Cümle:

- Kilo vermek istiyorsam tek yapabileceğim aç kalmaktır.

Karşıt-sav:

- *Hayır, sağlıklı yiyecekler tüketmeye özen göstererek ve düzenli spor yaparak aç kalmadan da kilo verebilirim. Gerekirse bir diyetisyen yardımına başvurabilirim.*

Lütfen, siz de bu örneklere benzer şekilde aşağıda size verilen cümleleri reddederek birer açıklama yazınız. **Bir cümle için geliştirdiğiniz karşıt-savı başka bir cümle için kullanmayınız.**

1. Bir yere zamanında varmanın tek yolu hız yapmaktır.

2. Yolda zamandan tasarruf etmek için her yolculuğumda hız limitlerinin üstüne çıkmakta bir sakınca yoktur.

3. Hızlı araç kullanmak riskli olsa da hissettiğim adrenalin ve coşku duygusu bu riske değer.

4. Benimle yolculuk yapan bir kadın hız yaparsam mutlaka etkilenecektir.

5. Araç kullanırken yolculardan biri hız yapmamı istediğinde yapabileceğim veya söyleyebileceğim hiçbir şey yok.

6. Çevremde önem verdiğim kişilerden hiçbiri hız ihlali yapmamı umursamaz.

7. İstediğimde hızımı düşürerek güvenli bir sınıra çekebileceğimden hız limitlerini aşarak yolculuk yapsam bile kaza geçirme ihtimalim yoktur.

8. Sürücü ben olduğum için araç kullandığım sürece tüm kontrol bendedir.

9. Araç kullanırken asıl ve öncelikli niyetim hız yapmaktır.

10. Her yolculuğumda sürücü bensem daima hız yapma niyetiyle yola çıkarım.

11. Araç kullanırken varış noktama geç kalmış olmam hissettiğim hız yapma isteğini daima haklı çıkarır.

12. Araç kullanırken tek istediğim hız yapmaktır.

13. Benim yaşlarımdaki çevremdeki bütün erkekler hız limitlerinin üzerinde araç kullanıyor.

14. Çevremde hız yapmayı seven arkadaşlarıma uyum sağlamak için tek yapabileceğim benim de hız yapmamdır.

15. Araç kullanma becerilerimin üstün olduğunu kanıtlamanın en iyi yolu hız yapmaktır.

16. Arkadaşlarımla yolculuk yaparken havalı gözükmek için hızlı araç kullanmam gerekiyor.

17. Benim gibi erkeklerin bir kadını etkileyebilmesinin tek yolu hız yaparak araç kullanmaktır.

G: TURKISH SUMMARY / TÜRKÇE ÖZET

1. Giriş

Trafik güvenliği üzerine yapılan araştırmalar her geçen gün artıyor olsa da, kara yollarını kullanan sürücülerin sayısı her geçen gün artmakta olduğundan, güvenlik hala dünya çapında bir sorun teşkil etmektedir. Trafik kazalarına bağlı ölümlerin %30'unda hız davranışı en önemli etken olduğundan (McDonald, Ingham, Hall, & Rolls, 1991), trafikte güvenli bir iklim oluşturulması için hız davranışının azaltılmasının önemli olduğu düşünülmektedir. Hız davranışı, yasal hız limitlerinin üzerine çıkarak veya kullanılan yol koşullarına uygun olandan daha yüksek hızda araç kullanmak olarak tanımlanmıştır (World Health Organization, 2008).

Sürücülerin hız davranışını etkileyen belli faktörler olduğu görülmektedir Yol tipi (şehir içi yollar, otobanlar, gibi) (Stephens, Nieuwesteeg, Page-Smith, & Fitzharris, 2017); hız ceza ve yaptırımları (Bautista, Sitges, & Tirado, 2015); yaş (Scott-Parker et al., 2014a), cinsiyet (Harré, Field, & Kirkwood, 1996; Freeman, Kaye, Truelove, & Davey, 2017), risk almaya yatkınlık (Musselwhite, 2006) gibi bireysel farklılıklar; ile akran baskısı (Williams, 2003) ve zamandan tasarruf etme (Gabany, Plummer, & Grigg, 1997) gibi çeşitli güdüsel faktörlerin etkili olduğu ortaya konmuştur. Dolayısıyla, bu faktörleri göz önüne alarak hız davranışına ilişkin bilişsel algıları değiştirmeye yönelik bir müdahale programının trafikte güvenliğe katkı sağlayacağı düşünülmektedir. Bu çalışmada ise böyle bir programı, psikolojik aşılama

yöntemini iki davranış modelinin birleşimi üzerinden kuramsal bir zemine oturtarak kurulması amaçlanmaktadır.

1.1. Davranışsal Kuramlar

1.1.1. Planlanmış Davranış Teorisi

Çalışmada kullanılan davranış modellerinden biri, Ajzen (1991) tarafından ortaya çıkarılan, Planlanmış Davranış Teorisi (PDT)'dir. Bu davranış kuramına göre, davranışı belirleyen faktör öncelikli olarak davranışa yönelik niyettir. Niyet ise tutum, öznel norm ve algılanan davranışsal kontrol olmak üzere üç faktörden etkilenmektedir. Diğer bir deyişle, bu kurama göre, eğer bireyin belli bir davranışa yönelik tutumları olumluysa, algılanan sosyal normlar davranışı gerçekleştirmeyle uyumluysa ve kişi, davranışı gerçekleştirebilecek kapasite ve uygun koşullara sahip olduğunu düşünüyorsa, bu davranışta bulunmaya niyet edecek ve sonuç olarak da yüksek olasılıkla gerçekleştirecektir. PDT, pek çok alanda olduğu gibi araç kullanmada da test edilmiş bir kuramdır. Elliott ve Thomson (2010), PDT'nin, hız yapma niyetindeki varyansın %55'ini, hız davranışındaki varyansın ise %47'sini açıkladığını göstermiştir.

PDT modelindeki önemli yapılardan biri tutumlardır. Tutumlar, Ajzen tarafından, bireyin bir davranışı gerçekleştirmeye yönelik değerlendirmesinin ne kadar olumlu veya olumsuz olduğu şeklinde tanımlanmıştır (1991). Türk örneklemi üzerinde yapılan bir çalışma, trafik güvenliği tutumlarının, sürücü davranışlarını yordamada en belirleyici etken olduğunu ortaya koymuştur (Nordfjærn, Şimşekoğlu, Can, & Somer,

2015). Literatür, güvenli trafik tutumlarına sahip bireylerin daha az trafik ihlallerinde ve hız davranışında bulunduğunu gösterirken (Nordfjærn, Jørgensen, & Rundmo, 2012), en çok hız ihlali yapan sürücülerin hız limitlerine karşı olumsuz, hız davranışına karşıysa olumlu tutumları olan kişiler olduğunu ortaya çıkarmıştır (Lheureux, 2012).

Öznel normlar, ise bir davranışı gerçekleştirip gerçekleştirmemeye yönelik algılanan sosyal baskı olarak tanımlanmıştır (Ajzen, 1991). Diğer bir deyişle, bir davranışın bireyin bakış açısından toplumda ne kadar kabul edilebilir olduğudur. Hız davranışı ele alındığında, öznel normlar, hız limitlerinin üzerinde araç kullanmanın aile, arkadaşlar, diğer yol kullanıcıları, polis gibi etmenler tarafından ne kadar kabul edilebilir ve yaygın olduğu ve bireyin bu davranışı gerçekleştirmesinin bu etmenler tarafından nasıl karşılanacağı algısını temsil eder. Alan yazına göre, birey, eğer hız davranışının çevresindekiler veya toplum tarafından kabul edilebilir olduğunu düşünüyorsa (Chorlton ve ark., 2012); veya bu normları göz önüne alma güdüsüne sahip değilse (Ulleberg & Rundmo, 2003) hız yapmaktan kaçınması düşük olasılıktadır.

PDT kuramına göre, algılanan davranışsal kontrol ise bir davranışın gerçekleştirilmesinin ne kadar kolay ve zor olduğu algısını temsil eder (Ajzen, 1991). Kuramdaki bu bileşenin, davranışı hem niyet yolu ile dolaylı olarak hem de kendi başına doğrudan yordadığı söylenmektedir. Literatürde, algılanan davranışsal kontrolün hız davranışına yönelik niyeti yordamada en önemli faktör olduğunu ortaya koyan çalışmalar mevcuttur (Elliott ve ark., 2003).

Niyet ise, tutumlar, öznel normlar ve algılanan davranışsal kontrolden etkilenerek davranışı doğrudan yordayan en önemli faktör olarak görülmektedir

(Ajzen, 1991). Kurama göre, niyet, bireyin davranışı gerçekleştirmeye hazır olması ve bu davranışı gerçekleştirme olasılığına yönelik algısıdır. Niyetin, PDT modelindeki güdüsel bileşeni temsil ettiği ve buna göre, kişinin belli bir davranışta bulunmaya yönelik ne kadar çaba harcamaya istekli olduğunu yansıttığı iddia edilmektedir (Ajzen, 1991). Literatürde, hız davranışı kapsamında niyeti yordayan değişkenleri araştıran pek çok çalışma bunumaktadır. Elliott (2010), afektif tutumlar ile algılanan kontrol edilebilirliğin hız niyetini etkileyen faktörler olduğunu göstermiştir.

1.1.2. Prototip / İsteklilik Modeli

Çalışmada kullanılan diğer bir davranışsal kuram ise Prototip İsteklilik Modeli (PİM)'dir (Gibbons, Gerrard, Blanton, & Russell, 1998). Bu model, PDT'nin aksine, tepkisel bir karar verme mekanizmasından bahseder. Niyetin yanı sıra, davranışı belirleyen ana faktörlerden biri olarak isteklilik bileşenini gösterir. Bu kurama göre, isteklilik, niyetten farklı olarak planlanmış veya belirlenmiş olmaktan ziyade, tepkisel ve anlıktır. İsteklilik, niyet gibi tutumlar ve öznel normlardan etkilenirken, niyetten farklı olarak prototip algılarından da etkilenmektedir. Ayrıca, PİM'e göre, davranışı hem doğrudan hem de niyet üzerinden dolaylı olarak yordayan önemli bir bileşendir. Dahası, trafik güvenliği alanındaki çalışmalardan birinde, istekliliğin davranışı yordamada niyetten daha güçlü bir faktör olduğu bulgular arasındadır (Demir ve ark., 2019). İstekliliği etkileyen faktörlerden biri prototiplerdir. Prototipler, davranışı gerçekleştiren tipik bireyin kişi için ne kadar *benzer* ve *olumlu* olarak algılandığıdır. Hız davranışı kapsamında bu bileşen, kişinin hız yapan tipik bireyi kendisine ne kadar benzer gördüğü ve bu bireyi ne kadar olumlu algıladığıyla ilişkilidir. Literatürdeki yol

güvenliği üzerine yapılan çalışmalar prototipler ile ilgili çelişkili bulgular ortaya koymaktadır. Yaya davranışını araştıran bir çalışma prototiplerin davranışı yordamada etkin olduğunu gösterirken (Demir ve ark., 2019), hız davranışı üzerinde yapılan başka bir araştırma ise prototip benzerliğinin davranışı hem doğrudan hem dolaylı olarak yordadığını; ancak prototip olumluluğunun, davranışı yordamada anlamlı bir faktör olmadığını ortaya koymuştur (Elliott ve ark., 2019). Bu sebeple, prototiplerin, üzerine daha çok araştırma yapılması gereken bir bileşen olduğuna inanılmaktadır.

Bu iki modelin birleşiminden oluşan bütünleşik bir kuram yol güvenliği kapsamında nadiren çalışılmıştır. Bu çalışmalardan hız davranışına yönelik olanlar ise oldukça azdır. Dolayısıyla, bu tür bütünleşik bir kuram çerçevesinde hız davranışına yönelik bir tekniğin test edilmesinin alan yazına önemli ölçüde katkı sağlayacağı düşünülmektedir.

1.2. Psikolojik Aşılama

Psikolojik Aşılama (PA) teorsi, ilk olarak McGuire (1961a) tarafından ortaya atılmıştır. Bu teori, bireylerin var olan tutum ve inançlarını bir virüs saldırısına benzer biçimde değiştirmeye yönelik bir stratejidir. Buna göre, eğer bireyler, sahip oldukları zararlı tutum ve inanışların daha abartılı biçimleriyle yüzleştirilir ve bunlara karşıt-sav geliştirmeleri istenirse, bu tutumlara karşı bağışıklık geliştirmeleri beklenmektedir. Bu strateji, pek çok alanda test edilmiştir. Örneğin, sigara ve tütün kullanma (Duryea, Ransom, & English, 1990) ve korunmasız cinsel ilişkiye girme (Olley, Abbas, & Gidron, 2011) alışkanlıklarını azaltmadan, fiziksel aktivitede bulunmayı artırmaya (Dorling, Blervacq, & Gidron, 2018) veya pazarlamada ikna yönteminin testine

(Szybillo & Heslin, 1973) kadar pek çok çalışmada araştırma konusu olmuştur. Gidron ve arkadaşları (2015) tarafından trafik güvenliği kapsamında yaptıkları bir dizi çalışmada PA'nın etkilerini araştırmışlardır. Bu çalışmalarda, PA müdahalesi gereği katılımcılara trafikteki zararlı tutumlarının abartılmış biçimleri sunulmuş ve bunları kendileri için anlamlı savlar geliştirerek çürütmeleri beklenmiştir. Örneğin, katılımcılara "Ne kadar tehlikeli araç kullanırsam kullanayım, kazaya karışma olasılığım yoktur" cümlesi verilmiş ve onlardan "Hayır, bilakis, tehlikeli araç kullanmak kaza olasılığımı ve bu kazanın sonuçlarının ciddiyetini artıracaktır" veya benzeri bir karşıt-sav sunmaları beklenmiştir. Araştırmalar, PA'nın riskli araç kullanımına yönelik düşünce hatalarını değiştirmede ve yolda gereksiz risk alımına karşı sürücülerin sosyal direnç geliştirmesinde etkili olduğunu göstermiştir (Gidron, Slor, Toderas, Herz, & Friedman, 2015). Bu çalışmalar, trafik güvenliği alanında yapılacak müdahalelerde psikolojik faktörlerin önemini ortaya koymaktadır.

1.2. Araştırmanın Amacı

Bu çalışmada, PA tekniği kullanılarak sürücülerin hız yapma niyet ve davranışlarının azaltılmasına yönelik bir program geliştirmek amaçlanmıştır. Ayrıca, PDT ve PİM davranış modellerinin bileşenlerinin hız davranışını yordamada etkililiğinin araştırılması hedeflenmiştir. Bu program, PDT ve PİM' den oluşan bütünleşik bir davranışsal kuram üstüne oturtularak, hız davranışını azaltmada hangi bilişsel yapılara odaklanılmasının daha iyi sonuç vereceği araştırılmıştır.

2. Yöntem

Çalışmaya, yaşları 19-30 arasında değişen 95 erkek sürücü katılımcı olmuştur. Öncelikle, Orta Doğu Teknik Üniversitesi Etik Kurulu'ndan bilimsel araştırma izni alınmıştır. Katılımcılara, sosyal medya aracılığıyla ulaşılmış ve yüz yüze olmak üzere iki aşamadan oluşan çalışmaya katılımları karşılığı 20 TL ödeme yapılmıştır. Katılımcılardan toplamda üç ölçüm alınmıştır. İlk ölçüm sırasında katılımcılardan, "Kişisel Bilgiler Formu" (Ek C), "Hız İhlali Üzerine Planlı Davranış Teorisi ve Prototip İsteklilik Ölçeği" (Ek D) doldurmaları istenmiştir. Ayrıca, PA müdahalesi olarak "Hız Davranışı Kapsamında Psikolojik Aşılama Ölçeği"ndeki (Ek E) cümleler okunmuş ve bu cümlelere karşıt-sav geliştirerek ölçeği doldurmaları istenmiştir. İkinci ölçüm, ilk ölçümden hemen sonra gerçekleşmiş ve katılımcılara yalnızca "Hız İhlali Üzerine Planlı Davranış Teorisi ve Prototip İsteklilik Ölçeği" verilmiştir. Bu ölçüm, gecikmesiz son test olarak değerlendirilmiştir. Katılımcılara, üçüncü ölçüm kapsamında 2 hafta sonrası için randevu verilerek, son kez "Hız İhlali Üzerine Planlı Davranış Teorisi ve Prototip İsteklilik Ölçeği" doldurmaları istenmiştir. Bu ölçüm ise gecikmeli son test olarak değerlendirilmiş ve sürücülerin zaman içerisindeki bilişsel ve davranışsal değişimlerinin araştırılması amaçlanmıştır.

3. Bulgular ve Tartışma

3.1. ANOVA Sonuçları ve Değerlendirmeleri

PA yönteminin hız davranışını azaltma üzerindeki etkililiğini araştırmak için ANOVA yapılmıştır. Ortaya çıkan sonuçlara göre, PA'nın tutumlar ($F(2,188)$ =

28.858, $p < .001$, $\eta_p^2 = .235$); öznel normlar ($F(1.751, 164.598) = 52.740$, $p < .001$, $\eta_p^2 = .359$); algılanan davranışsal kontrol ($F(1.663, 156.305) = 4.080$, $p = .025$, $\eta_p^2 = .042$); isteklilik ($F(1.849, 173.808) = 84.371$, $p < .001$, $\eta_p^2 = .473$); prototip benzerliği ($F(1.698, 159.628) = 42.141$, $p < .001$, $\eta_p^2 = .310$); prototip olumluluğu ($F(2, 188) = 4.786$, $p = .009$, $\eta_p^2 = .048$); niyet ($F(1.739, 163.490) = 28.851$, $p < .001$, $\eta_p^2 = .235$) ve davranış ($F(1,94) = 8.592$, $p = .004$, $\eta_p^2 = .084$) üzerinde anlamlı etkisi olmuştur. Gruplar arası fark değerleri Tablo 1'de verilmiştir.

Analizler sonucunda, tutumlar, öznel normlar, prototip benzerliği, ve niyet değişkenleri için ölçüm 1 ve 2 arasında ve ölçüm 1 ve 3 arasında anlamlı fark görülmesi ancak ölçüm 2 ve 3 arasında istatistiksel olarak anlamlı bir fark görülmemesi, PA'nın hıza ilişkin bu bilişsel değişkenleri azaltmada hemen etkili olduğunu ve bu etkinin zaman içinde de sürmeye devam ettiğini göstermektedir. Buna göre, sürücülerin hız davranışına ilişkin olumlu tutumları; hız davranışını ne derece kabul edilebilir ve yaygın olarak gördükleri; hız yapan tipik sürüclerle benzerliklerine yönelik algıları; ve hız yapma niyetleri PA müdahalesinden hemen sonra azalmış ve bu etki PA'dan iki hafta sonrasında da devam etmiştir.

Algılanan davranışsal kontrol değişkeninin ölçüm 2'de ölçüm 1'e göre anlamlı derecede artması; ölçüm 3 sonuçlarının ölçüm 2'ye göre anlamlı derecede azalması; ve ölçüm 1 ve 3 arasında anlamlı bir fark olmaması, PA'nın ilk etapta etki ettiğini, ancak bu etkinin uzun süreli olmadığını göstermektedir. Diğer bir deyişle, PA, sürücülerin hız davranışları üzerindeki kontrol algılarını anlamlı derecede artırmakta; ancak bu etki kısa süreli olmaktadır. Bunun anlamı, sürücüler, PA müdahalesi sonrası hız davranışından kaçınabilme üzerinde daha fazla kontrol sahibi olduklarını

düşünmüşler; fakat, 2 hafta gibi bir süre sonrasında hız davranışından kaçınma üzerindeki kontrol algıları müdahale öncesindeki seviyeye inmiştir.

Tablo 2. Tüm Değişkenlerin Gruplar Arası Karşılaştırılması

	(I) Ölçüm	(J) Ölçüm	Grup Farkı (I-J)	*p*
Tutum	Ölçüm-1	Ölçüm-2	.900*	.000
		Ölçüm-3	.805*	.000
	Ölçüm-2	Ölçüm-1	-.900*	.000
		Ölçüm-3	-.095	.494
Öznel Norm	Ölçüm-1	Ölçüm-2	.779*	.000
		Ölçüm-3	.670*	.000
	Ölçüm-2	Ölçüm-1	-.779*	.000
		Ölçüm-3	-.109	.127
Algılanan Davranışsal Kontrol	Ölçüm-1	Ölçüm-2	-.495*	.004
		Ölçüm-3	-.084	.706
	Ölçüm-2	Ölçüm-1	.495*	.004
		Ölçüm-3	.411*	.011
İsteklilik	Ölçüm-1	Ölçüm-2	1.663*	.000
		Ölçüm-3	1.316*	.000
	Ölçüm-2	Ölçüm-1	-1.663*	.000
		Ölçüm-3	-.347*	.003
Prototip Benzerliği	Ölçüm-1	Ölçüm-2	.947*	.000
		Ölçüm-3	.895*	.000
	Ölçüm-2	Ölçüm-1	-.947*	.000
		Ölçüm-3	-.053	.619
Prototip Olumluluğu	Ölçüm-1	Ölçüm-2	.040	.585
		Ölçüm-3	.221*	.009
	Ölçüm-2	Ölçüm-1	-.040	.585
		Ölçüm-3	.181*	.013
Niyet	Ölçüm-1	Ölçüm-2	.832*	.000
		Ölçüm-3	.765*	.000
	Ölçüm-2	Ölçüm-1	-.832*	.000
		Ölçüm-3	-.067	.552
Davranış	Ölçüm-1	Ölçüm-2	2.253*	.001

Not. Ölçüm-1 = ilk test; Ölçüm-2 = gecikmesiz son test; Ölçüm-3 = gecikmeli son test
*. $p < .05$.

Bulgulara göre prototip olumluluğu değişkeni için aksi bir değişim gözlenmiştir. Ölçüm 1 ve 3 arasında ve ölçüm 2 ve 3 arasında anlamlı bir düşüş görülürken, ölçüm 1 ve 2 arasında istatistiksel açıdan anlamlı bir fark bulunmamıştır. Bunun anlamı, PA, müdahaleden hemen sonra etki etmemiş, ancak zamanla tipik hız yapan bireye karşı olumlu algıyı azaltmıştır. Bu bulgunun sebeplerinden biri trafikte aktif şekilde araç kullanarak, bu prototipleri gerçek hayatta gözlemlemek olmuş olabilir.

İsteklilik değişkeni için ise tüm ölçümler arasında anlamlı bir fark gözlemlenmiştir. Ölçüm 2'de ölçüm 1'e göre anlamlı bir düşüş gözlenirken, ölçüm 3 isteklilik ortalaması, ölçüm 2'ye göre anlamlı derecede artmış; ancak ölçüm 1'e göre de anlamlı şekilde düşüktür. Bu bulgular gösteriyor ki, PA müdahalesi sonrası sürücülerin hız davranışında bulunmaya yönelik isteklilikleri anlamlı ölçüde azalmıştır. Bu etki uzun süreli olmamış; ancak hız yapmaya isteklilik seviyesi hem kısa vadede hem uzun vadede PA müdahalesi öncesine kıyasla anlamlı derecede düşmüştür.

3.2. Regresyon Sonuçları ve Değerlendirmeleri

3.2.1. Ölçüm-1'in Aracı Değişken Analizi Sonuçları

Çalışmada kullanılan bütünleşik modelin hız davranışını yordamada etkililiğini ölçmek amacıyla PROCESS ile aracı değişken analizi yapılmıştır. Yapılan analizler göstermiştir ki PA öncesinde ölçülen tutumlar, öznel normlar, algılanan davranışsal kontrol ve isteklilik değişkenleri davranışı hem niyet üzerinden hem de

doğrudan yordayabilmiştir. Buna göre, hız davranışına ilişkin olumlu tutumlar, öznel normlar ve hız davranışına yönelik isteklilik azaldıkça hız yapma niyet ve davranışları da azalmıştır. Algılanan davranışsal kontrol değişkeni için ise aksi yönde bir ilişki gözlemlenmiştir. Sürücülerin, hız limitlerini aşmaktan kaçınma davranışları üzerindeki kontrollerinin algısı arttıkça hız yapma niyetleri ve davranışları azalmıştır. Sonuçlar, ayrıca, tutumların davranışı isteklilik üzerinden de yordadığını göstermiştir. Sürücülerin, hıza yönelik olumlu tutumları azaldıkça, hız yapma isteklilikleri de azalmıştır. Prototip benzerliği ise davranışı ancak doğrudan yordamış, istekliliğin bu değişken için aracı bir etkisi gözlemlenmemiştir. Diğer bir deyişle, sürücülerin hız yapan tipik birey ile benzerlik algıları azaldıkça hız davranışları da azalmıştır; ancak bu etkinin hız yapmaya yönelik isteklilikleri azaldığı için olmamıştır. Prototip olumluluğu değişkeninin ne istekliliği ne davranışı yordadığı saptanmıştır. Son olarak, hız yapmaya niyetin, davranışı gerçekleştirmeyi yordadığı ortaya çıkmıştır.

3.2.2. Ölçüm-2'nin Regresyon Sonuçları

Ölçüm 2, ilk test ve sonrasında yapılan PA müdahalesinden hemen sonra gerçekleştiği için, bu aşamada davranış ölçümü alınamamıştır. Dolayısıyla, bu ölçüm için entegre modelin analizi için regresyon yapılmıştır. Bulgulara göre, tutum, öznel norm, algılanan davranışsal kontrol ve isteklilik, niyetteki varyansın %73'ünü açıklamaktadır (R^2 = .73, F(4,90) = 59.42, p < .001). Ayrıca, değişkenler ayrı ayrı incelendiğinde PA müdahaleseinden hemen sonra ölçülen tutum, öznel norm ve istekliliğin, niyeti olumlu şekilde yordadığı ortaya çıkmıştır. Buna göre, sürücülerin, PA müdahalesinden sonra ölçülen olumlu tutumları, bu davranışı ne derece kabul

edilebilir gördükleri ve hız davranışına yönelik isteklilikleri azaldıkça hız yapma niyetleri de azalmıştır. Algılanan davranışsal kontrol bu aşamada niyeti yordamayı başaramamıştır. Bunlara ek olarak, tutum, prototip benzerliği ve prototip olumluluğu değişkenleri isteklilikteki varyansın %45'ini açıklamaktadır (R^2 = .45, F(3,91) = 24.60, p < .001). Tutum ve isteklilik arasında anlamlı derecede olumlu birer ilişki saptanmıştır. Buna göre, sürücülerin hız davranışına yönelik tutumları azaldıkça hız yapmaya yönelik isteklilikleri de azalmaktadır. Benzer şekilde, prototip benzerliği ve isteklilik arasındaki anlamlı ilişki göstermiştir ki, sürücülerin hız yapan tipik bireyle benzerlik algıları azaldıkça isteklilikleri de azalmıştır. Prototip olumluluğu ile isteklilik arasında ise anlamlı bir ilişki bulunamamıştır. Bu sonuçlar gösteriyor ki, PA müdahalesinden hemen sonra, entegre modeldeki tutum, öznel norm, isteklilik değişkenleri niyeti; tutum ve prototip benzerliği istekliliği yordamada etkili değişkenlerdir.

3.2.3. Ölçüm-3'ün Aracı Değişken Analizi Sonuçları

PA müdahalesinden 2 hafta sonra gerçekleşen ölçüm sonuçlarından entegre modeli test etmek için, ölçüm-1'de olduğu gibi aracı değişken analizi yapılmıştır. Bulgulara göre, tutum, öznel norm, ve isteklilik değişkenleri hem niyet üzerinden hem de doğrudan davranışı yordamaktadır. Diğer bir deyişle, hız davranışına ilişkin olumlu tutumlar, bu davranışın ne kadar kabul edilebilir algılandığı ve hız davranışına yönelik isteklilik azaldıkça hız yapma niyet ve davranışları da azalmıştır. Algılanan davranışsal kontrol bu ölçümde de niyeti yordayamamıştır. Bunun bir sebebi, bu değişkenin ölçümü ile müdahalenin içeriğinin birbirine denk gelmemesi olabilir.

Müdahale, geleneksel PDT'ye uygun olarak, algılanan davranışsal kontrolün niyet ve davranışı olumlu şekilde yordayacağını varsayarak, trafikteki kontrol algısını azaltmayı hedeflemiştir. Böylece, niyetin ve davranışın da azalması beklenmiştir. Ancak, Türkçe'ye uyarlanarak kullanılan ölçekte algılanan davranışsal kontrol değişkeni, hız yapmaktan kaçınma davranışı üzerindeki kontrol algısını ölçmektedir. Dolayısıyla, bu iki değişkenin tam anlamıyla örtüşmemesi PA müdahalesinden sonra yapılan ölçümlerde algılanan davranışsal kontrol değişkeninin niyeti yordayıcı etkisini azaltmış olabilir. Sonuçlar ayrıca göstermiştir ki, tutumlar ve prototip benzerliği davranışı hem isteklilik üzerinden hem de doğrudan yordayabilmiştir. Diğer bir deyişle, hız davranışına ilişkin olumlu tutumlar ile sürücülerin hız yapan tipik bireyle olan benzerlik algıları azaldıkça, hız yapmaya yönelik isteklilikleri de dolayısıyla davranışları da azalmıştır. Diğer ölçümlerde olduğu gibi, prototip , bu ölçümde de, ne istekliliği ne de davranışı yordamayı başarmıştır. Bunun bir sebebi, bu değişkenin ölçümün yapıldığı grup üzerinde etkili olmaması olabilir. Bu çalışmanın yapıldığı kültürde veya uygulanan katılımcı grubunda, hız yapan tipik bireye olumlu özellikler atfedilmiyor olabilir. Aksine, bu sürücüler toplumda daha aşağı bir sınıfa ait görülüyor olabilirler. Bu olasılık, özellikle de müdahale ve ölçümler sırasında alınan geri bildirimlerle desteklenmiştir. Dolayısıyla, bu ve benzeri gruplarda yapılacak benzer bir müdahalede, prototip olumluluğundan ziyade prototip benzerliğine odaklanmak daha iyi sonuçlar verebilir.

3.3. Genel Değerlendirme ve Sonuç

Bu çalışmanın hem literatür hem saha için önemli katkıları olduğu düşünülmektedir. Öncelikle, PA'nın etkileri daha önce herhangi bir kuramsal çerçeve üzerinden araştırılmamıştır. Bu çalışmada ise iki farklı davranış modelinin, PDT ve PİM'in, bütünleştirilmesiyle oluşturulan kuramsal çerçeveye oturtularak her bir değişkenin etkililiği araştırılmıştır ve anlamlı sonuçlara ulaşılmıştır. Bununla birlikte, üç farklı zaman diliminde katılımcılardan veri toplanarak müdahalenin ve davranış modelinin etkililiğinin zaman içerisindeki değişimi gözlemlenebilmiştir. Bu çalışmanın, bu anlamda yarı deneysel bir çalışma olması sebebiyle uygulama alanında trafik güvenliği için bütük katkı sağlayabileceği düşünülmektedir. Psikoloji biliminde bu değişimin incelenebilmesi açısından, bu tür boylamsal çalışmaların değerli olduğunu söyleyebiliriz. Bu çalışma, aynı zamanda, sahaya da önemli katkılar sağlayabilir. PA müdahalesini kullanarak hız davranışı ve trafikteki benzer risk davranışlarını azaltmanın mümkün olabileceği sonucuna varabiliriz. Ehliyetine hız ihlalleri nedeniyle el konan veya hız limitlerini aşarak kazaya karışan sürücülere PA eğitimi koşulu zorunlu kılınabilir. Bununla birlikte, billboardlarda trafik güvenliği eğitiminin bir parçası olarak, "gideceğim yere hızlı varmaya çalışmak can güvenliğimden daha önemlidir" gibi PA ifadeleri yer alabilir.

Bu çalışmanın, önemli katkıları olduğu düşünülse de, eksiklikleri de vardır. İlk olarak, davranış ölçümü beyana dayalı olarak yapılmıştır. Simülatör gibi davranışı daha gerçekçi temsil edebilecek bir ölçüm yöntemi daha güvenilir sonuçlar doğurabilirdi. Ancak, çalışmada kullanılan davranış modellerinin bir amacı da davranışı yordayabilmek olduğundan, ortaya çıkan bulgular doğrultusunda, diğer

bilişsel yapılara dayanarak davranış hakkında da çıkarım yapmak mümkündür. Bir başka eksiklik ise katılımcılar arasında sürüş deneyimi 250 km kadar az olan katılımcıların bulunmasıdır. Bu katılımcılar için araç kullanımı henüz otomatikleşmediğinden, trafikteki genel sürücü prototipini yansıttığını söyleyemeyiz. Son olarak, katılımcıların pek çoğu hız ihlali yapmadığını beyan eden sürücülerden oluşmaktadır. Bu da PA'nın etkililiğini daha küçük bir örneklemde test etmiş olmaktadır. Gelecekteki araştırmaların bu konuları ele alarak daha iyi bir yöntem ile PA'nın etkilerini test etmesi tavsiye edilmektedir.

H: TEZ İZİN FORMU / THESIS PERMISSION FORM

ENSTİTÜ / INSTITUTE

Fen Bilimleri Enstitüsü / Graduate School of Natural and Applied Sciences	
Sosyal Bilimler Enstitüsü / Graduate School of Social Sciences	X
Uygulamalı Matematik Enstitüsü / Graduate School of Applied Mathematics	
Enformatik Enstitüsü / Graduate School of Informatics	
Deniz Bilimleri Enstitüsü / Graduate School of Marine Sciences	

YAZARIN / AUTHOR

Soyadı / Surname : SİMSER
Adı / Name : BERFİN SERENAT
Bölümü / Department : Psikoloji / Psychology

TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English) : The Effects of Psychological Inoculation on Drivers' Speeding Behavior

TEZİN TÜRÜ / DEGREE: **Yüksek Lisans** / Master [X] **Doktora** /PhD [ ]

1. **Tezin tamamı dünya çapında erişime açılacaktır.** / Release the entire work immediately for access worldwide. [X]
2. **Tez iki yıl süreyle erişime kapalı olacaktır.** / Secure the entire work for patent and/or proprietary purposes for a period of **two year *** [ ]
3. **Tez altı ay süreyle erişime kapalı olacaktır.** / Secure the entire work for period of **six months**. ***** [ ]

** Enstitü Yönetim Kurulu Kararının basılı kopyası tezle birlikte kütüphaneye teslim edilecektir. A copy of the Decision of the Institute Administrative Committee will be delivered to the library together with the printed thesis.*

Yazarın imzası / Signature ..... **Tarih** / Date .....