YOUNG DRIVER BEHAVIORS IN RELATIONS TO THE IMPLICIT AND EXPLICIT DRIVING SKILLS

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

BY

İBRAHİM ÖZTÜRK

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

SEPTEMBER 2017

Approval of the Graduate School of Social Sciences

Prof. Dr. Tülin Gençöz
Director

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

Prof. Dr. H. Canan Sümer
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.

Assoc. Prof. Dr. Türker Özkan
Supervisor

Examining Committee Members

Prof. Dr. Yeşim Yasak (Çankırı Karatekin Uni, PSY) ____________________

Assoc. Prof. Dr. Türker Özkan (METU, PSY) ____________________

Assist. Prof. Dr. Bahar Öz (METU, 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 : İbrahim Öztürk

Signature :

ABSTRACT

YOUNG DRIVER BEHAVIORS IN RELATIONS TO THE IMPLICIT AND EXPLICIT DRIVING SKILLS

Öztürk, İbrahim
M.S., Department of Psychology
Supervisor : Assoc. Prof. Dr. Türker Özkan

September 2017, 137 pages

Road traffic accidents are one of the important public health problems for all age groups, especially for the young people. Young drivers show more aberrant driver behaviors and are overly represented in road traffic accidents. The driving skills and driver behaviors are important predictors of road traffic accidents. Driving skills and driver behaviors might be measured by using self-reports, driving simulators, and implicit measurements. In this thesis, the relationship between self-reported and implicit driving skills and self-reported and simulated driver behaviors were investigated among young female and male drivers. The results showed that, in general, unlike implicit driving skills, self-reported driving skills are important predictors of both self-reported and simulated driver behaviors. Self-reported safety skills were found to be negatively related to self-reported violations and the mean speed in different road segments in a driving simulator. Moreover, self-reported perceptual-motor skills were found to be positively related to self-reported violations and positive driver behaviors, and simulated speeding and lane keeping behaviors and negatively with self-reported errors. Overall, the results are important in terms of the examining the relationship between driving skills and driver behaviors. The study also showed that the characteristics of the driving simulation scenario are an important factor while examining the driving skills and driver behaviors. Future studies might be conducted by including different age and experience groups with different types of driving scenarios.

Keywords: young drivers, driving skills, driver behaviors, driving simulator, implicit measurement

ÖZ

ÖRTÜK VE AÇIK SÜRÜCÜ BECERİLERİNE İLİŞKİN GENÇ SÜRÜCÜ DAVRANIŞLARI

Öztürk, İbrahim
Yüksek Lisans, Psikoloji Bölümü
Tez Yöneticisi : Doç. Dr. Türker Özkan

Eylül 2017, 137 sayfa

Karayolu trafik kazaları, bütün yaş grupları için, özellikle de genç insanlar için, önemli halk sağlığı problemlerinden biridir. Genç sürücüler sapkın sürücü davranışlarını daha fazla göstermekte ve karayolu trafik kazalarında fazlaca temsil edilmektedir. Sürüş becerileri ve sürücü davranışları karayolu trafik kazalarının önemli yordayıcılarındandır. Sürüş becerileri ve sürücü davranışları öz-beyana dayalı, sürüş simülatörü ve örtük ölçüm yöntemleri kullanılarak ölçülebilir. Bu tez çalışmasında, genç erkek ve kadın sürücülerde, öz-beyana dayalı ve örtük sürüş becerilerinin öz-beyana dayalı ve simülatördeki sürücü davranışlarına etkisi araştırılmıştır. Sonuçlara, genel olarak, örtük sürüş becerilerinin aksine, öz-beyana dayalı sürüş becerilerinin hem öz-beyana dayalı hem de sürüş simülatöründeki sürücü davranışlarının anlamlı bir yordayıcısı olduğunu göstermiştir. Öz-beyana dayalı güvenlik becerileri sürüş simülatöründeki farklı yol seğmenlerindeki ortalama hız ve öz-beyana dayalı ihlaller ile negatif ilişki göstermiştir. Ayrıca, öz-beyana dayalı algı-motor becerileri öz-beyana dayalı ihlaller ve pozitif sürücü davranışları ve sürüş simülatöründeki hız ve şerit takibi davranışları ile pozitif, öz-beyana dayalı hatalar ile negatif ilişki göstermiştir. Genel olarak, sonuçlar sürüş becerilerinin ve sürücü davranışlarının ilişkisinin araştırılması açısından önemlidir. Bu çalışma ayrıca sürüş simülatöründeki senaryo özelliklerinin sürüş becerileri ve sürücü davranışlarını araştırmada önemli bir faktör olduğu göstermiştir. Gelecekteki çalışmalar farklı yaş ve tecrübe gruplarını da dahil ederek farklı sürüş senaryolarında gerçekleştirilebilir.

Anahtar Kelimeler: genç sürücüler, sürüş becerileri, sürücü davranışları, sürüş simülatörü, örtük ölçüm

To My Grandparents

ACKNOWLEDGMENTS

There are many wonderful people who have some traces in this thesis and in my life.

First of all, I would like to thank my supervisor Dr. Türker Özkan for being the ultimate guide for my thesis, academic life, and life in general. I always feel the support and guidance of him and learn many things through sharing. I am also thankful for giving, guiding, and helping in shaping my motivation. Additionally, I also thank him for always making me feel that I learn new things in every conversation, integrating different information and developing different perspectives.

I am also thankful to my jury member, Dr. Bahar Öz, for her valuable feedbacks and for introducing the traffic and transportation psychology field, helping in shaping my academic life and guiding me throughout my education. Additionally, I also thank my head of jury member, Prof. Dr. Yeşim Yasak, for her valuable and kind feedbacks.

Together, I am very lucky to meet and work with one of the most important Traffic and Transportation Psychology lecturers, Dr. Timo Lajunen, Dr. Türker Özkan, and Dr. Bahar Öz. I thank them for supporting me and letting me be a part of something big and valuable.

In addition to my advisor and jury members, I also want to thank some special people whose support I always feel. First of all, I thank Pınar Bıçaksız and Yeşim Üzümcüoğlu Zihni for providing me best advisory, teaching, and friendly environment that encourages my motivation. I cannot express my feelings for teaching me how to share information, energy, and tea in every project we made together. I always feel their presence while writing this thesis.

I am also thankful to U. Uygar Erkuş and Bilgesu Kaçan for their support throughout data collection and after that. I also thank Özgün Özkan for being a good coworker and friend, supporting me and creating many ideas from the first day of my graduate education.

I thank the dear members of Safety Research Unit for being one of the most beautiful group and leading me to think differently about all kinds of transportations and road users. Finally, I am also thankful to my family for supporting me through my life even though I always live far away.

This thesis was supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK), I want to thank TÜBİTAK/BİDEB for their financial support.

TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

LIST OF ABBREVIATIONS

BIAT	Brief Implicit Association Test
DBQ	Driver Behaviors Questionnaire
DSI	Driver Skill Inventory
RTA	Road Traffic Accident
TUIK	Turkish Statistical Institute
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

Road traffic accidents (RTAs) are one of the most important public health problems all over the world. Each year, RTAs result in more than 1.25 million deaths and millions of injured people. For all age groups, road traffic accidents are one of the leading causes of death. Especially for young people, these accidents are the first cause of death (WHO, 2015a; 2015b). It is also found that 74% of the all road traffic deaths happened in middle-income countries, such as Turkey, where most of the world population live and approximately half of the cars are registered (WHO, 2015a). Road traffic accidents are also an important problem in Turkey (TUIK, 2016; WHO, 2015a). The number of traffic accidents with injured and dead people are continuously increasing since 2006 (TUIK, 2016).

1.1 Human Factors in Road Traffic Safety

In terms of the causes of road traffic accidents, human factors were found to be a single factor for the 57% of the accidents and contributing factor for over 90% of the accidents (Lewin, 1982; Treat et al., 1977). It is also reported that human error, especially driver error, was found to be the leading cause of accidents for more than 90% of road traffic accidents in Turkey (TUIK, 2016). Especially, younger drivers were found to be more vulnerable and riskier compared to older drivers (Sümer, Özkan, & Lajunen, 2006; WHO, 2015a).

In the studies related to traffic safety, human factors are mostly investigated as two distinct factors which are driver behaviors and driving skills (Parker & Stradling, 2001). Driver behaviors are defined as what drivers “do” while driving by focusing on the individual driving styles of drivers. On the other hand, driving skills are defined as what drivers “can do”. These skills involve information-processing and motor skills that might be developed with driving experience (Elander, West, & French, 1993).

Lajunen and Özkan (2011) developed a model that identifies the path to crash through driving skills and driving style which is driver behavior (see Figure 1). According to this model, driver errors are the outcome of driving skills and safety margins are the outcomes of driver behaviors. As seen in the model, different driver related factors affect the errors and safety margins through driving skills and driver behaviors which result in accidents.

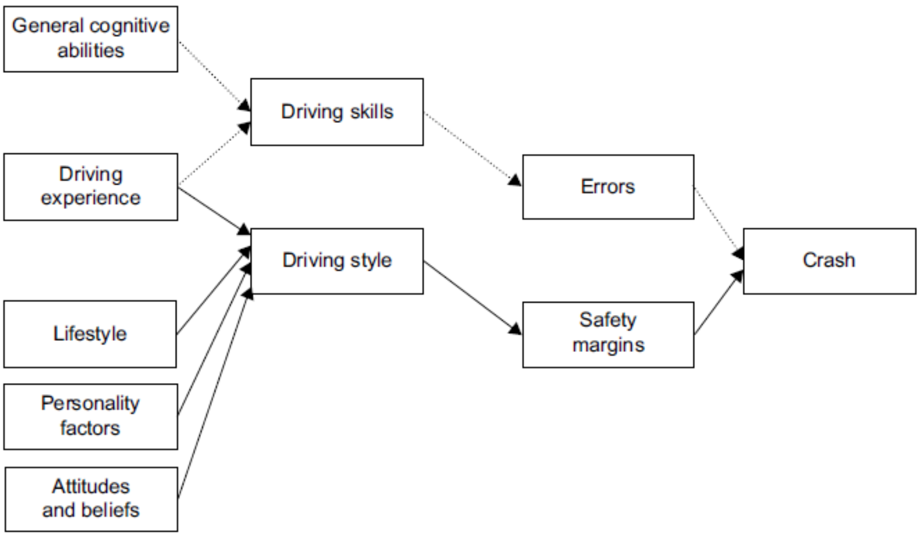

Figure 1. Two pathways to crash (Lajunen & Özkan, 2011)

1.2 Driving Skills

Driving skills are identified as two components perceptual-motor skills and safety skills. The most common measurement of driving skills, the Driver Skill Inventory (DSI), was developed by Lajunen and Summala (1995). Perceptual-motor skills include drivers' ability to handle or control a car, in other words, technical driving skills. On the other hand, safety skills represent the drivers' skills in terms of safe driving and avoiding accidents (Lajunen & Summala, 1995). In the measurement, certain characteristics of driving skills are rated by the drivers stating their own strong and weak sides of the driving (Lajunen, Corry, Summala, & Hartley, 1998a).

It should be also noted that the DSI measures the skill and safety orientation of drivers rather than measuring the actual level of skills (Lajunen & Özkan, 2011).

The DSI was found to be reliable and showed same two-factor structure across different countries such as Finland (Lajunen & Summala, 1995), Australia (Lajunen et al., 1998a), Germany (Ostapczuk, Joseph, Pufal, & Musch, 2017) and Turkey (Sümer et al., 2006). Özkan, Lajunen, Chliaoutakis, Parker, and Summala (2006a) also conducted a cross-cultural study with six countries and found that Driver Skill Inventory might be used in different cultures for the measurement of perceptual-motor and safety skills.

In a study conducted by Sümer and colleagues (2006), the perceptual-motor skills and safety skills showed the asymmetric relationship. The asymmetric relationship indicated that perceptual-motor skills were positively associated with unsafe traffic outcomes whereas safety skills were negatively associated with these outcomes. In terms of penalties, perceptual-motor skills were positively and safety skills were found to be negatively related. It is also stated that the overestimation of perceptual-motor skills might lead to aberrant driver behaviors but safety skills might have a different role that results in a decrease in the negative effects of these behaviors (Sümer et al., 2006).

Certain demographic characteristics result in differences in driving skills (Delhomme, 1991; Lajunen & Summala, 1995; Özkan & Lajunen, 2006). It has been found that drivers tend to have more positive ratings for themselves compared to average drivers (Delhomme, 1991). Especially, young male drivers tend to overestimate their perceptual-motor skills compared to other drivers. However, the overemphasis of perceptual-motor skills might be because of the driver education and cultural expectations (Sümer et al., 2006).

Age is one of the important factors affecting drivers' self-assessment of driving skills. However, there are some contradictory findings in terms of the relationship between age and driving skills. Younger drivers reported lower levels of perceptual-motor skills (Özkan & Lajunen, 2006; Sümer et al., 2006). In another study, older drivers show higher levels of both perceptual-motor skills and safety skills (Ostapczuk et al., 2017). On the other hand, perceptual-motor skills were found to be negatively correlated with age whereas safety skills were found to be positively correlated with age (Martinussen, Møller, & Prato, 2014).

In terms of experiences as mileage or licensing year, drivers with higher experiences tend to state having higher perceptual-motor skills but lower safety skills (Lajunen & Summala, 1995; Lajunen et al., 1998a). Moreover, drivers with higher mileage and older driving license reported significantly higher levels of perceptual-motor skills but not safety skills (Ostapczuk et al., 2017; Özkan & Lajunen, 2006; Sümer et al., 2006). It has been also found that drivers show higher driving skills as they gained experience through training (Boccara, Delhomme, Vidal-Gomel, & Rogalski, 2011). The negative effects of driving experience over driving skills might be because of the problems in learning and feedback (Lajunen & Summala, 1995).

In terms of gender differences, male drivers reported higher levels of both perceptual-motor skills and safety skills than female drivers (Delhomme, 1991; Lajunen et al., 1998a). However, some studies indicated no difference between male and female drivers (Lajunen & Summala, 1995) and some studies showed that male drivers have significantly higher levels of perceptual-motor skills but female drivers have significantly higher levels of safety skills (Martinussen et al., 2014; Özkan & Lajunen, 2006). Lajunen and Summala (1995) also stated that inexperienced male and female drivers show themselves as more safety oriented.

It has been reported that self-assessment of driving skills of young male drivers is inconsistent with their driving performance and changes according to the levels of driving experience. Less skilled drivers and more experienced young male drivers are found to be more inconsistent in terms of the self-assessment of driving skills (Martinussen, Møller, & Prato, 2017).

However, de Craen, Twisk, Hagenzieker, Elffers, and Brookhuis argued that the determination and comparisons of skills depend on how the driving skills were evaluated. Novice drivers reported having higher skills when they compared themselves with peer drivers but experienced drivers, compared to novice drivers, reported higher skills when they compared themselves with average drivers. It is also criticized that novice drivers did not overestimate their skills compared to average drivers (2011).

In terms of the outcomes of driving skills, in general, drivers with higher levels of perceptual-motor skills and lower levels of safety skills were found to be more dangerous than other drivers with different levels of driving skills (Martinussen et al., 2014; Sümer et al., 2006). Drivers with higher safety skills reported better safety records (Özkan & Lajunen, 2006). It has been also found that drivers with higher levels of safety skills reported a lower number of accidents, penalties, and speeding. On the other hand, perceptual-motor skills were found to be positively correlated with accidents, penalties, and speeding. Drivers with higher levels of perceptual-motor skills reported lower levels of dislike of driving. However, drivers with higher levels of safety skills reported lower levels of driver aggression and higher levels of dislike of driving. Moreover, speeding was found to be positively correlated with perceptual-motor skills and negatively correlated with safety skills. Safety skills were also found to be a significant predictor of speeding (Lajunen et al., 1998a).

In the comparison of six countries in terms of perceptual-motor skills and safety skills, safety skills were found to be negatively correlated with penalties in every country. However, only in Finland, Greece, and the Netherlands, perceptual-motor skills were found to be positively correlated with penalties. In terms of accidents, perceptual-motor skills were positively correlated with accidents in Iran and safety skills were negatively correlated in Greece and Iran (Özkan et al., 2006a). However, in a different study, country differences in terms of perceptual-motor skills and safety skills were not found to be related to accident statistics whereas self-reported safety skills were negatively associated with accident involvement in four countries. (Warner, Özkan, Lajunen, & Tzamaloukas, 2013). Moreover, in another study, it was found that DSI scores did not contribute to accident involvement (Bener & Crundall, 2008).

1.3 Driver Behaviors

Driver behaviors include various errors and violations while driving. The aberrant behaviors of drivers are measured by the Driver Behavior Questionnaire (DBQ) that was developed based on a taxonomy and divide these behaviors into two main categories named as violations and errors (Reason, Manstead, Stradling, Baxter, & Campbell, 1990). The DBQ is found to be the most common self-reported measurement of driver behaviors (Lajunen & Özkan, 2011; de Winter & Dodou, 2010). The DBQ has been used for the assessment of aberrant driver behaviors and prediction of accident involvement (Cordazzo, Scialfa, Bubric, & Ross, 2014). The DBQ has been used in different countries (de Winter & Dodou, 2010) such as Australia (Stephens & Fitzharris, 2016), France (Guého, Granié, & Abric, 2014), Denmark (Martinussen, Hakamies-Blomqvist, Møller, Özkan, & Lajunen, 2013), Ireland (Mattsson, O'Brien, Lajunen, Gormley, & Summala, 2015), and Turkey (Özkan & Lajunen, 2005).

The Driver Behavior Questionnaire (DBQ) is developed by using a taxonomy on the aberrant behaviors. The behaviors divided into two factors, violations and errors that are believed to have different origins. Errors which classified as slips, lapses, and mistakes are defined as "the failure of planned actions to achieve their intended consequences". On the other hand, violations, aggressive and ordinary violations, are defined as "deliberate deviations from those practices believed necessary to maintain the safe operation of a potentially hazardous system" (Reason et al., 1990). Lajunen and Özkan (2011) defined errors as the unintentional mistakes that result in serious consequences and lapses as the behaviors that are not dangerous but seen because of memory failures. The first-factor structure of the DBQ indicated three factors, as deliberate violations, dangerous errors, and silly errors (Reason et al., 1990; Parker, Reason, Manstead, & Stradling, 1995). The factor structure of the DBQ show a good differentiation intentional and unintentional aberrant driver behaviors (Martinussen et al., 2013). However, af Wåhlberg, Dorn and Kline (2011) stated that many different versions of DBQ with different items and factor structures have been applied in different studies.

Age was found to be significantly negatively correlated with violations, errors, and lapses (Martinussen et al., 2014). Younger drivers show higher levels of violations (Guého et al., 2014; Özkan et al., 2006b, Reason et al., 1990; Rowe, Roman, McKenna, Barker, & Poulter, 2015) and errors (de Winter & Dodou, 2010). The level of violations decreased with age (de Winter & Dodou, 2010; Reason, 1990). However, some studies reported that errors did not decrease with age (Reason et al., 1990). Moreover, violations were a stronger predictor of accident involvement for young drivers compared to old drivers (de Winter & Dodou, 2010). For female drivers, it has been also found that young drivers show more errors and violations compared to middle aged female drivers (Dobson, Brown, Ball, Powers, & McFadden, 1999).

Driving errors were also found to negatively related to experience. Novice drivers reported higher levels of errors (Guého et al., 2014). Drivers with a higher experience report fewer errors that are either because of distractions or inexperience (Shi, Bai, Ying, & Atchley, 2010). Moreover, drivers with higher mileage show higher levels of violations (de Winter & Dodou, 2010; Zhang, Jiang, Zheng, Wang, & Man, 2013). The low levels of violations might be seen because of the reason that drivers with low exposure to the driving environment do not develop aggressive violations (Zhang et al., 2013). In addition to these, weekly mileage significantly and negatively predicted inattention and inexperience errors and positively predicted ordinary and aggressive violations. Drivers with higher weekly mileage show more violations and fewer errors (Guého et al., 2014).

In terms of gender difference in DBQ, male drivers show higher levels of violations than female drivers in different ages (Reason et al., 1990). Especially for young drivers, male drivers report higher levels of ordinary and aggressive violations compared to female drivers (Rowe et al., 2015). On the other hand, female drivers also reported higher levels of errors (Guého et al., 2014; Reason et al., 1990), lapses (Stephens & Fitzharris, 2016) and slips (Rowe et al., 2015). In a different study, male drivers reported higher levels of violations, errors but female drivers reported higher levels of lapses (Martinussen et al., 2014; Özkan, Lajunen, & Summala, 2006b).

Male drivers also show higher numbers of aggressive violations (Hassan & Abdel-Aty, 2013; Stephens & Fitzharris, 2016). Moreover, male drivers show more aggressive and parking violations (Kontogiannis, Kossiavelou, & Marmaras, 2002). Shi and colleagues (2010) found that male drivers show more violations that are named as emotional and self-willed whereas female drivers report more violations that are caused because of lack of experience. Moreover, male drivers show higher violations and female drivers show higher errors in simulation-based driver training (de Winter, Wieringa, Kuipers, Mulder, & Mulder, 2007).

For the relationship between DBQ and accident involvement, DBQ subscales were found to be significantly associated with self-reported accident history (af Wåhlberg et al., 2011; Cordazzo et al., 2014). Violations, errors, and lapses were found to be significantly and positively correlated with accident involvement (Cordazzo et al., 2014). Errors and violations dimensions of the DBQ are equal predictors of self-reported accident involvement (de Winter & Dodou, 2010). In a different study, ordinary violations were also found to be strongly correlated with accident involvement. However, the effects of aggressive violations and slips disappeared after controlling for other DBQ factors. On the other hand, errors were found to be negatively correlated with crash involvement. Drivers with higher levels of errors reported lower numbers of accidents (Rowe et al., 2015).

In addition to these, after controlling demographic and descriptive variables, violations predict accident involvement (Gras et al., 2006; Zhang et al., 2013). It is also claimed that violations are predictive of accident involvement regardless of cultural, language, and driving condition differences (Gras et al., 2006).

In addition to these aberrant drivers, one of the most common aberrant driver behaviors is speeding (Hassan, Shawky, Kishta, Garib, & Al-Harthei, 2017). Drivers' speed choices change with different factors. In general, drivers reported that they prefer to drive over safe speed limit 2 or 3 km/h but their actual speed was below the speed that reported (Ahie, Charlton, & Starkey, 2015). Goldenbeld and van Schagen (2007) found that drivers prefer to drive faster on roads where the speed limit is 80 km/h. It has been also found that young drivers show higher speed preferences than older drivers. Moreover, road and roadside characteristics are also effective in younger drivers' speed preferences (Goldenbeld & van Schagen, 2007). In another study, it has been found that female drivers prefer to drive in lower speeds than male drivers. Moreover, drivers who see themselves as less safety oriented are more likely to drive at higher speeds (Sadia, Bekhor, & Polus, 2015). Young drivers tend to drive over speed limit more and perform multi task (Hassan & Abdel-Aty, 2013).

In addition to aberrant driver behaviors as ordinary violations, aggressive violations, errors, and lapses, Özkan and Lajunen (2005) developed positive driver behaviors dimension for the DBQ. The positive driver behaviors are defined as the behaviors that are characterized by an intention to take care of the traffic environment and other road users. These behaviors involve being polite and helping other (Özkan & Lajunen, 2005). The measurement of positive behaviors is especially important because these behaviors are not commonly studied (Guého et al., 2014). These positive driver behaviors show negative correlations with errors and violations. Young and inexperienced drivers show lower levels of positive driver behaviors. It was found that older drivers reported more positive driver behaviors than young drivers (Guého et al., 2014; Özkan & Lajunen, 2005). Young drivers might show less positive drivers because they tend to focus on traffic situations because of lack of experience (Guého et al., 2014).

1.4 The Relationship between Driving Skills and Driver Behaviors

Although there are many studies examining the relationship driving skills and driver behaviors with traffic related outcomes, there are few studies examining the relationship between driving skills and driver behaviors. In terms of this relationship, it was found that drivers with low levels of safety skills tend to exhibit aberrant driver behaviors such as violations and these behaviors result in risky driving (Sümer et al., 2006; Sümer & Özkan, 2002). Moreover, drivers with higher levels of perceptual-motor skills reported higher violations and lower errors and lapses but drivers with higher levels of safety skills reported lower violations, errors, and lapses (Martinussen et al., 2014). On the other hand, Lajunen, Parker, and Stradling (1998b) also found that only safety skills showed significant and negative correlation with aggressive and ordinary violations.

In a different study, Martinussen and colleagues (2014) used the combination of perceptual-motor skills and safety skills to investigate aberrant driver behaviors. Drivers who see themselves above average drivers in terms of skills tend to exhibit riskier driver behaviors because they might believe that they have all necessary skills to handle riskier situations and evaluate the situations as less dangerous (Martinussen et al., 2014; Reason et al., 1990). Drivers with higher levels of perceptual-motor skills and safety skills are low in aberrant driver behaviors. However, drivers with higher levels of perceptual-motor skills and lower levels of safety skills reported higher numbers of violations. Drivers with lower levels of perceptual-motor skills and safety skills are high in both violations and errors (Martinussen et al., 2014).

1.5 Young Male and Female Drivers and Traffic Safety

One of the major problems concerning road traffic accidents is the high risk and accident involvement of young drivers (Bener & Crundall, 2008; Weiss, Kaplan, & Prato, 2014). Young drivers and male drivers from different countries reported higher levels of aberrant behaviors especially speeding (Gheorghiu & Havârneanu, 2012; Scott-Parker & Oviedo-Trespalacios, 2017; WHO, 2015). Young drivers experienced more accidents than older drivers (Laapotti, Keskinen, Hatakka, & Katila, 2001). Young drivers also involved higher numbers of accidents with respect to their exposure level (Bener & Crundall, 2008; Gray, Quddus, & Evans, 2008). Even after controlling annual mileage, young drivers continue to be a risk group compared to other age groups (Lourens, Vissers, & Jessurun, 1999). Gregersen and Bjurulf (1996) stated that there are many factors and interactions of these factors that contribute to the problems of young drivers in the traffic.

Male drivers reported significantly higher levels of accidents, both active and passive accidents, compared to female drivers (Amarasingha & Dissanayake, 2014; Bener & Crundall, 2008; Özkan & Lajunen, 2006; Rowe et al., 2015). Male drivers also report higher mileage than female drivers (Bener & Crundall, 2008). Hassan and Abdel-Aty

(2013) also found that gender, driving experience and annual mileage affect young drivers' accident involvement through in-vehicle distractions and attitudes toward speeding. Female drivers show higher in-vehicle distractions than male drivers.

Amarasingha and Dissanayake (2014) investigated the gender differences in young drivers in the traffic environment. In general, young male drivers are found to be riskier than young female drivers because they involved higher numbers of accidents than young female drivers. The reasons behind the accidents were also different for male and female drivers. For example, when there was an accident, young male drivers show higher numbers of cases such as driving without valid licenses and driving under the influence of alcohol. On the other hand, young female drivers experienced higher numbers of accidents with minor injuries. Female drivers experienced more parking accidents than male drivers (Amarasingha & Dissanayake, 2014; Bener & Crundall, 2008). This might be explained by the fact that female drivers drive less than male drivers and this result in a high frequency of experiencing non-fatal accidents than fatal accidents (Massie, Campbell, & Williams, 1995).

Laapotti and Keskinen (2004) investigated the accident patterns of male and female drivers between 1984 and 2000. Male drivers got higher numbers of traffic offenses. It is also found that the gender difference between drivers is bigger in young drivers than older drivers. Female drivers experienced accidents that are caused by the problems in the lower levels of driver behaviors. On the other hand, male drivers experienced accidents because of violations such as speeding (Laapotti et al., 2001; Laapotti & Keskinen, 2004).

In general, even though male drivers show higher risk in terms of accident involvement compared to female drivers (Amarasingha & Dissanayake, 2014; Bener & Crundall, 2008; Özkan & Lajunen, 2006), young female drivers were also evaluated as riskier group compared to middle aged female drivers (Dobson et al., 1999).

1.6 Different Measurements in Traffic and Transportation Psychology and Traffic Safety

1.6.1 Explicit and Implicit Driver Measurements

Explicit, self-reported measurements are mostly preferred over simulator and instrumented car studies because of many advantages such as being less expensive, getting detailed information, and being able to reach large numbers of people (Lajunen & Özkan, 2011; Lajunen & Summala, 2003).

Although one of the most common measurements of driver behaviors, the DBQ, and one of the most common measurements of driving skills, the DSI are self-reported measurements, the reliability and validity problems exist. The validity issues of self-reported driver behaviors are not also studied much (Lajunen & Özkan, 2011). One of the problems using self-reports is social desirability (Lajunen & Summala, 2003). Lajunen and Summala (2003) found that social desirability has a relatively small effect on DBQ responses.

In a different study, self-reported instruments are found to be positively correlated with actual driving and simulated driving performance (Taubman-Ben-Ari, Eherenfreund-Hager, & Prato, 2016). However, it was also found that although DBQ subscales show significant association with self-reported accidents, the relationship does not continue with objective data (af Wåhlberg et al., 2011). In another study, it is also found that DBQ and DSI have not been associated accident involvement (Bener & Crundall, 2008). Moreover, Lajunen and Özkan (2011) also stated that, for example, automatization might affect the awareness of skills of experienced drivers. In general, the problems associated with self-reported DBQ or DSI are the problems of all self-reported measurement. However, it might be better to measure driver behaviors rather than driving skills with self-reports (Lajunen & Özkan, 2011).

In addition to self-reported questionnaires, there are also indirect measures. The Implicit Association Test (IAT) has been the most popular indirect measurement with a strong internal consistency, validity, and being adaptable into different research areas (Bar-Anan & Nosek, 2014). Moreover, the Brief Implicit Association Test (BIAT) is a short version of IAT involving fewer trials. In BIAT, same as IAT, participants evaluate focal concepts as belonging to a certain concept or not belonging to that concept (Nosek, Greenwlad, & Banaji, 2005). The BIAT show one of the highest psychometric qualities (Bar-Anan & Nosek, 2014).

The indirect measurements or implicit tests are not commonly used in driver behavior studies (Fulcher, Parkhurst, Alford, & Musselwhite, 2014; Harré & Sibley, 2007). The implicit measurements are less preferred compared to self-reported measurements in road safety studies. It was found that implicit measurements of attitudes toward risk and safety showed relatively low correlations with DBQ and DSI (Martinussen, Sømhovd, Møller, & Siebler, 2015).

In a different study, indirect measurement of speeding was found to be reliable and valid. Implicit and explicit attitudes of speeding were found to be positively correlated. Implicit attitudes toward speeding were also found to be positively correlated with minor accidents and violations indication that drivers with a high implicit preference for speeding reported higher accidents and violations (Rusu, Sârbescu, Moza, & Stancu, 2017). In addition to speeding behaviors, implicit measures are also used for helmet-use (Ledesma et al., 2015) and behavioral adaptations to changes in road characteristics (Lewis-Evans & Charlton, 2006). Özkan, Doğruyol, Harma, Bıçaksız, and Lajunen (2013) found that implicit and self-reported driving skills are related concepts but have different structures and that might be because of use of different cognitive paths. Drivers reported higher implicit perceptual-motor abilities compared to other drivers.

1.6.2 Driving Simulator

Driving simulators are one of the most common measurement tools of driving skills and driver behaviors by using experimental methods. The components of driving simulators range from one display screen to more complicated versions (Carsten & Jamson, 2011). The simulators show more accuracy and high fidelity compared to the old versions with the development of technology (Domeyer, Cassavaugh, & Backs, 2013).

Studies with driving simulators are seen as a new alternative to the other measurement methods such as field studies because of many theoretical and practical reasons (Bella, 2008; Brooks et al., 2010). Driving simulators are preferred for many reasons. For example, driving simulators provide control over the experiments and might be used to examine driver behaviors that are not easy and are also risky to observe in real life (Carsten & Jamson, 2011; Helman & Reed, 2015).

Driving simulators are used for different purposes (Carsten & Jamson, 2011; de Winter et al., 2009) such as training (de Winter et al., 2009) and speed research (Bella, 2008). Driving simulators are also found to be a valid measurement of real driver behaviors when the results compared with self-reported driver behaviors (Reimer, D'Ambrosio, Coughlin, Kafrissen, & Biederman, 2006). Moreover, it has been also found that driving simulators are valid instruments with concurrent and discriminant validities. Drivers' performance in a driving simulator is found to be positively correlated with on-road performance (Mayhew et al., 2011).

1.6.2.1 Simulator Behaviors and Driver Behaviors

Drivers' simulator performance was found to be correlated with on-road performance (Casutt, Martin, Keller, & Jäncke, 2014). Driving simulators were found to be valid instruments for the measurement of different driver behaviors and driver performance (de Winter et al., 2009) such as speeding (Bella, 2008; Helman & Reed, 2015), obeying traffic lights, and lane positioning (Meuleners & Fraser, 2015). Simulation-based programs might be also used to study the driver errors and violations differences made by DBQ (de Winter et al., 2007).

Helman and Reed (2015) examined the self-reported Driver Behavior Questionnaire and simulator behaviors. DBQ violations were found to be significantly correlated with speeding behaviors under different conditions in a driving simulator. Moreover, errors did not show any correlation with speed measurement in driving simulators.

Drivers usually drive faster in a driving simulator than on-road driving (Yang, Overton, Han, Yan, & Richards, 2014).

Driving simulators are found as a reliable measurement tool for the speeding behaviors of drivers (Chan, Pradhan, Pollatsek, Knodler, & Fisher, 2010; Godley, Triggs, & Fildes, 2002). Calvi, Benedetto, and de Blasiis (2015) investigated the speeding behaviors of drivers as a measurement of driving performance in a driving simulator with different road segments with different road characteristics. The results showed that the flow of the traffic affects the speeding behaviors of drivers. In a different study, drivers made less speeding violations in driving simulators than on-road performance. This might be explained by unfamiliarity with driving simulators. Moreover, driver behaviors as mirror checking, maintaining speed, and obeying traffic lights in driving simulator were found similar to on-road behaviors. However, drivers made higher speeding violations on-road than on driving simulator (Meuleners & Fraser, 2015). The characteristics of the road affect the speeding and lane position behaviors of drivers (Lewis-Evans & Charlton, 2006). Demographic variables such as gender and driving experience were also found to be correlated with driving simulator performance. Young male drivers and experienced drivers show more speeding behaviors in a driving simulator than female drivers and less experienced drivers (Taubman-Ben-Ari et al., 2016). In general, young drivers show more deviations of mean speed resulting in violations of some drivers by exceeding the posted speed limit (Doroudgar et al., 2017).

In addition to speeding behavior, lateral position or lane position is also another behavior studied in a driving simulator. Lateral position indicates the drivers' position with respect to roadway driving line (Dijksterhuis, Brookhuis, & de Waard, 2011). Lane keeping skills are measured by using the standard deviation of lateral position (Freydier, Berthelon, & Bastien-Toniazzo, 2016) and mean lateral position (Meuleners & Fraser, 2015; van Leeuwen, Happee, & de Winter, 2015).

1.6.2.2 Simulator Sickness and Adaptation to Driving Simulator

One of the factors that must be considered while conducting simulator studies is simulator sickness. Simulator sickness is defined as a form of motion sickness that is seen because of “a mismatch between the visual perception of acceleration or deceleration and vestibular sensation of the same motion” (Carsten & Jamson, 2011). Simulator sickness might be seen as a side effect of simulator studies (Brooks et al., 2010). The most common symptoms of simulator sickness are feeling sick to the stomach, the feeling might vomit, feeling hot, and sweaty. These symptoms were mostly seen in older drivers (Brooks et al., 2010).

In a different study, it is found that simulation sickness was also related to familiarity with simulation environment. Drivers who were familiar with the simulator environment reported less simulation sickness (Domeyer et al., 2013). It is also stated that the adaptation to the driving simulator depends on the characteristics of the road environment. Roads with complicated characteristics might require more time for adaptation to the driving environment and simulator (Ronen & Yair, 2013). However, although adaptation is seen as task-dependent, scenarios might be used to practice pedals and steering. Male and female drivers did not show any difference in terms of adaptation time to the driving simulator (Sahami & Sayed, 2013).

Some studies found that older drivers report higher numbers of simulation sickness compared to young drivers (Brook et al., 2010) whereas other studies did not find any difference between young, middle, and old drivers stating that the difference might be because of the subjective evaluation of overall well-being (Domeyer et al., 2013). Drivers with simulation sickness did not show any difference in terms of many driving measures such as lane keeping. However, drivers who experienced higher simulator sickness showed lower speed and steering wheel reversal in a driving simulator. Drivers with simulator sickness drove slower (Helland et al., 2016).

1.7 Aim of the Study

The aim of the present study is investigating the relationship between driving skills that are measured by using both self-reports and implicit measurements and driver behaviors that are measured by using both self-reports and a driving simulator. In addition to this, gender differences in terms of these variables and the relationship between self-reported speeding behaviors and simulated speeding behaviors are also investigated.

For the first time in the literature, the relationship between self-reported and implicitly measured driving skills and driving simulator behaviors are investigated together. Moreover, the implicit measurement of driving skills by using Brief Implicit Association Test (BIAT) is developed in this study.

CHAPTER 2

METHOD

2.1 Participants

80 drivers participated in the study. 2 participants, one male, and one female excluded from the study because of being outliers in terms of annual and total kilometers driven. Half of the participants (*N* = 39) were females and half of the participants (*N* = 39) were males. The age range was between 19 and 25 (*M* = 22.28, *SD* = 1.63). All participants have legal B type driving license minimum 1 and maximum 7 years (*M* = 3.53, *SD* = 1.58). Last year mileage ranged from 2500 km to 40000 km (*M* = 11218.18, *SD* = 9369.16). Total mileage ranged from 3750 km to 200000 km (*M* = 33867.10, *SD* = 35116.81).

2.2 Instruments

2.2.1 Demographic Information Form

In this section, participants were asked to state their demographic information and driving related history. Demographic information included age, gender, and education. Driving related questions included licensing year, type of mostly used gear, last year mileage, total mileage, active and passive accidents, tickets, speed preferences for urban roads, rural roads, roads with speed limit 50 km/h, 82 km/h, 90 km/h, and 100 km/h.

2.2.2 Driver Behavior Questionnaire (DBQ)

The Driver Behavior Questionnaire is a self-reported scale developed by Reason and colleagues (1990). The scale includes 28 items with 6-point Likert-type from 0 (never) to 5 (always). The scale consists of four subscales that are ordinary violations, aggressive violations, errors, and lapses. Sümer, Lajunen and Özkan (2002) adapted the scale into Turkish and the Turkish version of the scale was used in the current study (Sümer & Özkan, 2002). The factor analysis of the scale showed two factors solution as errors and violations. Errors consisted of 12 items with a Cronbach's Alpha level .75. Violations consisted of 13 items with a Cronbach's Alpha level .77. In addition to Reason and colleagues' scale, Özkan and Lajunen (2005) developed a scale that aims to measure positive driver behaviors. The scale is also 6-point Likert-type from 0 (never) to 5 (always). Positive driver behaviors scale consists of 14 items such as "Trafikte, diğer sürücülere engel teşkil etmemeye gayret göstermek." and with a Cronbach's Alpha level .55. The total scale consists of 42 items with 6-point Likert from 0 (never) to 5 (always).

2.2.3 Driver Skill Inventory (DSI)

The Driver Skill Inventory (DSI) is a self-reported scale that is developed to measure drivers' driving ability. The scale consists of two subscales that are perceptual-motor abilities and safety skills (Lajunen & Summala, 1995). The scale includes 20 items with 5-point Likert-type from 1 (very weak) to 5 (very strong). After the factor analysis, perceptual-motor skills subscale consists of 13 items such as "Seri araç kullanma". Safety skills consist of 7 items such as "Yeterli takip mesafesi bırakma". Participants are asked to rate their skills. Higher scores indicate higher levels of skills. The Turkish adaptation of the scale was used (Lajunen & Özkan, 2004). In this thesis, the internal consistency reliability coefficients of the perceptual-motor skills were found as .86. The internal consistency reliability coefficients of safety skills were found as .76.

2.2.4 Driving Scenario

To test the driver behaviors, STISIM Drive M100W (STISIM Drive® Model 100 Wide Field-of-View Complete System) with the software of STISIM DRIVE-M100W-ASPT driving simulator was used. The driving simulator consists of three driving displays and game-type driving controls. Computer screens were 22" LCD monitors (see Figure 2.). In this thesis, the only center screen was used to display scenarios (see Figure 3.).

Figure 2. STISIM Drive M100W Simulator

2.2.4.1 Test Scenario

Before the experiment scenario, every participant drove test scenario. Test scenario was used to introduce simulation equipment and system to the participants and test whether participants experience simulator sickness or not. After one test driving, all participants were asked to state whether they are ready to start experiment or not and experience any symptoms of simulation sickness. Every participant continued with the experiment scenario. None of the participants experienced any physiological problems that will indicate simulator sickness based on their self-reports. Some of the participants drove test scenario twice because of calibration problems or having difficulty understanding the simulation equipment.

Test scenario was the simple driving environment with four lanes road and three kilometers long. Two lanes on both side of the traffic, one sidewalk on both side of the traffic and not heavy traffic on the both side of the road were added to the scenario. There were five traffic lights that will turn into red or green when participants got closer to the traffic lights and force them to stop or change their speed. The driving scenario was in a manual shift so participants were introduced all of the components of the driving scenario. There are also some both left and right turn curves. Data regarding the test scenario was not collected.

Figure 3. Experiment Scenario in Single Screen

2.2.4.2 Experiment Scenario

The experiment scenario included four lanes and two lanes, 10 kilometers long road. There were two lanes on each side of the road and each lane was four meters width. There were lane lines between all of the lanes. The 1-degree slope from the center of the road to the roadsides. Road environment included roadside buildings and trees. Speed limits were assigned differently according to the different segments of the road by using legal speed limits in Turkey as a base. Speed tickets were also calculated by adding legal speed tolerance. There were pedestrians on both sides of the urban segments of the road. Some of the pedestrians walked through to road and some of them crossed the road. There were also some parked cars on the driver's side of the road. Some of the cars jumped from the second lane to the first lane on the right side of the road just one second before the driver's car reached that car. There is also oncoming traffic but the traffic did not have any interaction with driver's car unless the driver's car is on the left side of the roadway dividing line. There were also three intersections with traffic lights. In each intersection, there was a pedestrian or car crossing from another side of the road to the opposite side.

The road consisted of four segments. The first segment was an urban road that was the road segment between 0 and 4200 meters. The segment included parked cars on the right side of the road, oncoming traffic, two cars jumping on the left side of the road, and pedestrians. The second segment was an intercity road that was the road segment between 4200 and 5600 meters. The segment included oncoming traffic,

traffic lights, and forest like the side view. The third segment was an urban road that is the road segment between 5600 and 8100 meters. The segment was similar to the first segment like an urban road including houses, parked cars, and cars on each side of the road. The fourth segment was the curved road with one lane on each side of the road with both incoming and going traffic. The final segment was from 8100 to 10000 meters. Data was collected by the simulation in every five meters for predefined data dimensions. Some of these dimensions were elapsed time since the beginning of the run, lateral lane position with respect to roadway dividing line, longitudinal velocity, and speed limit. Moreover, data related to the speeding, tickets, and accidents in experiment scenario was also collected as different blocks.

2.2.5 Implicit Measurement of Driving Skills

In this thesis, the implicit measurement of driving skills was developed by using the Brief Implicit Association Test script developed by Sriram and Greenwald (2009) by using Inquisit 4 program. For perceptual-motor skills and safety skills, two different BIAT procedures were developed and applied together. Participants took these two BIATs in a counterbalanced order. Half of the participants first took perceptual-motor skills BIAT and then safety skills BIAT and another half first took safety skills BIAT and then perceptual-motor skills BIAT. The related words for each group are taken from a project about the implicit measurement of driving skills with different concept and procedures (Özkan et al., 2013). The words were integrated into the BIAT script.

The Brief Implicit Association Test (BIAT) is a different version of the Implicit Association Test (IAT) with simplified instructions and reduced spontaneous variation in subject strategy. The BIAT includes two of the four category tasks of the IAT. Before showing combined two tasks, two category labels with related words are shown. Participants are asked to remember these words and press a predetermined button when these words are seen and press another predetermined button when any other word appears. The BIAT is beneficial and easy to apply compared to standard IAT because it requires a fewer number of trials and asks participants to focus on just two of the four categories. By focusing on two of the four categories, the responses are faster and more accurate for the focal categories (Sriram & Greenwald, 2009).

At the beginning of the procedure, next block's focal categories and their related words were shown. After the instructions page, the words related to focal categories disappeared from the screen and just category labels were shown. In each trial, a word from one of the four categories was shown in the middle of the screen. Participants were asked to press one of the two buttons. If participants gave a wrong response, a red "X" appeared just below the word in the center and stayed on the screen for the time when the correct response was made. Latency to the correct response was recorded. A built-in-error penalty procedure was also applied. Between two trials, 250 ms of post-trial pause was given. The first two block were for practices and were not included in the analysis (Sriram & Greenwald, 2009).

2.2.5.1 Perceptual-Motor Skills BIAT

The perceptual-motor BIAT was designed to determine perceptual-motor skills association with the self. In the perceptual-motor skills BIAT, attributes are self and self-related six words such as "Ben" and "Bana" and others and others related six words such as "Başkası" and "Diğeri". Targets are skillful and skillful related six words such as "Becerikli" and "Usta" and unskillful and unskillful related six words such as "Beceriksiz" and "Acemi". The BIAT consists of 6 blocks. The first two blocks and first 4 trials of other blocks are not included in future analyses. First and second blocks consist of 12 trials per a block. Other 4 blocks consist of 20 trials per a block. Practice and experiment blocks were given in a counterbalanced order within each other. Participants were in one of the two groups. The data of each participant was collected separately. Positive overall D score means a stronger association between self and skillful than self and unskillful. Negative association means that a stronger association between self and unskillful than self and skillful.

2.2.5.2 Safety Skills BIAT

The safety BIAT was designed to determine safety skills association with the self. In the safety skills BIAT, attributes are self and self-related six words such as “Ben” and “Bana” and others and others related six words such as “Başkası” and Diğeri”. Targets are safe and safe related six words “Güvenli” and “Sakin” and unsafe and unsafe related six words such as “Güvensiz” and “Riskli”. The BIAT consists of 6 blocks. The first two blocks and first 4 trials of other blocks are not included in future analyses. First and second blocks consist of 12 trials per a block. Other 4 blocks consist of 20 trials per a block. Practice and experiment blocks were given in a counterbalanced order within each other. Participants were in one of the two groups. The data of each participant were collected separately. Positive D score means a stronger association between self and safe than self and unsafe. Negative association means that a stronger association between self and unsafe than safe self and safe.

2.2.5.3 The BIAT D Score

As in the standard IAT, the D score was determined for the BIAT. The difference between mean latencies of the two BIAT block divided by the inclusive standard deviation of latencies of the two block (Sriram & Greenwald, 2009). The program calculates D scores by using an improved algorithm (Greenwald, Nosek, & Banaji, 2003). The D score is ranged from -2 to +2. If the d score is between 0.0 and ± .15, this means then there is little or no preference. If the d score is between ±.15 and ±.35, there is a slight preference. If the d score is between ±.35 and ±.65, there is a moderate preference. Finally, if the d score is greater than ±.65, there is a strong preference.

2.3 Procedure

After getting ethical approval from Middle East Technical University Ethical Committee, the study announcement was distributed through social media channels. Participants were reached by using snowball and convenience sampling. Participants were asked to send e-mail and their contact information. Participants were asked to come to ODTU – TSK MODSIMMER Building Human Factor Lab. After getting informed consent, participants first drove test scenario in a driving simulator. After that, participants who did not experience simulator sickness continued to the study. All participants continued to the study. Participants filled out questionnaire package including demographic information form, Driver Behavior Questionnaire, Driving Skill Inventory. Participants continued with experiment scenario in a driving simulator. After they completed the experiment scenario, implicit association test was applied. After completing all of the measurements, participants got debriefing form and filled out payment form. Participants were paid 60 TL for their participation. The whole procedure took approximately 2 hours with a ten minutes break after completing the questionnaires. The data was collected as a part of a big project.

CHAPTER 3

RESULTS

3.1 Factor Analyses on DBQ and DSI

3.1.1 Factor Analysis on Driver Behavior Questionnaire

A factor analysis on the 28 items of Driver Behavior Questionnaire was conducted by using principal component analysis. For the rotation, varimax with Kaiser Normalization was used. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was found as .605 and Bartlett's Test of Sphericity was found to be significant (df = 378, p = .000) showing that the correlation matrix from the items of the scale is factorable. According to the theoretical framework of DBQ and the scree plot, two factors solution was decided as the best factor structure.

The first factor, violations, (a = .77) was consisted of 13 items and explained 15.02% of the variance. The communalities of these items were between .574 and .184. The initial eigenvalue of the factor was 4.20.

The second factor, errors, (a = .75) was consisted of 12 items and explained 12.21% of the variance. The communalities of these items were between .476 and .124. The initial eigenvalue of the factor was 3.42.

Three items were removed because of not loading into any of two factors. Total variance explained by two factors was found as 27.22%. The factor loadings of the items for corresponding factors and their communality values are shown in Table 1.

Table 1. *Factor Loadings and the Communality Values of the Items of the Driver Behavior Questionnaire with Varimax Rotation*

	Component		Communality
	1	2	
17. Şehir içi yollarda hız sınırını aşmak	**.751**		.574
31. Solda yavaş giden bir aracın sağından geçmek	**.695**		.495
32. Trafik ışığında en hızlı hareket eden araç olmak için yandaki araçlarla yarışmak	**.541**		.301
16. Kavşağa çok hızlı girip geçiş üstünlüğü olan aracı durmak zorunda bırakmak	**.510**		.345
26. Trafikte sinirlendiğiniz bir sürücüyü takip edip ona haddini bildirmeye çalışmak	**.510**		.277
34. Acil bir durumda duramayacak kadar, öndeki aracı yakın takip etmek	**.509**		.273
11. Başka bir sürücüye kızgınlığı belirtmek için korna çalmak	**.492**		.244
41. Otobanda hız limitlerini dikkate almamak	**.473**		.223
7. Dönel kavşakta dönüş istikametinize uygun olmayan şeridi kullanmak	**.457**		.225
37. Bazı tip sürücülere kızgın olmak (illet olmak) ve bu kızgınlığı bir şekilde onlara göstermek	**.452**		.227
28. Otoyolda ileride kapanacak bir şeritte son ana kadar ilerlemek	**.443**		.255

Table 1. *(continued)*

	Component		Communality
	1	2	
5. Yasal alkol sınırlarının üzerinde alkollü olduğunuzdan şüphelenseniz de araç kullanmak	**.432**		.209
35. Trafik ışıkları sizin yönünüze kırmızıya döndüğü halde kavşaktan geçmek	**.426**		.184
20. Sağa dönerken yanınızdan geçen bir bisiklet ya da araca neredeyse çarpmak			.134*
3. A yönüne gitmek amacıyla yola çıkmışken kendinizi daha alışkın olduğunuz B yönüne doğru araç kullanırken bulmak			.070*
13. Bir aracı sollarken ya da şerit değiştirirken dikiz aynasından yolu kontrol etmemek			.008*
21. "Yol ver" işaretini kaçırıp, geçiş hakkı olan araçlarla çarpışacak duruma gelmek		**.685**	.476
39. Sollama yaparken karşıdan gelen aracın hızını olduğundan daha yavaş tahmin etmek		**.668**	.453
8. Anayoldan sola dönmek için kuyrukta beklerken, anayol trafiğine dikkat etmekten neredeyse öndeki araca çarpacak duruma gelmek		**.595**	.358
30. Aracınızı park alanında nereye bıraktığınızı unutmak		**.588**	.355
33. Trafik işaretlerini yanlış anlamak ve kavşakta yanlış yöne dönmek		**.572**	.361

Table 1. *(continued)*

	Component		Communality
	1	2	
1. Geri geri giderken önceden fark etmediğiniz birşeye çarpmak		**.562**	.321
38. Seyahat etmekte olduğunuz yolu tam olarak hatırlamadığınızı fark etmek		**.498**	.270
19. Sinyali kullanmayı niyet ederken silecekleri çalıştırmak		**.493**	.255
25. Sola dönüş sinyali veren bir aracın sinyalini fark etmeyip onu sollamaya çalışmak		**.447**	.211
10. Anayoldan bir sokağa dönerken karşıdan karşıya geçen yayaları fark edememek		**.428**	.203
23. Trafik ışıklarında üçüncü vitesle kalkış yapmaya çalışmak		**.409**	.189
14. Kaygan bir yolda ani fren veya patinaj yapmak		**.319**	.124

Note. Factor loadings < .3 are suppressed. Factor labels. First factor = Violations, Second factor = Errors.

3.1.2. Factor Analysis on Driver Skill Inventory

A factor analysis on the 20 items of Driver Skill Inventory was conducted by using principal component analysis. For the rotation, varimax with Kaiser Normalization was used. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was found as .792 and Bartlett's Test of Sphericity was found to be significant (df = 190, p = .000) showing that the correlation matrix from the items of the scale is factorable. As stated by Reise, Comrey, and Waller (2000), 40% of variance explained by the factors was used as a cutoff value to decide on the number of factors. Moreover, the scree plot was also observed while deciding on the number of factors. Two factors structure was decided as the best factor solution.

The first of factor, perceptual-motor skills, (*a* = .86) was consisted of 13 items and explained 27.77% of the variance. The communalities of these items were between .629 and .182. The initial eigenvalue of the factor was 5.59.

The second factor, safety skills, (*a* = .76) was consisted of 7 items and explained 15.61% of the variance. The communalities of these items were between .597 and .272. The initial eigenvalue of the factor was 3.01.

None of the items were removed. Total variance explained by two factors was found as 43.38%. The factor loadings of the items for corresponding factors and their communality values are shown in Table 2.

Table 2. *Factor Loadings and the Communality Values of the Items of the Driver Skill Inventory with Varimax Rotation*

	Component		Communality
	1	2	
8. Hızlı karar alma	**.787**		.629
1. Seri araç kullanma	**.786**		.629
2. Trafikte tehlikeleri görme	**.768**		.590
5. İlerideki trafik durumlarını önceden kestirme	**.681**		.466
4. Kaygan yolda araç kullanma	**.669**		.506
14. Sollama	**.662**		.439
10. Aracı kontrol etme	**.636**		.407
6. Belirli trafik ortamlarında nasıl hareket edileceğini bilme	**.636**		.439
13. Geriye kaçırmadan aracı yokuşta kaldırma	**.595**		.354
20. Dar bir yere geri geri park edebilme	**.568**		.324

Table 2. *(continued)*

	Component		Communality
	1	2	
7. Yoğun trafikte sürekli şerit değiştirme	**.536**		.350
18. Diğer sürücülerin hatalarını telafi edebilme	**.421**		.182
12. Koşullara göre hızı ayarlama	**.400**	.322	.264
17. Gereksiz risklerden kaçınma		**.760**	.597
16. Hız sınırlarına uyma		**.714**	.551
11. Yeterli takip mesafesi bırakma		**.713**	.510
19. Trafik ışıklarına dikkatle uyma		**.642**	.441
9. Sinir bozucu durumlarda sakin davranma		**.616**	.379
3. Sabırsızlanmadan yavaş bir aracın arkasından sürme		**.552**	.346
15. Gerektiğinde kazadan kaçınmak için yol hakkından vazgeçme		**.441**	.272

Note. Factor loadings < .3 are suppressed. First factor = Perceptual-Motor Skills, Second factor = Safety Skills.

3.2 Descriptive Analysis

3.2.1 Speed Preferences

Participants reported their speed preferences for four different types of roads with different speed limits (see Table 3.)

Table 3. *Speed Preferences for All Participants*

Types of Road with Different Speed Limits	*Mean*	*Standard Deviations*	*Minimum Preferred Speed*	*Maximum Preferred Speed*
50 km/h Road	57.91	11.25	35.00	80.00
82 km/h Road	84.97	8.08	70.00	110.00
90 km/h Road	93.50	8.18	80.00	120.00
100 km/h Road	105.30	11.78	85.00	135.00

Note: Self-reported speed preferences of all participants for different types of roads with different limits.

3.2.2 Driving Skills

3.2.2.1 Driver Skill Inventory

For self-reported driving skills, the mean score of perceptual-motor ability was found as 3.92 (*SD* = .52, *Min* = 2.31, *Max* = 4.92). The mean score of safety skills was found as 3.75 (*SD* = .60, *Min* = 2.14, *Max* = 5.0).

3.2.2.2 Implicit Driving Skills

For the implicit measurement of driving skills, different d scores were calculated by the program's script. Two BIAT were used for perceptual-motor skills and safety skills. For each subscale, one independent d score and a total percentage of correct responses that were given as a first response were calculated.

For the perceptual-motor skills BIAT, the overall mean d score for the perceptual-motor skills was found as .42 (*SD* = .35, *Min* = -.44, *Max* = 1.25) showing a moderate preference for seeing themselves as having higher perceptual-motor skills than other drivers. The mean of total correct response percent that was given as a first response was found as 88.02 (*SD* = 11.27, *Min* = 46.88, *Max* = 100).

For the safety skills BIAT, the overall mean d score for the safety skills was found as .24 (*SD* = .33 *Min* = -.51, *Max* = .86) showing a slight preference seeing themselves as having higher safety skills than other drivers. The mean of total correct response percent than was given as a first response was found as 91.87 (*SD* = 8.43, *Min* = 51.56, *Max* = 100).

3.2.3 Driver Behavior Questionnaire

For the self-reported driver behaviors, errors, violations, and positive driver behaviors were calculated. The mean of errors was found as .72 (*SD* = .44, *Min* = .00, *Max* = 2.00). The mean of violations was found as 1.32 (*SD* = .59, *Min* = .38, *Max* = 2.77). The mean of positive driver behaviors was found as 3.52 (*SD* = .46, *Min* = 2.57, *Max* = 4.50).

3.2.4 Driving Simulation

For the driving simulation behaviors, driver mistakes, speed, and lane position behaviors of drivers were calculated. For driver mistakes, speed exceedances which correspond a total number of speed exceedances when the drivers exceeded the speed limit, centerline crossings which correspond total number of centerline crossings, road edge excursions which correspond total number of off-road driving, the percentage of time and distance over the speed limit, and percentage of time and distance out of the lane. Percentage of time and distance out of lane included both centerline crossings and road edge excursions. The mean and standard deviations for driver mistakes were given in Table 5.

Table 4. *Driver Mistakes in Driving Experiment Scenario*

Mistakes	*Mean*	*Standard Deviations*	*Minimum*	*Maximum*
Total Simulation Time	548.94	101.31	361.63	773.82
Total Number of Speed Exceedances	5.90	3.46	0.00	17.00
Total Number of Center Line Crossing	2.64	2.42	0.00	16.00

Table 4. *(continued)*

Mistakes	*Mean*	*Standard Deviations*	*Minimum*	*Maximum*
Total Number of Road Edge Excursion	.60	1.16	0.00	5.00
Percentage of Speed Exceedance Time	23.27	20.71	0.00	64.59
Percentage of Speed Exceedance Distance	31.97	28.22	0.00	83.80
Percentage of Out of Lane Time	3.24	3.47	0.00	24.73
Percentage of Out of Lane Distance	4.70	10.02	0.00	86.00

The speed and lateral lane position were analyzed for the whole drive and for four different segments of the road. The whole drive included all the elements of roads and lasted 10 kilometers. The first segment was between the beginning of the road and 4200th meters where the speed limit was determined as 82 kilometers/hour. The second segment was between 4200th meters and 5600th meters where the speed limit was determined as 90 kilometers/hour. The third segment was between 5600th meters and 8100th meters where the speed limit was determined as 82 kilometers/hour. The fourth segment was between 8100th meters and 10000th meters where the speed limit was determined as 55 kilometers/hour. For whole drive and each segment of the road, mean and standard deviations of speed and lateral positioning with respect to the roadway dividing line were calculated (see Table 6.). For lateral position, positive values indicate the right side of the road.

Table 5. *Driving Simulator Behaviors of Participants*

Variables	*Mean*	*Standard Deviations*	*Minimum*	*Maximum*
Mean Speed of				
Total	82.65	18.80	54.60	126.18
1st Segment	90.80	22.36	55.67	142.23
2nd Segment	88.93	20.97	54.92	129.15
3rd Segment	78.37	19.64	51.03	129.65
4th Segment	66.27	16.43	46.62	124.12
SD of Speed of				
Total	21.38	7.50	11.76	37.72
1st Segment	14.84	6.06	6.98	32.81
2nd Segment	19.93	7.40	4.41	36.83
3rd Segment	22.24	8.17	9.07	40.71
4th Segment	14.08	7.74	1.84	38.71
Mean Lateral Position of				
Total	2.64	.66	1.64	4.54
1st Segment	2.98	.79	1.79	5.26
2nd Segment	2.98	1.08	1.38	5.31
3rd Segment	2.78	1.22	1.50	5.61
4th Segment	1.49	.34	.48	2.26
SD of Lateral Position of				
Total	1.49	.35	.79	2.18
1st Segment	1.47	.26	.89	1.96
2nd Segment	1.20	.66	.02	2.09
3rd Segment	.95	.53	.15	1.95
4th Segment	.87	.31	.15	1.65

Note. Means, standard deviations, minimum, and maximum values of mean and standard deviations of speed and lateral position.

3.3 Correlations

For the study variables, bivariate correlations were computed (Table 6). First, age was only positively correlated with total kilometers (r = .332, p < .01) and negatively correlated with percent of distance out of lane (r = -.249, p < .05). Gender (1 = Male, 2 = Female) was positively correlated with total time spent during simulation (r = .333, p < .01), mean lane position in fourth segment (r = .269, p < .05) and negatively correlated with total mean speed (r = -.300, p < .01), mean speed in second segment (r = -.349, p < .01), mean speed in third segment (r = -.272, p < .05), mean speed in fourth segment (r = -.388, p < .01), speed standard deviation in second segment (r = -.250, p < .05), speed standard deviation in fourth segment (r = -.256, p < .05), percent of time over speed limit (r = -.244, p < .05), percent of distance over speed limit (r = -.224, p < .05), self-reported perceptual-motor skills (r = -.346, p < .01), and positive driver behaviors (r = -.235, p < .05).

Annual kilometer was found to be positively correlated with total kilometer (r = .608, p < .01), total accidents (r = .500, p < .01), active accidents (r = .344, p < .01), passive accidents (r = .299, p < .01), self-reported speed preference for 82 km/h (r = .298, p < .01), 90 km/h (r = .280, p < .01), 100 km/h (r = .306, p < .01), lane standard deviation in fourth segment (r = .357, p < .01), centerline crossing (r = .303, p < .01), percent of time out of lane (r = .318, p < .01), perceptual-motor skills (r = 225, p < .05), and violations (r = .473, p < .01). Moreover, annual kilometer was negatively correlated with mean lane position in fourth segment (r = -.280, p < .05) and safety skills (r = -.395, p < .01).

Self-reported speed preference for 50 km/h was positively correlated with mean speed in fourth segment where speed limit was 50 km/h (r = .321, p < .01). Self-reported speed preference for 82 km/h was positively correlated with mean speed in third segment where speed limit was 82 km/h (r = .343, p < .01). Self-reported speed preference for 90 km/h was positively correlated with mean speed in second segment where speed limit was 90 km/h (r = .282, p < .05).

Self-reported safety skills were negatively correlated with self-reported speed preferences for 50 km/h ($r = -.455$, $p < .01$), for 82 km/h ($r = -.512$, $p < .01$), 90 km/h ($r = -.473$, $p < .01$), and 100 km/h ($r = -.478$, $p < .01$). Self-reported perceptual-motor skills were positively correlated with 90 km/h ($r = .230$, $p < .05$) and 100 km/h ($r = .361$, $p < .01$). On the other hand, driver violations were positively correlated with self-reported speed preferences for 50 km/h ($r = .509$, $p < .01$), 82 km/h ($r = .460$, $p < .01$), 90 km/h ($r = .404$, $p < .01$), and 100 km/h ($r = .493$, $p < .01$).

The correlations between simulated mean speeds and standard deviations of speeds mostly positive and over .50. On the other hand, only mean lane position in fourth segment show negative correlations with speed means over .40 in total and all road segments. Self-reported perceptual-motor skills were positively correlated with simulation mean speed total ($r = .325$, $p < .01$), in first segment ($r = .288$, $p < .05$), in second segment ($r = .299$, $p < .01$), in third segment ($r = .281$, $p < .05$), and in fourth segment ($r = .368$, $p < .01$). Moreover, violations were also positively correlated with simulation mean speed total ($r = .565$, $p < .01$), in first segment ($r = .514$, $p < .01$), in second segment ($r = .520$, $p < .01$), in third segment ($r = .515$, $p < .01$), and in fourth segment ($r = .562$, $p < .01$). On the other hand, safety skills were negatively correlated with simulated mean speed total ($r = -.317$, $p < .01$), in the first segment ($r = -.274$, $p < .05$), in the second segment ($r = -.266$, $p < .05$), in the third segment ($r = -.334$, $p < .01$), and in the fourth segment ($r = -.316$, $p < .01$).

Self-reported safety skills were positively correlated with mean lane position in fourth segment ($r = .250$, $p < .01$) but negatively correlated with standard deviation of lane in fourth segment ($r = -.269$, $p < .05$), speed exceedances ($r = -.278$, $p < .05$), percent of time over speed limit ($r = -.401$, $p < .01$), percent of distance over speed limit ($r = -.384$, $p < .01$), and percent of distance out of lane ($r = -.323$, $p < .01$). On the other hand, self-reported perceptual-motor skills were found to be positively correlated with standard deviation of lane in total ($r = .306$, $p < .01$), standard deviation of lane in third segment ($r = .266$, $p < .05$) and in fourth segment ($r = .316$, $p < .01$) but negatively correlated with mean lane position in fourth segment ($r = -.295$, $p < .01$). Moreover, violations were found to be positively correlated with standard deviation of lane in total (r = .289, p < .05), in the first segment (r = .242, p < .05), in the second segment (r = .343, p < .01), in the third segment (r = .283, p < .01), and in the fourth segment (r = .505, p < .01). Violation were also positively correlated with speed exceedances (r = .373, p < .01), centerline crossing (r = .428, p < .01), percent of time over speed limit (r = .567, p < .01), percent of distance over speed limit (r = .565, p < .01), percent of time out of lane (r = .412, p < .01), percent of distance out of lane (r = .319, p < .01).

Self-reported perceptual-motor skills were positively correlated with violations (r = .377, p < .01), and positive behaviors (r = .403, p < .01) but negatively correlated with errors (r = -.253, p < .01). Self-reported safety skills were positively correlated with positive driver behaviors (r = .261, p < .01) but negatively correlated with violations (r = -.575, p < .01).

Table 6. *Correlations between Variables in the Present Study*

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Age	1												
2	Gender (1= Male, 2 = Female)	.095	1											
3	Annual Kilometer	.171	.009	1										
4	Total Kilometer	.332**	-.220	.608**	1									
5	Total Accidents	.054	.000	.500**	.229*	1								
6	Active Accidents	.056	.142	.344**	-.015	.561**	1							
7	Passive Accidents	-.110	-.216	.299**	.274*	.591**	-.037	1						
8	P.Speed 50 km/h	-.088	.015	.171	.032	.148	.142	.043	1					
9	P.Speed 82 km/h	-.043	-.083	.298**	.283*	.138	.085	.178	.589**	1				
10	P.Speed 90 km/h	.143	-.147	.280*	.324**	.139	.134	.210	.507**	.773**	1			
11	P.Speed 100 km/h	.116	-.141	.306**	.335**	.103	.087	.131	.529**	.712**	.861**	1		
12	Implicit Perceptual-Motor Skills	.074	-.154	-.137	.029	-.102	-.154	.113	.057	.118	.150	.167	1	
13	Implicit Safety Skills	-.047	.175	-.131	-.059	-.122	-.038	-.067	-.110	.137	.167	.052	.205	1

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

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

Table 6 *(continued)*

		1	2	3	4	5	6	7	8	9	10	11	12	13
14	Total Simulation Time	.087	.333**	-.192	-.185	-.181	-.057	-.239*	-.354**	-.345**	-.330**	-.362**	-.005	.073
15	Mean Speed Total	-.054	-.300**	.189	.135	.182	.057	.257*	.287*	.291**	.327**	.339**	.017	-.044
16	Mean Speed 1st Seg.	-.043	-.219	.141	.093	.146	.045	.214	.209	.217	.293**	.316**	-.027	-.047
17	Mean Speed 2nd Seg.	-.077	-.349**	.180	.092	.183	.065	.213	.263*	.293**	.282*	.308**	-.029	-.038
18	Mean Speed 3rd Seg.	-.066	-.272*	.207	.080	.185	.101	.248*	.340**	.343**	.348**	.324**	.019	-.030
19	Mean Speed 4th Seg.	-.022	-.388**	.221	.320**	.195	-.007	.310**	.321**	.281*	.280*	.295**	.173	-.042
20	SD Speed Total	-.078	-.102	.132	.048	.146	.096	.174	.181	.231*	.272*	.257*	-.061	.013
21	SD Speed 1st Seg.	-.045	.004	.195	.153	.118	.062	.138	.233*	.290**	.277*	.236*	.010	.092
22	SD Speed 2nd Seg.	-.064	-.250*	.164	.041	.269*	.142	.333**	.181	.274*	.326**	.320**	.111	.004
23	SD Speed 3rd Seg.	-.037	-.120	.095	-.030	.170	.130	.229*	.298**	.311**	.360**	.318**	.001	.060
24	SD Speed 4th Seg.	-.067	-.256*	.216	.248*	.144	.092	.181	.160	.216	.229*	.231*	.038	-.121
25	Mean Lane Total	-.111	-.052	-.171	-.104	-.212	-.165	-.069	-.084	-.206	-.062	-.099	-.036	-.034
26	Mean Lane 1st Seg.	-.117	-.085	-.120	-.144	-.196	-.133	.029	-.040	-.164	-.032	-.074	-.064	.032

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

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

Table 6 *(continued)*

		1	2	3	4	5	6	7	8	9	10	11	12	13
27	Mean Lane 2nd Seg.	-.129	-.141	-.147	-.086	-.114	-.082	-.053	.035	-.049	.031	.042	.074	-.023
28	Mean Lane 3rd Seg.	-.033	-.007	-.107	.026	-.139	-.160	-.099	-.098	-.183	-.076	-.114	-.016	-.093
29	Mean Lane 4th Seg.	-.079	.269*	-.280*	-.258*	-.225*	-.044	-.250*	-.262*	-.278*	-.171	-.176	-.171	-.009
30	SD Lane Total	-.076	-.106	.101	.103	-.018	-.061	.026	.067	-.018	.038	.050	-.029	-.017
31	SD Lane 1st Seg.	-.072	-.014	.222	.125	-.014	-.017	.029	.105	.065	.060	.068	-.054	.070
32	SD Lane 2nd Seg.	-.056	-.091	-.023	-.036	-.027	.008	-.113	.112	.097	.083	.171	.083	.155
33	SD Lane 3rd Seg.	.018	-.151	.155	.227*	.060	-.014	-.041	.050	.049	.134	.119	-.055	-.101
34	SD Lane 4th Seg.	-.058	-.182	.357**	.278*	.324**	.162	.292**	.320**	.297**	.265*	.240*	.021	-.046
35	Speed Exceedances	-.112	-.037	.136	.035	.322**	.318**	.228*	.309**	.292**	.188	.271*	.023	-.027
36	Centerline Crossing	-.036	-.107	.303**	.249*	.221	.116	.194	.180	.172	.102	.143	.009	-.089
37	Off Road Driving	-.165	.188	.017	-.016	-.003	.046	.003	.030	.057	.046	.048	-.096	.130
38	% Time over Speed	-.088	-.244*	.224	.080	.203	.112	.259*	.352**	.378**	.378**	.399**	-.004	-.031
39	% Distance over Speed	-.089	-.224*	.211	.079	.193	.109	.252*	.329**	.371**	.372**	.387**	-.009	-.022

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

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

Table 6 *(continued)*

		1	2	3	4	5	6	7	8	9	10	11	12	13
40	% Time Out of Lane	-.106	-.108	.318**	.224	.238*	.113	.205	.257*	.251*	.172	.176	-.033	-.061
41	% Distance Out of Lane	-.249*	.051	.048	.051	.027	.022	-.006	.201	.033	.157	.205	.119	.095
42	Perceptual-Motor Skills	.094	-.346**	.225*	.345**	-.006	.036	.059	.204	.142	.230*	.361**	-.008	-.177
43	Safety Skills	-.038	-.043	-.395**	-.258*	-.330**	-.247*	-.164	-.455**	-.512**	-.473**	-.478**	-.182	-.158
44	Errors	-.121	-.025	-.134	-.183	.160	-.042	.158	-.076	-.043	-.054	-.026	.038	-.056
45	Violations	-.016	-.030	.473**	.363**	.339**	.242*	.169	.509**	.460**	.404**	.493**	.070	-.120
46	Positive Behaviors	-.064	-.235*	-.203	.072	-.205	-.087	-.043	-.018	.020	-.034	-.059	-.004	-.072

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

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

Table 6 *(continued)*

		14	15	16	17	18	19	20	21	22	23	24	25	26
14	Total Simulation Time	1												
15	Mean Speed Total	-.957**	1											
16	Mean Speed 1st Seg.	-.895**	.952**	1										
17	Mean Speed 2nd Seg.	-.937**	.943**	.862**	1									
18	Mean Speed 3rd Seg.	-.887**	.924**	.791**	.895**	1								
19	Mean Speed 4th Seg.	-.809**	.837**	.697**	.757**	.782**	1							
20	SD Speed Total	-.797**	.889**	.924**	.826**	.793**	.578**	1						
21	SD Speed 1st Seg.	-.624**	.725**	.694**	.667**	.689**	.583**	.840**	1					
22	SD Speed 2nd Seg.	-.742**	.842**	.816**	.785**	.780**	.672**	.848**	.711**	1				
23	SD Speed 3rd Seg.	-.743**	.840**	.775**	.756**	.885**	.640**	.827**	.676**	.769**	1			
24	SD Speed 4th Seg.	-.767**	.798**	.738**	.714**	.734**	.771**	.695**	.542**	.696**	.626**	1		
25	Mean Lane Total	-.016	.018	.027	.036	-.009	.008	-.005	.044	-.034	-.140	.023	1	
26	Mean Lane 1st Seg.	-.120	.166	.157	.184	.154	.115	.142	.152	.126	.079	.125	.862**	1

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

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

Table 6 *(continued)*

		14	15	16	17	18	19	20	21	22	23	24	25	26
27	Mean Lane 2nd Seg.	-.156	.187	.186	.136	.163	.186	.168	.216	.177	.098	.173	.710**	.556**
28	Mean Lane 3rd Seg.	.037	-.096	-.096	-.055	-.126	-.041	-.152	-.084	-.189	-.310**	-.048	.826**	.487**
29	Mean Lane 4th Seg.	.606**	-.617**	-.467**	-.594**	-.634**	-.747**	-.412**	-.418**	-.475**	-.553**	-.563**	.198	.075
30	SD Lane Total	-.371**	.398**	.357**	.382**	.378**	.377**	.336**	.397**	.310**	.239*	.311**	.730**	.650**
31	SD Lane 1st Seg.	-.350**	.420**	.409**	.393**	.408**	.301**	.495**	.574**	.458**	.386**	.275*	.328**	.451**
32	SD Lane 2nd Seg.	-.262*	.278*	.246*	.242*	.285*	.258*	.236*	.280*	.276*	.242*	.232*	.306**	.226*
33	SD Lane 3rd Seg.	-.264*	.226*	.181	.276*	.189	.260*	.124	.205	.121	-.025	.151	444**	.204
34	SD Lane 4th Seg.	-.690**	.700**	.593**	.670**	.673**	.747**	.563**	.509**	.613**	.585**	.715**	.011	.121
35	Speed Exceedances	-.458**	.390**	.384**	.385**	.351**	.286*	.397**	.337**	.371**	.339**	.343**	-.110	-.017
36	Centerline Crossing	-.643**	.662**	.557**	.652**	.683**	.634**	.621**	.638**	.628**	.558**	.569**	-.173	-.072
37	Off Road Driving	-.060	.100	.087	.110	.127	.047	.208	.269*	.210	.075	.105	.262*	.324*
38	% Time over Speed	-.901**	.922**	.894**	.876**	.869**	.690**	.867**	.711**	.786**	.817**	.691**	-.037	.090
39	% Distance over Speed	-.893**	.928**	.916**	.873**	.858**	.686**	.900**	.741**	.815**	.826**	.710**	-.025	.105

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

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

Table 6 *(continued)*

		14	15	16	17	18	19	20	21	22	23	24	25	26
40	% Time Out of Lane	-.624**	.665**	.534**	.662**	.727**	.637**	.625**	.653**	.631**	.588**	.564**	-.115	.004
41	% Distance Out of Lane	-.190	.167	.128	.132	.174	.221	.101	.101	.098	.107	.172	-.207	-.192
42	Perceptual-Motor Skills	-.356**	.325**	.288*	.299**	.281*	.368**	.141	.020	.173	.195	.299**	.094	.077
43	Safety Skills	.388**	-.317**	-.274*	-.266*	-.334**	-.316**	-.229*	-.193	-.253*	-.318**	-.231*	.228*	.207
44	Errors	-.179	.160	.199	.188	.116	.013	.204	.036	.295**	.088	096	-.001	-.089
45	Violations	-.586**	.565**	.514**	.520**	.515**	.562**	.438**	.432**	.496**	.420**	.484**	-.115	-.084
46	Positive Behaviors	-.077	.089	.070	.061	.074	.147	.020	.012	-.030	.071	.090	.090	.168

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

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

Table 6 *(continued)*

		27	28	29	30	31	32	33	34	35	36	37	38	39
27	Mean Lane 2nd Seg.	1												
28	Mean Lane 3rd Seg.	.437**	1											
29	Mean Lane 4th Seg.	-.025	.144	1										
30	SD Lane Total	.674**	.593**	-.277*	1									
31	SD Lane 1st Seg.	.374**	.085	-.214	.713**	1								
32	SD Lane 2nd Seg.	.711**	.109	-.208	.574**	.381**	1							
33	SD Lane 3rd Seg.	.240*	.635**	-.117	.634**	.255*	.245*	1						
34	SD Lane 4th Seg.	.127	-.024	-.676**	.408**	.356**	.193	.241*	1					
35	Speed Exceedances	.064	-.181	-.302**	.042	.134	.145	-.064	.429**	1				
36	Centerline Crossing	-.029	-.153	-.580**	.260*	.365**	.154	.192	.681**	.306**	1			
37	Off Road Driving	.150	.088	.258*	.182	.208	.083	.106	.166	-.046	.271*	1		
38	% Time over Speed	.167	-.138	-.539**	.312**	.393**	.282*	.153	.618**	.501**	.607**	.058	1	
39	% Distance over Speed	.189	-.142	-.526**	.326**	.418**	.293**	.147	.623**	.508**	.605**	.080	.994**	1

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

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

Table 6 *(continued)*

		27	28	29	30	31	32	33	34	35	36	37	38	39
40	% Time Out of Lane	.016	-.137	-.572**	.321**	.413**	.181	.197	.728**	.254*	.928**	.366**	.584**	.588**
41	% Distance Out of Lane	-.099	-.151	-.177	-.104	-.111	.069	-.053	.161	.025	.265*	.060	.107	.102
42	Perceptual-Motor Skills	.083	.141	-.295**	.306**	.118	.081	.266*	.316**	-.009	.184	-.133	.222	.214
43	Safety Skills	.069	.159	.350**	.010	.031	-.134	-.043	-.269*	-.278*	-.203	.007	-.401**	-.384**
44	Errors	.083	.056	-.002	.017	006	.077	.060	.040	.123	.097	.127	.211	.217
45	Violations	.087	-.085	-.529**	.289*	.242*	.343**	.283*	.505**	.373**	.428**	-.058	.567**	.565**
46	Positive Behaviors	.035	.029	-.161	.140	.172	-.049	-.041	.043	-.064	-.056	-.171	.017	.023

Table 6 *(continued)*

		40	41	42	43	44	45	46
40	% Time Out of Lane	1						
41	% Distance Out of Lane	.274*	1					
42	Perceptual-Motor Skills	.181	.096	1				
43	Safety Skills	-.184	-.323**	-.109	1			
44	Errors	.105	-.106	-.253*	.032	1		
45	Violations	.412**	.319**	.377**	-575**	.109	1	
46	Positive Behaviors	-.013	-.181	.403**	.261*	-.135	-.037	1

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

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

3.4 Comparison of Self-Reported Speed Preferences and Driving Simulator Speed

Drivers' speed preferences for the certain types of roads and mean speeds in these kinds of roads in driving simulator were compared by using paired samples t-test.

According to results, self-reported driving speed on roads with 82 km/h speed limit (M = 84.97, SD = 8.08) was significantly and negatively different from the mean speed in driving simulator (M = 90.79, SD = 22.36) on first segment, $t(77) = -2.33$, $p = .022$, 95% CI [-10.80, -.85], and significantly and positively different from the mean speed in driving simulator (M = 78.37, SD = 19.64) on the third segment, $t(77) = 3.15$, $p = .002$, 95% CI [2.43, 10.77]. Results showed that participants drove faster that their preferred speed limit at the first segment and drove slower at the third segment where both speed limit was determined as 82 km/h.

Self-reported driving speed on roads where 90 km/h speed limit (M = 93.50, SD = 8.18) was significantly and positively different from the mean speed in driving simulator (M = 88.93, SD = 20.97) on the second segment, $t(77) = 1.99$, $p = .050$, 95% CI [.00, 9.13]. Drivers drove slower on the second segment in driving simulator.

Finally, self-reported speed on roads where 50 km/h speed limit (M = 57.91, SD = 11.25) was significantly and negatively different from the mean speed in driving simulator (M = 66.27, SD = 16.43) on the fourth segment, $t(77) = -4.44$, $p < .000$, 95% CI [-12.12, -4.60]. Drivers drove faster on the fourth segment than their self-reported speed preferences.

3.5 Gender Differences in Study Variables

A series of ANCOVA analysis was conducted to test whether there are gender differences on DBQ and DSI scores, implicit DSI, and simulated driver behaviors after controlling the effects of age and annual mileage. The means and standard deviation of study variables for female and male drivers were presented in Table 7.

Table 7. *The Means and Standard Deviations of Study Variables based on Gender*

Variables	*Female Drivers*		*Male Drivers*	
	Mean	*Standard Deviations*	*Mean*	*Standard Deviations*
Implicit Perceptual-Motor Skills	.37	.31	.48	.38
Implicit Safety Skills	.30	.33	.19	.32
DSI Perceptual-Motor Skills	3.74	.58	4.10	.38
DSI Safety Skill	3.73	.60	3.78	.60
DBQ Errors	.71	.42	.73	.46
DBQ Violations	1.30	.63	1.34	.56
DBQ Positive	3.41	.44	3.63	.46
Mean Speed of				
Total	77.05	16.12	88.25	19.79
1st Segment	85.92	20.36	95.67	23.45
2nd Segment	81.66	19.80	96.20	19.75
3rd Segment	73.07	17.41	83.68	20.51
4th Segment	59.94	9.91	72.60	19.15
SD of Speed of				
Total	20.62	7.22	22.14	7.79
1st Segment	14.86	5.71	14.81	6.46
2nd Segment	18.09	6.34	21.76	8.00
3rd Segment	21.27	7.67	23.21	8.63
4th Segment	12.10	6.49	16.05	8.44
Mean Lateral Position of				
Total	2.61	.70	2.68	.62
1st Segment	2.91	.80	3.04	.79
2nd Segment	2.83	1.13	3.14	1.02
3rd Segment	2.77	1.36	2.78	1.08
4th Segment	1.59	.30	1.40	.36

Table 7. *(continued)*

Variables	*Female Drivers*		*Male Drivers*	
	Mean	*Standard Deviations*	*Mean*	*Standard Deviations*
SD of Lateral Position of				
Total	1.46	.36	1.53	.34
1st Segment	1.47	.27	1.47	.25
2nd Segment	1.14	.65	1.26	.67
3rd Segment	.88	.53	1.03	.53
4th Segment	.81	.31	.92	.30
Total Number of Speed Exceedances	5.77	3.8	6.03	3.48
Total Number of Centerline Crossing	2.38	2.82	2.90	1.94
Total Number of Road Edge Excursion	.82	1.39	.38	.85
Percent of Time over Speed Limit	18.24	18.97	28.30	21.38
Percent of Distance over Speed Limit	25.70	25.83	38.24	29.42
Percent of Time Out of Lane	2.87	4.15	3.62	2.61
Percent of Distance Out of Lane	5.20	13.89	4.19	3.16

Note. The Means and Standard Deviations of Study Variables based on Gender.

3.5.1 Implicit and Self-Reported Driving Skills

There were not significant gender difference for the implicit measurement of perceptual-motor skills, ($F(1, 72) = 1.84$, $p = .179$, $\eta^2_p = .02$) and safety skills, ($F(1, 72) = 2.46$, $p = .121$, $\eta^2_p = .03$).

Gender difference for the self-reported perceptual-motor skills was significant ($F(1, 72) = 11.21$, $p = .001$, $\eta^2_p = .13$). Male drivers reported higher levels of perceptual-motor skills than female drivers. Gender difference for the self-reported safety skills was not significant ($F(1, 72) = .065$, $p = .800$, $\eta^2_p = .00$).

3.5.2 Self-Reported Driver Behaviors

There were not significant difference between female and male drivers on errors ($F(1, 72) = .006$, $p = .936$, $\eta^2_p = .00$) and violations ($F(1, 72) = .072$, $p = .789$, $\eta^2_p = .00$). However, gender difference on positive drivers behaviors was significant ($F(1, 72) = 4.34$, $p = .041$, $\eta^2_p = .06$) indicating male drivers reported higher levels of positive driver behaviors compared to female drivers.

3.5.3 Simulator Behaviors

In terms of simulator driver behaviors, there was a significant gender difference on total simulation speed mean ($F(1, 72) = 7.2$, $p = .009$, $\eta^2_p = .09$), mean speed on the second segment ($F(1, 72) = 10.24$, $p = .002$, $\eta^2_p = .12$), mean speed on the third segment ($F(1, 72) = 5.85$, $p = .018$, $\eta^2_p = .07$), and mean speed on the fourth segment ($F(1, 72) = 13.69$, $p = .000$, $\eta^2_p = .16$). During whole scenario and all of three segments, male drivers drive faster than female drivers. However, only gender difference on first segment mean speed was not significant ($F(1, 72) = 3.49$, $p = .066$, $\eta^2_p = .05$).

Gender differences in terms of standard deviation of speed during total scenario ($F(1, 72) = .590$, $p = .445$, $\eta^2_p = .01$), first segment ($F(1, 72) = .022$, $p = .882$, $\eta^2_p = .00$), and third segment ($F(1, 72) = .993$, $p = .322$, $\eta^2_p = .01$) were not significant. Only significant differences were found on second segment ($F(1, 72) = 4.72$, $p = .033$, $\eta^2_p = .06$) and fourth segment ($F(1, 72) = 5.19$, $p = .026$, $\eta^2_p = .07$) where male drivers showed higher speed deviations than female drivers.

Gender differences in terms of mean lane position during total scenario ($F(1, 72) = .098$, $p = .755$, $\eta^2_p = .00$), first segment ($F(1, 72) = .338$, $p = .563$, $\eta^2_p = .00$), second segment ($F(1, 72) = 1.46$, $p = .230$, $\eta^2_p = .02$), and third segment ($F(1, 72) = .001$, $p = .978$, $\eta^2_p = .00$) were not significant. Only significant difference was found on fourth segment (F(1, 72) = 6.96, p = .010, η^2_p = .09) where female drivers drove closer to the left side of the road than male drivers

Gender differences in terms of standard deviation of lane position were not significant during total scenario (F(1, 72) = .608, p = .438, η^2_p = .01), first segment (F(1, 72) = .016, p = .899, η^2_p = .00), second segment (F(1, 72) = .616, p = .435, η^2_p = .01), third segment (F(1, 72) = 1.579, p = .213, η^2_p = .02), fourth segment (F(1, 72) = 3.07, p = .084, η^2_p = .04).

In terms of other simulation variables, gender difference on total number of speed exceedances was not significant (F(1, 72) = .396, p = .531, η^2_p = .00). Gender difference on total number of centerline crossing was not significant (F(1, 72) = .744, p = .391, η^2_p = .01). Gender difference on total number of road edge excursion was not significant (F(1, 72) = 3.49, p = .066, η^2_p = 05). Gender difference on percent of time over speed limit was significant (F(1, 72) = 4.393, p = .040, η^2_p = .06). Male drivers drove over speed limit more than female drivers in terms of simulation time. Gender difference on percent of distance over speed limit was not significant (F(1, 72) = 3.564, p = .063, η^2_p = .05). Gender difference on percent of time out of lane was not significant (F(1, 72) = .756, p = .388, η^2_p = .01). Gender difference on percent of distance out of lane was not significant (F(1, 72) = .451, p = .504, η^2_p = .01).

3.6 Hierarchical Regression Analysis of Study Variables

To investigate the relationship between demographic variables, driving skills, and driver behaviors, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, self-reported perceptual-motor skills and safety skills or implicit perceptual-motor skills and safety skills were entered separately.

3.6.1 Hierarchical Regression Analysis of DSI and DBQ

For errors, violations, and positive driver behaviors dimensions of Driver Behaviors Questionnaire, three multiple regression analyses were conducted. In the first step, gender and annual mileage were included. In the second step, self-reported perceptual-motor skills and safety skills were entered into the model (Table 8).

For errors, the model was not significant ($F(4, 72) = 1.65$, $p = .171$) and explained 3.3% of the variance ($R^2_{adj} = .033$).

For driver violations, the model was significant ($F(4, 72) = 16.64$, $p < .001$) and explained 45.1 % of the variance ($R^2_{adj} = .451$). Annual mileage (95% CI [1.45, 5.29]) and perceptual-motor skills (95% CI [.12, .53]) were found to be positively and safety skills (95% CI [-.64, -.27]) were found to be negatively related to violations. Drivers with higher annual mileage, higher levels of perceptual-motor skills, and lower levels of safety skills tend to show higher violations.

For the positive driver behaviors, the model was significant ($F(4, 72) = 7.80$, $p < .001$) and explained 26.3 % of the variance ($R^2_{adj} = .263$). Perceptual-motor skills (95% CI [.24, .56]) and safety skills (95% CI [-.00, .33]) were found to be positively and annual mileage (95% CI [-1.90, -7.85]), and gender (95% CI [-.42, -.02]) were found to be negatively related to positive driver behaviors. Male drivers, and drivers with lower levels of annual mileage, drivers with higher levels of perceptual-motor skills and safety skills tend to show more positive driver behaviors.

3.6.2 Hierarchical Regression Analysis of DSI and Simulator Behaviors

3.6.2.1. Analysis on Simulation Mean Speeds

To investigate the relationship between demographic variables, driving skills, and simulation mean speeds, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, self-reported perceptual-motor skills and safety skills were entered into the model (see Table 9).

For the mean speed total, the model was significant ($F(4, 72) = 5.66$, $p = .001$) and explained 19.7 % of the variance ($R^2_{adj} = .197$). Gender (95% CI [-19.18, -3.33]) and safety skills (95% CI [-16.84, -2.76]) were found to be negatively related to total mean speed. Male drivers and drivers with lower levels of safety skills showed higher mean speed in total.

For the mean speed in first segment, the model was significant ($F(4, 72) = 3.64$, $p = .009$) and explained 12.2 % of the variance ($R^2_{adj} = .122$). Only safety skills (95% CI [-20.06, -.89]) were found to be negatively related to mean speed in the first segment. Drivers with higher levels of safety skills show lower mean speed in the first segment.

For the mean speed in second segment, the model was significant ($F(4, 72) = 5.278$, $p = .001$) and explained 18.4 % of the variance ($R^2_{adj} = .184$). Gender (95% CI [-23.21, -5.72]) and safety skills (95% CI [-16.40, -1.29]) were found to be negatively related to mean speed in the second segment. Male drivers and drivers with lower levels of safety skills show higher mean speed in the second segment.

For the mean speed in third segment, the model was significant ($F(4, 72) = 5.12$, $p = .001$) and explained 17.8 % of the variance ($R^2_{adj} = .178$). Gender (95% CI [-19.14, -2.67]) and safety skills (95% CI [-17.15, -3.63]) were found to be negatively related to mean speed in the third segment. In the third segment, male drivers and drivers with lower levels of safety skills show higher mean speed.

For the mean speed in fourth segment, the model was significant ($F(4, 72) = 8.00$, $p < .001$) and explained 26.9 % of the variance ($R^2_{adj} = .269$). Annual mileage (95% CI [.00, .00]) and perceptual-motor skills (95% CI [1.07, 12.00]) were found to be positively and gender (95% CI [-19.36, -6.15]) and safety skills (95% CI [-13.36, -3.18]) were found to be negatively related to mean speed in the fourth segment. Male drivers, drivers with higher annual mileage, drivers with higher levels of perceptual-motor abilities and drivers with lower levels of safety skills tend to show higher mean speed in the fourth segment.

Overall, male drivers show higher mean speed in the whole scenario and all segments except the first segment. Moreover, drivers with higher levels of safety skills show lower mean speed in total and all speed segments.

3.6.2.2. Analysis on Simulation Standard Deviation of Speeds

To investigate the relationship between demographic variables, driving skills, and simulation standard deviation of speeds, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, self-reported perceptual-motor skills and safety skills were entered into the model (see Table 10).

For the standard deviation of speed in total, the model was not significant ($F(4, 72) = 1.49$, $p = .213$) and explained 2.5 % of the variance ($R^2_{adj} = .025$). For the standard deviation of speed in first segment, the model was not significant ($F(4, 72) = 1.13$, $p = .351$) and explained .7 % of the variance ($R^2_{adj} = .007$). For the standard deviation of speed in second segment, the model was significant ($F(4, 72) = 2.92$, $p = .027$) and explained 9.2 % of the variance ($R^2_{adj} = .092$). Gender (95% CI [-6.82, -.46]) was found to be negatively related to the standard deviation of speed in the second segment. Male drivers show higher speed deviations in the second segment. For the standard deviation of speed in third segment, the model was significant ($F(4, 72) = 2.93$, $p = .026$) and explained 9.2 % of the variance ($R^2_{adj} = .092$). Safety skills (95% CI [-8.30, -1.22]) were negatively related to speed deviations in the third segment. Drivers with lower safety skills show higher speed deviations. For the standard deviation of speed in fourth segment, the model was significant ($F(4, 72) = 3.73$, $p = .008$) and explained 12.6 % of the variance ($R^2_{adj} = .126$). Annual mileage (95% CI [3.12, .00]) was found to be positively and gender (95% CI [-7.26, -.65]) was found to be negatively related to speed standard deviation in the fourth segment. Male drivers and drivers with higher annual mileage show more speed standard deviation in the fourth segment.

Overall, although there is not any clear pattern between variables, the gender of the drivers, annual mileage, and safety skills are found to be an important factor in different kinds of roads in terms of speed standard deviations.

3.6.2.3. Analysis on Simulation Mean Lane Position

To investigate the relationship between demographic variables, driving skills, and simulation mean lane position, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, self-reported perceptual-motor skills and safety skills were entered into the model (see Table 11).

For the mean lane position in total, the model was not significant ($F(4, 72) = 1.49$, $p = .214$) and explained 2.5 % of the variance ($R^2_{adj} = .025$). For the mean lane position in first segment, the model was not significant ($F(4, 72) = 1.02$, $p = .400$) and explained .1 % of the variance ($R^2_{adj} = .001$). For the mean lane position in second segment, the model was not significant ($F(4, 72) = .92$, $p = .457$) and explained -.4 % of the variance ($R^2_{adj} = -.004$). For the mean lane position in third segment, the model was not significant ($F(4, 72) = 1.14$, $p = .343$) and explained .8 % of the variance ($R^2_{adj} = .008$). For the mean lane position in fourth segment, the model was significant ($F(4, 72) = 5.85$, $p < .001$) and explained 20.3 % of the variance ($R^2_{adj} = .203$). Gender (95% CI [.04, .33]) and safety skills (95% CI [.07, .28]) were found to be positively related to mean lane position in the fourth segment. Female drivers and drivers with higher levels of safety skills drive on the right side of the road than male drivers and drivers with lower levels of safety skills on two-lane roads.

3.6.2.4. Analysis on Simulation Standard Deviation of Lane Position

To investigate the relationship between demographic variables, driving skills, and simulation standard deviation of lane position, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, self-reported perceptual-motor skills and safety skills were entered into the model (see Table 12).

For the standard deviation of lane in total, the model was not significant ($F(4, 72) = 1.93$, $p = .114$) and explained 4.7 % of the variance ($R^2_{adj} = .047$). For the standard deviation of lane in first segment, the model was not significant ($F(4, 72) = 1.26$, $p =$

.296) and explained 1.3 % of the variance (R^2_{adj} = .013). For the standard deviation of lane in second segment, the model was not significant (F(4, 72) = .68, p = .607) and explained -1.7 % of the variance (R^2_{adj} = -.017). For the standard deviation of lane in third segment, the model was not significant (F(4, 72) = 1.65, p = .171) and explained 3.3 % of the variance (R^2_{adj} = .033). For the standard deviation of lane in fourth segment, the model was significant (F(4, 72) = 5.00, p = .001) and explained 17.4 % of the variance (R^2_{adj} = .174). Annual mileage (95% CI [5.53, 2.46]) was found to be positively correlated with lane deviations in the fourth segment. Drivers with higher annual mileage show higher lane deviations.

Table 8. *Hierarchical Regression Analysis on Self-Reported DSI and DBQ*

	1. Errors				2. Violations				3. Positive Behaviors			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	-.008	.688			.204	10.757			.071	3.916		
Gender			-.015	.881			-.042	.736			-.215	.042
Annual Mileage			-6.273	.226			3.015	.001			-9.902	.020
2. DSI	.033	2.585			.451	17.675			.263	10.652		
Perceptual-Motor Skills			-.236	.035			.337	.002			.401	.000
Safety Skills			-.034	.717			-.456	.000			.176	.039

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3.

Table 9. *Hierarchical* Regression Analysis on Self-Reported DSI and Simulation Speed Means

	1. Mean Speed Total				2. Mean Speed 1st Seg.				3. Mean Speed 2nd Seg.				4. Mean Speed 3rd Seg.				5. Mean Speed 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	.101	5.291			.041	2.629			.132	6.797			.093	4.898			.180	9.322		
Gender			-11.227	.009			-9.614	.063			-14.701	.002			-10.696	.014			-12.827	.001
Annual Mileage			.000	.076			.000	.173			.000	.112			.000	.084			.000	.044
2. DSI	.197	5.400			.122	4.404			.184	3.332			.178	4.835			.269	5.529		
Perceptual-Motor Skills			7.356	.071			8.978	.112			6.270	.156			5.915	.141			6.615	.019
Safety Skills			-9.530	.010			-10.234	.040			-8.558	.028			-10.291	.004			-7.795	.005

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

Table 10. *Hierarchical Regression Analysis on Self-Reported DSI and Simulation Speed Standard Deviations*

	1. SD Speed Total				2. SD Speed 1st Seg.				3. SD Speed 2nd Seg.				4. SD Speed 3rd Seg.				5. SD Speed 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	.000	1.014			.012	1.463			.064	3.604			-.003	.879			.089	4.724		
Gender			-1.432	.409			.136	.920			-3.679	.025			-1.945	.310			-3.988	.020
Annual Mileage			.000	.249			.000	.125			.000	.114			8.440	.318			.000	.048
2. DSI	.025	1.945			.007	.799			.092	2.117			.092	4.896			.126	2.534		
Perceptual-Motor Skills			1.216	.521			-.363	.771			.718	.688			2.309	.280			2.791	.159
Safety Skills			-2.844	.110			-1.584	.175			-2.973	.074			-4.653	.012			-2.348	.152

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

Table 11. *Hierarchical Regression Analysis on Self-Reported DSI and Simulation Lane Position Means*

	1. Mean Lane Total				2. Mean Lane 1st Seg.				3. Mean Lane 2nd Seg.				4. Mean Lane 3rd Seg.				5. Mean Lane 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	.005	1.180			-.007	.750			.017	1.660			-.015	.429			.134	6.886		
Gender			-.055	.717			-.117	.524			-.316	.197			.007	.980			.191	.014
Annual Mileage			-1.200	.103			-1.007	.229			-1.684	.133			-1.400	.269			-1.037	.052
2. DSI	.025	1.774			.001	1.295			-.004	.215			.008	1.849			.203	4.222		
Perceptual-Motor Skills			.188	.234			.151	.463			.168	.541			.480	.130			-.101	.197
Safety Skills			.205	.149			.237	.180			.038	.861			.279	.266			.162	.002

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

Table 12. *Hierarchical Regression Analysis on Self-Reported DSI and Simulation Lane Standard Deviations*

	1. SD Lane Total				2. SD Lane 1st Seg.				3. SD Lane 2nd Seg.				4. SD Lane 3rd Seg.				5. SD Lane 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	-.007	.737			.024	1.915			-.017	.362			.019	1.725			.143	7.364		
Gender			-.068	.412			.004	.952			-.127	.409			-.150	.223			-.122	.074
Annual Mileage			3.841	.387			5.992	.030			-1.572	.834			8.841	.189			1.199	.009
2. DSI	.047	3.086			.013	.614			-.017	1.003			.033	1.549			.174	2.360		
Perceptual-Motor Skills			.206	.037			.043	.482			.074	.674			.221	.131			.119	.084
Safety Skills			.030	.729			.047	.415			-.186	.186			.008	.951			-.074	.192

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

3.6.3 Hierarchical Regression Analysis of Implicit Driving Skills and DBQ

For errors, violations, and positive driver behaviors dimensions of Driver Behaviors Questionnaire, three multiple regression analyses were conducted. In the first step, gender and annual mileage were included. In the second step, implicit perceptual-motor skills and safety skills were entered (see Table 13).

For errors, the model was not significant ($F(4, 72) = .45$, $p = .774$) and explained -3.0% of the variance ($R^2_{adj} = -.030$). For violations, the model was significant ($F(4, 72) = 6.01$, $p < .001$) and explained 20.9% of the variance ($R^2_{adj} = .209$). Annual mileage (95% CI [1.45, 5.29]) was found to be positively related to violations. Drivers with higher levels of annual mileage report more violations than drivers with lower levels of annual mileage. For positive behaviors, the model was not significant ($F(4, 72) = 2.05$, $p = .096$) and explained 5.2% of the variance ($R^2_{adj} = .052$).

3.6.4 Hierarchical Regression Analysis of Implicit Driving Skills and Simulation Behaviors

3.6.4.1. Analysis on Simulation Mean Speeds

To investigate the relationship between demographic variables, implicit driving skills, and simulation mean speeds, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, implicit perceptual-motor skills and safety skills were entered into the model (see Table 14).

For the mean speed total, the model was significant ($F(4, 72) = 2.61$, $p = .043$) and explained 7.8% of the variance ($R^2_{adj} = .078$). Only gender (95% CI [-18.80, -2.82]) was found to be negatively related to mean speed total. Male drivers show higher mean speed than female drivers. For the mean speed in first segment, the model was not significant ($F(4, 72) = 1.33$, $p = .267$) and explained 1.7% of the variance ($R^2_{adj} = .017$). For the mean speed in second segment, the model was significant ($F(4, 72) = 3.49$, $p = .012$) and explained 11.6% of the variance ($R^2_{adj} = .116$). Gender (95% CI [-23.20, -5.65]) was found to be negatively related to mean speed in the second segment. Male drivers show higher mean speed than female drivers. For the mean speed in third segment, the model was not significant (F(4, 72) = 2.43, p = .055) and explained 7.0 % of the variance (R^2_{adj} = .070). For the mean speed in fourth segment, the model was significant (F(4, 72) = 5.19, p = .001) and explained 18.1% of the variance (R^2_{adj} = .181). Annual kilometer (95% CI [.00, .00]) was found to be positively and gender (95% CI [-19.53, -6.21]) was found to be negatively related to mean speed in the fourth segment. Drivers with higher levels of annual kilometers and male drivers show higher mean speed in the fourth segment.

3.6.4.2. Analysis on Simulation Standard Deviation of Speeds

To investigate the relationship between demographic variables, implicit driving skills, and simulation standard deviation of speeds, multiple regression analysis were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, implicit perceptual-motor skills and safety skills were entered into the model (see Table 15).

For the standard deviation of speed in total, the model was not significant (F(4, 72) = .65, p = .627) and explained -1.9 % of the variance (R^2_{adj} = -.019). For the standard deviation of speed in first segment, the model was not significant (F(4, 72) = .99, p = .416) and explained .0 % of the variance (R^2_{adj} = .000). For the standard deviation of speed in second segment, the model was not significant (F(4, 72) = 2.02, p = .101) and explained 5.1 % of the variance (R^2_{adj} = .051). For the standard deviation of speed in third segment, the model was not significant (F(4, 72) = .62, p = .651) and explained -2.0 % of the variance (R^2_{adj} = -.020). For the standard deviation of speed in fourth segment, the model was not significant (F(4, 72) = 2.392, p = .058) and explained 6.8 % of the variance (R^2_{adj} = .068).

3.6.4.3. Analysis on Simulation Mean Lane Position

To investigate the relationship between demographic variables, implicit driving skills, and simulation mean lane position, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model.

In the second step, implicit perceptual-motor skills and safety skills were entered into the model (see Table 16).

For the mean lane position in total, the model was not significant ($F(4, 72) = .70$, $p = .594$) and explained -1.6 % of the variance ($R^2_{adj} = -.016$). For the mean lane position in first segment, the model was not significant ($F(4, 72) = .62$, $p = .651$) and explained -2.0 % of the variance ($R^2_{adj} = -.020$). For the mean lane position in second segment, the model was not significant ($F(4, 72) = .85$, $p = .499$) and explained -.8 % of the variance ($R^2_{adj} = -.008$). For the mean lane position in third segment, the model was not significant ($F(4, 72) = .44$, $p = .782$) and explained -3.1 % of the variance ($R^2_{adj} = -.031$). For the mean lane position in fourth segment, the model was significant ($F(4, 72) = 4.28$, $p = .004$) and explained 14.7 % of the variance ($R^2_{adj} = .147$). Gender (95% CI [.04, .33]) was found to be positively related to mean lane position in the fourth segment. Male drivers drive closer to the center line of the road.

3.6.4.4. Analysis on Simulation Standard Deviation of Lane Position

To investigate the relationship between demographic variables, implicit driving skills, and simulation standard deviation of the lane, multiple regression analyses were conducted. In the first step, gender and annual mileage were entered into the model. In the second step, implicit perceptual-motor skills and safety skills were entered into the model (see Table 17).

For the standard deviation of lane position in total, the model was not significant ($F(4, 72) = .40$, $p = .809$) and explained -3.3 % of the variance ($R^2_{adj} = -.033$). For the standard deviation of lane position in first segment, the model was not significant ($F(4, 72) = 1.24$, $p = .302$) and explained 1.2% of the variance ($R^2_{adj} = .012$). For the standard deviation of lane position in second segment, the model was not significant ($F(4, 72) = .76$, $p = .555$) and explained -1.3% of the variance ($R^2_{adj} = -.013$). For the standard deviation of lane position in third segment, the model was not significant ($F(4, 72) = .96$, $p = .437$) and explained -.2% of the variance ($R^2_{adj} = -.002$). For the standard deviation of lane position in fourth segment, the model was significant (F(4,

72) = 3.66, p = .009) and explained 12.3% of the variance (R^2_{adj} = .123). Only, annual mileage (95% CI [5.52, 2.50]) was found to be positively related to standard deviation of lane in fourth segment.

Table 13. *Hierarchical Regression Analysis on Implicit DSI and DBQ*

	1. Errors				2. Violations				3. Positive Behaviors			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	-.008	.688			.204	10.757			.071	3.916		
Gender			-.015	.881			-.042	.736			-.215	.042
Annual Mileage			-6.273	.226			3.015	.001			-9.902	.020
2. Implicit DSI	-.030	.222			.209	1.210			.052	.263		
Perceptual-Motor Skills			.040	.796			.267	.173			-.077	.580
Safety Skills			-.107	.496			-.163	.344			-.066	.645

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3.

Table 14. *Hierarchical Regression Analysis on Implicit DSI and Simulation Speed Means*

	1. Mean Speed Total				2. Mean Speed 1st Seg.				3. Mean Speed 2nd Seg.				4. Mean Speed 3rd Seg.				5. Mean Speed 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	.101	5.291			.041	2.629			.132	6.797			.093	4.898			.180	9.322		
Gender			-11.227	.007			-9.614	.062			-14.701	.003			-10.696	.016			-12.827	.001
Annual Mileage			.000	.078			.000	.167			.000	.120			.000	.083			.000	.043
2. Implicit	.078	.056			.017	.097			.116	.314			.070	.088			.181	1.047		
Perceptual-Motor Skills			-.675	.912			-3.295	.650			-4.449	.480			-.304	.960			6.883	.210
Safety Skills			2.218	.739			1.547	.850			4.241	.525			2.909	.693			1.280	.827

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

Table 15. *Hierarchical Regression Analysis on Implicit DSI and Simulation Speed Standard Deviations*

	1. SD Speed Total				2. SD Speed 1st Seg.				3. SD Speed 2nd Seg.				4. SD Speed 3rd Seg.				5. SD Speed 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	.000	1.014			.012	1.463			.064	3.604			-.003	.879			.089	4.724		
Gender			-1.432	.401			.136	.922			-3.679	.027			-1.945	.294			-3.988	.022
Annual Mileage			.000	.238			.000	.124			.000	.117			8.440	.333			.000	.047
2. Implicit	-.019	.310			.000	.543			.051	.478			-.020	.373			.068	.167		
Perceptual-Motor Skills			-1.728	.514			.109	.954			1.834	.539			-.676	.814			.971	.734
Safety Skills			1.571	.587			2.234	.295			1.231	.664			2.625	.425			-1.409	.693

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

Table 16. *Hierarchical Regression Analysis on Implicit DSI and Simulation Lane Position Means*

	1. Mean Lane Total				2. Mean Lane 1st Seg.				3. Mean Lane 2nd Seg.				4. Mean Lane 3rd Seg.				5. Mean Lane 4th Seg.			
Variables	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p	R^2_{adj}	FΔ	B	p
1. Demographic Variables	.005	1.180			-.007	.750			.017	1.660			-.015	.429			.134	6.886		
Gender			-.055	.717			-.117	.529			-.316	.196			.007	.981			.191	.014
Annual Mileage			-1.200	.103			-1.007	.229			-1.684	.117			-1.400	.274			-1.037	.054
2. Implicit	-.016	.244			-.020	.497			-.008	.079			-.031	.450			.147	1.560		
Perceptual-Motor Skills			-.126	.555			-.263	.278			.138	.695			-.045	.912			-.165	.160
Safety Skills			-.071	.779			.141	.604			-.093	.836			-.408	.418			-.063	.604

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

Table 17. *Hierarchical Regression Analysis on Self-Reported DSI and Simulation Lane Standard Deviations*

	1. SD Lane Total				2. SD Lane 1st Seg.				3. SD Lane 2nd Seg.				4. SD Lane 3rd Seg.				5. SD Lane 4th Seg.			
Variables	R^2_{adj}	$F\Delta$	B	p	R^2_{adj}	$F\Delta$	B	p	R^2_{adj}	$F\Delta$	B	p	R^2_{adj}	$F\Delta$	B	p	R^2_{adj}	$F\Delta$	B	p
1. Demographic Variables	-.007	.737			.024	1.915			-.017	.362			.019	1.725			.143	7.364		
Gender			-.068	.393			.004	.947			-.127	.408			-.150	.224			-.122	.068
Annual Mileage			3.841	.376			5.992	.027			-1.572	.833			8.841	.193			1.199	.013
2. Implicit	-.033	.077			.012	.584			-.013	1.155			-.002	.223			.123	.130		
Perceptual-Motor Skills			-.046	.686			-.050	.558			.065	.760			-.084	.586			.039	.631
Safety Skills			.028	.827			.094	.331			.342	.180			-.072	.686			.025	.831

*Df*s for F-tests: 1. Step = 2, 74; 2. Step = 4, 72 for DV 1, DV 2, DV 3, DV 4, DV5.

CHAPTER 4

DISCUSSION

4.1 Overview

The aim of present study is investigating the effects of self-reported and implicit driving skills on self-reported and simulated driver behaviors. Moreover, the gender difference in terms of driving related variables was also investigated. The relationship between self-reported speed preferences and simulated speeding behaviors were studied to understand the relationship between self-reported speed preferences and speeding behaviors in a driving simulator. For the first time in the literature, driving skills are measured by using the Brief Implicit Association Test and compared with both self-reported and simulated driver behaviors. Driver behaviors are measured by using self-reported and driving simulation with different roads with different characteristics and these differences with respect to different roads were also discussed.

In the following section, the summary and discussion of the results in terms of the factor structure of the questionnaires, correlations between study variables, speeding behaviors, gender difference among study variables, and regression predictions in self-reported and simulated driver behaviors are discussed. In addition to these, the contributions of the present study, and limitations and suggestions for future studies are also addressed.

4.2 Summary and Discussion of the Results

4.2.1 Factor Analyses of DBQ and DSI

4.2.1.1 Factor Analyses of DBQ

The Driver Behavior Questionnaire was found to be a reliable and valid measurement of aberrant driver behaviors across different cultures (de Winter & Dodou, 2010; Özkan et al., 2006a; Reason et al., 1990). It has been the most common measurement of aberrant driver behaviors (de Winter & Dodou, 2010). As stated af Wåhlberg and colleagues (2011), DBQ shows different factor structure in different studies. The taxonomy that was used to develop the scale identified two factors, errors, and violations, as having different origins (Reason et al., 1990).

In this thesis, according to the principal axis factor analysis with varimax rotation and scree plot, the factor structure of the Driver Behaviors Questionnaire was found to be two different factors supporting the general two-factor structure of DBQ which differentiates the intentional and unintentional aberrant driver behaviors as violations and errors across different cultures (Martinussen et al., 2013; Özkan et al., 2006a). This two factors solution was evaluated as the most explanatory factor structure in the longitudinal study of the DBQ (Özkan et al., 2006b). The differentiation between intentional violations and unintentional errors was found to be the fundamental differentiation (de Winter & Dodou, 2010). In addition to these factors, positive driver behaviors are also used as another factor (Özkan & Lajunen, 2005). However, positive driver behaviors showed relatively low Cronbach's alpha reliability.

4.2.1.2 Factor Analyses of DSI

The Driving Skills Inventory was found to be a reliable and valid measurement of driving skills across different cultures (Özkan et al., 2006a). The general factor structure of DSI includes two factors differentiating perceptual-motor skills and safety skills with 10 items in each factor (Lajunen & Summala, 1995). In the current study, the factor structure of DSI resulted in the same differentiation between perceptual-motor skills and safety skills. The item loadings of these two factors were found to be similar to the Turkish adaptation (Lajunen & Özkan, 2004). It might be suggested that, in Turkish sample, the current version of factor loadings is better to use while evaluating driving skills.

4.2.2 Discussion of Correlation Results

The correlations between gender and perceptual-motor skills show that male drivers show a positive correlation with perceptual-motor skills compared to female drivers. The results are consistent with the literature suggesting that male drivers show higher perceptual-motor skills compared to female drivers (Martinussen et al., 2014; Özkan & Lajunen, 2006). Moreover, in terms of the safety skills, gender is not correlated with the gender of the drivers supporting the no difference between male and female drivers (Lajunen & Summala, 1995).

In terms of the correlation results, total mileage was significantly and positively correlated with total accidents, speed preferences, center line crossing, and means of speed in a driving simulator. Total mileage was also significantly and negatively correlated with mean and standard deviations of speed and lane position in the fourth segment except mean lane position in the fourth segment which is negatively correlated with. Drivers with higher mileage show more speeding behaviors and lane changing in one lane road. Moreover, they also show more center line crossing and higher speed preferences.

The annual and total mileage are found to be positively correlated with perceptual-motor skills and negatively correlated with safety skills. Drivers with higher mileage report higher levels of perceptual-motor skills and lower levels safety skills. The results also support the finds that drivers with higher experiences report higher levels of perceptual-motor skills and lower levels of safety skills (Lajunen & Summala, 1995; Lajunen et al., 1998a). As stated by Lajunen and Summala (1995), the negative correlation between safety skills and driving experience might be because of learning and feedback mechanisms. In the current study, participants are young drivers who have a certain level of experience and continue learning. Violations are also found to be significantly and positively correlated with annual and total mileage and supported the general findings of de Winter and Dodou (2010). As stated by Zhang and colleagues (2013), the increased exposure to traffic might increase the violations. Moreover, it should be also noted that less skilled drivers and more experienced drivers were found to be inconsistent in terms of self-reported driving skills (Martinussen et al., 2017). Overall, the relationships between experience and perceptual-motor skills, safety skills, and violations might represent a safety issue for traffic safety.

Moreover, only violations show significant correlations with accident involvement of the drivers. Drivers with higher levels of violations report higher numbers of both passive and active accidents (Cordazzo et al., 2014; Rowe et al., 2015). However, contrary to the finds of Cordazzo and colleagues (2014), errors are not found to be correlated with accident involvement of drivers. Moreover, safety skills also show a negative correlation with a total number of accidents and active accidents of drivers. Male drivers also show a positive correlation with positive driver behaviors. However, in general, positive driver behaviors show non-significant or weak correlations with other variables. This might be explained by the lack of experience of young drivers (Guého et al., 2014).

In accordance with the findings of Helman and Reed (2015), the correlation results showed that there are significant positive correlations between DBQ violations dimension and means and standard deviations of speed in a driving simulator. Moreover, all speed dimensions except speed standard deviation in the second segment are not correlated with DBQ errors. Overall, the correlations between DBQ dimensions, violations and driving simulator speeding measures are supported by the literature in terms of speeding behaviors in a driving simulator with two-lane roads (Helman & Reed, 2015). Moreover, positive behaviors are also found not correlated with all speed dimensions in a driving simulator.

Safety skills are also found to be negatively correlated with all speed means and standard deviations in all segments expect the standard deviation of speed in the first segment. Moreover, safety skills are found to be negatively correlated with all speed means and standard deviations in driving simulator expect the standard deviation of speed in the first segment. Perceptual-motor skills are found to be positively correlated with mean speeds in all segments. The results support the overall positive relationship between perceptual-motor skills and speeding and negative relationship between safety skills and speeding (Lajunen et al., 1998a).

In addition to speed measurements, standard deviations of lane position in all segments are also found to be positively correlated with DBQ violations. Drivers with higher levels of violations also show higher speeding behaviors, speed changes, and lane changes. These might be evaluated as speed and lateral position measurements in driving simulators are more related to DBQ violations but not errors. The correlations with errors might also be evaluated as the item content of the subscale because errors items are situation specific items which can be measured by driving simulator by creating certain situations or observing these behaviors in real life.

In terms of the correlations between DSI and DBQ dimensions, perceptual-motor skills are found to be positively correlated with violations and positive behaviors and negatively correlated with errors. On the other hand, safety skills are found to be positively correlated positive driver behaviors and negatively correlated with violations. The results supported the general relationship between violations, perceptual-motor skills and safety skills (Martinussen et al., 2014; Sümer et al., 2006). However, in the literature, positive driver behaviors were found to be negatively correlated with errors and violations (Guého et al., 2014; Özkan & Lajunen, 2005). The differences might be explained by the lack of experience of young drivers that results in lower positive driver behaviors compared to more experienced drivers (Guého et al., 2014).

4.2.3 Self-Reported and Simulated Driving Speeding Behaviors

In terms of the relationship between the speed limit and speed preferences, the participants reported that they prefer speed limits that are above legal speed limit around 4-5 km/h. In a similar study, Goldenbeld and van Schagen also found that drivers prefer to drive over speed limit around 8 km/h when the speed limit is 80 km/h on the road (2007). Fleiter and Watson (2006) also found that drivers prefer to drive above speed limit around 10 to 20 km/h. The results are consistent with the literature in a sense that drivers prefer to drive above the speed limit.

There have been differences between self-reported speed preferences in certain types of roads and speed behaviors in that kind of roads in a driving simulator. Drivers drove faster in the first segment where the speed limit was 82 km/h. However, drivers drove slower in the second and third segments where speed limits were 82 km/h and 90 km/h respectively. On the last segment where the speed limit was 50 km/h, drivers drove faster in the driving simulator. Contrary to the other findings suggesting that drivers drive faster in a driving simulator compared to on-road performance (Bella, 2008; Yang et al., 2014), the driver usually drove slower in all segment than their self-reported on-road speed except the first and fourth segments. It should be noted that the second and third road segments included traffic lights that turned into red when there was a certain distance between the car and the light. Because of these lights, the mean speeds of these two segments are lower. In terms of the difference between first and third segments which resulted in negative difference although the speed limit is the same, the speeding behaviors might be different in the first segment. Since the first segment is the beginning of the new scenario, drivers may need to adapt to new scenario even after driving the practice scenario (Ronen & Yair, 2013). In a different study, it was found that drivers made less speeding violations in a driving simulator compared to on-road performance. The reason behind the results might be the unfamiliarity with the driving simulator. In general, it was found that driving simulator performance and on-road performance in terms of speeding was comparable for maintaining speed but not comparable for correct speeding behaviors (Meuleners & Fraser, 2015). The difference between self-reported speed preferences, legal speed limits and driving simulator speeds show that there might be other factors that might affect the perception of speed. However, the positive correlations between speeding behaviors in a driving simulator and self-reported on road-behaviors also show the validity of driving simulator.

4.2.4 Gender Differences in Study Variables

The literature shows that there are some contradictory findings in terms of the gender difference in driving skills (Delhomme, 1991; Lajunen & Summala, 1995; Lajunen et al., 1998a). In terms of gender difference in driving skills, only gender difference is found for the self-reported perceptual-motor skills stating that male drivers show higher levels of perceptual-motor skills than female drivers supporting the finding of Delhomme (1991) and Özkan and Lajunen (2006). However, safety skills did not show gender difference contrary to the other studies (Delhomme, 1991; Özkan & Lajunen, 2006).

Although there are many studies supporting the gender difference between male and female drivers in terms of driver behaviors (Reason et al., 1990; Rowe et al., 2015; Stephens & Fitzharris, 2016), the gender of the drivers did not show any difference after controlling age and total mileage for violations and errors. However, male drivers show more positive driver behaviors than female drivers. This might be related to other factors between young male and female drivers such as experience (Guého et al., 2014).

In terms of speeding behaviors, male drivers drive at significantly higher speeds than female drivers in whole scenario and all segments except the first segment. Hassan and Abdel-Aty (2013) also found that young male drivers drove over speed limit more than female drivers. The non-significant result might be seen because the first segment is the beginning of the whole scenario. It has been found that the adaptation to the driving simulation environment depends on the tasks and characteristics of the road (Ronen & Yair, 2013; Sahami & Sayed, 2013). Because of that, the certain part of the first segment might serve as an adaptation part. In that section, drivers may not show their certain behavioral characteristics because of observing simulation environment. After the first segment, there are similar gender differences in all segments regardless of the characteristics of the road.

In terms of the standard deviations of speed during the whole scenario and all segments, the only significant gender difference was found in the second segment where the speed limit is 90 km/h, the highest speed limit. In that segment of the road, male drivers show higher speed deviations than female drivers. As stated earlier, male drivers also drove faster in that segment. This might indicate that when the speed limit is high, male drivers drive faster and show higher speed changes. On the other hand, female drivers drive slower and more stable.

The only gender difference for the lane position measurement was found in the fourth segment mean lane position. The results showed that male drivers drove closer to the center line and pass more than female drivers. This might be because of the characteristics of the road. In the fourth segment, there was only one lane in each section and there are cars with different speeds so drivers had to decide whether to follow the cars and overtake. The results show that male drivers show higher lane changing than female drivers in narrow roads with a certain amount of traffic.

4.2.5 Discussion of Hierarchical Regression Analyses

4.2.5.1 Self-Reported Driver Behaviors as the Outcome

Annual mileage and self-reported perceptual-motor skills positively predicted violations. On the other hand, safety skills negatively predicted violations. Drivers with lower levels of safety skills show more violations (Sümer et al., 2006; Sümer & Özkan, 2002). The results support the findings of Sümer et al. (2006) stating the asymmetric relationship between perceptual-motor skills and safety skills in terms of unsafe traffic outcomes. However, for the positive driver behaviors, self-reported perceptual-motor skills and safety skills showed symmetric relationship. Martinussen and colleagues (2014) also found that drivers with higher levels of perceptual-motor skills and lower levels of safety skills show higher levels of violations. For the positive driver behaviors, both self-reported perceptual-motor skills and safety skills positively predicted positive driver behaviors. However, annual mileage and being female negatively predicted positive driver behaviors.

4.2.5.2 Simulated Speeding Behaviors as the Outcome

For the mean speed in a driving simulator, being male positively predicted mean speed in total, in the second segment, in the third segment, and in the fourth segment. Annual mileage only positively predicted mean speed in the fourth segment. Self-reported perceptual-motor skills only positively predicted mean speed in the fourth segment. Self-reported safety skills negatively predicted mean speed in total, in the first segment, in the second segment, in the third segment, and in the fourth segment. The results supporting the findings of Lajunen and colleagues (1998a) indicating that only safety skills were found to be a significant predictor of speed. It was found that gender of the drivers and self-reported safety skills are important predictors of mean speed regardless of the characteristics of the road. However, when the road is one lane on each side with a certain amount of traffic, self-reported perceptual-motor skills also have a predictive role indicating when the road is one lane and have higher density, self-reported perceptual-motor skills positively predicted mean speed.

The asymmetric relationship between self-reported perceptual-motor skills and safety skills in terms of speeding behaviors of young drivers was found to be supporting the findings of Sümer and colleagues (2006) indicating that young drivers with higher levels of perceptual-motor skills showed higher levels of speeding behaviors whereas driver with higher levels of safety skills showed lower speeds. The results support the findings of Taubman-Ben-Ari and colleagues (2016) stating that being male and having higher annual mileage as being more experienced found to be positively correlated with higher speeding behaviors in a driving simulator.

For the standard deviation of speed in a driving simulator, being male positively predicted standard deviation of speed in the second segment and fourth segment. Annual mileage positively predicted standard deviation of speed only in the fourth segment. Self-reported safety skills negatively predicted standard deviation of speed in the third segment. It might be said that the effects of demographic variables are present depending on the speed limits and characteristics of the road.

As stated by Calvi and colleagues (2015), the flow and characteristics of the traffic in driving simulator affect the speeding behaviors of drivers. In the line with this finding, the different characteristics of road segments and mean speeds in these segments represent the adaptive driver behaviors of drivers and reliability of the driving simulator. It was also found that different road characteristics result in differences in speeding and lane position behaviors of drivers (Lewis-Evans & Charlton, 2006). Overall, the only difference was found on the two-lane roads, a fourth segment, in terms of lane position. This might be explained by the characteristics of the road. As stated earlier, the fourth segment was two lanes, one on each side with a certain traffic density. In other words, if the drivers want to continue to road over a certain speed, they have to overtake and use other side of the road resulting in decreased lane mean and increased lane deviation. The results support the statement by showing that drivers with lower levels of safety skills, higher perceptual-motor skills, and male drivers drive closer to the centerline and overtake more than other drivers. Moreover, it was also found that drivers with higher levels of perceptual-motor skills and lower levels of safety skills were found to be riskier than other drivers (Martinussen et al., 2014). The situation in the final segment might be explained by the interaction of road characteristics and driving skills that result in differences in speedings and lane position.

4.2.5.3 Simulated Lane Position Behaviors as the Outcome

For the mean lane position in a driving simulator, only in the fourth segment, being female and safety skills positively predicted mean lane position indicating that female drivers and drivers with higher safety skills drive more on the right side of the road and show fewer behaviors such as getting closer to the centerline and crossing. For the standard deviation of lane position, only in the fourth segment, annual mileage positively predicted standard deviation of lane position. In general, different types of the road with different speed limits were found to be related to self-reported perceptual-motor skills.

4.3 Overall Discussion and Implications of the Results

Although there are some studies founding that young male drivers are inconsistent in terms of their self-assessment of driving skill and driving performance (Martinussen et al., 2017), in the current study, the relations between self-reported perceptual-motor skills, safety skills and self-reported and simulated driver behaviors were found to be consistent in terms of the direction of the relationship.

In general, the results indicated that self-reported driving skills, as perceptual-motor skills and safety skills, are predictive of both self-reported and simulated driver behaviors. It is also found that the role of perceptual-motor skills might depend on the characteristics of the road in the driving simulator.

It should be noted that the methodology and results of the present study is important for the both researches in traffic and transportation psychology and driver education. The results show that self-reported perceptual-motor skills and safety skills are important predictors of self-reported violations, positive driver behaviors and behaviors in a driving simulator. In terms of the driver education system, the results show that how drivers see themselves is an important predictor of young drivers' behaviors. Throughout the driver education, the focus of the driver skills should be distributed equally between perceptual-motor skills and safety skills. Drivers should receive continuous feedback and training with respect to their driving skills involving perceptual-motor skills and safety skills. The definion of "good" or "skillful" driver should include characteristics of the both perceptual-motor skills and safety skills.

However, in terms of the implicit measurement of driving skills, perceptual-motor skills, and safety skills did not show any significant effect on both self-reported and simulated driver behaviors. The results showed an unexpected situation in terms of implicit measurement of driving skills. The results might be related to experience. The implicit attitudes regarding safe driving might be affected from driving experience (Martinussen et al., 2015). Since the participants were young drivers, the level of experience is low. In the literature, implicit measurements of risk and safety attitudes show relatively weak relationships with driver behaviors (Martinussen et al., 2015). As stated by Özkan et al. (2013), the implicit measurement might be conducted with different groups of drivers such as drivers who received traffic tickets or lost their license.

4.4 Contributions of the Present Study

The first contribution of the present thesis is the investigation of the relationship between driver behaviors and driving skills by using self-reports implicit measurements and driving simulator. For the first time in the literature, driving skills were measured by using Brief Implicit Association Test (BIAT) in addition to measuring with a self-report.

Moreover, the gender difference in young drivers in terms of driving skills and driver behaviors were also studied. Another contribution of the present thesis is that the relationships between self-reported driving skills and both self-reported and simulated driver behaviors with respect to different types of roads were investigated in a Turkish sample.

4.5 Limitations and Suggestions for Future Studies

First of all, the use of self-reports and simulations for the measurement of driver behaviors has some shortcomings (Carsten & Jamson, 2011; Lajunen & Summala, 2003; Lajunen & Özkan, 2011). The driver behaviors measurements that are done with either self-reported or simulations might not correspond to the actual driver behaviors of drivers. In terms of the road characteristics of a driving simulator, it might be important to examine the behaviors of drivers in different roads. Moreover, the self-reports are vulnerable in terms of socially desirable responding. Since the whole study was conducted in a laboratory setting, participants might give socially desirable responses and even drive more cautiously in a driving simulator.

For the implicit measurement of driving skills, the results indicated that implicit measurement of driving skills by using BIAT did not predict self-reported and simulated driver behaviors and was not found to be correlated with driving-related variables. There might be different reasons behind these results. First of all, young drivers may not develop implicit driving skills compared to more experienced drivers. As stated earlier, the implicit measurement of driving skills might be conducted with other experienced driver groups. Secondly, there are different versions of implicit measurement, other methods might be used to test the reliability of the results. Thirdly, the levels of education might be another factor that affects the results in terms of implicit measurement. All participants did show high performance in terms of the percentage of correct responses in the BIAT test.

In terms of the factor structure of the Driver Behavior Questionnaire, future studies should examine the item structure of the DBQ because, with the development of technology in terms of road and in-car, some of the items may not be representative of the real traffic environment. Moreover, the error dimension of DBQ should be studied with specific road scenarios in a driving simulator.

A final limitation of the present study is the sample size. A total number of 80 participants, 40 of them males and 40 of them females, were participated and 78 of them were used in the analysis. The study might be conducted with a higher number of participants with different characteristics in terms of mileage and being professional drivers. Moreover, the number of participants might result in problems with the statistical power of the study.

REFERENCES

af Wåhlberg A., Dorn, L., & Kline, T. (2011). The Manchester Driver Behaviour Questionnaire as a predictor of road traffic accidents. *Theoretical Issues in Ergonomics Science, 12*(1), 66–86. doi: 10.1080/14639220903023376

Ahie, L. M., Charlton, S. G., & Starkey, N. J. (2015). The role of preference in speed choice. *Transportation Research Part F: Traffic Psychology and Behaviour, 30,* 66–73. doi: 10.1016/j.trf.2015.02.007

Amarasingha, N., & Dissanayake, S. (2014). Gender differences of young drivers on injury severity outcome of highway crashes. *Journal of Safety Research, 49,* 113–120. doi: 10.1016/j.jsr.2014.03.004

Bar-Anan, Y., & Nosek, B. A. (2014). A comparative investigation of seven indirect attitude measures. *Behavioral Research, 46,* 668–688. doi: 10.3758/s13428-013-0410-6

Bella, F. (2008). Driving simulator for speed research on two-lane rural roads. *Accident Analysis and Prevention, 40,* 1078–1087. doi: 10.1016/j.aap.2007.10.015

Bener, A., & Crundall, D. (2008). Role of gender and driver behaviour in road traffic crashes. *International Journal of Crashworthiness, 13*(3), 331–336. doi: 10.1080/13588260801942684

Boccara, V., Delhomme, P., Vidal-Gomel, C., & Rogalski, J. (2011). Time course of driving-skill self-assessment during French driver training. *Accident Analysis and Prevention, 43,* 241–246. doi: 10.1016/j.aap.2010.08.016

Brooks, J. O., Goodenough, R. R., Crisler, M. C., Klein, N. D., Alley, R. L., Koon, B. L., …, Wills, R. F. (2010). Simulator sickness during driving simulator studies. *Accident Analysis and Prevention, 42,* 788–796. doi: 10.1016/j.aap.2009.04.013

Calvi, A., Benedetto, A., & de Blasiis, M. R. (2012). A driving simulator study of driver performance on deceleration lanes. *Accident Analysis and Prevention, 45,* 195–203. doi:10.1016/j.aap.2011.06.010

Carsten, O., & Jamson, A. H. (2011). *Driving simulators as research tools in traffic psychology.* In B. E. Porter (Ed.), Handbook of Traffic Psychology (pp.87-96). San Diego, CA: Elseveir.

Casutt, G., Martin, M., Keller, M., & Jäncke, L. (2014). The relationship between performance in on-road driving, cognitive screening and driving simulator in older healthy drivers. *Transportation Research Part F: Traffic Psychology and Behaviour, 22,* 232–244. doi: 10.1016/j.trf.2013.12.007

Chan, E., Pranhan, A. K., Pollatsek, A., Knodler, M. A., & Fisher, D. L. (2010). Are driving simulators effective tools for evaluating novice drivers' hazard anticipation, speed management, and attention maintenance skills? *Transportation Research Part F: Traffic Psychology and Behaviour, 13,* 343–353. doi:10.1016/j.trf.2010.04.001

Cordazzo, S. T. D., Scialfa, C. T., Bubric, K., & Ross, R. J. (2014). The Driver Behaviour Questionnaire: A North American analysis. *Journal of Safety Research, 50,* 99–107. doi: 10.1016/j.jsr.2014.05.002

de Craen, S., Twisk, D. A. M., Hagenzieker, M. P., Elffers, H., & Brookhuis, K. A. (2011). Do young novice drivers overestimate their driving skills more than experienced drivers? Different methods lead to different conclusions. *Accident Analysis and Prevention, 43,* 1660–1665. doi:10.1016/j.aap.2011.03.024

de Winter, J. C. F., & Dodou, D. (2010). The Driver Beahviour Questionnaire as a predictor of accidents: A meta-analysis. *Journal of Safety Research, 41,* 463–470. doi:10.1016/j.jsr.2010.10.007

de Winter, J. C. F., de Groot, S., Mulder, M., Wieringa, P. A., Dankelman, J., & Mulder, J. A. (2009). Relationshiops between driving simulator performance and driving test results. *Ergonomics, 52*(2), 137–153. doi: 10.1080/00140130802277521

de Winter, J. C. F., Wieringa, P. A., Kuipers, J., Mulder, J. A., & Mulder, M. (2007). Violations and errors during simulation-based driver training. *Ergonomics, 50*(1), 138–158. doi: 10.1080/00140130601032721

Delhomme, P. (1991). Comparing one's driving with others': Assessment of abilities and frequency of offences. Evidence for a superior conformity of self-bias? *Accident Analysis and Prevention, 23*(6), 493–508.

Dijksterhuis, C., Brookhuis, K. A., & de Waard, D. (2011). Effects of steering demand on lane keeping behaviour, self-reports, and physiology. A simulator study. *Accident Analysis and Prevention, 43,* 1074–1081. doi:10.1016/j.aap.2010.12.014

Dobson, A., Brown, W., Ball, J., Powers, J., & McFadden, M. (1999). Women drivers' behaviour, socio-demographic characteristics and accidents. *Accident Analysis and Prevention, 31,* 525–535.

Domeyer, J. E., Cassavaugh, N. D., & Backs, R. W. (2013). The use of adaptation to reduce simulation sickness in driving assessment and research. *Accident Analysis and Prevention, 53,* 127–132. doi: 10.1016/j.aap.2012.12.039

Doroudgar, S., Chuang, H. M., Perry, P. J., Thomas, K., Bohnert, K., & Canedo, J. (2017). Driving performance comparing older versus younger drivers. *Traffic Injury Prevention, 18*(1), 41–46. doi: 10.1080/15389588.2016.1194980

Elander, J., West, R., & French, D. (1993). Behavioral correlates of individual differences in road-traffic crash risk: an examination method and findings. *Psychological Bulletin, 113*(2), 279–294.

Fleiter, J. J., & Watson, B. C. (2006). The speed paradox: The misalignment between driver attitudes and speeding behaviour. *Journal of the Australasian College of Road Safety, 17*(2), 23–30.

Freydier, C., Berthelon, C., & Bastier-Toniazzo, M. (2016). Does early training improve driving skills of young novice French drivers? *Accident Analysis and Prevention, 96,* 228–236. doi: 10.1016/j.aap.2016.07.026

Fulcher, G., Parkhurst, G., Alford, C., & Musselwhite, C. (2014). The role of implicit data collection techniques in driver behaviour research. Retrieved from: http://www.drcharliemuss.com/uploads/1/2/8/0/12809985/utsg_paper_g_fulcher_2014_final.pdf

Gheorghiu, A., & Havârneanu, C. (2012). Driving behaviours of a sample of young Romanian drivers. *Procedia – Social and Behavioral Sciences, 33,* 697–701.

Godley, S. T., Triggs, T. J., & Fildes, B. N. (2002). Driving simulator validation for speed research. *Accident Analysis and Prevention, 34,* 589–600.

Goldenbeld, C., & van Schages, I. (2007). The credibility of speed limits on 80 km/h rural roads: The effects of road and person(ality) characteristics. *Accident Analysis and Prevention, 39,* 1121–1130. doi:10.1016/j.aap.2007.02.012

Gras, M. E., Sullman, M. J. M., Cunill, M., Planes, M., Aymerich, M., & Font-Mayolas, S. (2006). Spanish drivers and their aberrant driving behaviors. *Transportation Research Part F: Traffic Psychology and Behaviour, 9,* 129–137. doi: 10.1016/j.trf.2005.09.004

Gray, R. C., Quddus, M. A., & Evans, A. (2008). Injury severity analysis of accidents involving young male drivers in Great Britain. *Journal of Safety Research, 39,* 483–495. doi:10.1016/j.jsr.2008.07.003

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: An improved scoring algorithm. *Journal of Personality and Social Psychology, 85*(2), 197–216. doi: 10.1037/0022-3514.85.2.197

Gregersen, N. P., & Bjurulf, P. (1996). Young novice drivers: Towards a model of their accident involvement. *Accident Analysis and Prevention, 28*(2), 229–241.

Guého, L., Granié, M. A., & Abric, J. C. (2014). French validation of a new version of the Driver Behavior Questionnaire (DBQ) for drivers of all ages and level of experiences. *Accident Analysis and Prevention, 63,* 41–48. doi: 10.1016/j.aap.2013.10.024

Harré, S., & Sibley, C. G. (2007). Explicit and implicit self-enhancement biases in drivers and their relationship to driving violations and crash-risk optimism. *Accident Analysis and Prevention, 39,* 1155–1161. doi: 10.1016/j.aap.2007.03.001

Hassan, H. M., & Abdel-Aty, M. A. (2013). Exploring the safety implications of young drivers' behavior, attitudes and perception. *Accident Analysis and Prevention, 50,* 361–370. doi: 10.1016/j.aap.2012.05.003

Hassan, H. M., Shawy, M., Kishta, M., Garib, A. M., & Al-Harthei, H. A. (2017). Investigation of drivers' behavior towards speeds using crash data and self-reported questionnaire. *Accident Analysis and Prevention, 98,* 348–358. doi: 10.1016/j.aap.2016.10.027

Helland, A., Lydersen, S., Lervåg, L. E., Jenssen, G. D., Mørland, J., & Slørdal, L. (2016). Driving simulator sickness: Impact on driving performance, influence of blood alcohol concentration, and effect of repeated simulator exposures. *Accident Analysis and Prevention, 94,* 180–187. doi: 10.1016/j.aap.2016.05.008

Helman, S., & Reed, N. (2015). Validation of the driver behaviour questionnaire using behavioural data from an instrumented vehicle and high-fidelity driving simulator. *Accident Analysis and Prevention, 75,* 245–251. doi: 10.1016/j.aap.2014.12.008

Kontogiannis, T., Kossiavelou, Z., & Marmaras, N. (2002). Self-reports of aberrant behaviour on the roads: errors and violations in a sample of Greek drivers. *Accident Analysis and Prevention, 34,* 381–399.

Laapotti, S., & Keskinen, E. (2004). Has the difference in accident patterns between male and female drivers changed between 1984 and 2000? *Accident Analysis and Prevention, 36,* 577–584. doi:10.1016/S0001-4575(03)00064-2

Laapotti, S., Keskinen, E., Hatakka, M., & Katila, A. (2001). Novice drivers' accident and violations – a failure on higher or lower hierarchical levels of driving behaviour. *Accident Analysis and Prevention, 33,* 759–769.

Lajunen, T., & Özkan, T. (2011). *Self-report instruments and methods*. In B. E. Porter (Ed.), Handbook of Traffic Psychology (pp.43-59). San Diego, CA: Elseveir.

Lajunen, T., & Summala, H. (1995). Driving experience, personality, and skill and safety-motive dimensions in drivers' self-assessments. *Personality & Individual Differences, 19*(3), 307–318.

Lajunen, T., & Summala, H. (2003). Can we trust self-report of driving? Effects of impression management on driver behaviour questionnaire responses. *Transportation Research Part F: Traffic Psychology and Behaviour, 6,* 97–107. doi: 10.1016/S1369-8478(03)00008-1

Lajunen, T., Corry, A., Summala, H., & Hartley, L. (1998a). Cross-cultural differences in drivers' self-assessment of their perceptual-motor and safety skills: Australians and Finns. *Personality and Individual Differences, 24*(4), 539–550.

Lajunen, T., Parker, D., & Stradling, S. G. (1998b). Dimensions of driving anger, aggressive and highway code violations and their mediation by safety orientation in UK drivers. *Transportation Research Part F: Traffic Psychology and Behaviour, 1,* 107–121.

Ledesma, R. D., Tosi, J., Poó, F. M., Montes, S. A. & López, S. S. (2015). Implicit attitudes and road safety behaviors. The helmet-use case. *Accident Analysis and Prevention, 79,* 190–197. doi: 10.1016/j.aap.2015.03.030

Lewin, I. (1982). Driver training: a perceptual-motor skill approach. *Ergonomics, 25,* 917–924.

Lewis-Evans, B., & Charlton, S. G. (2006). Explicit and implicit processes in behavioural adaptation to road width. *Accident Analysis and Prevention, 38,* 610–617. doi:10.1016/j.aap.2005.12.005

Lourens, P. F., Vissers, J. A. M. M., & Jessurun, M. (1999). Annual mileage, driving violations, and accident involvement in relations to drivers' sex, age, and level of education. *Accident Analysis and Prevention, 31,* 593–597.

Martinussen, L. M., Hakamies-Blomqvist, L., Møller, M., Özkan, T., & Lajunen, T. (2013). Age, gender, mileage, and the DBQ: The validity of the Driver Behavior Questionnaire in different driver groups. *Accident Analysis and Prevention, 52,* 228–236. doi: 10.1016/j.aap.2012.12.036

Martinussen, L. M., Møller, M., & Prato, C. G. (2014). Assessing the relationship between the Driver Behavior Questionnaire and the Driver Skill Inventory: Revealing sub-groups of drivers. *Transportation Research Part F: Traffic Psychology and Behaviour, 26,* 82–91. doi: 10.1016/j.trf.2014.06.008

Martinussen, L. M., Møller, M., & Prato, C. G. (2017). Accuracy of young male drivers' self-assessment of driving skill. *Transportation Research Part F: Traffic Psychology and Behaviour, 46,* 228–235. doi: 10.1016/j.trf.2017.03.001

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: Traffic Psychology and Behaviour, 30,* 74–83. doi: 10.1016/j.trf.2015.02.005

Massie, D. L., Campbell, K. L., & Williams, A. F. (1995). Traffic accident involvement rates by driver age and gender. *Accident Analysis and Prevention, 27*(1), 73–87.

Mattsson, M., O'Brien, F., Lajunen, T., Gromley, M., & Summala, H. (2015). Measurement invariance of the Driver Behavior Questionnaire across samples of young drivers from Finland and Ireland. *Accident Analysis and Prevention, 78,* 185–200. doi: 10.1016/j.aap.2015.02.017

Mayhew, D. R., Simpson, H. M., Wood, K. M., Lonero, L., Clinton, K. M., & Johnson, A. G. (2011). On-road and simulared driving: Concurrent and discriminant validation. *Journal of Safety Research, 42,* 267–275. doi:10.1016/j.jsr.2011.06.004

Meuleners, L., & Fraser, M. (2015). A validation study of driving errors using a driving simulator. *Transportation Research Part F: Traffic Psychology and Behaviour, 29,* 14–21. doi: 10.1016/j.trf.2014.11.009

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2005). Understanding and using the Implicit Association Test: II. Method variables and construct validity. *Personality and Social Psychology Bulletin, 31,* 166–180.

Ostapczuk, M., Joseph, R., Pufal, J., & Musch, J. (2017). Validation of the German version of the Driver Skill Inventory (DSI) and the Driver Social Desirability Scales (DSDS). *Transportation Research Part F: Traffic Psychology and Behaviour, 45,* 169–182. doi: 10.1016/j.trf.2016.12.003

Özkan, T., & Lajunen, T. (2004). *Kultur, guvenlik kulturu, Turkiye ve Avrupa`da trafik guvenligi.* Project No: SBB-3023, June 2004, Ankara, Turkey.

Özkan, T., & Lajunen, T. (2005). A new addition to DBQ: Positive Driver Behaviours Scale. *Transportation Research Part F: Traffic Psychology and Behaviour, 8,* 355–368. doi: 10.1016/j.trf.2005.04.018

Özkan, T., & Lajunen, T. (2006). What causes the differences in driving between young men and women? The effects of gender roles and sex on young drivers' driving behaviors and self-assessment of skills. *Transportation Research Part F: Traffic Psychology and Behaviour, 9,* 269–277. doi: 10.1016/j.trf.2006.01.005

Özkan, T., Doğruyol, B., Harma, M., Bıçaksız, P., & Lajunen, T. (2013). *Algı-motor ve güvenli sürücülük becerilerinin örtük ölçülmesi ve objektif performans testleri ile ilişkisi.* TÜBİTAK Project Report. No: 111K333.

Özkan, T., Lajunen, T., & Summala, H. (2006b). Driver Behaviour Questionnaire: A follow-up study. *Accident Analysis and Prevention, 38,* 386–395. doi: 10.1016/j.aap.2005.10.012

Özkan, T., Lajunen, T., Chliaoutakis, J. E., Parker, D., & Summala, H. (2006a). Cross-cultural differences in driving skills: A comparison of six countries. *Accident Analysis and Prevention, 38,* 1011–1018. doi:10.1016/j.aap.2006.04.006

Parker, D., & Stradling, S. (2001). *Influencing Driver Attitudes and Behaviour, DETR Road Safety Research Report No.17,* London: DETR.

Reason, J. T., Manstead, A., Stradling, S. G., Baxter, J., & Campbell, K. (1990). Errors and violations on the road – A real distinction. *Ergonomics, 33*(10/11), 1315–1332.

Reimer, B., D'Ambrosio, L. A., Coughlin, J. F., Kafrissen, M. E., & Biederman, J. (2006). Using self-reported data to assess the validity of driving simulator data. *Behavior Research Methods, 38*(2), 314–324.

Ronen, A., & Yair, N. (2013). The adaptation period to a driving simulator. *Transportation Research Part F: Traffic Psychology and Behaviour, 18,* 94–106. doi: 10.1016/j.trf.2012.12.007

Rowe, R., Roman, G. D., McKenna, F. P., Barker, E., & Poulter, D. (2015). Measuring errors and violations on the road: A bifactor modeling approach to the Driver Behavior Questionnaire. *Accident Analysis and Prevention, 74,* 118–125. doi: 10.1016/j.aap.2014.10.012

Rusu, A., Sârbescu, P., Moza, D., & Stancu, A. (2017). Implicit attitudes towards risky driving: Development and validation of an affect misattribution procedure for speeding. *Accident Analysis and Prevention, 100,* 15–22. doi: 10.1016/j.aap.2016.12.022

Sadia, R., Bekhor, S., & Polus, A. (2015). Individiual selection of driving speeds: Analysis of a stated preference survey. *Journal of Transprotation Safety & Security, 7,* 291–306. doi: 10.1080/19439962.2014.959582

Sahami, S., & Sayed, T. (2013). How drivers adapt to drive in driving simulator, and what is the impact of practice scenario on the research? *Transportation Research Part F: Traffic Psychology and Behaviour, 16,* 41–52. doi: 10.1016/j.trf.2012.08.003

Scott-Parker, B., & Oviedo-Trespalacios, O. (2017). Young driver risky behaviour and predictors of crash risk in Autralia, New Zealand and Colombia: Same but different? *Accident Analysis and Prevention, 99,* 30–38. doi: 10.1016/j.aap.2016.11.001

Shi, J., Bai, Y., Ying, X., & Atchley, P. (2010). Aberrant driving behaviors: A study of drivers in Beijing. *Accident Analysis and Prevention, 42,* 1031–1040. doi:10.1016/j.aap.2009.12.010

Sriram, N., & Greenwald, A. G. (2009). The brief implicit association test. *Experimental Psychology, 56*(4), 283–294. doi: 10.1027/1618-3169.56.4.283

Stephens, A. N., & Fitzharris, M. (2016). Validation of the Driver Behaviour Questionnaire in a presentative sample of drivers in Australia. *Accident Analysis and Prevention, 86,* 186–198. doi: 10.1016/j.aap.2015.10.030

Sümer, N., Lajunen, T., & Özkan, T. (2002). *Surucu davranislarinin kaza risklerindeki roller: Ihlaller ve hatalar,* Traffic and Road Safety International Congress, Gazi University, Ankara, Turkey, 8-12 May.

Sümer, N., & Özkan, T. (2002). The role of driver behaviors, skills, and personality traits in traffic accidents. *Journal of Turkish Psychology, 17*(50), 1–22.

Sümer, N., Özkan, T., & Lajunen, T. (2006). Asymmetric relationship between driving and safety skills. *Accident Analysis and Prevention, 38,* 703–711. doi: 10.1016/j.aap.2005.12.016

Taubman-Ben-Ari, O., Eherenfreund-Hager, A., & Prato, C. G. (2016). The value of self-report measures as indicators of driving behaviors among young drivers. *Transportation Research Part F: Traffic Psychology and Behaviour, 39,* 33–42. doi: 10.1016/j.trf.2016.03.005

Treat, J. R., Tumbas, N. S., McDonald, S. T., Shinar, D., Hume, R. D., Mayer, R. E., Stanisfer, R. L., & Castellan, N. J. (1977). Tri-level study of the causes of traffic accidents. *Report No. DOT-HS-034-3-535-77 (TAC).*

Türkiye İstatistik Kurumu (2016). Karayolu trafik kaza istatistikleri, 2015. Retrieved from: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=21611

van Leeuwen, P. M., Happee, R., & de Winter, J. C. F. (2015). Changes of driving performance and gaze behavior of novice drivers during a 30-min simulation-based training. *Procedia Manufacturing, 3,* 3325–3332. doi: 10.1016/j.promfg.2015.07.422

Warner, H. W., Özkan, T., Lajunen, T., & Tzamaloukas, G. Sp. (2013). Cross-cultural comparison of driving skills among students in four different countries. *Safety Science, 57,* 69–74. doi: 10.1016/j.ssci.2013.01.003

Weiss, H. B., Kaplan, S., & Prato, C. G. (2014). Analysis of factors associated with injury severity in crashes involving young New Zealand drivers. *Accident Analysis and Prevention, 65,* 142–155. doi: 10.1016/j.aap.2013.12.020

World Health Organization (2015a). Global Status Report on Road Safety. Retrieved from: http://www.who.int/violence_injury_prevention/road_safety_status/2015/en/

World Health Organization (2015b). 10 facts on global road safety. Retrieved from: http://www.who.int/features/factfiles/roadsafety/facts/en/

Yang, Q., Overton, R., Han, L. D., Yan, X., & Richards, S. H. (2014). Driver behaviours on rural highways with and without curbs – a driving simulator based study. *International Journal of Injury Control and Safety Promotion, 21*(2), 115–126. doi: 10.1080/17457300.2013.792279

Zhang, Q., Jiang, Z., Zheng, D., Wang, Y., & Man, D. (2013). An application of the Driver Behavior Questionnaire to Chinese carless young drivers. *Traffic Injury Prevention, 14*(8), 867–873. doi: 10.1080/15389588.2013.775432

APPENDICES

Appendix A: Ethnical Permission

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 / 137

06 Nisan 2016

Gönderilen: Doç.Dr. Türker ÖZKAN

Psikoloji Bölümü

Gönderen: Prof. Dr. Canan SÜMER

İnsan Araştırmaları Kurulu Başkanı

İlgi: Etik Onayı

Sayın Doç.Dr. Türker ÖZKAN'ın danışmanlığını yaptığı yüksek lisans öğrencisi İbrahim ÖZTÜRK'ün "Reported and Implicit Driver Skills: Relations to Driving Performance/ Belirtilmiş ve Örtük Sürücü Becerileri: Sürücü Performans ile İlişkileri" başlıklı araştırması İnsan Araştırmaları Komisyonu tarafından uygun görülerek gerekli onay **2016-SOS-059** protokol numarası ile **25.04.2016-01.10.2016** tarihleri arasında geçerli olmak üzere verilmiştir.

Prof. Dr. Canan SÜMER

Uygulamalı Etik Araştırma Merkezi

İnsan Araştırmaları Kurulu Başkanı

Appendix B: Informed Consent Form

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Bu araştırma, ODTÜ Psikoloji Bölümü öğretim elemanlarından Doç. Dr. Türker Özkan danışmanlığında Psk. İbrahim Öztürk tarafından tez araştırması kapsamında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Çalışmanın amacı, sürücü becerilerinin örtük ve beyana dayalı şekillerde ölçülerek bu becerilerin sürücü davranışlarına olan etkisinin incelenmesidir.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Çalışma kapsamında sizden yaklaşık 1 saat süren bir deney bataryası tamamlamanız istenecektir.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız?

Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Çalışmada, kimlik belirleyici hiçbir bilgi istenmemektedir. Anket formları gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir. Elde edilecek bilgiler sadece bilimsel yayımlarda kullanılacaktır.

Katılımınızla ilgili bilmeniz gerekenler:

Çalışma genel olarak kişisel rahatsızlık verecek bir etkileşim içermemektedir. Ancak, katılım sırasında herhangi bir nedenden ötürü kendinizi rahatsız hissederseniz çalışmayı istediğiniz zaman bırakmakta serbestsiniz.

Araştırmayla ilgili daha fazla bilgi almak isterseniz:

Bu çalışmaya katıldığınız için şimdiden çok teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için araştırmacılar ile iletişim kurabilirsiniz.
İbrahim Öztürk (e179162@metu.edu.tr)
Tel.: 312 210 31 54
Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

Ad Soyad	Tarih	İmza
	---/----/-----	

Appendix C: Demographic Information Form

A. Demografik sorular

A1. Yaşınız: ______

A2. Cinsiyetiniz: ☐ Erkek ☐ Kadın

A3. Aşağıdakilerden hangisi sosyo- ekonomik statünüzü tanımlar? ☐ Alt ☐ Ortanın altı ☐ Orta ☐ Ortanın Üstü ☐ Üst

A4. Eğitim durumunuz?
☐ Okur-yazar ☐ İlkokul ☐ Ortaokul ☐ Lise
☐ Üniversite (Lisans) ☐ Üniversite (Lisansüstü)

A5. Ehliyetiniz var mı? ☐ Hayır ☐ Evet

A6. Kaç yıldır ehliyet sahibisiniz? _____________

A7. Son bir yılda yaklaşık olarak toplam kaç kilometre araç kullandınız?
____________________km

A8. Bütün hayatınız boyunca yaklaşık olarak toplam kaç kilometre araç kullandınız?
___________________km

A9. Genel olarak, ne sıklıkla araç kullanırsınız?
☐ Hemen hemen her gün ☐ Haftada 3-4 gün ☐ Haftada 1-2 gün
☐ Ayda birkaç kez ☐ Çok nadir

A10. Son üç yılda kaç kez araç kullanırken **aktif olarak** (sizin bir araca, bir yayaya veya herhangi bir nesneye çarptığınız durumlar) kaza yaptınız? (hafif kazalar dâhil)_________________ kez

A11. Son üç yılda kaç kez araç kullanırken **pasif olarak** (bir aracın ya da bir yayanın size çarptığı durumlar) kaza geçirdiniz? (hafif kazalar dâhil)_________________ kez

A12. Son üç yılda aşağıdaki trafik cezalarını kaç kere aldığınızı belirtiniz.
Yanlış park etme :___________
Hatalı sollama :___________
Hız ihlali :___________
Diğer :___________

13. Hava ve yol koşulları uygun olduğunda şehirlerarası yollarda yaklaşık ortalama kaç
kilometre hızla gidersiniz? _________km/saat

14. Hava ve yol koşulları uygun olduğunda şehir içi yollarda yaklaşık ortalama kaç kilometre
hızla gidersiniz? ________km/saat

15. Hız limitinin 50 km/s olduğu yollarda kaç km/s hızla gitmeyi tercih edersiniz? _____km/s

16. Hız limitinin 82 km/s olduğu yollarda kaç km/s hızla gitmeyi tercih edersiniz? _____km/s

17. Hız limitinin 90 km/s olduğu yollarda kaç km/s hızla gitmeyi tercih edersiniz? _____km/s

18. Hız limitinin 100 km/s olduğu yollarda kaç km/s hızla gitmeyi tercih edersiniz?_____km/s

Appendix D: Driver Behavior Questionnaire

B. Aşağıda verilen durumları ne sıklıkta yaparsınız ?

Lütfen her bir madde için verilen durumun ne sıklıkta başınızdan geçtiğini belirtiniz. Soruları, nasıl araç kullandığınızı düşünerek cevaplandırınız ve her bir soru için sizi tam olarak yansıtan cevabı, yanındaki kutudaki uygun rakamı daire içine alarak belirtiniz.

0= HİÇ BİR ZAMAN , 1= NADİREN , 2= BAZEN , 3= OLDUKÇA SIK 4= SIK SIK , 5= HER ZAMAN

		Hiçbir zaman	**Nadiren**	**Bazen**	**Oldukça sık**	**Sık sık**	**Her zaman**
1	Geri geri giderken önceden fark etmediğiniz birşeye çarpmak	0	1	2	3	4	5
2	Trafikte, diğer sürücülere engel teşkil etmemeye gayret göstermek	0	1	2	3	4	5
3	A yönüne gitmek amacıyla yola çıkmışken kendinizi daha alışkın olduğunuz B yönüne doğru araç kullanırken bulmak	0	1	2	3	4	5
4	Geçiş hakkı sizde dahi olsa diğer sürücülere yol vermek	0	1	2	3	4	5
5	Yasal alkol sınırlarının üzerinde alkollü olduğunuzdan şüphelenseniz de araç kullanmak	0	1	2	3	4	5
6	Aracınızı kullanırken yol kenarında birikmiş suyu ve benzeri maddeleri yayaların üzerine sıçratmamaya dikkat etmek	0	1	2	3	4	5
7	Dönel kavşakta dönüş istikametinize uygun olmayan şeridi kullanmak	0	1	2	3	4	5
8	Anayoldan sola dönmek için kuyrukta beklerken, anayol trafiğine dikkat etmekten neredeyse öndeki araca çarpacak duruma gelmek	0	1	2	3	4	5
9	Trafikte, herhangi bir sürücü size yol verdiğinde veya anlayış gösterdiğinde, elinizi sallayarak, korna çalarak vb. şekilde teşekkür etmek	0	1	2	3	4	5

		Hiçbir zaman	Nadiren	Bazen	Oldukça sık	Sık sık	Her zaman
10	Anayoldan bir sokağa dönerken karşıdan karşıya geçen yayaları fark edememek	0	1	2	3	4	5
11	Başka bir sürücüye kızgınlığı belirtmek için korna çalmak	0	1	2	3	4	5
12	Karşıdan gelen araç sürücüsünün görüş mesafesini koruyabilmesi için uzunları mümkün olduğunca az kullanmak	0	1	2	3	4	5
13	Bir aracı sollarken ya da şerit değiştirirken dikiz aynasından yolu kontrol etmemek	0	1	2	3	4	5
14	Kaygan bir yolda ani fren veya patinaj yapmak	0	1	2	3	4	5
15	Arkanızdan hızla gelen aracın yolunu kesmemek için sollamadan vazgeçip eski yerinize dönmek	0	1	2	3	4	5
16	Kavşağa çok hızlı girip geçiş üstünlüğü olan aracı durmak zorunda bırakmak	0	1	2	3	4	5
17	Şehir içi yollarda hız sınırını aşmak	0	1	2	3	4	5
18	Önünüzdeki aracın sürücüsünü, onu rahatsız etmeyecek bir mesafede takip etmek	0	1	2	3	4	5
19	Sinyali kullanmayı niyet ederken silecekleri çalıştırmak	0	1	2	3	4	5
20	Sağa dönerken yanınızdan geçen bir bisiklet ya da araca neredeyse çarpmak	0	1	2	3	4	5
21	"Yol ver" işaretini kaçırıp, geçiş hakkı olan araçlarla çarpışacak duruma gelmek	0	1	2	3	4	5
22	Yeşil ışık yandığı halde hareket etmekte geciken öndeki araç sürücüsünü korna çalarak rahatsız etmemek	0	1	2	3	4	5
23	Trafik ışıklarında üçüncü vitesle kalkış yapmaya çalışmak	0	1	2	3	4	5
24	Yayaların karşıdan karşıya geçebilmeleri için geçiş hakkı sizde dahi olsa durarak yol vermek	0	1	2	3	4	5

		Hiçbir zaman	Nadiren	Bazen	Oldukça sık	Sık sık	Her zaman
25	Sola dönüş sinyali veren bir aracın sinyalini fark etmeyip onu sollamaya çalışmak	0	1	2	3	4	5
26	Trafikte sinirlendiğiniz bir sürücüyü takip edip ona haddini bildirmeye çalışmak	0	1	2	3	4	5
27	Arkanızdaki aracın ileriyi iyi göremediği durumlarda sinyal vb. ile işaret vererek sollamanın uygun olduğunu belirtmek	0	1	2	3	4	5
28	Otoyolda ileride kapanacak bir şeritte son ana kadar ilerlemek	0	1	2	3	4	5
29	Sollama yapan sürücüye kolaylık olması için hızınızı onun geçiş hızına göre ayarlamak	0	1	2	3	4	5
30	Aracınızı park alanında nereye bıraktığınızı unutmak	0	1	2	3	4	5
31	Solda yavaş giden bir aracın sağından geçmek	0	1	2	3	4	5
32	Trafik ışığında en hızlı hareket eden araç olmak için yandaki araçlarla yarışmak	0	1	2	3	4	5
33	Trafik işaretlerini yanlış anlamak ve kavşakta yanlış yöne dönmek	0	1	2	3	4	5
34	Acil bir durumda duramayacak kadar, öndeki aracı yakın takip etmek	0	1	2	3	4	5
35	Trafik ışıkları sizin yönünüze kırmızıya döndüğü halde kavşaktan geçmek	0	1	2	3	4	5
36	Otobanda trafik akışını sağlayabilmek için en sol şeridi gereksiz yere kullanmaktan kaçınmak	0	1	2	3	4	5
37	Bazı tip sürücülere kızgın olmak (illet olmak) ve bu kızgınlığı bir şekilde onlara göstermek	0	1	2	3	4	5
38	Seyahat etmekte olduğunuz yolu tam olarak hatırlamadığınızı fark etmek	0	1	2	3	4	5
39	Sollama yaparken karşıdan gelen aracın hızını olduğundan daha yavaş tahmin etmek	0	1	2	3	4	5

		Hiçbir zaman	Nadiren	Bazen	Oldukça sık	Sık sık	Her zaman
40	Gereksiz yere gürültü yapmamak için kornayı kullanmaktan kaçınmak	0	1	2	3	4	5
41	Otobanda hız limitlerini dikkate almamak	0	1	2	3	4	5
42	Aracınızı park ederken diğer yol kullanıcılarının (yayalar, sürücler vb.) hareketlerini sınırlamamaya özen göstermek	0	1	2	3	4	5

Appendix E: Driver Skill Inventory

Araç kullanırken güçlü ve zayıf yönleriniz nelerdir?

Doğal olarak, hepimizin güçlü ve zayıf sürücü yönlerimiz vardır. Lütfen sizin, bir sürücü olarak güçlü ve zayıf yönlerinizin neler olduğunu her bir madde için aşağıdaki uygun seçeneği işaretleyerek belirtiniz

1= ÇOK ZAYIF

2= ZAYIF

3= NE ZAYIF NE GÜÇLÜ

4=GÜÇLÜ

5= ÇOK GÜÇLÜ

		Çok zayıf	**Zayıf**	**Ne zayıf ne güçlü**	**Güçlü**	**Çok güçlü**
1	Seri araç kullanma	1	2	3	4	5
2	Trafikte tehlikeleri görme	1	2	3	4	5
3	Sabırsızlanmadan yavaş bir aracın arkasından sürme	1	2	3	4	5
4	Kaygan yolda araç kullanma	1	2	3	4	5
5	İlerideki trafik durumlarını önceden kestirme	1	2	3	4	5
6	Belirli trafik ortamlarında nasıl hareket edileceğini bilme	1	2	3	4	5
7	Yoğun trafikte sürekli şerit değiştirme	1	2	3	4	5
8	Hızlı karar alma	1	2	3	4	5
9	Sinir bozucu durumlarda sakin davranma	1	2	3	4	5
10	Aracı kontrol etme	1	2	3	4	5
11	Yeterli takip mesafesi bırakma	1	2	3	4	5
12	Koşullara göre hızı ayarlama	1	2	3	4	5
13	Geriye kaçırmadan aracı yokuşta kaldırma	1	2	3	4	5
14	Sollama	1	2	3	4	5
15	Gerektiğinde kazadan kaçınmak için yol hakkından vazgeçme	1	2	3	4	5
16	Hız sınırlarına uyma	1	2	3	4	5
17	Gereksiz risklerden kaçınma	1	2	3	4	5
18	Diğer sürücülerin hatalarını telafi edebilme	1	2	3	4	5
19	Trafik ışıklarına dikkatle uyma	1	2	3	4	5
20	Dar bir yere geri geri park edebilme	1	2	3	4	5

Appendix F: Simulation Scenario

```
Metric
  0, ROAD, 4, 4, 2, 7, .1, 3, 1, .1, .1, 0, -1, -1, -1, 1, -1, 1, -1, 2, -1, 2
 0, SOBJ, 60, 20 {2}, 0, 0, 0, 0, C:\STISIM\Projects\Ibrahim\Speed82.3ds, 0
 0, LS, 90, 60
 3600, SIGN, 100, 500, C:\STISIM\Data\EuroSigns\Speed_90.3ds, 1, 0, 0
 3200, LS, 100, 1000
 4500, SOBJ, 1000, 20 {2}, 0, 0, 0, 0, C:\STISIM\Projects\Ibrahim\Speed82.3ds
 4600, LS, 90, 1000
 7000, SIGN, 100, 1000, C:\STISIM\Data\EuroSigns\EuroSpeed_050.Lmm, 1, 0, 0
 7100, LS, 55, 1000
  0, BLDG, 10, 5 {1}, H*2~14, 0
  0, BLDG, 100, 5 {1}, H*2~14, 0
  50, BLDG, 400, 5 {1}, H*2~14, 0
  75, BLDG, 400, 5 {1}, H*2~14, 0
  100, BLDG, 400, 5 {1}, H*2~14, 0
  125, BLDG, 400, 5 {1}, H*2~14, 0
  150, BLDG, 400, 5 {1}, H*2~14, 0
  175, BLDG, 400, 5 {1}, H*2~14, 0
  200, BLDG, 400, 5 {1}, H*2~14, 0
  225, BLDG, 400, 5 {1}, H*2~14, 0
  250, BLDG, 400, 5 {1}, H*2~14, 0
  275, BLDG, 400, 5 {1}, H*2~14, 0
  350, BLDG, 400, 5 {1}, H*2~14, 0
  375, BLDG, 400, 5 {1}, H*2~14, 0
  450, BLDG, 400, 5 {1}, H*2~14, 0
  475, BLDG, 400, 5 {1}, H*2~14, 0
  550, BLDG, 400, 5 {1}, H*2~14, 0
  575, BLDG, 400, 5 {1}, H*2~14, 0
  650, BLDG, 400, 5 {1}, H*2~14, 0
```

675, BLDG, 400, 5 {1}, H*2~14, 0

750, BLDG, 400, 5 {1}, H*2~14, 0

775, BLDG, 400, 5 {1}, H*2~14, 0

850, BLDG, 400, 5 {1}, H*2~14, 0

875, BLDG, 400, 5 {1}, H*2~14, 0

950, BLDG, 400, 5 {1}, H*2~14, 0

975, BLDG, 400, 5 {1}, H*2~14, 0

1050, BLDG, 400, 5 {1}, H*2~14, 0

1075, BLDG, 400, 5 {1}, H*2~14, 0

1150, BLDG, 400, 5 {1}, H*2~14, 0

1175, BLDG, 400, 5 {1}, H*2~14, 0

1250, BLDG, 400, 5 {1}, H*2~14, 0

1275, BLDG, 400, 5 {1}, H*2~14, 0

1350, BLDG, 400, 5 {1}, H*2~14, 0

1375, BLDG, 400, 5 {1}, H*2~14, 0

1450, BLDG, 400, 5 {1}, H*2~14, 0

1475, BLDG, 400, 5 {1}, H*2~14, 0

1550, BLDG, 400, 5 {1}, H*2~14, 0

1575, BLDG, 400, 5 {1}, H*2~14, 0

1650, BLDG, 400, 5 {1}, H*2~14, 0

1675, BLDG, 400, 5 {1}, H*2~14, 0

1750, BLDG, 400, 5 {1}, H*2~14, 0

1775, BLDG, 400, 5 {1}, H*2~14, 0

1850, BLDG, 400, 5 {1}, H*2~14, 0

1875, BLDG, 400, 5 {1}, H*2~14, 0

1950, BLDG, 400, 5 {1}, H*2~14, 0

1975, BLDG, 400, 5 {1}, H*2~14, 0

2050, BLDG, 400, 5 {1}, H*2~14, 0

2075, BLDG, 400, 5 {1}, H*2~14, 0

2150, BLDG, 400, 5 {1}, H*2~14, 0

2175, BLDG, 400, 5 {1}, H*2~14, 0

2250, BLDG, 400, 5 {1}, H*2~14, 0

2275, BLDG, 400, 5 {1}, H*2~14, 0

2350, BLDG, 400, 5 {1}, H*2~14, 0

2375, BLDG, 400, 5 {1}, H*2~14, 0

2450, BLDG, 400, 5 {1}, H*2~14, 0

2475, BLDG, 400, 5 {1}, H*2~14, 0

2550, BLDG, 400, 5 {1}, H*2~14, 0

2575, BLDG, 400, 5 {1}, H*2~14, 0

2650, BLDG, 400, 5 {1}, H*2~14, 0

2675, BLDG, 400, 5 {1}, H*2~14, 0

2750, BLDG, 400, 5 {1}, H*2~14, 0

2775, BLDG, 400, 5 {1}, H*2~14, 0

2850, BLDG, 400, 5 {1}, H*2~14, 0

2875, BLDG, 400, 5 {1}, H*2~14, 0

2950, BLDG, 400, 5 {1}, H*2~14, 0

2975, BLDG, 400, 5 {1}, H*2~14, 0

3050, BLDG, 400, 5 {1}, H*2~14, 0

3075, BLDG, 400, 5 {1}, H*2~14, 0

3150, BLDG, 400, 5 {1}, H*2~14, 0

3175, BLDG, 400, 5 {1}, H*2~14, 0

3250, BLDG, 400, 5 {1}, H*2~14, 0

3275, BLDG, 400, 5 {1}, H*2~14, 0

3350, BLDG, 400, 5 {1}, H*2~14, 0

3375, BLDG, 400, 5 {1}, H*2~14, 0

3450, BLDG, 400, 5 {1}, H*2~14, 0

3475, BLDG, 400, 5 {1}, H*2~14, 0

3550, BLDG, 400, 5 {1}, H*2~14, 0

3575, BLDG, 400, 5 {1}, H*2~14, 0

3600, BLDG, 400, 5 {1}, H*2~14, 0

0, BLDG, 10, -5 {2}, H*2~14, 0

0, BLDG, 100, -5 {2}, H*2~14, 0

50, BLDG, 400, -5 {2}, H*2~14, 0

100, BLDG, 400, -5 {2}, H*2~14, 0

125, BLDG, 400, -5 {2}, H*2~14, 0

150, BLDG, 400, -5 {2}, H*2~14, 0

175, BLDG, 400, -5 {2}, H*2~14, 0

200, BLDG, 400, -5 {2}, H*2~14, 0

225, BLDG, 400, -5 {2}, H*2~14, 0

250, BLDG, 400, -5 {2}, H*2~14, 0

275, BLDG, 400, -5 {2}, H*2~14, 0

350, BLDG, 400, -5 {2}, H*2~14, 0

375, BLDG, 400, -5 {2}, H*2~14, 0

450, BLDG, 400, -5 {2}, H*2~14, 0

475, BLDG, 400, -5 {2}, H*2~14, 0

550, BLDG, 400, -5 {2}, H*2~14, 0

575, BLDG, 400, -5 {2}, H*2~14, 0

650, BLDG, 400, -5 {2}, H*2~14, 0

675, BLDG, 400, -5 {2}, H*2~14, 0

750, BLDG, 400, -5 {2}, H*2~14, 0

775, BLDG, 400, -5 {2}, H*2~14, 0

850, BLDG, 400, -5 {2}, H*2~14, 0

875, BLDG, 400, -5 {2}, H*2~14, 0

950, BLDG, 400, -5 {2}, H*2~14, 0

975, BLDG, 400, -5 {2}, H*2~14, 0

1050, BLDG, 400, -5 {2}, H*2~14, 0

1075, BLDG, 400, -5 {2}, H*2~14, 0

1150, BLDG, 400, -5 {2}, H*2~14, 0

1175, BLDG, 400, -5 {2}, H*2~14, 0

1250, BLDG, 400, -5 {2}, H*2~14, 0

1275, BLDG, 400, -5 {2}, H*2~14, 0

1350, BLDG, 400, -5 {2}, H*2~14, 0

1375, BLDG, 400, -5 {2}, H*2~14, 0

1450, BLDG, 400, -5 {2}, H*2~14, 0
1475, BLDG, 400, -5 {2}, H*2~14, 0
1550, BLDG, 400, -5 {2}, H*2~14, 0
1575, BLDG, 400, -5 {2}, H*2~14, 0
1650, BLDG, 400, -5 {2}, H*2~14, 0
1675, BLDG, 400, -5 {2}, H*2~14, 0
1750, BLDG, 400, -5 {2}, H*2~14, 0
1775, BLDG, 400, -5 {2}, H*2~14, 0
1850, BLDG, 400, -5 {2}, H*2~14, 0
1875, BLDG, 400, -5 {2}, H*2~14, 0
1950, BLDG, 400, -5 {2}, H*2~14, 0
1975, BLDG, 400, -5 {2}, H*2~14, 0
2050, BLDG, 400, -5 {2}, H*2~14, 0
2075, BLDG, 400, -5 {2}, H*2~14, 0
2150, BLDG, 400, -5 {2}, H*2~14, 0
2175, BLDG, 400, -5 {2}, H*2~14, 0
2250, BLDG, 400, -5 {2}, H*2~14, 0
2275, BLDG, 400, -5 {2}, H*2~14, 0
2350, BLDG, 400, -5 {2}, H*2~14, 0
2375, BLDG, 400, -5 {2}, H*2~14, 0
2450, BLDG, 400, -5 {2}, H*2~14, 0
2475, BLDG, 400, -5 {2}, H*2~14, 0
2550, BLDG, 400, -5 {2}, H*2~14, 0
2575, BLDG, 400, -5 {2}, H*2~14, 0
2650, BLDG, 400, -5 {2}, H*2~14, 0
2675, BLDG, 400, -5 {2}, H*2~14, 0
2750, BLDG, 400, -5 {2}, H*2~14, 0
2775, BLDG, 400, -5 {2}, H*2~14, 0
2850, BLDG, 400, -5 {2}, H*2~14, 0
2875, BLDG, 400, -5 {2}, H*2~14, 0
2950, BLDG, 400, -5 {2}, H*2~14, 0

2975, BLDG, 400, -5 {2}, H*2~14, 0

3050, BLDG, 400, -5 {2}, H*2~14, 0

3075, BLDG, 400, -5 {2}, H*2~14, 0

3150, BLDG, 400, -5 {2}, H*2~14, 0

3175, BLDG, 400, -5 {2}, H*2~14, 0

3250, BLDG, 400, -5 {2}, H*2~14, 0

3275, BLDG, 400, -5 {2}, H*2~14, 0

3350, BLDG, 400, -5 {2}, H*2~14, 0

3375, BLDG, 400, -5 {2}, H*2~14, 0

3450, BLDG, 400, -5 {2}, H*2~14, 0

3475, BLDG, 400, -5 {2}, H*2~14, 0

3550, BLDG, 400, -5 {2}, H*2~14, 0

3575, BLDG, 400, -5 {2}, H*2~14, 0

3600, BLDG, 400, -5 {2}, H*2~14, 0

100, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

125, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

150, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

175, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

200, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

225, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

250, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

275, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

275, PED, 400, 400 {4}, 5, 2.5 {1}, B, *1~10, 0

300, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

325, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

350, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

375, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

400, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

425, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

426, PED, 400, 400 {4}, 5, 2 {1}, B, 11, 0

500, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

600, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

800, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

900, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

1000, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

1100, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

1200, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

1300, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

1800, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

1900, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

2100, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

2200, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

2600, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

2600, PED, 400, 400 {4}, 5, 2.5 {1}, B, *1~10, 0

3000, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

3200, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

3300, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

100, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

125, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

150, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

175, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

200, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

225, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

250, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

275, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

275, PED, 400, 400 {4}, 5, -2.5 {2}, B, *1~10, 0

300, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

325, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

350, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

375, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

400, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

425, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

425, PED, 400, 400 {4}, 5, -1.5 {2}, B, *1~10, 0

500, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

600, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

800, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

900, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

1000, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

1100, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

1200, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

1300, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

1800, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

1900, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

2100, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

2200, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

2600, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

2600, PED, 400, 400 {4}, 5, -2.5 {2}, B, *1~10, 0

3000, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

3200, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

3300, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

1000, TBox, 1100, 2 {1}, 200, 20, 500

1000, TBox, 1100, -20 {2}, 200, 20, 500

100, V, 0, 400, 0 {1}, 1, *18~34

125, V, 0, 400, 0 {1}, 1, *18~34

150, V, 0, 400, 0 {1}, 1, *18~34

175, V, 0, 400, 0 {1}, 1, *18~34

200, V, 0, 400, 0 {1}, 1, *18~34

225, V, 0, 400, 0 {1}, 1, *18~34

250, V, 0, 400, 0 {1}, 1, *18~34

275, V, 0, 400, 0 {1}, 1, *18~34

400, V, 0, 400, 0 {1}, 1, *18~34

425, V, 0, 400, 0 {1}, 1, *18~34

450, V, 0, 400, 0 {1}, 1, *18~34

475, V, 0, 400, 0 {1}, 1, *18~34

500, V, 0, 400, 0 {1}, 1, *18~34

525, V, 0, 400, 0 {1}, 1, *18~34

550, V, 0, 400, 0 {1}, 1, *18~34

575, V, 0, 400, 0 {1}, 1, *18~34

800, V, 0, 400, -2{1}, 1, *18~34, 2{0}, *0, *1, 2, 2400{7}, -2{1}, 0, 5

2100, V, 0, 400, -2{1}, 1, *18~34, 2{0}, *0, *1, 2, 3500{7}, -2{1}, 0, 5

3300, V, 0, 400, -2{1}, 1, *18~34, 2{0}, *0, *1, 2, 5000{7}, -2{1}, 0, 5

500, PED, 200, 5{0}, 2, 2{1}, R, 4

700, PED, 200, 5{0}, 2, 2{1}, L, 4

5400, PED, 200, 5{0}, 2, 2{1}, R, 4

6000, PED, 200, 5{0}, 2, 2{1}, R, 4

6800, PED, 200, 5{0}, 2, 2{1}, R, 4

7000, PED, 200, 5{0}, 2, 2{1}, R, 4

7600, PED, 200, 5{0}, 2, 2{1}, R, 4

100, V, 0, 400, 0 {2}, 1, *18~34

125, V, 0, 400, 0 {2}, 1, *18~34

150, V, 0, 400, 0 {2}, 1, *18~34

175, V, 0, 400, 0 {2}, 1, *18~34

200, V, 0, 400, 0 {2}, 1, *18~34

225, V, 0, 400, 0 {2}, 1, *18~34

250, V, 0, 400, 0 {2}, 1, *18~34

275, V, 0, 400, 0 {2}, 1, *18~34

300, V, 0, 400, 0 {2}, 1, *18~34

400, V, 0, 400, 0 {2}, 1, *18~34

425, V, 0, 400, 0 {2}, 1, *18~34

450, V, 0, 400, 0 {2}, 1, *18~34

475, V, 0, 400, 0 {2}, 1, *18~34

500, V, 0, 400, 0 {2}, 1, *18~34

525, V, 0, 400, 0 {2}, 1, *18~34

550, V, 0, 400, 0 {2}, 1, *18~34

575, V, 0, 400, 0 {2}, 1, *18~34

600, V, 0, 400, 0 {2}, 1, *18~34

1500, V, 0, 400, 0 {1}, 1, *18~34

1510, V, 0, 400, 0 {1}, 1, *18~34

1520, V, 0, 400, 0 {1}, 1, *18~34

1530, V, 0, 400, 0 {1}, 1, *18~34

1540, V, 0, 400, 0 {1}, 1, *18~34

1550, V, 0, 400, 0 {1}, 1, *18~34

1560, V, 0, 400, 0 {1}, 1, *18~34

1570, V, 0, 400, 0 {1}, 1, *18~34

1580, V, 0, 400, 0 {1}, 1, *18~34

1590, V, 0, 400, 0 {1}, 1, *18~34

1600, V, 0, 400, 0 {1}, 1, *18~34

1610, V, 0, 400, 0 {1}, 1, *18~34

1620, V, 0, 400, 0 {1}, 1, *18~34

1630, V, 0, 400, 0 {1}, 1, *18~34

1640, V, 0, 400, 0 {1}, 1, *18~34

1650, V, 0, 400, 0 {1}, 1, *18~34

1660, V, 0, 400, 0 {1}, 1, *18~34

1670, V, 0, 400, 0 {1}, 1, *18~34

1680, V, 0, 400, 0 {1}, 1, *18~34

1690, V, 0, 400, 0 {1}, 1, *18~34

100, A, *5, 400, -2 {0}, *18~34

100, A, *5, 400, -6 {0}, *18~34

125, A, *5, 400, -6 {0}, *18~34

150, A, *5, 400, -2 {0}, *18~34

175, A, *5, 400, -6 {0}, *18~34

200, A, *5, 400, -2 {0}, *18~34

225, A, *5, 400, -6 {0}, *18~34

250, A, *5, 400, -2 {0}, *18~34

275, A, *5, 400, -6 {0}, *18~34

300, A, *5, 400, -2 {0}, *18~34

325, A, *5, 400, -6 {0}, *18~34

350, A, *5, 400, -2 {0}, *18~34

375, A, *5, 400, -6 {0}, *18~34

400, A, *5, 400, -2 {0}, *18~34

400, A, *5, 400, -6 {0}, *18~34

425, A, *5, 400, -6 {0}, *18~34

450, A, *5, 400, -2 {0}, *18~34

475, A, *5, 400, -6 {0}, *18~34

500, A, *5, 200, -2 {0}, *18~34

525, A, *5, 400, -6 {0}, *18~34

550, A, *5, 400, -2 {0}, *18~34

575, A, *5, 400, -6 {0}, *18~34

600, A, *5, 400, -2 {0}, *18~34

625, A, *5, 400, -6 {0}, *18~34

650, A, *5, 400, -2 {0}, *18~34

675, A, *5, 400, -6 {0}, *18~34

700, A, *5, 400, -6 {0}, *18~34

700, A, *5, 400, -2 {0}, *18~34

725, A, *5, 400, -6 {0}, *18~34

750, A, *5, 400, -2 {0}, *18~34

775, A, *5, 400, -6 {0}, *18~34

800, A, *5, 400, -2 {0}, *18~34

825, A, *5, 400, -6 {0}, *18~34

850, A, *5, 400, -2 {0}, *18~34

875, A, *5, 400, -6 {0}, *18~34

900, A, *5, 400, -2 {0}, *18~34

925, A, *5, 400, -6 {0}, *18~34

950, A, *5, 400, -2 {0}, *18~34

975, A, *5, 400, -6 {0}, *18~34

1000, A, *5, 400, -2 {0}, *18~34

1025, A, *5, 400, -6 {0}, *18~34

1050, A, *5, 400, -2 {0}, *18~34

3700, SIGN, 2, 500, 1, 1, 0, 0

4700, I, 0, 0, 1, 2, 2, 0

3700, SL#1, -1000, 5 {0}, 3, 20, 0, 15, 2, 1, 1

4000, SIGN, 10, 400, 1, 1, 0, 0

5100, BLDG, 400, 5 {1}, H*1~14, 0

5150, BLDG, 400, 5 {1}, H*1~14, 0

5200, BLDG, 400, 5 {1}, H*1~14, 0

5250, BLDG, 400, 5 {1}, H*1~14, 0

5300, BLDG, 400, 5 {1}, H*1~14, 0

5350, BLDG, 400, 5 {1}, H*1~14, 0

5400, BLDG, 400, 5 {1}, H*1~14, 0

5450, BLDG, 400, 5 {1}, H*1~14, 0

5500, BLDG, 400, 5 {1}, H*1~14, 0

5550, BLDG, 400, 5 {1}, H*1~14, 0

5600, BLDG, 400, 5 {1}, H*1~14, 0

5650, BLDG, 400, 5 {1}, H*1~14, 0

5700, BLDG, 400, 5 {1}, H*1~14, 0

5750, BLDG, 400, 5 {1}, H*1~14, 0

5800, BLDG, 400, 5 {1}, H*1~14, 0

5850, BLDG, 400, 5 {1}, H*1~14, 0

5900, BLDG, 400, 5 {1}, H*1~14, 0

5950, BLDG, 400, 5 {1}, H*1~14, 0

6000, BLDG, 400, 5 {1}, H*1~14, 0

6050, BLDG, 400, 5 {1}, H*1~14, 0

6100, BLDG, 400, 5 {1}, H*1~14, 0

6150, BLDG, 400, 5 {1}, H*1~14, 0

6200, BLDG, 400, 5 {1}, H*1~14, 0

6250, BLDG, 400, 5 {1}, H*1~14, 0

6300, BLDG, 400, 5 {1}, H*1~14, 0

6350, BLDG, 400, 5 {1}, H*1~14, 0
6400, BLDG, 400, 5 {1}, H*1~14, 0
6450, BLDG, 400, 5 {1}, H*1~14, 0
6500, BLDG, 400, 5 {1}, H*1~14, 0
6550, BLDG, 400, 5 {1}, H*1~14, 0
6600, BLDG, 400, 5 {1}, H*1~14, 0
6750, BLDG, 400, 5 {1}, H*1~14, 0
6800, BLDG, 400, 5 {1}, H*1~14, 0
6850, BLDG, 400, 5 {1}, H*1~14, 0
6900, BLDG, 400, 5 {1}, H*1~14, 0
6950, BLDG, 400, 5 {1}, H*1~14, 0
7000, BLDG, 400, 5 {1}, H*1~14, 0
7050, BLDG, 400, 5 {1}, H*1~14, 0
7100, BLDG, 400, 5 {1}, H*1~14, 0
7150, BLDG, 400, 5 {1}, H*1~14, 0
7200, BLDG, 400, 5 {1}, H*1~14, 0
7250, BLDG, 400, 5 {1}, H*1~14, 0
7300, BLDG, 400, 5 {1}, H*1~14, 0
7350, BLDG, 400, 5 {1}, H*1~14, 0
7450, BLDG, 400, 5 {1}, H*1~14, 0
7500, BLDG, 400, 5 {1}, H*1~14, 0
7550, BLDG, 400, 5 {1}, H*1~14, 0
7600, BLDG, 400, 5 {1}, H*1~14, 0
5100, BLDG, 400, -5 {2}, H*1~14, 0
5150, BLDG, 400, -5 {2}, H*1~14, 0
5200, BLDG, 400, -5 {2}, H*1~14, 0
5250, BLDG, 400, -5 {2}, H*1~14, 0
5300, BLDG, 400, -5 {2}, H*1~14, 0
5350, BLDG, 400, -5 {2}, H*1~14, 0
5400, BLDG, 400, -5 {2}, H*1~14, 0
5450, BLDG, 400, -5 {2}, H*1~14, 0

5500, BLDG, 400, -5 {2}, H*1~14, 0

5550, BLDG, 400, -5 {2}, H*1~14, 0

5600, BLDG, 400, -5 {2}, H*1~14, 0

5650, BLDG, 400, -5 {2}, H*1~14, 0

5700, BLDG, 400, -5 {2}, H*1~14, 0

5750, BLDG, 400, -5 {2}, H*1~14, 0

5800, BLDG, 400, -5 {2}, H*1~14, 0

5850, BLDG, 400, -5 {2}, H*1~14, 0

5900, BLDG, 400, -5 {2}, H*1~14, 0

5950, BLDG, 400, -5 {2}, H*1~14, 0

6000, BLDG, 400, -5 {2}, H*1~14, 0

6050, BLDG, 400, -5 {2}, H*1~14, 0

6100, BLDG, 400, -5 {2}, H*1~14, 0

6150, BLDG, 400, -5 {2}, H*1~14, 0

6200, BLDG, 400, -5 {2}, H*1~14, 0

6250, BLDG, 400, -5 {2}, H*1~14, 0

6300, BLDG, 400, -5 {2}, H*1~14, 0

6350, BLDG, 400, -5 {2}, H*1~14, 0

6400, BLDG, 400, -5 {2}, H*1~14, 0

6450, BLDG, 400, -5 {2}, H*1~14, 0

6500, BLDG, 400, -5 {2}, H*1~14, 0

6550, BLDG, 400, -5 {2}, H*1~14, 0

6600, BLDG, 400, -5 {2}, H*1~14, 0

6750, BLDG, 400, -5 {2}, H*1~14, 0

6800, BLDG, 400, -5 {2}, H*1~14, 0

6850, BLDG, 400, -5 {2}, H*1~14, 0

6900, BLDG, 400, -5 {2}, H*1~14, 0

6950, BLDG, 400, -5 {2}, H*1~14, 0

7000, BLDG, 400, -5 {2}, H*1~14, 0

7050, BLDG, 400, -5 {2}, H*1~14, 0

7100, BLDG, 400, -5 {2}, H*1~14, 0

7150, BLDG, 400, -5 {2}, H*1~14, 0

7200, BLDG, 400, -5 {2}, H*1~14, 0

7250, BLDG, 400, -5 {2}, H*1~14, 0

7300, BLDG, 400, -5 {2}, H*1~14, 0

7350, BLDG, 400, -5 {2}, H*1~14, 0

7400, BLDG, 400, -5 {2}, H*1~14, 0

7450, BLDG, 400, -5 {2}, H*1~14, 0

7500, BLDG, 400, -5 {2}, H*1~14, 0

7550, BLDG, 400, -5 {2}, H*1~14, 0

7600, BLDG, 400, -5 {2}, H*1~14, 0

5100, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5125, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5150, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5175, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

5200, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5225, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5250, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

5275, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5275, PED, 400, 400 {4}, 5, 2.5 {1}, B, *1~10, 0

5300, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

5325, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5350, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5375, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

5400, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5425, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

5425, PED, 400, 400 {4}, 5, 1.5 {1}, F, *1~10, 0

5500, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5600, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5800, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

5900, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

6000, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

6100, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

6200, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

6300, PED, 400, 400 {4}, 5, 2 {1}, F, *1~10, 0

6800, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

6900, PED, 400, 400 {4}, 5, 2 {1}, B, *1~10, 0

5100, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5125, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5150, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5175, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

5200, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5225, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5250, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

5275, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5275, PED, 400, 400 {4}, 5, -2.5 {2}, B, *1~10, 0

5300, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

5325, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5350, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5375, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

5400, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5425, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

5425, PED, 400, 400 {4}, 5, -1.5 {2}, F, *1~10, 0

5500, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5600, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

5800, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

5900, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

6000, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

6100, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

6200, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

6300, PED, 400, 400 {4}, 5, -2 {2}, F, *1~10, 0

6800, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

6900, PED, 400, 400 {4}, 5, -2 {2}, B, *1~10, 0

4800, V, 0, 400, 0 {1}, 1, *1~34, 200 {5}, 6 {0}, *10, 5

7100, I, 0, 0, 1, 2, 2, 0

6100, SL#2, -1000, 5 {0}, 3, 20, 0, 15, 2, 1, 1

6100, SIGN, 2, 500, 1, 1, 0, 0

6900, V, 0, 400, 0 {1}, 1, *19~35

6910, V, 0, 400, 0 {1}, 1, *19~35

6920, V, 0, 400, 0 {1}, 1, *19~35

6930, V, 0, 400, 0 {1}, 1, *19~35

6940, V, 0, 400, 0 {1}, 1, *19~35

6950, V, 0, 400, 0 {1}, 1, *19~35

6960, V, 0, 400, 0 {1}, 1, *19~35

6970, V, 0, 400, 0 {1}, 1, *19~35

6980, V, 0, 400, 0 {1}, 1, *19~35

6990, V, 0, 400, 0 {1}, 1, *19~35

6900, V, 0, 400, 0 {1}, 1, *19~35

6910, V, 0, 400, 0 {1}, 1, *19~35

6920, V, 0, 400, 0 {1}, 1, *19~35

6930, V, 0, 400, 0 {1}, 1, *19~35

6940, V, 0, 400, 0 {1}, 1, *19~35

6950, V, 0, 400, 0 {1}, 1, *19~35

6960, V, 0, 400, 0 {1}, 1, *19~35

6970, V, 0, 400, 0 {1}, 1, *19~35

6980, V, 0, 400, 0 {1}, 1, *19~35

6990, V, 0, 400, 0 {1}, 1, *19~35

7800, I, 0, 0, 1, 2, 2, 0

0, SL#3, -7800, 10 {1}, 3, 20, 1, 4, 5, 1, 1

7500, SIGN, 10, 400, 1, 1, 0, 0

8000, ROAD, 3.66, 2, 1, 1, 0.3, 3.05, 3.05, 0.15, 0.15, 100, -1, -1, -5, 1.83, -5, 1.83, -30, 3.05, -30, 3.05, 0, 0, 0, C:\STISIM\Data\Textures\Grass01.Jpg, 12, 0, 0, C:\STISIM\Data\Textures\Grass04.Jpg, 12

8000, V, 12, 200, 2.13, 1, *1~13

8300, V, 17, 350, 2.13, 1, *1~13

8800, V, 15, 300, 2.13, 1, *1~13

8800, V, 15, 420, 2.13, 1, *1~13

7000, A, 12, 2000, -2.13, 3

7000, A, 12, 2050, -2.13, *1~13

7000, A, 12, 2100, -2.13, 3

7000, A, 12, 2150, -2.13, *1~13

7000, A, 12, 2175, -2.13, 3

7000, A, 12, 2200, -2.13, *1~13

7500, A, 12, 770, -2, 3

7500, A, 12, 850, -2, *1~13

7500, A, 12, 930, -2, *1~13

8000, A, 12, 880, -2, *29~34

8000, A, 12, 930, -2, *29~34

8200, A, 12, 930, -2, *1~13

8200, A, 12, 980, -2, *1~13

8200, A, 12, 1000, -2, *1~13

8500, A, 12, 770, -2, 3

8000, c, 0, 150, 200, 150, 8E-03

8800, c, 0, 20, 300, 100, -5E-03

9600, c, 0, 20, 200, 50, 3E-03

8600, SIGN, 5, 1000, 0, 1

0, BSAV, 0, 5, 0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 23, 24, 26, 27, 28, 32, 35, 36, 37, 38, 44, 50, 18, 19, 21

10000, ESAV

0, RMSB, 0, Standart Deviations

10000, RMSE

10000, ES

Appendix G: Debriefing Form

KATILIM SONRASI BİLGİ FORMU

Bu araştırma, daha önce de belirtildiği gibi, ODTÜ Psikoloji Bölümü Trafik ve Ulaşım Psikolojisi Yüksek Lisans programı öğrencisi İbrahim Öztürk tarafından Doç. Dr. Türker Özkan danışmanlığında yürütülmektedir. Araştırmanın amacı, sürücü becerilerinin örtük ve beyana dayalı ölçülerek bu becerilerin sürücü davranışlarına etkisinin incelenmesidir.

Bu çalışmadan alınacak ilk verilerin Haziran 2016 sonunda elde edilmesi amaçlanmaktadır. Elde edilen bilgiler sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışmanın sağlıklı ilerleyebilmesi ve bulguların güvenilir olması için çalışmaya katılacağını bildiğiniz diğer kişilerle çalışma ile ilgili detaylı bilgi paylaşımında bulunmamanızı dileriz. Bu araştırmaya katıldığınız için tekrar çok teşekkür ederiz.

Araştırmanın sonuçlarını öğrenmek ya da daha fazla bilgi almak için araştırmacılara başvurabilirsiniz.

İbrahim Öztürk (e179162@metu.edu.tr)

Çalışmaya katkıda bulunan bir gönüllü olarak katılımcı haklarınızla ilgili veya etik ilkelerle ilgi soru veya görüşlerinizi ODTÜ Uygulamalı Etik Araştırma Merkezi’ne iletebilirsiniz.

E-posta: ueam@metu.edu.tr

Appendix H: Turkish Summary/Türkçe Özet

Giriş

Trafik kazaları dünya genelinde en önemli halk sağlığı problemlerinden biri olarak görülmektedir. Her yıl, bu kazalarda ortalama 1.25 milyon insan hayatını kaybetmekte ve milyonlarca insan yaralanmaktadır. Bütün yaş grupları için ölümlerin önde gelen nedenlerinden biri olan trafik kazaları, gençlerde ise birinci sırada yer almaktadır (WHO, 2015a; 2015b). Trafik kazaları, Türkiye'de de önemli bir problem olarak görülmektedir. 2006 yılından günümüze kadar olan veriler incelendiğinde ölümlü veya yaralanmalı trafik kazalarının sürekli bir artış gösterdiği görülmektedir (TÜİK, 2016; WHO, 2015a).

Trafik Güvenliğinde İnsan Faktörleri

Trafik kazalarının nedenleri araştırıldığında, insan faktörlerinin kaza nedenleri içerisinde %57 oranında tek başına etken faktör olduğu ve toplamda %90'ın üstünde bir oranda ise diğer faktörlerle etkileşime girerek etken faktörlerden biri olduğu bulunmuştur (Lewis, 1982; Treat ve ark., 1977). Türkiye'deki kazaların nedenlerine bakıldığında ise kazalarının %90'ından fazlasında insan hatası, özellikle sürücü hatası, kazalarının başlıca nedeni olarak görülmektedir (TÜİK, 2016). Genç sürücülerin diğer sürücülere kıyasla trafik kazaları ve diğer olumsuz çıktılar açısından daha mağdur ve riskli bir grup olduğu bulunmuştur (Sümer ve ark., 2006; WHO, 2015a).

Trafik güvenliği ile ilgili yapılan çalışmalarda, insan faktörleri temel olarak sürücü davranışları ve sürücü becerileri olmak üzere iki farklı alt grupta incelenmektedir (Parker ve Strandling, 2001). Sürücü davranışları sürücülerin sürüş esnasında ne yaptığına odaklanırken, sürücü becerileri sürücülerin ne yapabildiklerine odaklanmaktadır (Elander, West ve French, 1993).

Sürücü Becerileri

Algı-motor ve güvenlik becerileri olmak üzere iki farklı bileşenden oluşan sürücü becerileri, en sık olarak Sürücü Becerileri Ölçeği (DSI) ile ölçülmektedir. Algı-motor becerileri aracı kontrol etmek gibi teknik becerileri kapsarken, güvenlik becerileri sürücülerin güvenli sürüş ve kazadan kaçınma gibi güvenlik becerilerini kapsamaktadır (Lajunen ve Summala, 1995). Lajunen ve Özkan'a göre (2011), DSI gerçek beceri seviyesindense aslında sürücülerin beceri ve güvenlik yönelimlerini ölçmektedir. DSI ile ilgili farklı ülkelerde yapılan çalışmalarda iki faktörlü yapının güvenilir ve geçerli olduğu bulunmuştur (Lajunen ve Summala, 1995; Ostapczuk ve ark., 2017; Özkan ve ark., 2006a). Bu iki faktöre yönelik yapılan bir çalışmada algı-motor becerilerin ve güvenlik becerilerinin asimetrik bir ilişki gösterdiği bulunmuştur. Bu asimetrik ilişki algı-motor becerilerinin güvensiz trafik çıktıları ile pozitif, güvenlik becerilerinin ise bu çıktılarla negatif ilişki göstermesi olarak kendini göstermektedir (Sümer ve ark., 2006).

Demografik değişkenler sürücü becerilerinde farklılıklara neden olmaktadır. Genel olarak, sürücüler ortalama bir sürücüye kıyasla kendilerini daha pozitif olarak değerlendirme eğilimindedirler (Delhomme, 1991). Yaş, sürücülerin öz beceri değerlendirmesini etkileyen faktörlerden biridir. Ancak, yaş ile ilgili çalışmalarda birbiriyle çelişen bulgular bulunmaktadır. Genç sürücüler düşük seviyede algı-motor beceriler raporlarken, yaşlı sürücüler daha yüksek seviyede algı-motor ve güvenlik becerileri raporlamışlardır (Ostapczuk ve ark., 2017; Özkan ve Lajunen, 2006; Sümer ve ark., 2006). Başka bir çalışmada ise yaşın algı-motor becerileri ile negatif, güvenlik becerileri ile pozitif korelasyon gösterdiği bulunmuştur (Martinussen ve ark., 2014). Trafiğe daha fazla maruz kalan tecrübeli sürücülerin ise daha yüksek seviyelerde algı-motor becerileri ve daha düşük seviyede güvenlik becerileri raporladığı bulunmuştur (Lajunen ve Summala, 1995; Lajunen ve ark., 1998a). Cinsiyet ile sürücü becerileri arasındaki ilişkiye bakıldığında ise yine çelişkili bulgular görülmektedir. Bazı çalışmalarda erkek sürücülerin hem algı-motor becerilerini hem de güvenlik becerilerini kadın sürücülere göre daha yüksek raporladığı bulunmuştur (Delhomme, 1991; Lajunen ve ark., 1998a). Ancak, diğer çalışmalarda ise sürücü becerileri açısından cinsiyet özelinde bir farklılık bulunamamıştır (Lajunen ve Summala, 1995).

Beyana dayalı sürücü becerilerinin sürücü davranışlarıyla tutarsız olduğu ve sürücülerin tecrübesine göre bu tutarlılığın değiştiği görülmektedir (Martinussen ve ark., 2017). Sürücü becerilerinin çıktılarına bakıldığında ise yüksek seviyede algı-motor becerilerine ve düşük seviyedeki güvenlik becerilerine sahip olduğunu beyan eden sürücülerin sapkın sürücü davranışları açısından en tehlikeli sürücü grubu olduğu bulunmuştur (Martinussen ve ark., 2014; Sümer ve ark., 2006). Yüksek seviyede güvenlik becerilerine sahip sürücülerin daha az kaza yaşadığı, daha az ceza aldığı ve düşük hız yaptığı bulunmuştur. Bunun aksine, algı-motor becerileri yüksek olan sürücülerin kaza, ceza ve hız gibi çıktıları daha çok ve yüksek oranda tecrübe ettiği bulunmuştur (Lajunen ve ark, 1998a).

Sürücü Davranışları

Sürücü davranışları belirli bir taksonomiye göre geliştirilen Sürücü Davranışlar Ölçeği (DBQ) ile temel olarak ihlaller ve hatalar olarak sınıflandırılarak ölçülmektedir (Reason ve ark., 1990). DBQ, sürücü davranışlarının ölçülmesinde en sık kullanılan ölçüm kaynağıdır (Lajunen ve Özkan, 2011; de Winter ve Dodou, 2010) ve birçok farklı ülkede de güvenilir ve geçerli bulunmuştur (de Winter ve Dodou, 2010; Stephens ve Fitzharris, 2016).

Sürücü Davranışları Ölçeği'nin geliştirilmesinde kullanılan taksonomi sürücü davranışlarını ihlaller ve hatalar olmak üzere iki temel grupta sınıflandırmaktadır. Hatalar planlanan davranışların niyet edilen sonuca ulaşmadaki başarısızlığı olarak tanımlanırken, ihlaller potansiyel tehlikeli bir sistem içerisinde güvenli bir akışı sağlamak için gerekli olan davranışları kasıtlı olarak gerçekleştirmemek olarak tanımlanabilir (Reason ve ark., 1990). Lajunen ve Özkan (2011) hataları ciddi sonuçlara neden olabilen kasıtsız yanlışlıklar olarak tanımlarken kaymaları hafıza problemlerinden kaynaklı tehlikeli olmayan davranışlar olarak tanımlamaktadır. af Wåhlberg ve arkadaşları (2011) tarafından da belirtildiği üzere DBQ'nun farklı faktör yapıları ile kullanılan birçok farklı versiyonu kullanılmaktadır. Fakat, DBQ sürücü davranışlarının niyetli ve niyetsiz sapkın sürücü davranışlarını güvenilir bir şekilde sınıflandırdığı bulunmuştur (Martinussen ve ark., 2013).

Yaşın ihlaller, hatalar ve sapmalarla negatif ilişki gösterdiği bulunmuştur (Martinussen ve ark., 2014). Genç sürücüler yüksek oranda ihlaller (Özkan ve ark., 2006b) ve hatalar (de Winter ve Dodou, 2010) raporlamışlardır. Yaşlı sürücülere kıyasla genç sürücülerde ihlallerin trafik kazalarına dahil olmayı anlamlı şekilde yordadığı bulunmuştur (de Winter ve Dodou, 2010). Hatalar tecrübe ile negatif ilişkili bulunmuştur. Tecrübesiz sürücüler yüksek oranda hata raporlamaktadır (Guého ve ark., 2014). Tecrübeli sürücülerin ise daha fazla ihlal raporladığı bulunmuştur (de Winter ve Dodou, 2010). Tecrübe ile ihlaller arasındaki bu ilişki sürücülerin trafiğe daha az maruz kalması sonucu saldırgan ihlaller geliştirmemesinden kaynaklı olabilir (Zhang ve ark., 2013). Erkek sürücüler kadın sürücülere kıyasla daha fazla ihlal yapmaktadır (Reason ve ark., 1990). Özellikle genç erkek sürücüler, kadın sürücülere kıyasla daha fazla saldırgan ve sıradan ihlal yaptığı bulunmuştur (Rowe, Roman, McKenna, Barker ve Poulter, 2015). Bunun aksine, kadın sürücülerin ise daha fazla hata ve kayma yaptığı bulunmuştur (Guého ve ark., 2014; Stephens ve Fitzharris, 2016). Başka bir çalışmada ise erkek sürücülerin daha fazla ihlal ve hata yaptığı, ve kadın sürücülerin daha fazla kayma yaptığı bulunmuştur (Özkan ve ark., 2006b). DBQ kaza çıktılarını anlamlı olarak yordamaktadır (af Wåhlberg ve ark., 2011; de Winter ve Dodou, 2010). Demografik değişkenleri kontrol ettikten sonra, ihlaller kazaya dahil olmayı anlamlı olarak yordamaya devam etmektedir. Ayrıca, ihlallerin kültür, dil ve sürüş koşullarındaki farklılıklardan bağımsız bir şekilde kazalara dahil olmayı yordayacağı önerilmektedir (Gras ve ark., 2006).

Sıradan ihlaller, saldırgan ihlaller, hatalar ve kaymalardan oluşan sapkın sürücü davranışlarına ek olarak, Özkan ve Lajunen (2005) pozitif sürücü davranışları boyutunu DBQ'ya farklı bir boyut olarak eklemiştir. Pozitif sürücü davranışları kasıtlı olarak sürüş ortamı ve diğer yol kullanıcılarıyla ilgilenmek olarak tanımlanmaktadır. Pozitif sürücü davranışları diğer sapkın sürücü davranışlarıyla negative yönde ilişki göstermektedir. Ayrıca, genç ve tecrübesiz sürücüler daha düşük oranda pozitif sürücü davranışı göstermektedir (Guého ve ark., 2014; Özkan ve Lajunen, 2005). Genç sürücülerin tecrübesiz olduklarından dolayı trafikteki durumlara daha çok odaklandıkları ve bu yüzden de pozitif sürücü davranışlarını daha az gösterdikleri düşünülmektedir (Guého ve ark., 2014).

Sürücü Becerileri ve Davranışları Arasındaki İlişki

Sürücü becerileri ve davranışları ile ilgili bu değişkenleri farklı sürüş çıktılarına bağlayan birçok çalışma olmasına rağmen bu değişkenlerin birbirleri arasındaki ilişki çok az çalışmada incelenmiştir. Güvenlik becerisi yüksek sürücülerin daha düşük oranda ihlal ve riskli sürücü davranışları gösterdiği bulunmuştur (Sümer ve ark., 2006; Sümer ve Özkan, 2002). Algı-motor becerileri yüksek sürücülerin ise yüksek oranda ihlal ve düşük oranda hata ve kayma yaptığı bulunmuştur. Buna ek olarak güvenlik becerileri yüksek sürücülerin daha fazla ihlal, hata ve ihmal yaptığı görülmektedir (Martinussen ve ark., 2014). Kendini ortalama bir sürücüden daha becerikli gören sürücülerin riskli durumları kontrol edebilmek için yeterli beceriye sahip olduklarını düşündükleri ve durumları daha az tehlikeli olarak algıladıkları düşünülmektedir. Bu yüzden de daha riskli davranışlar gösterdikleri bulunmuştur. Özellikle yüksek seviyede algı-motor becerisi ve düşük seviyede güvenlik becerisine sahip sürücülerin daha fazla ihlal gösterdiği bulunmuştur (Martinussen et al., 2014).

Genç Erkek - Kadın Sürücüler ve Trafik Güvenliği

Trafik güvenliği ilgili önemli problemlerden biri de genç sürücülerin yüksek risk teşkil etmesi ve kazalara daha fazla dahil olmasıdır (Bener ve Crundall, 2008). Genç sürücüler diğer sürücülere göre daha fazla sapkın sürücü davranışları göstermektedir (Gheorghiu ve Havârneanu, 2012). Erkek sürücüler, kadın sürücülere göre daha fazla aktif ve pasif kaza yaşamaktadırlar (Özkan ve Lajunen, 2006). Amarasingha ve Dissanayake'ye göre (2014), erkek sürücüler kadın sürücülere göre daha fazla kazaya dahil olmakta ve daha riskli bir sürücü profile sergilemektedirler. Kat edilen kilometre miktarı kontrol edildikten sonra bile genç sürücüler diğer yaş gruplarına göre riskli grup olmaya devam ettiği bulunmuştur (Lourens, Vissers ve Jessurun, 1999). Yaş grupları ve cinsiyet farklılığının trafik kazalarına ilişkin değişkenlere etkisine bakıldığında ise genç sürücülerde yaşlı sürücülere göre trafik kazalarında cinsiyet farklılığının daha yüksek oranda olduğu bulunmuştur (Laapotti ve Keskinen, 2004).

Trafik Psikolojisi Çalışmalarında Ölçüm Araçları

Açık ve Örtük Ölçüm Yöntemleri

Beyana dayalı ölçüm yöntemleri, simülatör gibi diğer araçlara kıyasla daha ucuz olması, aynı anda birçok insana ulaşabilmesi gibi birçok teorik ve pratik nedenden ötürü daha fazla tercih edilmektedir. Ancak, DBQ ve DSI gibi sürücü davranışlarını ve becerilerini ölçmekte en sık kullanılan ölçüm araçlarının da güvenilirlik ve geçerlilik problemleri görülmektedir (Lajunen ve Özkan, 2011). Bunlara rağmen öz beyana dayalı ölçüm yöntemleri gerçek sürüş ve simülatördeki sürüş davranışlarıyla pozitif yönde ilişki göstermektedir (Taubman-Ben-Ari ve ark., 2016).

Öz beyana dayalı ölçüm yöntemlerine ek olarak, örtük ölçüm araçları da yaygın olmasa da trafik psikolojisi çalışmalarında kullanılmaktadır (Flucher ve ark., 2014). Martinussen ve arkadaşları (2015) tarafından yapılan bir çalışmada riske karşı örtük tutumların, DBQ ve DSI ile düşük korelasyon gösterdiği bulunmuştur. Rusu, Sârbescu, Moza ve Stancu (2017) tarafından yapılan çalışmada ise hıza karşı örtük tutumların açık tutumlar ve ihlallerle pozitif ilişki gösterdiği görülmektedir. Özkan ve arkadaşları (2013) tarafından yapılan bir çalışmada açık ve örtük sürücü becerilerinin bağlantılı olduğu ancak farklı yapılar sergilediği bulunmuştur.

Sürüş Simülatörü

Birçok farklı versiyonu bulunan sürüş simülatörleri de trafik ve ulaşım psikolojisi alanında en yaygın kullanılan ölçüm yöntemlerinden biridir. Özellikle de araştırma ortamına yönelik kontrol sağlaması ve riskli trafik durumlarını ve olaylarını çalışmaya imkan sağlaması gibi birçok uygulamalı nedenden ötürü tercih edilmektedir (Carsten ve Jamson, 2011). Teorik ve pratik anlamda sağladığı birçok imkandan dolayı simülatörler, saha çalışmaları gibi birçok ölçüm yöntemine yeni bir alternatiftir (Bella, 2008). Reimer ve arkadaşları (2006) tarafından yapılan bir çalışmada sürüş simülatöründen elde edilen verilerin beyana dayalı sürücü davranışlarıyla ilişkili olduğu görülmüştür. Ayrıca, Casutt, Martin, Keller ve Jäncke (2014) tarafından yapılan çalışmada da simülatör performansının sürücülerin yoldaki performansıyla ilişkili olduğu belirtilmiştir. Calvi, Benedetto ve de Blasiis (2014) tarafından yapılan çalışmada ise farklı özellikler içeren yollarda sürücülerin hız davranışları araştırılmıştır. Bulgular, yolun özelliklerinin ve trafik akışının sürücülerin hızlarını etkilediğini göstermiştir. Ayrıca, sürücüler gerçek yol performanslarına göre daha az hız ihlalleri göstermiştir. Bununla ilgili olarak da sürüş simülatörü ortamındaki farklılığın, özellikle sürücülerin simulator ortamına aşina olmamasının, sürücülerin hızlarına yansıyabileceği düşünülmektedir. Helman ve Reed (2015) tarafından yapılan çalışmada DBQ'nun ihlaller boyutu sürüş simulatöründe farklı koşullardan hız davranışı ile pozitif ilişkili bulunmuştur. Ayrıca, genç sürücülerin sürüş simulatöründe daha fazla ihlal yaptığı bulunmuştur (Doroudgar ve ark., 2017).

Sürüş simülatörü ile ilgili olarak değinilmesi gereken konulardan biri de simülatör hastalığı veya hareket hastalığıdır (Carsten ve Jamson, 2011). Hareket hastalığının simülatör ortamına alışkın olma ile ilişkili olduğu bulunmuştur (Domeyer, Cassavaugh, ve Backs, 2013). Özellikle daha karışık özellikler sahip yolların daha fazla zaman alabileceği düşünülmektedir (Ronen ve Yair, 2013).

Çalışmanın Amacı

Bu çalışmanın amacı, öz beyana dayalı ve örtük şekillerde ölçülen sürücü becerileri ile öz beyana dayalı ve sürüş simülatöründe ölçülen sürücü davranışları arasındaki ilişkiyi araştırmaktır. Ayrıca, bu değişkenler özelinde cinsiyet farklılığı ve öz beyana dayalı hız davranışları ve sürüş simülatöründeki hız davranışları arasındaki ilişki de incelenecektir.

Literatürde ilk defa, öz beyana dayalı ve örtük sürücü becerileri ile sürüş simülatöründeki sürücü davranışları birlikte çalışılacaktır. Ayrıca, sürücü becerilerinin ölçümü ilk defa Kısa Örtük Çağrışım Testi (Brief Implicit Association Test) kullanılarak yapılacaktır.

Method

Katılımcılar

Çalışmaya toplam 78 kişi katılmıştır. Katılımcıların yarısı erkek ve yarısı kadındır. Katılımcılar 18 -25 yaş arasında, B sınıfı ehliyet sahibi olup, son bir yılda en az 2500 km araç kullanmışlardır.

Ölçekler

Demografik Bilgi Formu'nda katılımcılardan genel ve trafik ortamına ilişkin demografik değişkenler içeren bir anket doldurmaları istenmiştir. Sürücü Davranışları Ölçeği'nde katılımcılardan toplamda 6'lı Likert tipte 42 maddelik bir ölçekte belirtilen sürücü davranışlarını ne sıklıkla yaptıklarını belirtmeleri istenmiştir. Sürücülerden ihlal, hata ve pozitif sürücü davranışlarını ne sıklıkla yaptıklarını raporlamaları istenmiştir (Özkan ve Lajunen, 2005; Reason ve ark., 1990). Sürücü Becerileri Ölçeği'nde sürücülerden 5'li Likert tipte 20 maddede sürücü becerilerini değerlendirmeleri istenmiştir (Lajunen ve Summala, 1995). Sürücülerden kendilerini algı-motor ve güvenlik alt boyutlarına ilişkin maddelerde değerlendirmeleri istenmiştir. Sürücü davranışlarının sürüş simülatöründe ölçülmesi için STISIM Drive M100W modeli kullanılmıştır. Katılımcılara simulatör ortamını tanıtmak ve katılımcıların herhangi bir rahatsızlık yaşamadığına emin olmak için bir test senaryosu kullanılmıştır. Sürüş simülatörü ortamında ise asıl senaryo 4 farklı yol özelliği içeren 10 kilometre uzunluğunda bir yoldur. 4 segment farklı hız limitleri ve farklı yol özellikleri içermektedir. Tüm sürüş boyunca çeşitli özelliklerde sürücü davranışlarına yönelik veriler kaydedilmiştir. Sürücü becerilerinin örtük ölçülmesi için kullanılan yöntemde ise algı-motor ve güvenlik becerilerine yönelik ayrı ayrı ölçümler yapılmıştır. Örtük ölçüm testinin geliştirilmesi için Sriram ve Greenwald (2009) tarafından Inquisit 4 programı için geliştirilen Kısa Örtük Çağrışım Testi taslak üzerine Özkan ve arkadaşlarının (2013) çalışmasında yer alan örtük çağrışım testi kelime grubu kullanılmıştır. İki ölçüm sonrasında da ayrı ayrı örtük ölçüm değeri, d değeri, elde edilmiştir.

Prosedür

Orta Doğu Teknik Üniversitesi Uygulamalı Etik Araştırma Merkezi'nden etik onay aldıktan sonra çalışma kapsamında katılımcılardan demografik bilgi formu, Sürücü Davranışları Ölçeği, Sürücü Becerileri Ölçeği'ni doldurmaları istenmiştir. Ardından sürüş simülatöründe bir test sürüşü ve 10 km'lik asıl senaryoyu tamamlamışlardır. Son olarak da sürücü becerilerinin örtük ölçülmesi için geliştirilen örtük çağrışım testini tamamlamışlardır. Çalışma bataryasının tamamlanmasının ardından çalışma sonrası bildirim formu ve 60 TL'lik ödeme teslim edilmiştir.

Sonuçlar ve Tartışma

Çalışma kapsamında ilk olarak değişkenlere ait faktör analizleri ve korelasyon analizleri yapılmıştır. Yapılan faktör analizleri sonucunda Sürücü Davranışları Ölçeği'nin temel yapısı olan niyetli ihlaller ve kasıtsız hatalar ayrımını yansıtan bir faktör yapısı gösterdiği bulunmuştur (de Winter ve Dodou, 2010). Buna ek olarak Sürücü Becerileri Ölçeği ise algı-motor becerileri ve güvenlik becerileri olmak üzere iki faktörlü yapısını korurken geliştirilme çalışmasının aksine birkaç madde Lajunen ve Özkan (2004) tarafından yapılan Türkçe uyarlama çalışmasındaki gibi farklı faktöre yüklenmiştir.

Korelasyon analizlerine bakıldığında ise kat edilen kilometre miktarları ihlallerle ve algı-motor becerileri ile pozitif ilişki gösterirken güvenlik becerileri ile negatif ilişki göstermiştir (de Winter ve Dodou, 2010; Lajunen ve Summala, 1995). Sürüş simülatöründeki ortalama hız ve hızdaki standart sapmalar beyana dayalı ihlaller ile pozitif ilişkili bulunmuştur (Helman ve Reed, 2015). Buna ek olarak, ihlaller simülatördeki şerit takibindeki standart sapma ile de pozitif ilişki göstermiştir. Ayrıca, algı-motor becerileri tüm ortalama hız değişkenleriyle pozitif ilişki göstermiştir. Bunun aksine, güvenlik becerileri tüm hız değişkenleri ile negatif ilişki göstermiştir. Genel olarak bakıldığında ise, beyana dayalı ihlaller, hataların aksine, sürüş simülatöründeki hız ve şerit takibi gibi değişkenlerle ilişkili bulunmuştur. Beyana dayalı sürücü davranışları ve sürücü becerileri bulguları genel olarak literatürü destekler niteliktedir (Martinussen ve ark., 2014; Sümer ve ark., 2006).

Algı-motor becerileri ihlaller ve pozitif sürücü davranışlarıyla pozitif ilişkili bulunurken hatalar ile negatif ilişki göstermiştir. Ayrıca güvenlik becerileri pozitif sürücü davranışlarıyla pozitif, ihlaller ile negatif ilişkili bulunmuştur.

Fleiter ve Watson (2006) tarafından da belirtildiği üzere sürücüler yasal hız limitinin belirli bir miktar üstünde sürmeyi tercih ettiklerini belirtmişlerdir. Çalışmada da sürücüler belirtilen yasal limitlerin üzerindeki hızlarda sürdüklerini beyan etmişlerdir. Buna karşı, beyana dayalı hız ile simülatördeki hız davranışları arasındaki ilişkiye bakıldığında ise sürücüler 50 km/s limitli yolda raporladıklarından daha yavaş giderken 90 km/s limitli yolda daha hızlı gitmişlerdir. 82 km/s limitli iki farklı yolda ise ilk bölümde daha yavaş giderken ikinci bölümde daha hızlı gitmişlerdir. Meuleners ve Fraser (2015) tarafından da belirtildiği gibi sürüş simülatöründeki hız performansı ile yoldaki hız performansı hızın korunması açısından karşılaştırılabilirken gerçek hız davranışı konusunda uygun kıyaslamaya imkan vermemektedir. Bu çalışmada da görüldüğü üzere yasal hız limiti, beyana dayalı tercih edilen hız limiti ve sürüş simülatöründeki hız davranışları arasında farklılıklar bulunmaktadır. Bu da hız konusunda sürücülerin algılarını etkileyen farklı değişkenler olabileceğinin bir göstergesidir. Ancak, beyana dayalı sürücü davranışları ile simülatördeki hız davranışları arasındaki pozitif korelasyon sürüş simülatörlerinin bu alanda kullanılabileceğini göstermektedir.

Değişkenler arası cinsiyet farklılıklarına bakıldığında ise erkek sürücüler daha fazla beyana dayalı algı-motor becerisi ve pozitif sürücü davranışları raporlamışlardır. Ayrıca, erkek sürücüler sürüş simülatöründe toplamda ve tüm bölümlerde daha hızlı araç kullanmışlardır. Hız limitinin düşük olduğu ve trafik yoğunluğunun yüksek olduğu son bölümde ise erkek sürücüler daha hızlı araç kullanmış, daha yüksek miktarda hız değişimleri ve daha fazla şerit değişikliği göstermişlerdir. Bulgular genel olarak Hassan ve Abdel-Aty (2013) tarafından yapılan çalışmanın bulguları destekler nitelikte olup erkek sürücülerin kadın sürücülere kıyasla hız sınırlarının üstüne daha fazla çıktıklarını göstermektedir. Cinsiyet farklılığındaki önemli bulgulardan biri de yolun tek şeritli ve yoğun trafikli bölümünde kadın sürücülerin yolun daha fazla sağında sürdüğünü, buna karşı erkek sürücülerin de daha fazla sol şeride geçmesidir.

Değişkenler arasında ayrıca aşamalı regresyon analizleri yapılmıştır. Bu analizlerde birinci aşamada cinsiyet ve son bir yılda kat edilen kilometre miktarı girilirken ikinci aşama beyana dayalı veya örtük ölçülmüş sürücü becerileri girilmiştir. Çıktı değişkeni olarak beyana dayalı sürücü davranışları ve sürüş simülatöründeki hız ve şerit çıktıları değerlendirilmiştir. Beyana dayalı sürücü davranışları içerisinde son bir yılda kat edilen kilometer, ihlalleri negatif yordarken pozitif sürücü davranışlarını pozitif yordamıştır. Ayrıca erkek olmak da pozitif sürücü davranışlarıyla pozitif ilişki göstermiştir. İkinci aşamadaki, beyana dayalı algı-motor becerileri hataları negatif yordarken ihlalleri ve ihlalleri ve pozitif sürücü davranışlarını pozitif yordamıştır. Güvenlik becerileri ise ihlalleri negatif, pozitif sürücü davranışlarını ise pozitif yordamıştır. Daha düşük güvenlik becerilerine sahip sürücülerin daha fazla ihlal yaptığı bulunmuştur (Sümer ve ark., 2006). Sümer ve arkadaşları (2006) tarafından da belirtildiği gibi algı-motor ve güvenlik becerileri sapkın sürücü davranışı çıktılarıyla asimetric bir ilişki göstermiştir ancak bu asimetrik ilişki pozitif sürücü davranışlarında devam etmemiştir. Pozitif sürücü davranışlarında algı-motor ve güvenlik becerileri simetrik bir ilişki göstermiştir. Martinussen ve arkadaşları (2014) tarafından da belirtildiği üzere algı-motor becerisi yüksek ve güvenlik becerisi düşük sürücüler diğer sürücülerden daha fazla ihlal yapmaktadırlar. Sürüş simülatöründeki ortalama hız davranışları için bakıldığında ise erkek olmak pozitif ilişkili bulunurken güvenlik becerileri ortalama hızı negatif olarak yordamıştır. Tüm yol türlerinde sadece güvenlik becerileri Lajunen ve arkadaşlarının (1998a) da belirttiği üzere hız davranışını negatif olarak yordamıştır. Buna ek olarak, yol tek şerit ve daha yoğun bir trafiğe sahip olduğunda algı-motor becerilerde hız davranışını pozitif yordadığı bulunmuştur. Şerit takibi değişkenlerinde ise tek anlamlı farklılık tek şeritli olan son bölümde görülmüştür. Burada ise kadın olan ve güvenlik becerileri yüksek olan sürücülerin diğer sürücülere göre daha fazla sağ şeritte kaldığı bulunmuştur. Ayrıca son bir yılda daha fazla kilometre kat eden sürücülerin daha fazla şerit değişikli yaptığı da bulunmuştur. Örtük ölçüm sonuçlarına bakıldığında ise örtüm ölçüm sonucu algı-motor becerileri ve güvenlik becerileri hiçbir davranış çıktısı ile anlamlı bir ilişki göstermemiştir.

Calvi ve arkadaşları tarafından da belirtildiği üzere simülasyon ortamındaki trafiğin içeriği sürücülerin hız davranışlarını etkilemektedir. Bu çalışmada da görüldüğü üzere farklı karakterlerdeki yollarda sürücüler farklı hız davranışları sergilemiştir. Özellikle son bölümün diğer bölümlerden hız ve şerit takibi değişkenleri açısından farklı olması da yolun karakteristik özelliklerinin farklılığına bağlanabilir.

Genel olarak bakıldığında, diğer çalışmalarda genç erkek sürücülerin beyan ettikleri sürücü becerileri ve sürüş performansları her ne kadar tutarsız olarak değerlendirilse de (Martinussen ve ark., 2017), bu çalışmada beyan edilen sürücü becerileri ve beyan edilen sürücü davranışları ve simülatördeki sürücü davranışları arasındaki ilişki genel olarak ilişkinin yönü açısından tutarlı bulunmuştur. Bulgular, beyana dayalı sürücü becerilerinin, örtük sürücü becerileri aksine, beyana dayalı ve simülasyondaki sürücü davranışlarını yordadığı bulunmuştur.

Genel olarak çalışmanın yöntem ve sonuçları hem trafik ve ulaşım psikolojisi alanındaki araştırmalar için hem de sürücü eğitimi için önemlidir. Sonuçlar öz beyana dayalı sürücü becerilerinin öz beyana dayalı ihlal, pozitif sürücü davranışları ve sürüş simülatöründeki sürücü davranışları üzerinde etkisi olduğunu göstermiştir. Sürücü eğitimi sistemi açısından, bulgular genç sürücülerin kendilerini nasıl gördüklerinin davranışları açısından önemini göstermektedir. Bu yüzden de sürücü eğitimi boyunca hem algı-motor hem de güvenlik becerilerine eşit olarak odaklanılmalı ve bu konularda sürücülere düzenli geri bildirim ve eğitim sağlanmalıdır. İyi sürücü tanımı yapılırken hem algı-motor hem de güvenlik becerilerine ilişkin özellikler dahil edilmelidir.

Çalışmanın ilk katkısı, literatürde ilk defa, beyana dayalı ve örtük şekilde ölçülen sürücü becerileri ile beyana dayalı ve simülatörde ölçülen sürücü davranışları arasındaki ilişkinin birlikte araştırılması olmuştur. Yine literatürde ilk defa, sürücü becerilerinin örtük ölçülmesi Kısa Örtük Çağrışım Testi kullanılarak gerçekleştirilmesi olmuştur. Ayrıca çalışma kapsamında genç sürücülerde sürücü becerileri ve sürücü davranışları açısından cinsiyet farklılığı da araştırılmıştır. Ayrıca, Türk örnekleminde ilk defa beyana dayalı sürücü becerileri hem beyana dayalı hem de simülatördeki sürücü davranışlarıyla birlikte çalışılmıştır.

Çalışmanın kısıtlılıklarına bakıldığında ise, ilk olarak, çalışmada kullanılan beyana dayalı ölçüm yöntemleri ve sürüş simülatörünün çeşitli kısıtlılıkları vardır (Carsten ve Jamson, 2011; Lajunen ve Özkan, 2011). Daha önce de belirtildiği üzere, sürüş simülatörü veya beyana dayalı ölçümler kullanılarak yapılan sürücü davranışları ölçümleri aslında varolan sürücü davranışları ile birebir örtüşmeyebilir. Özellikle çalışmanın bir laboratuvar ortamında olması katılımcıların sosyal istenir cevaplar vermesi veya sürüş simülatöründe normalde göstermedikleri davranışları göstermiş olası ile sonuçlanabilir. Sürücü becerilerinin örtük ölçümü açısından bakıldığında ise, bulgular örtük ölçüm sonuçlarının beyana dayalı veya simülatördeki sürücü davranışları ile arasında bir ilişki olmadığını göstermektedir. Bu durumun arkasında birçok neden olabilir. Örneğin, genç sürücüler örtük sürücü becerileri olgusunu tecrübeli sürücülere veya suçlu sürücülere kıyasla geliştirmemiş olabilirler. Ayrıca, farklı örtük ölçüm yöntemleri sürücü becerilerinin ölçülmesinde kullanılabilir. Son olarak da sürücü becerileri yapı olarak örtük ölçüme uygun olmayan bir yapıya sahip olabilir. Bir başka kısıtlılık ve gelecekteki çalışmalara öneri ise Sürücü Davranışları Ölçeği'nin geçerliliği ve güvenilirliği hakkındadır. Madde içeriklerine bakıldığında trafik ortamındaki özellikle de teknoloji ile birlikte meydana gelen değişimler sonucunda daha kapsayıcı ve güncel bir ölçek geliştirilmesi önerilebilir. Ayrıca, hatalar ile ilgili maddelere bakıldığında bu boyutların sürüş simülatöründe olay özelinde çalışılması ve her bir hata için özel olaylar geliştirilmesi daha güvenilir sonuçlar oluşturacaktır. Son olarak da katılımcı sayısının arttırılması ve farklı gruplardan sürücülerle çalışmanın tekrarlanması çalışmanın bulgularının güvenilirliği ve geçerliliği açısından önemlidir.

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	☐
Sosyal Bilimler Enstitüsü	☒
Uygulamalı Matematik Enstitüsü	☐
Enformatik Enstitüsü	☐
Deniz Bilimleri Enstitüsü	☐

YAZARIN

Soyadı : Öztürk
Adı : İbrahim
Bölümü : Psikoloji

TEZİN ADI (İngilizce) : Young driver behaviors in relations to the implicit and explicit driving skills

TEZİN TÜRÜ : Yüksek Lisans ☒ Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☒
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☒
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ☐

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: