LEARNER DRIVER FOLLOW-UP STUDY: ATTITUDE CHANGE AND DRIVER BEHAVIOR

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ABSTRACT

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Novice drivers are overrepresented in accidents especially at the beginning of solo driving. Learning process is important in driving because pre-attitudes and behaviors could determine the later driver behaviors. Therefore, driver education and training become irrefutably critical for safe driving. The first aim of the current study is investigating the attitude change of learner drivers through driver education and training by taking attitude measurements both before the beginning of education and after they complete driving practices. Second aim is investigating the attitude effect on driver behaviors which are observed during driving practices. 150 learner drivers (92 male, 58 female) whose mean age was 25.26 participated in the study voluntarily. Turkish version of Manchester Driver Attitude Scale (Lajunen, & Özkan, 2004) was used to measure driving-specific attitudes and Traffic Safety Climate Scale (Özkan, & Lajunen, unpublished(a);

Gehler, Hagemaister, & Özkan, 2014) was used to measure attitudes toward traffic climate. Then, driver behaviors were measured by Driver Behavior Questionnaire with positive driver behaviors (Özkan, & Lajunen, 2005) to see self-reported driver behaviors during driving practices. Results showed that, risky-oriented attitudes of learner drivers increased over the learning period but safety-oriented attitudes and traffic climate attitudes did not change after driver education. Pre and post attitudes differed in predicting driving behaviors but risky-oriented attitudes seem the most powerful predictor of different driver behaviors which are observed during driving practices. The results, contributions and limitations of the study were discussed along with the suggestions for the future research.

Keywords: learner drivers, driver education and practice, driving-specific attitudes, traffic climate attitudes, driver behaviors

ÖZ

SÜRÜCÜ ADAYLARI TAKİP ÇALIŞMASI: TUTUM DEĞİŞİMİ VE SÜRÜCÜ DAVRANIŞLARI

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Acemi sürücüler özellikle tek başlarına araç kullanmaya başladıkları dönemin başında trafik kazalarına en çok karışan gruplardan biridir. Sürücülükte öğrenme dönemi bu dönemdeki tutum ve davranışların gelecek sürücü davranışlarındaki belirleyici etkisi sebebi ile çok önemlidir. Bu nedenle sürücü eğitimi güvenli bir sürüş ve trafik için yadsınamayacak şekilde kritiktir. Bu çalışmanın ilk amacı sürücü adayları eğitime başlamadan hemen önce ve en son aşama olan direksiyon çalışmalarını bitirir bitirmez tutum ölçümü alarak eğitim boyunca oluşan tutum değişimini bir takip çalışması ile incelemektir. İkinci olarak ise, tutum değişiminin

yanı sıra tutumların direksiyon eğitimlerinde ortaya çıkan sürücü davranışlarına etkisini görmektir. Bu sebeple yaş ortalamaları 25.26 olan 150 sürücü adayı (92 erkek, 58 kadın) çalışmaya gönüllü olarak katılmıştır. Manchester Sürücü Tutum Ölçeği' nin Türkçe versiyonu (Lajunen, & Özkan, 2004) sürücü adaylarının sürüş ile ilgili tutumlarını ölçmek için, Trafik İklimi Ölçeği (Özkan, & Lajunen, yayımlanmamış makale(a); Gehlert, Hagemaister, & Özkan, 2014) ise trafik iklimine karşı olan tutumlarını ölçmek için kullanılmıştır. Son olarak, sürücü davranışlarını inceleyebilmek için Sürücü Davranışları Anketi'nin olumlu sürücü davranışlarını içeren versiyonu (Özkan, & Lajunen, 2005) kullanılmıştır. Sonuçlar, sürücü adaylarının risk odaklı tutumlarının sürücü eğitimi boyunca arttığını fakat güvenlik odaklı ve trafik iklimi ile ilgili olan tutumlarının aynı kaldığını göstermiştir. Eğitimden önceki ve sonraki tutumlar sürücü davranışları olan hataları, ihlalleri ve olumlu sürücü davranışlarını yordama konusunda farklı sonuçlar verse de riskli tutumlar direksiyon eğitimlerinde ortaya çıkan farklı sürücü davranışları için en güçlü yordayıcı olarak gözükmektedir. Çalışmanın sonuçları, katkıları ve olası kısıtlayıcı faktörler, gelecek çalışmalar için öneriler ile birlikte tartışılmıştır.

Anahtar kelimeler: sürücü adayları, sürücü eğitimi, sürüş tutumları, trafik iklimi tutumları, sürücü davranışları

To Hasne, Murat, &

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CHAPTER I

INTRODUCTION

1.1. General Introduction

Deaths and injuries that are resulted from traffic accidents are ongoing serious health challenges in the worldwide (Helman, Kinnear, McKennaa, Allsop & Horswill, 2013). Every year nearly 1.24 million people die around the world because of traffic accidents and 20 to 50 million people are exposed to nonfatal injuries that are resulted from road traffic accidents (WHO, 2013). During the past 30-35 years, road safety has been improved especially in motorized countries but, road safety records do not please any of them and persistence of some road safety problems cannot be handled (Elvik, 2008).

1.1.1. An Accident

An accident as an outcome is resulted from contribution of human factor (i.e., road user), environment factor which includes vehicles and possible interaction of these two factors (Özkan, 2006). Drivers always interact with environment and vehicle because driving is not an isolated task (Oppenheim & Shinar, 2011) Therefore, an accident can be defined as independent or combined outcome of behavioral, vehicle and road environment related factors (Özkan & Lajunen, 2011). Human factor is the dominant factor as compared to environment and vehicle although they are easier to be controlled (Oppenheim & Shinar, 2011). The largest role in traffic safety belongs the human factor or road users because changes of driver behavior are the keys of traffic safety (Evans, 2004).). The first investigation of causes of accidents was conducted in 1970's in Indiana

University for the U.S. National Highway Traffic Safety Administration (Shinar, 2007). Over 2000 police-reported accidents were investigated in terms of human failures, vehicle failures and environmental problems and it was found out that road users were responsible for 57% of traffic accidents, while environmental factors and vehicles were responsible for 3% and 2%, respectively (Treat *et al*., 1979). Road user was the sole or contributing reason in 94% of the accidents. At the same times, Sabey and Staughton (1975) conducted very similar study in England and despite the country and vehicle differences, results of the study showed that, road user were responsible for 65% of the accidents, environment was %2 and vehicles were %2 (Shinar 2007). Also, Sabey and Staughton (1975) identified sole or contributing effect of road user to accidents as %95 (Shinar, 2007). This may means that most of the driver behaviors contribute to an accident (Shinar, 2007) and understanding psychological mechanisms that underlying driver behavior is very important to assess human contribution to road traffic accidents (Lawton, Parker, Manstead & Stradling, 1997). Therefore human factor should be analyzed deeply to provide road safety. Human factor, in different saying behavioral factor, can be investigated in two different components namely driver behaviors/styles and driver performances/skills (Elander, West, & French, 1993).

Driver performance could be described as driver's knowledge, skill and perceptual and cognitive abilities (Evans, 2004). Higher level skills which are related to driving such as judgement of speed, speed adaptation, visual performance, judgement of spacing or overtaking cannot be learned as quickly as elementary control skills such as start, stop or propel the car (Evans, 2004). Lack of skills may lead to higher accident rates but higher levels of driving skills do not lower the accident risk (Evans, 2004). For example, in the study of Katila, Keskinen and Hatakka (1996), skid training was offered to drivers with anticipating and maneuvering exercises and results showed that these kind of skill developing exercises may lead to underestimation of the risk due to increase in self-confidence (Katila, Keskinen & Hatakka, 1996). Driving practice provides

learning opportunity to teens but they demonstrate driving skill deficits during the first several months of solo driving (Durbin et al., 2014). In this study, learner drivers who are at the beginning of their driver education is the target group so, it is hard to investigate the driving skills for them. Instead of the driver skills, driver behaviors are believed to give more specific and pure results.

1.1.2. Driver Behaviors/Styles: Errors, Violations and Positive Driver Behaviors

In a simple meaning driver behavior refers to what driver usually does (Evans, 2004). According to Reason et al. (1990), there are two categories of aberrant driving behavior which are errors and violations (Reason, Manstead, Stradling, Baxter & Campbell, 1990). Errors are defined as 'the failure of planned actions to achieve their intended consequences' while violations are described as 'deliberate deviations from those practices believed necessary to maintain the safe operation of potentially hazardous system (Reason et al., 1990). Although most of the attention is paid on errors and violations due to their likely contributions to road accidents, there are also slips and lapses. Slips are defined as externalized actions which are not as planned and lapses are more likely to memory failures (Reason et al., 1990). Running on the red light or speeding could be the example of violation, braking too abruptly could be identified as error, and missing the motorway exist could be described as lapse (Martinussen, Møller & Prato, 2014).

In the traffic safety literature, Driver Behavior Questionnaire (DBQ) is probably the most used self-report instrument due to its ability to predict accident involvement (Wåhlberg & Dorn, 2012). There are some divergent opinions about accident prediction of DBQ (Winter & Dodou, 2010) for example, positive correlation between errors and self-reported accidents were reported in the studies of Freeman et al. (2009) and Sümer (2003). A negative correlation between lapses and accidents were reported by Stephens and Groeger (2009). In the study of Özkan and Lajunen (2005) a correlation was found between ordinary violations and accidents, but Davey et al. reported insignificant correlations for highway

violations and accidents (Davey, Wishart, Freeman, & Watson, 2007). Not the errors but the violations were found to be predictors of accidents in the study of Stradling et al. (Stradling, Parker, Lajunen, Meadows, & Xie, 1998) while DeLucia et al. stated that not the violations but the errors are predictors of accidents (DeLucia, Bleckley, Meyer, & Bush, 2003).

Self-reported aberrant behaviors could be understood robustly by DBQ (Winter & Dodou, 2010). However, first aim of developing DBQ is not to establish connection between aberrant driver behavior and accident liability but to classified driver behaviors as errors, violations and slips and lapses (Reason et al., 1990). Five classes of aberrant driver behavior which are namely slips, lapses, mistakes, unintended violations and deliberate violations were selected in the first study of 50-item DBQ and three main categories were suggested as slips and lapses, mistakes and deliberate violations (Reason et al., 1990). DBQ with 27-item was extended by Lawton et al. via adding items on violation scale and split it as ordinary and aggressive violations (Lawton, Parker, Manstead & Stradling, 1997). However, even the 27-item DBQ was found to be too long and it was thought that long DBQ could lead increase in refusal rates of participants to the studies, or participants may leave out the questions partly or entirely or they may give biased or random answers (Martinussen, Lajunen, Møller, Özkan, 2013). Therefore, Martinussen et al. tested the fit of the 2 short versions of DBQ which are 9 and 12-item. Then, 9-item DBQ showed better fit so; they shortened DBQ into 9 items while 3 factor, which are errors, lapses and violations remain (Martinussen, Lajunen, Møller, Özkan, 2013).

Actually, all of the items of DBQ were designed to describe bad behaviors (Reason et al., 1990) and label of aberrant is valid for both errors and violations and extending traffic safety may require focusing on these negative behaviors (Öz, 2011). However, there are some behaviors in everday driving that cannot be classified as errors or violations (Özkan & Lajunen, 2005). These behaviors intent to take care other road users or help and be polite to them and traffic environments without safety concerns (Özkan & Lajunen, 2005). To be able to

identify these kinds of behaviors Özkan and Lajunen developed Positive Driver Behavior Scale in 2005. Analyses were administered on 38 items and 13 items were found to be in positive driver behavior factor with violations and errors (Özkan & Lajunen, 2005).

Later studies maintained in investigating the factor structures of DBQ (Lajunen, Parker & Summala, 2004; Lajunen & Özkan, 2004; Özkan, Lajunen, Chliaoutakis, Parker & Summala, 2006; Özkan, Lajunen & Summala, 2006; Warner, Özkan, Lajunen & Tzamalouka, 2011; Guého, Granié & Abric, 2014) In Finland and Netherlands DBQ was found to be four-factor structure with aggressive violations, ordinary violations, errors and lapses and it was also in congruent with British data (Lajunen, Parker & Summala, 2004). In the comparison of Finland, Great Britain, Greece, Iran, Netherlands and Turkey three-factor structure was found to be satisfactory which are ordinary violations, errors and aggressive violations (Özkan, Lajunen, Chliaoutakis, Parker & Summala, 2006). Another study measured time-across stability of different factor structures of DBQ and it was seen that most stable one was two-factor structure with errors and violations (Özkan, Lajunen & Summala, 2006). Two-factor structure with errors and violations was suggested to be more suitable for Finland, Sweden, Greece and Turkey by Warner, Özkan, Lajunen and Tzamalouka (2011). In France, six-factor solution was confirmed with inattention errors, ordinary violations, positive behaviors, aggressive violations, dangerous errors and in experience errors (Guého, Granié & Abric, 2014). In Turkey, errors, ordinary violations, lapses and aggressive violations were composed four-factor solution (Lajunen & Özkan, 2004).

There are a lot of aberrant driving behavior studies in the literature but learner driver behaviors were not investigated deeply in their learning process at all. Beside the driver behaviors and skills, attitudes of driver are also important in risky driving and accident involvement, so attitudes should be focused with behaviors and skills for deeper understanding of human contributions to road safety.

1.1.3. Driver Attitudes

Although there are some ambiguities, attitudes are considered as a person's degree of favorableness or unfavorableness toward a psychological object (Ajzen & Fishbein, 2000). Driver education and training are designed to teach the future driver knowledge, attitudes and skills which are necessary to road safety because especially acquisition of vehicle control skills and the attitudinal changes govern the desired driving style (Shinar, 2007). The importance of attitudes comes from their basis on drivers' tendencies to traffic violations and by this way prediction of accident involvement (Shinar, 2007).

The Theory of Planned Behavior (TBP) is proposed by Ajzen to explain behavior in a social context (Shinar, 2007). According to the TBP, people have full control on their behaviors and intentions help behaviors to be tracked (Ajzen, 1991). Intentions are assumed to be indicators of people's willingness to perform a behavior and they capture the motivational factors (Ajzen, 1991). Cognitive representation of readiness to perform a behavior is reflected by intentions and the stronger the intention, the more likely to perform the behavior (Ajzen, 1991). Attitudes, subjective norms and perceived behavioral control determine the intentions in TPB and in this context, subjective norms are defined as perceived social pressure to perform or not to perform a behavior and perceived behavioral control is perception of people about ease or difficulty of engaging any behavior (Conner et al., 2007). Behavior-specific attitudes instead of general attitudes are better at predicting actual behavior (Ajzen, & Fishbein, 2000) and driver attitudes could be interested in two main areas which are driving-specific attitudes and traffic climate attitudes.

1.1.3.1. Driving-specific Attitudes

The relationship between driving related attitudes like violations, speeding, careless driving, drinking and driving and behaviors were analyzed in some studies (Iversen, 2004; Ulleberg & Rundmo, 2003; Chen, 2009; Tronsmoen, 2010). Iversen suggested that there is a lack of study in traffic psychology about

safety attitudes, risky behaviors and predicting future behaviors from reported attitudes (Iversen, 2004). He measured attitudes toward violations and speeding, careless driving of others and drinking and driving. Risky driving was asked in terms of, violations of traffic rules and speeding, reckless driving, not using seat belts, cautious and watchful driving, drinking and driving, attentiveness towards children and driving below speed limits. Also, participants were asked to report involvement in collisions with only material damage as driver, passenger or pedestrian. Same questionnaires were repeated after a year and results showed that attitudes toward violations and speeding were the strongest predictor of behaviors. Moreover, attitudes toward careless driving of others and drinking and driving had a relationship with risky driving (Iversen, 2004). The critical point is that, reported positive attitudes toward rule violations and speeding at the first questionnaire, resulted with more risky driving at the second survey (Iversen, 2004). The average age was 45.5 in Iversen's study but Ulleberg and Rundmo conducted their study with people whose average age was 18.5. Ulleberg and Rundmo measured attitudes in three classifications which are traffic flow vs. rule obedience, speeding and fun riding (Ulleberg & Rundmo, 2003). Furthermore, behavior was measured in terms of speeding, rule violations and self-assertiveness. Actually, they also measured personality traits' effect on driver behaviors and according to the results; attitudes had the only direct effect on risky driving behavior (Ulleberg & Rundmo, 2003). Although attitudes and behaviors were measured simultaneously, which was criticized by Ulleberg and Rundmo, more positive attitudes toward traffic safety resulted with less risky driving behaviors (Ulleberg & Rundmo, 2003). Another direct association between attitudes toward safety and risky driving behaviors was found by Chen whose study was conducted with same safety attitude and behavioral scales with Ulleberg and Rundmo (2003) in motorcyclists (Chen, 2009). Tronsmoen (2010) measured attitudes in the same way with Iversen (2004) and behavior was measured as violations, mistakes, inattention errors and inexperience errors (Tronsmoen, 2010). In accordance with other studies, self-reported attitudes

toward driving were significantly associated with risky behaviors (Tronsmoen, 2010). In addition, people whose age ranged between 12 and 16 who have risky attitudes during pre-driving period are found to be engaged in risky behaviors in the future (Mann & Lansdown, 2009) and it should be noted that young drivers evaluate traffic rules more negatively than older drivers and this attitude contributes more commission of violations (Yagil, 1998).

1.1.3.1.1. Driving-specific Attitudes and Accident Risk

Despite there are a lot of studies which focus on driver attitudes and behaviors, the relationship between attitudes and accidents is uncertain (Assum, 1997). The possible contribution of age, gender and annual mileage should be taken into account for the relationship between attitudes and accident risk (Assum, 1997). The 56 items which were related with general attitudes toward traffic safety, speed, drinking and driving, other road users, responsibility, and characteristics of the driver was measured and after two years attitudes, accidents and number of kilometers driven were asked to same drivers in Assum's study. Results indicated that, age and annual mileage are more important than attitudes in accident risk. On the contrary, Iversen and Rundmo stated that attitudes are the most important predictors of behaviors even if age, gender and years holding a license were taken into equation and they criticized Assum's study in terms of psychometric qualities of attitude measurement instruments (Iversen & Rundmo, 2004).

All of these studies are focused on attitudes toward driving and traffic rules and these specific attitudes could be better at predicting behaviors. However, these attitudes may not be enough to be able to understand all parts of the drivers' perspective to all traffic system. Although there are wide range of studies about specific attitudes which are related to traffic rules and some behaviors, the number of studies about general traffic attitudes is really low. Therefore, drivers' way of understanding and evaluating the whole traffic system must be investigated. Examining the traffic climate attitudes could be useful path for this aim.

1.1.3.2. General Attitudes: Traffic Climate Attitudes

Driving is a complex process which is affected by contextual and environmental stimuli found both inside and the outside of the vehicle (Hennessy, 2011). Driver could be the central component of driving but, individual factors are expressed within a social exchange among drivers and other road users so, it is more than a mechanical operation (Hennessy, 2011). As a result of exposure and interaction with each other, drivers share formal rules which are applied by traffic polices, informal rules, values and norms in traffic (Özkan & Lajunen, 2011). Norms, values and mostly informal and formal rules are the center of traffic culture mechanism (Özkan & Lajunen, 2011). Description of traffic culture could be the sum of all factors that affect skills, attitude and behavior of drivers as well as equipment (Leviäkangas, 1998). Empirical measurement of traffic culture is hard because it overlaps with traffic climate (Özkan & Lajunen, 2011) and traffic climate could be defined as road users' attitudes and perceptions of the traffic of the context (Özkan & Lajunen, 2011). Studying concepts like traffic culture and traffic climate is an alternative approach for road safety (Gehlert, Hagemeister, & Özkan, 2014). Adaptation to the environment is facilitated via attitudes by organizing and interpreting new information or expressing central values and beliefs and in this sense, traffic safety climate could be treated as attitudes which help people to interpret traffic situations and/or interaction with other road users (Gehlert, Hagemeister, & Özkan, 2014). Traffic climate as attitudes is measured by Traffic Climate Scale (TCS) which was developed and tested by Özkan and Lajunen in the Turkish sample (unpublished(a)). In the first study with non-professional drivers, factors were separated as functionality, external-affective demands, internality, uncontrollability and competitiveness (Özkan & Lajunen, unpublished(a)). By applying scaling, it was found that these five factors are along with three components namely functionality, externality, and internality. In the second study there were bus and truck drivers with amateur drivers and results indicated that factors were functionality, externality, internality and competitiveness (Özkan & Lajunen, unpublished(a)). Also, number of total

accidents and passive accidents were predicted by functionality and internality negatively (Özkan & Lajunen, unpublished(a)). In the third study, driver behaviors were taken into account and it was found that aggressive violations are negatively associated with internality, ordinary violations were predicted negatively by internality and errors were predicted positively by functionality and externality and negatively with internality (Özkan & Lajunen, unpublished(b)). Relatively low level of explained variance of factors on driver behaviors should be noted which are 6% for aggressive violations, 12% for ordinary violations and %10 for errors (Özkan & Lajunen, unpublished(b)). TCS was also used in German sample which was formed by different road user groups like pedestrians, cyclists and car drivers and results indicated that three-factor structure was suitable with external-affective demands, internality and functionality (Gehlert, Hagemeister, & Özkan, 2014). External-affective demands described as emotional engagement required by road users when participating in traffic, internality was the part of successfully participation in traffic by focusing on road users' skills and abilities, lastly, functionality means, requirements of functional traffic system (Gehlert, Hagemeister, & Özkan, 2014). Red light running was measured as a driver behavior and number of accidents and/or near accidents were asked to participants. As a result, only a weak correlation was detected between traffic safety climate and accidents/near accidents. Road users who evaluate traffic more internality, found red light running less acceptable and they were unlikely to run in red light. Also, more functionality decreased red light running for all of the road users. However, more externality increased red light running for car drivers and decreased for pedestrians and relation could not found for cyclists (Gehlert, Hagemeister, & Özkan, 2014).

Exploring traffic climate attitudes with driving specific attitudes is believed to be better way for road safety literature than examining only one of them because becoming a driver is a process and attitudes are liable to change trough time and across being member of different road user groups over time.

1.1.3.3. Attitude Change: Pre-driving and Driving Periods

It is seen that attitudes has an important role in traffic safety literature. It is claimed that appropriate behavior could appear only if the attitudes could be changed (Lonero & Clinton, 2009). Mann and Lansdown (2009) tested the relationship between pre-driving attitudes, intentions and future driving behaviors. Information gathering was done in three different times because future driver was wanted to be measured. As an intervention, awareness campaign was used and results showed significant attitude change over 3-time sampling which means in 6-month period (Mann & Lansdown, 2009). Intentions to speed in the future, attitudes toward driving violations like speeding, not wearing seat belts and drink-driving decreased over the six months by an awareness campaign which was a DVD covered topics such as passenger behavior, importance of seat belt, drink-driving, using mobile phones, driving under influence of drugs and the consequences of car accidents (Mann & Lansdown, 2009). Having knowledge about future behaviors are related to pre-driving intentions and attitudes are important because interventions could be developed for pre-drivers to prevent them behave aberrantly (Mann, & Lansdown, 2009).

All in all, driver behaviors and attitudes seem very important for road safety in the literature. Some road users endanger road safety more than others or they could be more vulnerable to dangers in traffic system. Analyzing risk of accident involvement of certain groups of drivers is often the main interest of traffic safety research (Massie, Campbell, & Williams, 1995). Studies about driver behaviors and attitudes point young and novice drivers in most of them because of their vulnerability and threatening characteristics.

1.2. Young and Novice Drivers

Although some improvements have been reached in road safety problems lately, some of them seem more permanent than others. Higher accident involvement of young drivers is one of these problems (Elvik, 2010). Not only the accident rate but also the injury rate of young drivers is high (Elvik, 2010). A lot of reasons

could be listed for these higher rates but generally it can be said that being young ages brings the inexperience because nowadays people want to receive their driving license as soon as they are legally permitted (Shinar, 2007). Young drivers especially the novice ones are the most overrepresented group in the traffic accidents (Goldstein, 1972) due to immaturity and high risk taking behaviors and inexperience which leads inadequate driving skills (Shinar, 2007). Factors could be summed in two different captions which are inexperience related factors and immaturity.

1.2.1. Inexperience Related Factors

Most of the novice drivers are young and they get their driving licenses in their late teens (Derry, 1999). New drivers, especially young ones, involve in accidents highly (Mayhew & Simpson, 2002). Driving is a complex task which requires psychomotor, perceptual, and cognitive skills to be integrated (Williams & Ferguson, 2002) and novice drivers could learn vehicle control skills quickly but, they need more time to be able to have higher order cognitive skills in driving (Derry, 1999). Cognitive resources are consumed by a lot of new things for the novice driver which must be handled but with time most of these tasks become automated and requirements of cognitive resources decrease (Gregersen & Bjurulf, 1996).

Experience related factors play stronger role in the accident risk over the first years of driving (McKnight and McKnight, 2003). Also, from at least 17 years of age, experience has greater importance than age (Gregersen & Bjurulf, 1996).

Accident involvement of 140000 British, Columbia and Canada drivers was analyzed by Cooper et al. (1995). Accident times were separated as first, second and third year of licensure and novice drivers who were under 35 showed significantly more accidents in their first year when compared second and the third year (Cooper, Pinili, & Chen, 1995). Reasons of younger and inexperienced drivers' accidents could be listed as lack of visual search prior to left turns, not watching the car ahead, driving too fast for conditions and failure to adjust to wet

roads (McKnight and McKnight, 2003). Moreover, males are overrepresented accidents because of speed that unsafe for conditions, fatigue and alcohol while female are represented in inadequate search before left turns and before crossing intersections (McKnight and McKnight, 2003).

Driver's situation awareness for a dangerous configuration in the road is hazard perception (Underwood, Crundall, & Chapman, 2011) and it is one of the most critical skills for the accident problem of novice drivers (Derry, 1999). Inadequate information processing skills could be related with poor hazard perception for novice drivers, for example, it was found that novice drivers are less active in their visual search and they focused less critical items (Underwood, Chapman, Bowden, & Crundall, 2002). Experienced and older drivers are more sensitive towards the hazards on the road than young-inexperienced drivers because they do not have enough feedback from the environment with similar situations (Borowsky, Shinar, & Oron-Gilad, 2010). In addition, although potential hazards continuously exist in the traffic environment, young-inexperience drivers stop searching and rely on prominent events (Borowsky, Shinar, & Oron-Gilad, 2010).

Due to ineffective hazard detection skills, young drivers could underestimate the risk perception which refers to subjective experience of risk in potential traffic hazards (Derry, 1999). Perceiving low level of risk in potential hazards would likely be resulted with less cautious responds (Derry, 1999). Underestimating the risk could be arisen from poor estimating of the novice drivers' own ability (Gregersen & Bjurulf, 1996), which means drivers overestimate their driving skills (Derry, 1999). Young drivers are liable to regard themselves more skillful than experienced drivers (Gregersen, 1996). Drivers receive performance feedbacks mostly from other drivers because driving is a public activity (Roy & Liersch, 2013). Actually all drivers but especially young ones think that other drivers evaluate them as less skillful than their actual skill level because 'good driver' refers different meanings for different drivers (Roy & Liersch, 2013). Moreover, young male drivers consider themselves as more skilled than other

young and old drivers while old drivers consider themselves as equally skilled to other drivers but more skillful than young drivers (Matthews & Moran, 1986).

Lack of experience (Gregersen & Bjurulf, 1996), inefficient hazard detection (Derry, 1999) underestimation of risk (Gregersen & Bjurulf, 1996) and overestimation of skills (Gregersen, 1996), are some of the contributors which increase the likelihood of accident involvement for young drivers because risky driving behaviors arise with them. Risk taking behaviors of young novice drivers may be resulted from combination of their inexperience and relatively low levels of driving skills (Derry, 1999). Results of the study that was conducted in New Zealand indicated that, adolescents in year 12 of school (approximately age 16) were riskier than year 10 of school (approximately 14 age) in experience of being passenger of drinking driver, back seat belt wearing, knowledge about driving risk and reckless driving and in addition males found to be riskier than females (Harré, Brandt, & Dawe, 2000). Therefore, junior high-school years are suggested for the application of prevention from risky driving (Harré, Brandt, & Dawe, 2000).

1.2.2. Lack of maturity

Accident rates could vary in terms of maturity and experience which is defined by the amount of driving so; age is the critical point that affects the accident rate (McKnight and McKnight, 2003).

It is suggested that risk taking behaviors in adolescence is normative, biologically driven and partially inevitable (Steinberg, 2008). Between childhood and adolescence socio-emotional system changes and it leads increase in reward-seeking especially from the peers so risk-taking behaviors occur during this time (Steinberg, 2008). However, between adolescence and adulthood, cognitive control systems changes and self-regulation capacity increases, by this way risk-taking declines (Steinberg, 2008). Reward-seeking and self-regulation competence continues until middle of the twenties so risky and reckless behaviors of mid-adolescences are heightened during this time (Steinberg, 2008). Risk taking can be modulated even there is heightened arousal in the socio-emotional

system after cognitive control system matures (Steinberg, 2007). Sensation seeking and impulsivity have an important role in adolescence (Romer, 2010). According to Zuckerman, sensation seeking refers to a trait defined by the seeking of varied, novel, complex, and intense sensations and experiences and the willingness to take physical, social, legal, and financial risks for the sake of such experiences (Jonah, Thiessen, & Au-Yeung, 2001). In the review of Jonah, results showed positive correlation between sensation seeking and risky driving behaviors (Jonah, 1997). Moreover, college students who have higher sensation seeking scores found to be higher in speeds, they report low levels of seat belt wearing, they drink frequently, drive after drinking, perceive low risk for impaired driving, and perceive that they could drink more beer before being impaired (Jonah, Thiessen, & Au-Yeung, 2001).

In addition to age, experience, and skills, lifestyles contribute to young drivers' accident involvement (Gregersen, 1996). The general idea in lifestyle and driver behavior is that, the way drivers live, their interests, personal styles, morals and ideologies affect accident risk as much as perceptions and thoughts about traffic and driving (Chliaoutakis, Darviri, & Demakakos, 1999). Lifestyle is based on the young drivers' interests, leisure time activities and their relationship to driving behaviors (Møller, 2004). Lifestyle related with alcohol consumption is associated to high accident risk while religious life style related with low level of accident risk (Chliaoutakis, Darviri, & Demakakos, 1999). Also going theatre, listening jazz, classic and rock music, reading literature and watching social movies have association with low risk of accidents and lack of destination meaning destination which else from school, workplace or amusement place, has association with high risk of accidents (Chliaoutakis, Darviri, & Demakakos, 1999).

Teenagers must attend to school, they develop night-time social life, and often work at evenings or early mornings and these situations lead sleep deprivations for them. (Groeger, 2006). Lack of sleep affects young and inexperienced drivers more than the experienced ones because it includes decrease in information

process, sustained attention, and motor control, and increase in reaction times (Groeger, 2006).

Driver behaviors, skills and attitudes are needed to be developed in a safe manner for the beneficence of all the drivers. To be able to make young and novice drivers future safe drivers some guidance is necessary. This guidance is provided by licensing which includes driver education and training and it is counted as a countermeasure for reducing number of fatalities, serious injuries or material damages (Keskinen & Hernetkoski, 2011).

1.3. Driver Education and Training

The basic ability of driving is necessary to be able to drive and avoid accidents and knowledge, skill development and experience help this ability to develop (Shope, 2006). Rules of the road and the way how a vehicle works should be known by all new drivers and these knowledge is gained by driver education, training or behind the wheel learning (Shope, 2006). Furthermore, young novice drivers must learn some basic skills like, lane keeping and speed control and competence in these skills could be achieved through practice which takes place in driver education (Shope, 2006). Even if these knowledge and skills are gained, necessity of experience is inevitable for satisfying driving ability (Shope, 2006). Needed skills and capabilities are taught to novice drivers by parents, another licensed adult or professional instructors before they get their driving licenses (Mayhew & Simpson, 2002).

Driver education can be described as preparation of drivers who have intention to drive independently (Groeger, 2011). Making novice driver safer is the focus area of the driver education but its effectiveness is not proven with empirical findings because formal driver education is time limited and it emphasizes teaching key skills and capabilities instead of acquisition of situations that risky for young drivers (Mayhew & Simpson, 2002). The success of formal driver education in reducing collision risk has been subject to studies but they reveal very little positive findings (Mayhew, Simpson, Williams, & Ferguson, 1998). Also,

teaching key skills may not help safer drivers for example, Gregersen found that training for slippery roads lead overestimation of skills in young drivers although they do not make any difference in real skill levels (1996). Another skid training for slippery conditions which includes identification of causes lead to loss of control over vehicle, way of avoidance from these situations, and awareness of possible dangers involved in those conditions initiated that perceived risk increase after training, as compared to before the training (Rosenbloom, Shahar, Elharar, & Danino, 2008). However, intentions of speed choice, and thrill-seeking, and skill level perceptions become less safe after education (Helman, Kinnear, McKenna, Allsop, & Horswill, 2013).

Having a driver license as soon as possible is motivation of young drivers so they are not motivated for safety and teaching safe driving could be beyond reach of a driver instructor (Williams & Ferguson, 2004). Also, it is suggested that not the safe driving but the driving is taught, overconfidence is alerted by education and lifestyle problem of young drivers is not taken into account (Mayhew & Simpson, 2002).

Both of the quality and quantity of driver education are thought to be increase when professional driving instructors are coordinated with lay instructors but, providing materials to lay instructor, advising them about supervision of driving practice, giving general tips about driving safety especially for teenagers and emphasizing the importance of following the rules of licensing system are expected to driving education (Williams & Ferguson, 2004). However, there is not much evidence that classroom or individual education increase the driving knowledge and attitudes toward driving (Groeger, 2011).

There are empirical evidences for effect of driver education and training on road safety via overestimation of skills, perceived risk and intentions even if they are partially contradictory. However, there is little knowledge about attitude and behavior changes throughout pre-solo-driving phase and pre-driving period is very fruitful to develop interventions for later driving safety (Helman, Kinnear,

McKenna, Allsop, & Horswill, 2013) so learner drivers should be focused to see the changes in driver attitudes and their effects on driver behavior throughout driver education process.

Driver education and training systems could show differences between countries. Graduate Driving Licensing System (GDL) is used most of the countries like New Zealand, United States, Canada and Australia (Gulliver, Begg, Brookland, Ameratunga, & Langley, 2013). GDL is designed for allowing beginner drivers having driving experience under low risk conditions by addressing inexperience and immaturity problems of them (Hedlund, Shults, & Compton, 2003). Delaying access to a full or unrestricted license until driving experience has been gained is the way of GDL for addressing young and novice driver problem (Ferguson, 2003). Protective environment for the novice drivers is provide by lengthening the learning process with some restrictions and multi-stage construction of GDL attempts to safety of novice drivers (Vanlaar et al., 2009). GDL includes three parts which are learner's permit, provisional license and full license which means candidates should get through different license stages until they got their full licenses (Hedlund, Shults, & Compton, 2003). In the learner phase, candidates are only allowed to drive a car while supervised by a fully licensed driver after they passed vision and knowledge tests (Hedlund, Shults, & Compton, 2003). Also, even if there is a supervision of fully licensed driver, candidates are not allowed to drive a car before passing the learner license theory (Begg, Sullman, & Samaranayaka, 2012). Learner stage which lasts at least six-month is found to decline fatal accidents of 16 and 17-year-old drivers (Ehsani, Bingham, & Shope, 2013). In the provisional phase, candidates can drive the car unsupervised but some restrictions such as night driving, number and type of the passengers (Hedlund, Shults, & Compton, 2003). Night time restriction intends to reduce driving under low illumination, drink-driving and fatigue while passenger restriction aims to decrease the number of crashes which are resulted from influence of peers (McKnight, & Peck, 2003). Also, with the passenger restriction, a possible accident does not harm a lot of people (McKnight, & Peck, 2003).

Furthermore, when all of these stages are completed, the age of the learner drivers raise (McKnight, & Peck, 2003). All in all, long learning period, nighttime restriction and passenger restriction helps to reduction of accident rate (Williams, 2007).

The main difference between GDL and Turkish driver education system is that, unlike GDL, driver education and training system in Turkey gives permit to driver alone to newly licensed drivers after they complete their education. Therefore, it can be said that Turkish driver education system gives shorter time to learner drivers to be able to drive alone than GDL. New drivers might be pleased from this situation but it could be dangerous for all of the road users. Also, another difference should be kept in mind that, teenagers can start their driving education when they turn into 16 or 17 in some countries where GDL is used but Turkish teenagers must be 18-year old to be able to apply to a driving course. Therefore, in the literature, learners are candidates of full license who passed theoretical part of education and are allowed drive a car under supervision. In this study, concept of 'learner driver' is used for candidates who are having driver education theoretically and practically to be able to get a driver license. The difference is that, learners in this study become drivers immediately after learner stage. They do not have limitations like in the provisional stage in the GDL system. To provide better understanding of Turkish driver education and training system it will be explained in detailed below.

1.3.1. Driver Education and Training System in Turkey

Laws of the driver education system in Turkey were published in Official Journal which number is 28661 in 2013. The lowest legal age of getting a driver license is 17 in Turkey (for type A2 and H) and not only the legal age but also the process is different than most of the countries. First of all, candidates need register themselves to a driver license course. Before registration, they should go to a healthcare center and take a report that identifies their general health conditions which involves their blood type and especially the health condition of their eyes.

There are 8 different types of driver license in Turkey which are A1 for motorbike, A2 for motorcycle, B for automobile, minibus, and small truck, C for truck, D for tow truck, E for motorbus, F for tire wheel tractor, G for heavy construction equipment, and H for physically disabled people. Type H is divided as motorcycle and automobile. At the basic level all of them have similar education periods. Differences show up when candidates wants to change their driver license types but in this thesis all of the participants are learner drivers who register driving license course for the first time.

After registration is accomplished, driver candidates take 3 different classes, Traffic and Environment, Technical Issues of Vehicle, and First-aid. These theoretical classes last for 16, 6, and 8 hours respectively. According to the laws, driver candidates can take maximum 6 hours per day for these classes. It means, at least 5 working days are needed to be able to finish theoretical lessons. All of the candidates are responsible for attending classes. If they do not attend at least %20 of the lesson, they dismissed from course. Lessons last almost 2 weeks and after that candidates take a pilot written exam in their courses. Courses do not have to give pilot written exam and results do not affect anything for the candidates. Then, Ministry of Education gives the real written exam at the same time all over Turkey. Written exam gives an hour to candidates to answer 50 questions. Twenty one of the questions are from Traffic and Environment, 16 questions from Technical Issues of Vehicle and 13 questions from First-aid. Candidates have 2 points for each true answer. Results of the written exam are announced between 7 or 10 days. Candidates whose scores below the 70 over 100 fail and they wait for the following written exam, meanwhile they take lessons again with other group if they want or just study by themselves. If the candidates fail 5 written exams they start all over and have to register again to the course. They cannot have wheel practice until they pass the written exam.

Candidates who pass the written exam, determines their wheel practice times with an authorized person from the course. Driving practice aims making learner drivers gain skills like being able to do preparation for driving, having necessary

knowledge, skills and habits to drive a car, being able to obey traffic signs, drive the car safely under different road and environmental conditions and using the car economical (*Driver Education and New Drivers*, 2002). Type A1 and A2 should practice at least 10 hours and this practice time is 12 for type B, 24 for C and E, 30 for D, 10 for F, 10 for H(motorcycle), 12 for H(automobile) in traffic flow. Also, A1, A2, B, F and H types should practice at least 2 hours at nights and this duration is 4 hours for type C, D, and E. Daily practice time for each candidate is an hour. The important thing is that, candidates are not allowed to having practice in road open to traffic with their cars even if they have an adult person with them who has driving license. At the time that arranged by Ministry of Education, generally after a mount from the written exam, driving exam is done. Candidates drive the car one by one and commission that consists by 2 teachers evaluates candidates driving skills in terms of their observation forms. There are 3 different observation forms. One of them for type A1, one of them for type A2, and the last one for type B, C, D, E, F and H. Also, an inspectorate of schools is retained for observing the exam area by Ministry of Education stands in the critical points for example the place where driver candidates are asked for going backward. Driving courses should arrange their schedule according to the number of candidates and the number of their vehicles, because only 14 driver candidates could take driving exam in the same car in a day and Ministry of Education retains 2 teachers for 14 candidates. Moreover, 2 inspectorates of schools are retained for 4 driving courses. In the evening of driving exam day, results are announced as pass or fail. Driving course prepares files for successful candidates and asks for an appointment from Security General Directorate. Finally, candidates go Security General Directorate with their files and take their full driving license (see figure 1).

Turkish driver education system is being revised and practical part is going to change in January 2016 with candidate driver system (Official Journal 29329, 2015). This system states that, drivers who apply to driver license for the first time and drivers whose licenses were cancelled for some reasons would be the

candidate driver for two years. However, during these two years, if they violate traffic lights for three times, drive the car under influence of alcohol or drugs, have 100 points due to traffic punishments, violate the turning rules, do not give way to pedestrians on zebra crossing or students in front of the schools for three times and do not use protective tools like helmets or seat belts for three times their license will be cancelled and they will have to registered driving license course again. Although there is a change in practical part of the education process there is no any difference in theoretical part. By this change a stage would add to full driving license process and Turkish driver education and training system will be more likely to GDL. However, there is no distinctive law for experience level so, a driver candidate could be a full driver without driving car in two years.

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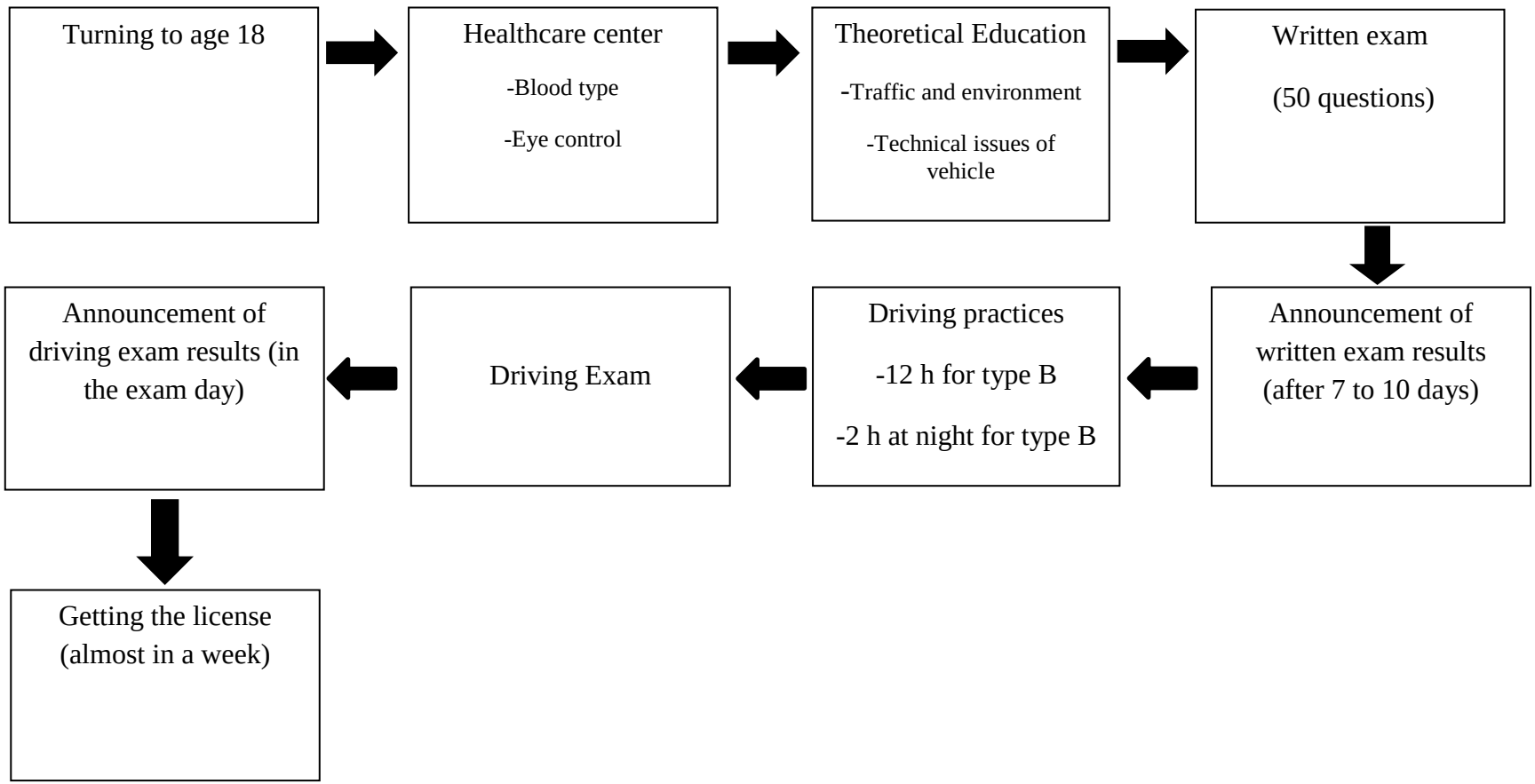

Figure 1. Driver Education System in Turkey

1.4. Learner Drivers Literature

It is seen that learner drivers and learner stage itself have critical importance. This critical role is interested in different ways. Generally, learner drivers' literature focuses on comparing learner drivers with restricted license drivers or experienced drivers, differences between female and male learners and behaviors after complete learner stage. There are both pre-posttest designs and simultaneous measurements.

For example, Gregersen studied with learner drivers for their overestimations to explain their accident involvement (1996). When different learner groups trained for slippery roads with different strategies, as skilled (making learners as skilled as possible in handling the car in critical situations) and as insight (making driver aware that their skills could be limited and unpredictable in critical situations), even if their actual level skill does not change, skill group learners see themselves more experienced and overestimate their skill levels (Gregersen, 1996). In the experience investigation of learner drivers, study demonstrated that, learner drivers do not get enough experience until near to the end of the learner stage due to lack of time pressure and they generally accrue very little experience for hazardous situation and night time driving (Harrison, 2004). Both feelings and emotions take part in risk appraisal and when skin responses used to measure learner, novice and experienced drivers' psycho-physiological responses toward driving hazards, experienced drivers produce skin response to developing hazards twice as novice drivers and three times than learner drivers (Kinnear, Kelly, Stradling, & Thomson, 2013). Moreover, experience of less than 1000 miles make novice drivers more likely to learner drivers in physiological hazard responses but after 1000 miles, responds become similar to experienced drivers (Kinnear, Kelly, Stradling, & Thomson, 2013).

Female and male learners show differences in both learning process and exams. Female learners spend more time in theoretical part of the education by studying for the written test and they use education book more than male learners (Nyberg

& Gregersen, 2007). Exam results of females are higher than males, female perform lay-instructed driving in daylight, on dry roads and dry weather while males perform under slippery roads, and males do not make skill practice more than females (Nyberg & Gregersen, 2007). All of the young novice drivers from learner and provisional stages who are ready to take advantages of risky driving but female young novice drivers report more harm to themselves and to other road users, in contrast male report more tangible cost like monetary fine (Scott-Parker, Watson, King, & Hyde, 2012). Furthermore, young learner drivers find using hands-free mobile phones when driving to be safer and they think their family members or friends support their usage of hands-free phone in the car but young male learners have significantly higher perceived behavioral control on phone usage than young female learners (Zhou, Wu, Rau, & Zhang, 2009).

Learner drivers aged 16 to 17 are immediate-uptake novice drivers and 18 to 19 are delayed-uptake novice drivers (Scott-Parker, Watson, King, & Hyde, 2013). Delayed-uptake drivers have longer learner duration, report more unsupervised driving and more avoidance of police in learner phase (Scott-Parker, Watson, King, & Hyde, 2013). Also, male novices from both groups report more unsupervised driving and avoidance of reports than female novices. In the learner phase female immediate-uptake drivers engage more risky behaviors than delayed-uptake drivers. Male immediate-uptake drivers report more driving misjudgment than male delayed-uptake (Scott-Parker, Watson, King, & Hyde, 2013). Learner drivers who report unsupervised driving 1–12 times are 80% more likely to be involved in accidents than learner drivers who never drive unsupervised and the accident risk is approximately doubled for learner drivers who drive with unsupervised 13 times or more (Langley, Begg, Samaranayaka, Brookland, & Weiss, 2013).

Pre-license drivers who start to drive a car without entering licensing system engage more risky driving as learner and provisional drivers (Scott-Parker, Watson, King, & Hyde, 2012). Also, male pre-license drivers engage more risky

driving than female pre-license drivers and pre-license driving could be sufficient predictor of risky driving (Scott-Parker, Watson, King, & Hyde, 2012).

Intentions regarding speed choice and thrill-seeking, and perception regarding skill level become riskier for learner drivers after they pass their practical exam when compared to their intentions and perceptions near the beginning of their learning (Helman, Kinnear, McKenna, Allsop, & Horswill, 2013). In contrast, intentions regarding following distance and overtaking tendency become safer and conspicuously attitude changes of female and male learners do not differ during learning period (Helman, Kinnear, McKenna, Allsop, & Horswill, 2013).

Increased time during learner driving phase is found to be associated with reduced accident risk in unsupervised restricted license stage and drivers who drive car unsupervised during learner stage are at heightened risk of accident involvement during restricted license stage (Gulliver, Begg, Brookland, Ameratunga, & Langley, 2013). In some countries like Netherland, Poland and United Kingdom, driver candidates are allowed to have their licenses in a short time with lessons which last all day long and learners who receive intense driving course report more incidents than drivers with education of traditional driving courses due to the lack of driving skills (Craen, & Vlakveld, 2013). However, although 16 and 17-year old novice drivers hold their learner permit longer than required 6-month and 18-year or older novices hold it less than 6-month, accident rate of 16 and 17-year old novices are higher than other age groups after they have license to drive unsupervised (Chapman, Masten, & Browning, 2014). Also, both inexperience-related violations like disobey traffic sign/signal or poor lane position and overconfidence-related violations such as exceeded maximum speed limit or unbelted driver/passenger peaks when the 16-17-year-old novices turn age 18 (Chapman, Masten, & Browning, 2014).

However, in Turkey there is lack of learner driver studies. There is a study which investigates the thoughts of new novice drivers about sufficiency of driver education, inadequate parts of driver education, evaluations about themselves in

terms of driving skills, and suggestions for better driver education system (Driver Education and New Drivers, 2002) but nothing related with learner drivers so; learner driver issue should be interested in Turkey.

1.5. Aims of the Study

First of all, investigating the attitude changes of Turkish learner drivers with a follow up study is the main aim of the present study. Also, investigating the driver education effect on attitude changes overtime and possible attitude effect on future driver behaviors are the objectives for this study. More specifically;

- Investigating the factor structures of MDAS, TCS and DBQ in learner drivers of Turkey for the first time.
- Investigating the differences in learner female and male among age, km/h during driving practices, number of accidents during driving practice, written exam scores, driving exam scores and factors of MDAS, TCS and DBQ.
- Testing the education level difference effect on written exam scores, driving exam scores, number of accidents during driving practice, and factors of MDAS, TCS and DBQ for learner drivers.
- Examining the driver education effect on drivers' pre and post attitudes toward driving and traffic.
- Investigation the prediction ability of pre and post attitudes on driver behaviors.
- Testing the prediction ability of written exam scores on driver behaviors, pre attitudes on written exam scores, driver behaviors on driving exam results and post attitudes on driving exam results.

CHAPTER II

METHOD

2.1. Participants

A total of 150 learner drivers participated in this study but 43 of them had a different time schedule for fulfilling time-1 and time-2 measurements. They have less time between their theoretical classes and driving exam so, they started their driving practices before they learn their written exam results. Therefore, some of these 43 participants had time-2 measurements even if they had failed in the written exam. There were 92 male learner drivers while there were 58 female participants. The mean age of 149 learner drivers was 25.26 (*SD* = 8.18). Twenty of the participants were graduated from elementary school, 22 from secondary school, 60 from high school, 12 participants had associate degree and 29 of them had undergraduate degree. For the safeness of further analyses, education levels of participants were grouped as elementary school, high school and college. By this way, sample sizes of the groups got closer to each other. All of the participants had been in a driving license course for the first time to have a driver license not because of changing the type of their licenses. Sixty two of the participants had driving experience, 73 of them did not have any experience and 13 of the reported that they know how to drive a car.

Time-2 measurements were not filled out the by 19 participants because of drop out or failure in the written exam. The average mileage was 105.11 (*SD* = 47.19) during the driving practices and most used vehicles by participants to practice themselves were automobile (N = 114), small lorry (N = 2), minibus (N= 1),

pickup track (N =1) and motorcycle (N =1). Only 2 participants stated that they had accidents during driving practices. One of them had 2 active accidents and the other one had an active accident. None of the participants had passive accidents. Only one of the participants got a ticket for parking. Also, the average preferred speed in the high ways was stated as 107.10 km/h (*SD* = 20.66) and 59.08 km/h (*SD* = 15.98) in the urban roads. Lastly, 117 participants stated that they overtake less than they are overtaken, 7 stated that they overtake as much as they are overtaken and 8 of them indicated that they overtake more than they are overtaken.

The average written exam score of 133 participants was 80.06 (*SD* = 11.08) and 8 participants stated that they failed in the written exam. These 8 participants did not have the driving exam, 93 of them pass at the first time, 20 participants failed at the first time but passed in the second exam, 2 of them failed in the first and the second exam but passed in the third exam, 7 participants failed and did not become successful until all of the data was collected for this study, 2 participants failed for 5 times so they had to repeat all of the lessons and practices. One of the participants missed the driving exam and results of 17 participants were not stated by the course because they refused to fulfill time-2 measurement.

Table 1.1 and table 1.2 provide information about descriptive statistics of both time-1 and time-2 measurements and new grouping of education levels could be seen in table 1.2.1

Table 1.1. Mean and Standard Deviation (SD) Values of Age, Average Mileage During Driving Practice, Preferred Average Speed Both Highway and Urban Way, Exam Score

	Mean	**SD**	**Min.**	**Max.**
Age	25.26	8.18	18	57
Mileage	105.11	47.19	10	320
Speed(highway)	107.10	20.66	30	150
Speed(urban way)	59.08	15.98	60	210
Written exam score	80,06	11,08	34	100

Table 1.2. Education Levels of Participants

Education Level	**N**	**%**
Elementary school	20	13.3
Secondary school	22	14.7
High school	60	40.0
Associate degree	12	8.0
Undergraduate degree	29	19.3

Table 1.2.1. New Grouping of Education Levels

Education Level	**N**	**%**
Elementary school	42	28.0
High school	60	40.0
College	41	27.3

2.2. Procedure

The present study was planned as pre-posttest design because main aim was investigating the effects of driving educating system of Turkey on learner drivers'

attitudes about traffic. When the attitudes and behaviors are measured simultaneously, in fact attitudes become a variable which is used for measuring past behavior and studies which measurement is done in two times use attitudes to be able to predict future behaviors (Iversen, 2004). Data were collected via questionnaires from the participants and exam results of participants were gathered from the driving course for the further analysis.

Data of this study was collected in a driving course at Çorlu for one and a half year. Çorlu is the county of the Tekirdağ and it is in the region of Marmara. It has a geopolitical importance because roads that between Europe and Asia are settled in Çorlu. According to nuncupative statements of Directorate General of Security, there are 71790 vehicles in Çorlu which consist from cars, tractors, buses, bowsers, motorcycles, ambulances, minibuses, trucks, small lorries, tow trucks and jeeps.

For data gathering people who register to driving course for the first time were asked directly to participate to study. Registrations which aims changing driving license type did not included because learner drivers were interested in the study. People who accepted to participate in the study were provided confidentiality and when they came to take their first lesson they were asked to fill the data sheets of time-1 in the canteen or classes of driving course. Participants were assured that there would not be any negative outcomes if they quit the experiment. Also, they were encouraged to asking questions about concepts that were unfamiliar to them. Pretest was consisted from Demographic Information Form, Manchester Driver Attitude Scale, and Traffic Climate Scale. After learner drivers filled their questionnaire they took their theoretical lessons and they had the written exam. Participants who passed the written exam starts their driving practice sessions. Posttest was given to participants at the end of the last driving practice or when they came to course to take their document to be able to have driving test. Different type of demographic information form, Driver Behavior Questionnaire, Manchester Driver Attitude Scale and Traffic Climate Scale comprised the posttest. Participants were asked to fill DBQ according to their experience during

the driving practice sessions. Some of the participants were given permission to fill their posttest at their home due to lack of time. Deadline for the posttest was the driving exam day. Participants who failed the written exam waited for posttests until they had right to take the driving exam. After this part, written and driving exam scores and attendance records of the participants were taken from the driving course. Informed content were given to the participants but most of them did not interested (see figure 2).

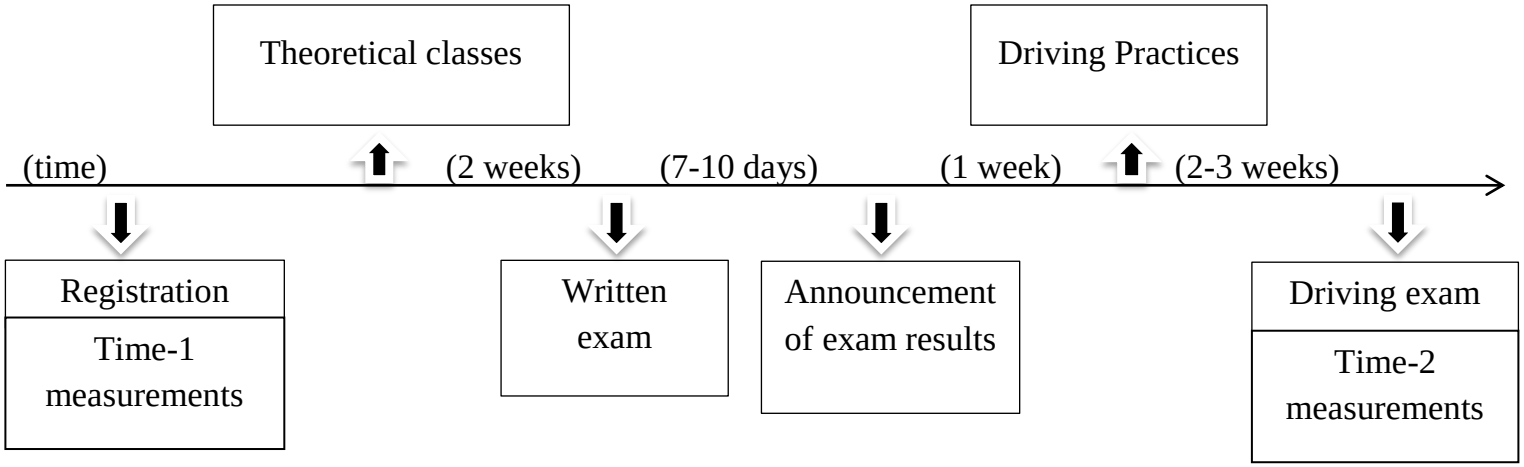

Figure 2. Timing Schedule of Driving Course and Data Collection

2.3. Measures

2.3.1. Demographic Information Form

Demographic information forms of pre and posttest were different from each other. Demographic information form of time 1 asked for age, sex, education level, and occupation of the participants. Also, aim of the registration to driving license course was asked as multiple choices. The question for this information was: 'your purpose of registration to course' and options were 'to get a driver license' and 'to change the type of the driver license'. However, authorized person from the course was informed about only the learner drivers will participated in the study so, people who came to driving course to change their driving license type had never seen the questionnaires. To be able to learn the driving experience levels of participants another question was added to demographic information form which was 'Did you do driving practice with someone before you register to driving course'. Moreover, participants were asked to report how many hours practice did they make in the average.

Demographic information form of posttest asked age and sex of the participant again to prevent possible complications. Also, average mileage, type of the most used vehicle, number of accidents, type of the accidents, number of penalties, and type of penalties were asked to be reported which were experienced during driving practice. The question related with accident number was 'within your driving practice session how many times did you have an accident as a driver including the slight collisions'. Definitions of active and passive accidents were explained in the next 2 questions as 'within your driving practice session how many times did you have an active accident (you hit a vehicle, pedestrian or an object) as a driver' and 'within your driving practice session how many times did you have a passive accident (you hit by another driver) as a driver'. After the accident related questions, traffic penalties were asked with multiple choices and the related question was 'how many times did you get the following penalties during your driving practice' and choices were 'parking, overtaking, speed

violation, red light violation, and other types of violations'. After that participants were asked report their choice of speed both urban and highway roads. These questions were 'under proper conditions, how many miles per hour do you prefer in the highways and urban roads' in order. At the last question, participants were asked to report their overtaking tendency. The related question was 'Compare yourself with other drivers in a normal condition travel. Do you overtake more than you are overtaken' and participants were asked to choose one of the sentences which were 'I overtake less than I am overtaken', 'I overtake as much as I am overtaken' and 'I overtake more than I am overtaken'.

2.3.2. Manchester Driver Attitude Scale

Manchester Driver Behavior Research Group developed Driver Attitude Scale (MDAS) to measure drivers' attitudes toward overtaking, tailgating, speed and drink driving. All of the 4 factors consisted from 5 items. Lajunen and Özkan translated MDAS in Turkish and it was seen that 5 items loaded in attitudes toward overtaking and tailgating factor (α = 0.75), 6 items loaded in attitudes toward speed limits (α = 0.71), 4 items loaded in attitudes toward structural applications (α = 0.56) and 5 items in attitudes toward drink-driving (α = 0.62) (2004). Participants were asked to evaluate 20 items on 5-point Likert-type scale both pre and posttest (1 = totally agree, 5 = totally disagree).

2.3.3. Traffic Safety Climate Scale

Traffic Climate Scale (TCS) was used to see whether driver education system affects participants' evaluations, perceptions or attitudes toward traffic climate. The scale was developed by Özkan and Lajunen (unpublished(a)) and it consisted of adjectives and statements about characteristics of traffic like time-consuming, dangerous, safe ext. Participants were asked to state in what degree each item describes the traffic on a 6-point Likert-type both pre and posttest (1 = does not describe at all, 6 = describes it fully). In the original study of TCS there are 41 items with four factors as externality with 12 items (α = 0.84), functionality with 12 items (α = 0.79), internality with 10 items (α = .80), and competitiveness with

7 items (α = 0.73) but in this study 44 items were used and the 3-factor structure with functionality, internality and externality seems more robust (Gehlert, Hagemeister, & Özkan, 2014).

2.3.4. Driver Behavior Questionnaire Scale

Driver Behavior Questionnaire (DBQ) was used to measure aberrant driver behavior of participants. Reason, Manstead, Stradling, Baxter and Campbell developed DBQ in 1990. Errors, ordinary violations, slips and lapses, and aggressive violations, were included in DBQ. In the Turkish sample 9 items loaded on errors (α = 0.81), 10 items loaded on ordinary violations (α = 0.86), 5 items loaded on slips and lapses (α = 0.56) and 3 items loaded on aggressive violations (α = 0.71) (Lajunen & Özkan, 2004). DBQ was adapted to Turkish for non-professional drivers by Lajunen and Özkan (2004). Positive Driver Behavior Scale (Özkan & Lajunen, 2005) was also used with DBQ to measure driver behaviors which conducted with positive intention because there are some behaviors which are observed in the traffic and not related with any traffic code or safety rules. Participants of this study were not able to drive unless it was their time to driving practice. Therefore, all of the 42 questions were asked as "how often you commit these behaviors during your driving practice session". Each item was asked to be evaluated on a 6-point Likert-type scale only in posttest (1 = never, 6 = always).

2.4. Statistical Analysis

In the further analysis, factor analysis will be conducted for Manchester Driver Attitude Scale (MDAS), Traffic Safety Climate (TSC) and Driver Behavior Questionnaire (DBQ). These scales, especially DBQ, were used so many times in samples which comprised novice, experienced or professional drivers. However, there is not many studies with learner drivers in the literature with these scales so; factor structure could be very different for the ones who did not have education and practice about driving. To be able to see possible differences or similarities

before and after the training factor analysis of MDAS and TSC will be done separately for time-1 and time-2 measurements.

After factor analysis, correlations between studied variables will be analyzed. Then, differences between female and male will be searched in terms of age, km/h during driving practices, number of active accidents, written exam scores, factors of MDAS, TCS, DBQ and results of driving exam. Also, education level groups will be compared with each other in written exam scores, number of active accidents during driving practices and factors of MDAS, TCS, DBQ and results of driving exam.

In order to see the possible education effect on driver attitudes, paired sample t-test will be conducted between both factors and items of MDAS and TCS after correlation analysis.

Lastly, hierarchical regressions will be used to see the relationships between attitudes and behaviors, exam scores and behaviors, attitudes and written exam scores, behaviors and driving exam results, and finally attitudes and driving exam results.

CHAPTER III

RESULTS

3.1. Factor Structure of Manchester Driver Attitude Scale (MDAS), Traffic Climate Scale (TCS) and Driver Behavior Questionnaire (DBQ)

3.1.1. Factor Structure of MDAS in Time-1 Measurements

First of all, the factorability of the 20 MDAS items was examined for time-1 measurements. Kaiser-Meyer-Olkin measure of sampling adequacy was .73, above the recommended value of .60. Factor analysis without rotation was conducted for items of Manchester Driver Attitude Scale. Principle axis factoring analysis showed that there were 7 factors but 2 of them had eigenvalues more than 1. Scree plot showed that there were 3 factors so items were extracted as 3 factors and varimax rotation was applied. Factor loadings lower than .30 was suppressed to detect reliable loadings. Principle axis factoring with varimax rotation showed that explained variance was 28.33. However, only 2 items loaded on only third factor and their factor loadings were .53 and .38. First item was related with drink-driving and the other one was related with tailgating. Also, 4 items did not load any of the factors and 2 items loaded more than 1 factor. Therefore, analyses were repeated with same method but items were extracted as 2 factors to be able to have more interpretable results. In two-factor solution, results showed that explained variance was 24.33%. First factor included 9 items which accounting for 16.29% and range of factor loadings was between .74 and .31. Cronbach α = .78, and it was named as "safety-oriented attitudes". Second factor included 8 items which accounted for 8.03% and loading scores were between .55 and .33.

Cronbach α = .63, and it was named as "risky-oriented attitudes". None of the items loaded more than one factor and 3 items, item1 'Some people can drive perfectly safely after drinking three or four pints of beer', item 3 'I would welcome further use of double white lines to let me know when it is unsafe to overtake', and item 4 'Speed limits are often set too low, with the result that many drivers ignore them' did not load on any factor so they were not used in further analyses. According to results, item of MDAS were separated into 2 factors. Internal consistency coefficients of factors were acceptable and item loadings were high (see Table 2.1)

Table 2.1. Mean and Standard Deviation for 20 MDAS Items and the Two-factor Solution with Varimax Rotation (Time-1 Measurements)

Items	**Mean(SD)**	**Factor 1[a]**	**Factor 2**
17. Stricter enforcemalet of speed limits on 50 mph roads would be effective in reducing the occurrence of road accidents	3.87 (1.14)	.74	
18. Even driving slightly too close to the car in front makes you less safe as a driver	3.65 (1.12)	.70	
14. Even driving slightly faster than the speed limit makes you less safe as a driver	3.51 (1.24)	.59	
10. Even one drink makes you drive less safely	3.71 (1.48)	.54	
11. I would favour stricter enforcemalet of the speed limit on 50 mph roads	3.76 (1.31)	.54	
20. The law should be changed so that drivers aren't allowed to drink any alcohol	3.61(1.50)	.53	
16. I would be happier if close following regulations were more strictly applied	3.55 (1.26)	.52	
13. The aim of the police should be to stop as many people as possible overtaking in risky circumstances	3.23 (1.29)	.43	
5. I think the police should start breathalysing a lot more drivers around pub closing times	3.91 (1.48)	.31	
12. Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front	3.72 (1.17)		.55
9. Some drivers can be perfectly safe overtaking in situations which would be risky for others	3.87 (1.18)		.54
7. Close following isn't really a serious problem at the momalet	3.87 (1.18)		.43
6. It is quite acceptable to take a slight risk when overtaking	3.72 (1.22)		.41
Eigenvalues		3.26	1.60
Percent of explained variance		16.29%	8.03%
Reliability		.78	.63

Table 2.1. (continued)

Items	Mean(SD)	Factor 1[a]	Factor 2
19. I think it is O.K. to overtake in risky circumstances as long as you drive within your own capabilities	3.66 (1.29)		.40
2. People stopped by the police for close following are unlucky because lots of people do it	3.53 (1.32)		.37
15. It's hard to have a good time if everyone else is drinking but you have to limit yourself because you're driving	3.64 (1.38)		.34
8. I know exactly how fast I can drive and still drive safely	3.10 (1.19)		.33
1. Some people can drive perfectly safely after drinking three or four pints of beer*	4.60 (.87)		
3. I would welcome further use of double white lines to let me know when it is unsafe to overtake*	2.82 (1.46)		
4. Speed limits are often set too low, with the result that many drivers ignore them*	2.57 (1.23)		
Eigenvalues		3.26	1.60
Percent of explained variance		16.29%	8.03%
Reliability		.78	.63

Note. Factor loadings < .3 are suppressed. [a] Factor labels. Factor 1= Safety-oriented attitudes, Factor 2= Risky-oriented attitudes. * Dropped items which did not load on any of the factors and were excluded in further analyses.

3.1.2. Factor Structure of MDAS in Time-2 Measurements

Factor analysis without rotation was conducted for items of Driver Attitude Scale (MDAS) in time-2 measurements. Kaiser-Meyer-Olkin test showed that items were factorable (.78). In the principle axis factoring analysis, scree plot showed that there were 3 factors but 2 of them had eigenvalues more than 1, and explained variance was 48.27. Therefore, parallel analysis was applied with varimax rotation and items were considered and extracted as 2 factors. Two-factor solution explained 32.53% of variance. To be able to have clear results .30 was detected as cut-off point for item loading values.

Results indicated that first axis which was named as “safety-oriented attitudes” explained 19.80% of the variance and defined by 10 items. Loading scores of factor 1 changed between .78 and .31, Cronbach α = .74.

Second axis “risky-oriented attitudes” explained 12.71% of variance. 7 items loaded on risky-oriented attitudes and range of factor loadings was between .65 and .46. Cronbach α = .79 (see Table 2.2).

There are some differences between time-1 and time-2 measurements factor analysis of MDAS. For example, item 4 ‘Speed limits are often set too low, with the result that many drivers ignore them’ loaded on safety-oriented attitudes in time-2 measurements when it did not load any of the factors in the time-1 measurements. Item 1 ‘Some people can drive perfectly safely after drinking three or four pints of beer’ loaded on risky-oriented attitudes in time-2 measurements while it did not load any of the factors in time-1 measurements. Item 8 ‘I know exactly how fast I can drive and still drive safely’ and item 15 ‘It's hard to have a good time if everyone else is drinking but you have to limit yourself because you're driving’ did not load on any of the factors when they loaded on risky-oriented attitudes in time-1 measurements. In a harmony with time-1 measurements, item 3 ‘I would welcome further use of double white lines to let me know when it is unsafe to overtake’ did not load any of the factors again. Therefore, item 3, 8 and 15 in time-2 measurements were excluded from the study.

Table 2.2. Mean and Standard Deviation for 20 MDAS Items and the Two-factor Solution with Varimax Rotation (Time-2 Measurements)

Items	Mean(SD)	Factor 1[a]	Factor 2
17. Stricter enforcemalet of speed limits on 50 mph roads would be effective in reducing the occurrence of road accidents	3.92 (1.15)	.78	
18. Even driving slightly too close to the car in front makes you less safe as a driver	3.58 (1.12)	.71	
11. I would favour stricter enforcemalet of the speed limit on 50 mph roads	4.17 (1.07)	.66	
5. I think the police should start breathalysing a lot more drivers around pub closing times	4.06 (1.24)	.63	
14. Even driving slightly faster than the speed limit makes you less safe as a driver	3.44 (1.20)	.59	
16. I would be happier if close following regulations were more strictly applied	3.58 (1.09)	.58	
10. Even one drink makes you drive less safely	3.92 (1.28)	.54	
20. The law should be changed so that drivers aren't allowed to drink any alcohol	3.66 (1.39)	.51	
4. Speed limits are often set too low, with the result that many drivers ignore them	2.83 (1.25)	-.46	
13. The aim of the police should be to stop as many people as possible overtaking in risky circumstances	3.20 (1.17)	.31	
3. I would welcome further use of double white lines to let me know when it is unsafe to overtake*	2.47 (1.26)		
6. It is quite acceptable to take a slight risk when overtaking	3.80 (1.21)		.65
19. I think it is O.K. to overtake in risky circumstances as long as you drive within your own capabilities	3.86 (1.24)		.64
9. Some drivers can be perfectly safe overtaking in situations which would be risky for others	3.85 (1.25)		.62
12. Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front	3.95 (1.04)		.60
1. Some people can drive perfectly safely after drinking three or four pints of beer	4.57 (.87)		.57
7. Close following isn't really a serious problem at the momalet	4.14 (1.12)		.55
2. People stopped by the police for close following are unlucky because lots of people do it	3.64 (1.25)		.46
8. I know exactly how fast I can drive and still drive safely *	3.32 (1.15)		
15. It's hard to have a good time if everyone else is drinking but you have to limit yourself because you're driving*	3.55 (1.32)		
Eigenvalues		3.96	2.54
Percent of explained variance		19.80%	12.71%
Reliability		.74	.78

Note. Factor loadings < .3 are suppressed. [a] Factor labels. Factor 1= Safety-oriented attitudes, Factor 2= Risky-oriented attitudes. * Dropped items which did not load on any of the factors and were excluded in further analyses.

3.1.3. Factor Structure of (TCS) in Time-1 Measurements

In order to explore the factorial structure of TCS, principle axis factoring analysis with varimax rotation was conducted for all of the 44 items. The scree plot suggested four-factor solution although there were five-axis with eigenvalues more than 1. Therefore, items were extracted as 4 factors. Kaiser-Meyer-Olkin measure of sampling adequacy was .77, above the recommended value of .60. Factor loadings lower than .30 was suppressed to get clear results. Principle axis factoring with varimax rotation showed that explained variance was 38.54. %. Three of the items, 27 'Including deterring rules', 8 'Monotonous' and 14 'Requiring quickness' did not load any of the factors and results were not easily interpretable. Therefore, TCS was extracted as 3 factors. In three-factor solution item 14 and 27 did not load any of the factors again and they were excluded from the further analyses. The factors were interpreted in line with the original scale (Özkan & Lajunen, unpublished(a)).

First factor 'Internality' included 20 items which accounting for 17.98% and range of factor loadings were between .72 and .34 Cronbach α = .89. There were 5 cross loading items in this factor. Item 7 'Stressful' negatively loaded on factor 2, item 41 'Requiring knowledge of traffic rules' loaded both factor 2 positively and factor 3 negatively , item 36 'Annoying' loaded on factor 2 negatively and factor 3 positively, item 29 'Chaotic' loaded on factor 3 and lastly item 42 'Directing your behaviours' loaded on factor 2. Item 36 and 42 had very close loading values which lower than .02 so they were dropped from the study.

Second factor 'Functionality' included 9 items and explained 12.21% of variance. Factor loadings ranged from .75 to .37. Cronbach α = .86. Only 2 items were cross loadings. Item 26 'Directed to compensate the things that happened' loaded on factor 3 and item 15 'requiring you to obey traffic rules' loaded on factor 1. Item 26 and 15 were excluded because their loading values were very close between the factors.

Third factor ‘External-affective demands’ was determined by 8 items which accounting for 5.33% of the variance. Factor loadings were between .65 and .31. Cronbach α = .69. There was only one cross loading item. Item 25 ‘Putting pressure on you’ loaded on factor 2 negatively and it was decided to drop it due to lack of clear separation between factors (see Table 2.3).

Table 2.3. Mean and Standart Deviation of 44 TSC Items and the Three-factor Solution with Varimax Rotation (Time-1 Measurements)

Items	**Mean(SD)**	**Factor 1[a]**	**Factor 2**	**Factor 3**
28. Risky	4.43(1.55)	.72		
30. Requiring patience	5.04 (1.12)	.64		
12. Requiring cautiousness	5.33 (1.15)	.63		
32. Requiring vigilance	5.11 (1.25)	.62		
3. Complicated	4.37 (1.53)	.61		
1. Dangerous	4.35 (1.51)	.61		
19. Causing tension	4.64 (1.47)	.59		
33. Requiring skilfulness	5.19 (1.11)	.59		
10. Requiring you on the alert	4.81 (1.55)	.57		
13. Requiring experience	5.18 (1.28)	.57		
44. Dense	4.90 (1.29)	.55		
43. Unpredictable	4.33 (1.62)	.54		
7. Stressful	4.70 (1.46)	.53	-.31	
41. Requiring knowledge of traffic rules	5.03 (1.38)	.52	.37	-.30
18. Mobile	4.38 (1.41)	.50		
4. Aggressive	4.22 (1.74)	.50		
31. Making irritated	4.19 (1.54)	.45		
36. Annoying *	3.81 (1.79)	.43	-.41	.41
29. Chaotic	3.68 (1.56)	.41		.36
42. Directing your behaviours *	4.22 (1.41)	.39	.37	
2. Dynamic	3.69 (1.46)	.36		
6. Fast	4.19 (1.64)	.34		
14. Requiring quickness *	4.20 (1.67)			
24. Planned	3.56 (1.49)		.75	
Eigenvalues		7.90	5.37	2.34
Percent of explained variance		17.97%	12.21%	5.33%
Reliability		.89	.86	.69

Table 2.3. (continued)

Items	Mean(SD)	Factor 1[a]	Factor 2	Factor 3
38. Safe	3.42 (1.62)		.72	
39. Functional	3.64 (1.48)		.67	
21. Under enforcement	3.99 (1.47)		.66	
22. Travel easily from place to place	4.01 (1.67)		.63	
40. Free flowing	3.65 (1.48)		.60	
23. Dependent on mutual consideration	3.53 (1.68)		.59	
37. Egalitarian	3.09 (1.65)		.58	
20. Including preventive measures	4.16 (1.53)		.55	
26. Directed to compensate the things that happened *	3.09 (1.43)		.38	.35
15. Requiring you to obey traffic rules *	5.13 (1.27)	.37	.37	
27. Including deterring rules *	3.14 (1.57)			
9. Depends on luck	3.39 (1.75)			.65
17. Giving a feeling that you are worthless	3.07 (1.74)			.59
16. What you done becomes a benefit to you	3.10 (1.77)			.50
11. Depends on fate	3.04 (1.83)			.45
5. Exciting	3.57 (1.65)			.40
25. Putting pressure on you *	3.57 (1.63)		-.36	.39
35. Time consuming	3.73 (1.69)			.38
8. Monotonous	3.05 (1.68)			.34
34. Harmonious	3.57 (1.48)			.31
Eigenvalues		7.90	5.37	2.34
Percent of explained variance		17.97%	12.21%	5.33%
Reliability		.89	.86	.69

Note. Factor loadings < .3 are suppressed. [a] Factor labels. Factor 1= Internality, Factor 2= Functionality, Factor 3= External-Affective Demands. * Dropped items

3.1.4. Factor Structure of Traffic Climate Scale (TCS) in Time-2 Measurements

A principle axis factoring analysis with Varimax rotation was carried out to analyze the factor structure of 44 TCS items. Kaiser-Meyer-Olkin measure of sampling adequacy was .83 so items were factorable. In the first step, there were 6 axes which had eigenvalues more than 1 and according to the results of scree plot test four-factor solution is the best for TCS. However, three-factor structure was more interpretable so, in the second step items were extracted as 3 factors and factor loadings lower than .30 was suppressed to get more interpretable results. Three-factor accounted for 41.93% of variance. Only the 5th item did not load any of the factors and were not used in the further analyses.

First axis 'Internality' included 23 items which accounting for 24.81% and range of factor loadings were between .81 and .43. Cronbach α = .94. There were 7 cross loading items. Item 41 'Requiring knowledge of traffic rules' loaded on factor 2. Item 19 'Causing tension', item 4 'Aggressive', Item 25 'Putting pressure on you, item 29 'Chaotic' and item 43 'Unpredictable' loaded on factor 3. Lastly, item 36 'Annoying' loaded on factor 2 negatively and on factor 3 positively and it was excluded from the study due to lack of clear loading values.

Second axis 'Functionality' included 13 items and explained 12.30% of variance. Factor loadings ranged from .73 to .31. Cronbach α = .85. Only item 42 'Directing your behaviours' loaded on first axis.

Third factor 'External-affective demands' was determined by 6 items which accounting for 4.80% of the variance. Factor loadings were between .71 and .35. Cronbach α = .72. Item 35 'Time consuming' loaded on factor 1(see Table 2.4).

Table 2.4. Mean and Standart Deviation of 44 TSC Items and the Three-factor Solution with Varimax Rotation (Time-2 Measurements)

Items	**Mean(SD)**	**Factor 1[a]**	**Factor 2**	**Factor 3**
10. Requiring you on the alert	4.98 (1.51)	.81		
12. Requiring cautiousness	5.20 (1.32)	78		
28. Risky	4.60 (1.45)	.76		
30. Requiring patience	4.99 (1.23)	.74		
13. Requiring experience	5.09 (1.35)	.73		
32. Requiring vigilance	4.91 (1.42)	.72		
7. Stressful	4.67 (1.47)	.69		
19. Causing tension	4.69 (1.45)	.65		.34
1. Dangerous	4.55 (1.47)	.64		
14. Requiring quickness	4.74 (1.53)	.63		
33. Requiring skilfulness	5.11 (1.28)	.63		
15. Requiring you to obey traffic rules	5.17 (1.21)	.62		
3. Complicated	4.45 (1.50)	.60		
31. Making irritated	4.26 (1.55)	.59		
4. Aggressive	4.52 (1.44)	.57		.33
44. Dense	4.94 (1.27)	.56		
41. Requiring knowledge of traffic rules	5.08 (1.38)	.55	.34	
25. Putting pressure on you	3.86 (1.57)	.55		.35
18. Mobile	4.46 (1.38)	.53		
29. Chaotic	4.05 (1.38)	.50		.36
6. Fast	4.32 (1.51)	.50		
36. Annoying *	4.19 (1.68)	.44	-.40	.40
43. Unpredictable	4.34 (1.57)	.43		.36
2. Dynamic	4.14 (1.38)	.43		
38. Safe	3.18 (1.45)		.73	
21. Under enforcement	3.89 (1.41)		.68	
Eigenvalues		10.91	5.41	2.11
Percent of explained variance		24.81%	12.30%	4.80%
Reliability		.94	.85	.72

Table 2.4. (continued)

Items	Mean(SD)	Factor 1[a]	Factor 2	Factor 3
40. Free flowing	3.55 (1.39)		.67	
23. Dependent on mutual consideration	3.10 (1.55)		.64	
20. Including preventive measures	3.87 (1.49)		.63	
24. Plannned	3.45 (1.45)		.63	
39. Functional	346 (1.35)		.62	
22. Travel easily from place to place	3.81 (1.65)		.59	
37. Egalitarian	3.19 (1.51)		.51	
42. Directing your behaviours	4.49 (1.27)	.30	.41	
34. Harmonious	3.48 (1.47)		.39	
27. Including deterring rules	3.17 (1.46)		.35	
26. Directed to compensate the things that happened	2.92 (1.42)		.31	
9. Depends on luck	3.20 (1.66)			.71
11. Depends on fate	3.09 (1.71)			.71
16. What you done becomes a benefit to you	2.95 (1.79)			.57
17. Giving a feeling that you are worthless	2.90 (1.54)			.57
35. Time consuming	3.96 (1.66)	.33		.46
8. Monotonous	3.19 (1.48)			.35
5. Exciting*	3.69 (1.51)			
Eigenvalues		10.91	5.41	2.11
Percent of explained variance		24.81%	12.30%	4.80%
Reliability		.94	.85	.72

Note. Factor loadings < .3 are suppressed. [a] Factor labels. Factor 1= Internality, Factor 2= Functionality, Factor 3= External-Affective Demands. * Dropped items

3.1.5. Factor Structure of DBQ

Factor analysis was conducted for 42 items of DBQ with Positive Driver Behavior Scale. Kaiser-Meyer-Olkin measure showed that items were factorable because sampling adequacy was .86, above the recommended value of .60. Principle axis factor analysis with Varimax rotation resulted with 6 axes which had eigenvalues more than 1. However, scree plot suggested three-factor solution to be the most

interpretable one. Therefore, items were extracted as 3 factor and factor loadings lower than .30 was suppressed to get more interpretable results. Three factors explained 46.35% of variance. Item 8 was excluded from the further analysis because it did not load on any of the factors.

The first axis 'Error' had 14 items and accounted for 28.86% of variance. (Cronbach α = .93). Factor loadings were between .76 and .38. Item 16 'Attempt to overtake someone that you hadn't noticed to be signalling a right turn', item 26 'Realise that you have no clear recollection of the road along which you have just been travelling', item 10 'Pull out of a junction so far that the driver with right of way has to stop and let you out', item 14 'Miss "Give Way" signs, and narrowly avoid colliding with traffic having right of way', item 13 'On turning left, nearly hit a cyclist who has come up on your inside', item 28 'Disregard the speed limit on a motorway', item 7 'Sound your horn to indicate your annoyance to another road user', and item 25 'Become angered by a certain type of driver and indicate your hostility by whatever means you can' also loaded on second axis named 'violations'. Item 28 and 7 had small differences between their loading values so they were excluded from the study.

The second axis 'Violation' included 10 items which explained 13.25% of variance. (Cronbach α = .91). The range of factor loadings was .80 to .37. Item 22 'Misread the signs and exit from a roundabout on the wrong road', item 23 'Drive so close to the car in front that it would be difficult to stop in an emergency', item 19 'Forget where you left your car in a car park', item 11 'Disregard the speed limit on a residential road' , item 17 'Become angered by another driver and give chase with the intention of giving him/her a piece of your mind', and item 20 'Overtake a slow driver on the inside' loaded on 'error' positively while item 9 'Brake too quickly on a slippery road, or steer the wrong way in a skid' loaded on the third axis negatively. Item 17 were excluded from the study due to lack of clear loading value.

The third axis 'Positive driver behavior' had 14 items and explained 4.24 % of variance. (Cronbach α = .89). None of the items had cross loadings and factor loadings changed between .79 and 30. (see Table 2.5)

Table 2.5. Mean and Standart Deviation of 42 DBQ Items and the Three-factor Solution with Varimax Rotation

Items	**Mean(SD)**	**Factor 1[a]**	**Factor 2**	**Factor 3**
27.Underestimate the speed on an oncoming vehicle when overtaking	1.61 (.91)	.76		
6. Fail to notice that pedestrians are crossing when turning into a side street from a main road	1.39 (.69)	.72		
2. Intending to drive to destination A, you "wake up" to find yourself on the road to destination B, perhaps because the latter is your more usual destination	1.52 (.83)	.70		
16. Attempt to overtake someone that you hadn't noticed to be signalling a right turn	1.39 (.87)	.69	.42	
5. Queuing to turn left onto a main road, you pay such close attention to the main stream of traffic that you nearly hit the car in front	1.48 (.76)	.67		
12. Switch on one thing, such as the headlights, when you meant to switch on something else, such as the wipers	1.58 (.95)	.66		
26. Realise that you have no clear recollection of the road along which you have just been travelling	1.73 (.98)	.63	.36	
1. Hit something when reversing that you had not previously seen	1.53 (.89)	.62		
4. Get into the wrong lane approaching a roundabout or a junction	1.34 (.84)	.60		
15. Attempt to drive away from the traffic lights in third gear	1.67 (1.03)	.59		
10. Pull out of a junction so far that the driver with right of way has to stop and let you out	1.32 (.79)	.58	.46	
14. Miss "Give Way" signs, and narrowly avoid colliding with traffic having right of way	1.27 (.69)	.57	.41	
13. On turning left, nearly hit a cyclist who has come up on your inside	1.33 (.75)	.54	.45	
28. Disregard the speed limit on a motorway *	1.52 (1.07)	.45	.44	
7. Sound your horn to indicate your annoyance to another road user *	2.07 (1.05)	.39	.37	
25. Become angered by a certain type of driver and indicate your hostility by whatever means you can	1.48 (.79)	.38	.31	
8. Fail to your rear-view mirror before pulling out, changing lanes etc. *	1.96 (1.47)			
22. Misread the signs and exit from a roundabout on the wrong road	1.30 (.78)	.40	.80	
3. Drive when you suspect you might be over the legal blood alcohol limit	1.17 (.64)		.78	
18. Stay in a motorway lane that you know will be closed ahead until the last minute before forcing your way into the other lane	1.27 (.67)		.75	
Eigenvalues		12.12	5.56	1.78
Percent of explained variance		28.85%	13.25%	4.24%
Reliability		.92	.90	.88

Table 2.5. (continued)

Items	Mean(SD)	Factor 1[a]	Factor 2	Factor 3
21. Race away from traffic lights with the intention of beating the driver next to you	1.24 (.67)		.74	
23. Drive so close to the car in front that it would be difficult to stop in an emergency	1.33 (.79)	.35	.67	
19. Forget where you left your car in a car park	1.38 (.82)	.36	.65	
21. Race away from traffic lights with the intention of beating the driver next to you	1.24 (.67)		.74	
23. Drive so close to the car in front that it would be difficult to stop in an emergency	1.33 (.79)	.35	.67	
19. Forget where you left your car in a car park	1.38 (.82)	.36	.65	
11. Disregard the speed limit on a residential road	1.33 (.74)	.45	.61	
17. Become angered by another driver and give chase with the intention of giving him/her a piece of your mind*	1.27 (.66)	.47	.51	
20. Overtake a slow driver on the inside	1.79 (1.15)	.31	.50	
24. Cross a junction knowing that the traffic lights have already turned against you	1.14 (.60)		.44	
9. Brake too quickly on a slippery road, or steer the wrong way in a skid	1.47 (.77)		.37	-.30
36. Adjusted your speed to help someone trying to overtake	4.33 (1.69)			.79
42. Paid attention to a puddle not to splash water on pedestrians or other road users.	4.82 (1.69)			.77
35. Avoided close following not to disturb the car driver in front.	4.60 (1.64)			.75
40. When parking your car, took into account other road users' needs for space.	4.38 (1.62)			.71
32. Did not sound your horn to avoid noise.	4.13 (1.72)			.68
39. Let pedestrians cross the road even if it was your right of way.	4.11 (1.67)			.67
34. Avoided using the left lane not to slow down traffic.	4.02 (2.09)			.66
37. Gave up overtaking not to block the way of a car approaching behind.	3.78 (1.93)			.63
31. Tried to use less frequently your long lights not to disturb the oncoming drivers.	4.04 (1.90)			.62
38. Thanked another driver for helping or showing consideration by waving your hand, sounding horn, etc.	3.61 (1.88)			.55
41. Did not sound your horn to avoid disturbing the driver in front waiting even after the traffic light had switched to	3.64 (1.80)			.53
33. Used your indicator to help the driver behind you whose view was not good enough for overtaking	2.56 (1.79)			.37
30. Gave your right of way to another driver.	2.50 (1.37)			.32
29. Did your best not to be an obstacle for other drivers.	3.55 (2.05)			.30
Eigenvalues		12.12	5.56	1.78
Percent of explained variance		28.85%	13.25%	4.24%
Reliability		.92	.90	.88

Note. Factor loadings < .3 are suppressed. [a] Factor labels. Factor 1= Errors, Factor 2= Violations, Factor 3= Positive Driver Behaviors * Dropped items

3.2. Test-Retest Reliabilities of Factors and Items

The gap between time-1 and time-2 measurements could be seen in the time scale. After time-1 measurements, participants exposed to theoretical classes, written exam, driving practices and driving exam. Therefore, correlation between factors and items which were measured time-1 and time-2 were investigated.

According to the results of paired sample-t test, all of the factors of MDAS and TCS had significant correlations with themselves in %95 confidence interval; safety-oriented attitudes (*CI* = -.14, .11, *r* = -.21, *p* < .001), risky-oriented attitudes (*CI* = -43, -.15, *r* = .33, *p* < .001), internal requirements (*CI* = -.20, .12, *r* = .42, *p* < .001), functionality (*CI* = -.00, .33, *r* = .53, *p* < .001), and external affective demands (*CI* = -.07, .31, *r* = .40, *p* < .001).

Then, items of MDAS were analyzed and correlations which in %95 confidence interval were identified. Except item 7, significant correlations were found for item 2 (*CI* = -.39, .16, *r* = .20, *p* < .05), item 5 (*CI* = -.49, .06, *r* = .30, *p* < .001), item 6 (*CI* = -.27, -.21, *r* = .28, *p* < .01), item 9 (*CI* = -.13, .33, *r* = .35, *p* < .001), item 10 (*CI* = -.50, .07, *r* = 26, *p* < .01), item 11 (*CI* = -.66, -.18, *r* = .28, *p* < .01), item 12 (*CI* = -.46, .00, *r* = .22, *p* < .01), item 13 (*CI* = -.24, .24, *r* = .32, *p* < .001), item 14 (*CI* = -.20, .29, *r* = .28, *p* < .01), item 16 (*CI* = -.30, .21, *r* = .20, *p* < .05), item 17 (*CI* = -.29, .19, *r* = .22, *p* < .01), item 18 (*CI* = -.19, .27, *r* = .27, *p* < .01), item 19 (*CI* = -.43, .08, *r* = .27, *p* < .01), and item 20 (*CI* = -.35, .24, *r* = .28, *p* < .01).

Lastly, items of TCS were examined. Item 13, 18, 32 and 35 did not showed significant correlation in %95 confidence interval between time-1 and time-2 measurements. Items with significant correlations were item 1 (*CI* = -.52, .17, *r* = .19, *p* < .05), item 2 (*CI* = -.69, -.12, *r* = .30, *p* < .001), item 3 (*CI* = -.33, .22, *r* = .41, *p* < .001), item 4 (*CI* = -.58, .09, *r* = .22, *p* < .05), item 6 (*CI* = -.40, .26, *r* = .24, *p* < .01), item 7 (*CI* = -.20, .38, *r* = .28, *p* < .01), item 8 (*CI* = -.44, .21, *r* = .30, *p* < .001), item 9 (*CI* = -.04, .68, *r* = .20, *p* < .05), item 10 (*CI* = -.35, .22, *r* = .35, *p* < .001), item 11 (*CI* = -.42, .25, *r* = .37, *p* < .001), item 12 (*CI* = -.11, .35, *r*

= .37, $p < .001$), item 16 (*CI* = -.14, .50, $r = .44$, $p < .001$), item 17 (*CI* = -.09, .53, $r = .37$, $p < .001$), item 19 (*CI* = -.26, .34, $r = .23$, $p < .01$), item 20 (*CI* = -.00, .58, $r = .36$, $p < .001$), Item 21 (*CI* = -.14, .41, $r = .37$, $p < .001$), item 22 (*CI* = -.14, .49, $r = .36$, $p < .001$), item 23 (*CI* = .11, .76, $r = .34$, $p < .001$), item 24 (*CI* = -.16, .40, $r = .38$, $p < .001$), item 28 (*CI* = -.38, .18, $r = .37$, $p < .001$), item 29 (*CI* = -.63, -.05, $r = .32$, $p < .001$), item 30 (*CI* = -.17, .30, $r = .28$, $p < .01$), item 31 (*CI* = -.31, .31, $r = .29$, $p < .01$), item 33 (*CI* = -.21, .31, $r = .18$, $p < .05$), item 34 (*CI* = -.18, .40, $r = .35$, $p < .001$), item 37 (*CI* = -.46, .17, $r = .30$, $p < .001$), item 38 (*CI* = .02, .58, $r = .44$, $p < .001$), item 39 (*CI* = -.13, .37, $r = .46$, $p < .001$), item 40 (*CI* = -.17, .38, $r = .35$, $p < .001$), item 41 (*CI* = -.28, .29, $r = .23$, $p < .01$), item 43 (*CI* = -.29, .34, $r = .30$, $p < .001$), and item 44 (*CI* = -.31, .19, $r = .36$, $p < .001$).

3.3. Testing the Driver Education Effect

To be able to test driver education effect Driver Attitude Scale (MDAS) and Traffic Climate Scale (TCS) were applied both pretest and posttests. Paired sample t-test was conducted to MDAS and TCS in factor based and then item based. Only the time-1 risky-oriented attitudes ($M = 3.67$, $SD = .64$) differed significantly from time-2 risky-oriented attitudes ($M = 3.97$, $SD = .76$) in factor base; $t(131) = -4.18$, $p = .00$ (see Table 3.1)

In the item base, 11th item of MDAS ‘I would favour stricter enforcement of the speed limit on 50 mph roads’ showed significant difference between time-1 ($M = 3.74$, $SD = 1.27$) and time-2 ($M = 4.17$, $SD = 1.07$); $t(131) = -3.44$, $p = .00$ (see Table 3.2). Also, 4 items from TCS had significant differences between time-1 and time-2 measurements. There were significant differences in the scores of time-1 item 2 ‘Dynamic’ ($M = 3.73$, $SD = 1.44$) and time-2 ($M = 4.14$, $SD = 1.38$); $t(131) = -2.82$, $p = .00$, time-1 item 23 ‘Dependent on mutual consideration’ ($M = 3.54$, $SD = 1.70$) and time-2 ($M = 3.10$, $SD = 1.55$); $t(131) = 2.70$, $p = .00$, time-1 item 29 ‘Chaotic’ ($M = 3.70$, $SD = 1.52$) and time-2 ($M = 4.05$, $SD = 1.38$); $t(131) = -2.37$, $p = .01$ and lastly time-1 item 38 ‘Safe’ ($M = 3.48$, $SD = 1.60$) was

significantly different from time 2 (M = 3.18, SD = 1.46); t(131)= 2.16, p = .03 (see Table 3.3).

Table 3.1. Descriptive Statistics and t-test Results in Factor Base

	Pretest		Posttest						
Outcome	M	SD	M	SD	n	95% CI for Mean Difference	R	t	df
Safety-oriented attitudes	3.62	.76	3.63	.66	132	-.14, .11	.46***	-.19	131
Risky-oriented attitudes	3.67	.64	3.97	.76	132	-.43, -.15	.33***	-4.18**	131
Internality	4.61	.82	4.65	.93	132	-.20, .12	.42***	-.47	131
Functionality	3.67	1.09	3.50	.87	132	-.00, .33	.53***	1.95	131
External-affective demands	3.33	.96	3.21	1.06	132	-.07, .31	.40***	1.24	131

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

Table 3.2. Descriptive Statistics and t-test Results in Item Base (MDAS)

	Pretest		Posttest						
Outcome	M	SD	M	SD	n	95% CI for Mean Difference	R	t	df
2. People stopped by the police for close following are unlucky because lots of people do it	3.53	1.31	3.64	1.25	132	-.39, .16	.20*	-.80	131
5. I think the police should start breathalysing a lot more drivers around pub closing times	3.85	1.50	4.06	1.24	132	-.49, .06	.30***	-1.49	131
6. It is quite acceptable to take a slight risk when overtaking	3.77	1.17	3.80	1.21	132	-.27, -.21	.28**	-.24	131
7. Close following isn't really a serious problem at the moment	3.93	1.10	4.14	1.12	132	-.46, .04	.12	-1.65	131
9. Some drivers can be perfectly safe overtaking in situations which would be risky for others	3.95	1.12	3.85	1.25	132	-.13, .33	.35***	.83	131
10. Even one drink makes you drive less safely	3.70	1.48	3.92	1.28	132	-.50, .07	.26**	-1.50	131
11. I would favour stricter enforcement of the speed limit on 50 mph roads	3.74	1.27	4.17	1.07	132	-.66, -.18	.28**	-3.44*	131
12. Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front	3.73	1.16	3.95	1.04	132	-.46, .00	.22**	-1.90	131
13. The aim of the police should be to stop as many people as possible overtaking in risky circumstances	3.20	1.29	3.20	1.17	132	-.24, .24	.32***	.00	131

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

Table 3.2. (continued)

Outcome	Pretest M	Pretest SD	Posttest M	Posttest SD	n	95% CI for Mean Difference	R	t	df
14. Even driving slightly faster than the speed limit makes you less safe as a driver	3.48	1.25	3.44	1.20	132	-.20, .29	.28**	.35	131
16. I would be happier if close following regulations were more strictly applied	3.53	1.26	3.58	1.09	132	-.30, .21	.20*	-.34	131
17. Stricter enforcement of speed limits on 50mph roads would be effective in reducing the occurrence of road accidents	3.87	1.13	3.92	1.15	132	-.29, .19	.22**	-.42	131
18. Even driving slightly too close to the car in front makes you less safe as a driver	3.62	1.14	3.58	1.12	132	-.19, .27	.27**	.31	131
19. I think it is O.K. to overtake in risky circumstances as long as you drive within your own capabilities	3.67	1.27	3.85	1.25	132	-.43, .08	.27**	-1.31	131
20. The law should be changed so that drivers aren't allowed to drink any alcohol	3.61	1.50	3.66	1.39	132	-.35, .24	.28**	-.35	131

*$p<.05$, ** $p < .01$, *** $p<.001$

Table 3.3. Descriptive Statistics and t-test Results in Item Base (TCS)

Outcome	Pretest M	Pretest SD	Posttest M	Posttest SD	n	95% CI for Mean Difference	R	t	df
1. Dangerous	4.35	1.47	4.55	1.46	132	-.52, .17	.19*	-1.25	131
2. Dynamic	3.73	1.44	4.14	1.38	132	-.69, -.12	.30***	-2.82*	131
3. Complicated	4.40	1.50	4.45	1.50	132	-.33, .22	.41***	-.37	131
4. Aggressive	4.27	1.69	4.52	1.44	132	-.58, .09	.22*	-1.41	131
6. Fast	4.25	1.63	4.32	1.51	132	-.40, .26	.24**	-.40	131
7. Stressful	4.76	1.41	4.67	1.47	132	-.20, .38	.28**	.60	131
8. Monotonous	3.08	1.70	3.19	1.48	132	-.44, .21	.30***	-.69	131
9. Depends on luck	3.52	1.73	3.20	1.66	132	-.04, .68	.20*	1.71	131
10. Requiring you on the alert	4.92	1.44	4.98	1.51	132	-.35, .22	.35***	-.46	131
11. Depends on fate	3.01	1.81	3.09	1.71	132	-.42, .25	.37***	-.48	131
12. Requiring cautiousness	5.33	1.81	5.20	1.32	132	-.11, .35	.39***	1.00	131
13. Requiring experience	5.14	1.29	5.09	1.32	132	-.24, .34	.16	.35	131
16. What you done becomes a benefit to you	3.11	1.77	2.93	1.78	131	-.14, .50	.44***	1.11	130
17. Giving a feeling that you are worthless	3.12	1.73	2.90	1.53	132	-.09, .53	.37***	1.37	131

*$p<.05$, ** $p < .01$, *** $p<.001$

Table 3.3. (continued)

Outcome	Pretest		Posttest		n	95% CI for Mean Difference	R	t	df
	M	SD	M	SD					
18. Mobile	4.36	1.40	4.46	1.37	132	-.42, .22	.07	-.59	131
19. Causing tension	4.73	1.39	4.69	1.44	132	-.26, .34	.23**	.24	131
20. Including preventive measures	4.16	1.51	3.87	1.49	132	-.00, .58	.36***	1.94	131
21. Under enforcement	4.02	1.45	3.89	1.41	132	-.14, .41	.37***	.97	131
22. Travel easily from place to place	3.98	1.67	3.81	1.65	132	-.14, .49	.36***	1.06	131
23. Dependent on mutual consideration	3.54	1.70	3.10	1.55	132	.11, .76	.34***	2.70*	131
24. Planned	3.57	1.51	3.45	1.44	132	-.16, .40	.38***	.84	131
28. Risky	4.50	1.49	4.60	1.44	132	-.38, .18	.37***	-.68	131
29. Chaotic	3.70	1.52	4.05	1.38	132	-.63, -.05	.32***	-2.37*	131
30. Requiring patience	5.06	1.09	4.99	1.22	132	-.17, .30	.28**	.56	131
31. Making irritated	4.26	1.49	4.26	1.54	132	-.31, .31	.29**	.00	131
32. Requiring vigilance	5.11	1.25	4.91	1.42	132	-.10, .51	.09	1.30	131
33. Requiring skilfulness	5.16	1.13	5.11	1.25	132	-.21, .31	.18*	.39	131
34. Harmonious	3.58	1.52	3.48	1.47	132	-.18, .40	.35***	.71	131
35. Time consuming	3.72	1.69	3.96	1.66	132	-.61, .13	.16**	-1.28	131
37. Egalitarian	3.05	1.61	3.19	1.51	132	-.46, .17	.30***	-.89	131
38. Safe	3.48	1.60	3.18	1.45	132	.02, .58	.44***	2.16*	131
39. Functional	3.58	1.46	3.46	1.35	132	-.13, .37	.46***	.95	131
40. Free flowing	3.65	1.50	3.55	1.38	132	-.17, .38	.35***	.74	131
41. Requiring knowledge of traffic rules	5.08	1.37	4.36	1.58	132	-.28, .29	.23**	.05	131
43. Unpredictable	4.36	1.58	4.34	1.56	132	-.29, .34	.30***	.14	131
44. Dense	4.88	1.32	4.94	1.26	132	-.31, .19	.36***	-.47	131

*$p<.05$, ** $p < .01$, *** $p<.001$

3.4. Bivariate Correlation Coefficients

Correlations between age, written exam score, result of driving exam, km/h during driving practice, number of active accidents during driving practices, safety-oriented attitudes, risky-oriented attitudes, internal requirements, functionality, external affective demands, errors, violations and positive driver behaviors were listed in Table 4.

First of all, age was positively related with time-2 safety-oriented attitudes (r = .17, $p < .05$) and time-2 risky-oriented attitudes (r = .20, $p < .05$). Written exam score was negatively related with result of driving exam (r = -.46, $p < .01$),

number of active accidents during driving practices (r = -.44, p < .01), and time-1 functionality (r = -.27, p < .01). Also, written exam score was positively related with time-1 safety-oriented attitudes (r = .17, p < .05), time-2 safety-oriented attitudes (r = .21, p < .05), time-1 internal requirements (r = .18, p < .05), time-2 internal requirements (r = .28, p < .01) and lastly time-2 external affective demands (r = .25, p < .01). Result of driving exam was positively related with both number of active accident during driving practices (r = .24, p < .01) and time-1 functionality (r = .19, p < .05). Km/h during driving practice was negatively related with time-2 functionality (r = -.18, p < .05) and positively related with time-2 external affective demands (r = .18, p < .05)

Time-1 safety-oriented attitudes was positively related with time-2 safety-oriented attitudes (r = .46, p < .01), time-2 risky-oriented attitudes (r = .20, p < .05), time-1 internal requirements (r = .22, p < .01), and time-2 internal requirements (r = .17, p < .05). Time-1 risky-oriented attitudes was positively related with time-2 safety-oriented behaviors (r = .18, p < .05), time-2 risky-oriented behaviors (r = .33, p < .01), positive driver behaviors (r = .32, p < .01), time-1 internal requirements (r = .23, p < .01), and time-2 internal requirements (r = .17, p < .05). Moreover, time-1 risky-oriented attitudes was negatively related with errors (r = -.22, p < .01) and violations (r = -.30, p < .01).

Time-2 safety-oriented attitudes was found to be positively related with time-2 risky-oriented attitudes (r = .21, p < .05), positive driver behaviors (r = .28, p < .01), time-1 internal requirements (r = .28, p < .01), and time-2 internal requirements (r = .36, p < .01), but negatively related with violations (r = -.17, p < .05). Time-2 risky-oriented attitudes was positively related with time-1 internal requirements (r = .23, p < .01) but negatively related with errors (r = -.38, p < .01), violations (r = -.31, p < .01) and time-2 external affective demands (r = -.27, p < .01).

Time-1 internal requirements was positively related with time-1 external affective demands (r = .31, p < .01), time-2 internal requirements (r = .42, p < .01),

positive driver behaviors (r = .34, p < .01) and negatively with violations (r = -.18, p < .05). Time-1 functionality positively related with time-2 functionality (r = .53, p < .01) and negatively related with time-2 internal requirements (r = -.21, p < .05). Time-1 external affective demands was positively related with time-2 external affective demands (r = .40, p < .01) and errors (r = .19, p < .05).

Time-2 internal requirements was negatively related with violations (r = -.19, p < .05) and positively related with positive driver behaviors (r = .32, p < .01) and time-2 external affective demands (r = .38, p < .01). Time-2 external affective demands was positively related with violations (r = .17, p < .05).

Errors was positively related with violations (r = .70, p < .01) (see Table 4).

Table 4. Correlations, Means and Standard Deviations of All Variables

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.Age	25.26	8.17	1																	
2. WES	80.06	11.08	-.06	1																
3. RDE			.12	-.46**	1															
4. Km/h	105.11	47.19	-.03	.09	-.07	1														
5. NAA			-.03	-.44**	.24**	-.10	1													
6. T1SA	3.64	.79	-.08	.17*	-.09	-.08	.09	1												
7. T1RA	3.63	.66	.12	10*	.05	.05	-.15	.14	1											
8. T2SA	3.63	.66	.17*	.21*	-.04	-.11	.04	.46**	.18*	1										
9. T2RA	3.97	.76	.20*	.11	.01	-.09	-.01	.20*	.33**	.21*	1									
10. T1IR	4.58	.83	.00	.18*	.03	-.11	.08	.22**	.23**	.28**	.23**	1								
11. T1F	3.67	1.09	.12	-.27**	.19*	-.13	.17	-.11	-.06	-.09	-.04	-.11	1							
12. T1ED	3.31	.95	-.07	.04	.14	-.00	.08	-.14	-.11	-.02	-.09	.31**	-.04	1						
13. T2IR	4.65	.93	-.00	.28**	-.08	-.00	.09	.17*	.17*	.36**	-.01	.42**	-.21*	.02	1					
14. T2F	3.50	.87	.06	-.06	.08	-.18*	.03	-.03	.02	-.01	-.02	-.00	.53**	-.09	.04	1				
15. T2ED	3.21	1.06	-.16	.25**	-.14	-.18*	.00	.03	-.16	.07	-.27**	.15	-.15	.40**	.38**	-.05	1			
16. ER	1.47	.60	-.09	-.04	.10	-.06	.01	-.03	-.22**	-.02	-.38**	-.04	.07	.19*	-.01	-.15	.15	1		
17. VS	1.34	.56	-.14	-.06	.01	.02	.01	-.13	-.30**	-.17*	-.31**	-.18*	.03	.14	-.19*	-.03	.17*	.70**	1	
18. PDB	3.86	1.12	.08	.11	-.06	-.06	.03	.11	.32**	.28**	.09	.34**	.03	-.06	.32**	.11	.06	-.01	-.13	1

*Note. WES=Written Exam Score; RDE=Result of Driving Exam; NAA=Number of Active Accidents; NPA=Number of Passive Accidents; T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T1IR=Time-1 Internal Requirements; T1F=Time-1 Functionality; T1ED=Time-1 External Affective Demands; T2IR=Time-2 Internal Requirements; T2F=Time-2 Functionality; T2ED=Time-2 External Affective Demands; ER= Errors;VS=Violations; PDB=Positive Driver Behaviors * Correlation significant at the .05 level (2-Tailed). **Correlation significant at the .01 level (2-Tailed).*

3.5. Main Analyses

3.5.1. Comparisons of Demographic Variables

3.5.1.1. Comparison of Female and Male in Study Variables

A one-way analysis of variance (ANOVA) was conducted to compare female and male in terms of age, km/h during driving practices, and numbers of active accidents, written exam scores, factors of Manchester Driver Attitude Scale, Traffic Climate Scale and Driver Behavior Questionnaire.

Results showed that significant difference existed between female and male in time-1 internality ($F(1, 148) = 12.15$, $p = .00$, $\eta^2 = .07$), time-2 internality ($F(1, 130) = 17.49$, $p = .00$, $\eta^2 = .11$), and positive driver behaviors ($F(1, 130) = 4.45$, $p = .03$, $\eta^2 = .03$). Female ($M = 4.87$, $SD = .66$) ($M = 5.04$, $SD = .57$) had higher scores on internality factor than male ($M = 4.40$, $SD = .88$) ($M = 4.39$, $SD = 1.04$) both time-1 and time-2 respectively. Also, female ($M = 4.10$, $SD = 1.01$) reported more positive driver behavior than male ($M = 3.69$, $SD = 1.17$). Results were listed in Table 5.1.

Table 5.1. Analysis of Variance Summary- Differences between Female and Male in Study Variables

Source	*Female's Mean* (N=58)	*Male's Mean* (N=91)	*F*	*Partial Eta Squared*
1. Age	25.50	25.10	.08	.00
2. WES	81.89	78.85	2.42	.01
3. Km/h	98.66	109.78	1.61	.01
4. NAA	.04	.01	.49	.00
5. T1SA	3.79	3.54	3.55	.02
6.T1RA	3.74	3.57	2.41	.01
7. T2SA	3.77	3.54	3.84	.02
8. T2RA	4.00	3.95	.13	.00

*Note. WES=Written Exam Score; RDE=Result of Driving Exam; NAA=Number of Active Accidents; NPA=Number of Passive Accidents; T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External Affective Demands; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External Affective Demands; VS=Violations; PDB=Positive Driver Behaviors, * p<.05; ** p<.01. Adjusted mean scores are used*

Table 5.1. (continued)

Source	*Female's Mean* (N=58)	*Male's Mean* (N=91)	*F*	*Partial Eta Squared*
9.T1IR	4.87	4.40	12.15**	.07
10.T1F	3.51	3.77	1.97	.01
11. T1ED	3.33	3.30	.05	.00
12. T2IR	5.04	4.39	17.49**	.11
13. T2F	3.54	3.47	.16	.00
14. T2ED	3.33	3.13	1.10	.00
15. Errors	1.54	1.42	1.15	.00
16. VS	1.27	1.38	1.28	.01
17. PDB	4.10	3.69	4.45*	.03

*Note. WES=Written Exam Score; RDE=Result of Driving Exam; NAA=Number of Active Accidents; NPA=Number of Passive Accidents; T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External Affective Demands; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External Affective Demands; VS=Violations; PDB=Positive Driver Behaviors, * p<.05; ** p<.01. Adjusted mean scores are used*

3.5.1.1.1. Comparison of Female and Male in Driving Exam

Female and male were compared in terms of their driving exam results. Chi-square analysis was used because results were coded as pass or fail.

According to the results, significant difference did not exist between driving exam results of female and male (see table 5.2)

Table 5.2. Result Results of Chi-square Test and Descriptive Statistics for Driving Exam Results by Gender

RDE	GENDER	
	Female	Male
Pass	35 (66%)	58 (72.5%)
Fail	18 (34%)	22 (27.5%)

Note. χ^2 = .63, df = 1. Numbers in parentheses indicate column percentages.

RDE= Result of Driving Exam

3.5.1.2 Comparisons of Education Levels in Study Variables

To be able to evaluate the relationship between education levels of participants and written exam scores, number of active accidents during driving practices and factors of Manchester Driver Attitude Scale, Traffic Climate Scale and Driver Behavior Questionnaire one-way ANOVA was conducted one by one. Education level was separated 3 section which were elementary, high school and college.

ANOVA was significant for written exam scores ($F(2,124) = 7.75$, $p=.00$, $\eta^2 = .11$). Mean of college group ($M = 84.84$, $SD = 10.98$) was significantly higher than mean of elementary group ($M = 74.91$, $SD = 11.82$). Also, time-1 safety-oriented attitudes of elementary group ($M = 3.25$, $SD = .92$) were significantly lower than both high school group ($M = 3.75$, $SD = .68$) and college group ($M = 3.83$, $SD = .68$) ($F(2,140) = 7.31$, $p=.00$, $\eta^2 = .09$). Another significant difference occurred in time-1 internality scores ($F(2,140) = 7.89$, $p=.00$, $\eta^2 = .10$). Both elementary group ($M = 4.42$, $SD = .84$) and high school group ($M = 4.45$, $SD = .81$) had lower scores than college group ($M = 5.01$, $SD = .61$). Moreover, time-1 functionality scores of elementary group ($M = 3.97$, $SD = 1.08$) were significantly higher than college group ($M = 3.35$, $SD = 1.11$) ($F(2,140) = 3.64$, $p=.02$, $\eta^2 = .05$). The last significant difference was between time-2 internality scores of elementary group ($M = 4.19$, $SD = 1.02$) and college group ($M = 5.07$, $SD = .73$) ($F(2,123) = 8.93$, $p=.00$, $\eta^2 = .12$). Results were listed in Table 6.1.

Table 6.1. Analysis of Variance Summary- Differences between Education Levels in Study Variables

Source	*Elementary Group Mean* (N=35)	*High School Group Mean* (N=55)	*College GroupMean* (N=37)	*F*	*Partial Eta Squared*
1. WES	74.91	80.02	84.84	7.75**	.11
2. NAA	.00	.02	.05	.66	.01
3. T1SA	3.25	3.75	3.83	7.31**	.09
4.T1RA	3.58	3.66	3.63	.16	.00
5. T2SA	3.50	3.60	3.78	1.68	.02
6. T2RA	4.03	3.88	4.07	.80	.01
7.T1IR	4.42	4.45	5.01	7.89**	.10
8.T1F	3.97	3.74	3.35	3.64*	.05
9. T1ED	3.34	3.18	3.46	1.11	.01
10. T2IR	4.19	4.62	5.07	8.93**	.12
11. T2F	3.54	3.52	3.45	.10	.00
12. T2ED	3.06	3.17	3.33	.60	.01
13. Errors	1.48	1.52	1.35	.96	.01
14. VS	1.39	1.39	1.18	2.02	.03
15. PDB	3.74	3.85	3.92	.22	.00

*Note. WES=Written Exam Score; RDE=Result of Driving Exam; NAA=Number of Active Accidents; NPA=Number of Passive Accidents; T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External Affective Demands; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External Affective Demands; VS=Violations; PDB=Positive Driver Behaviors, * p<.05; ** p<.01. Adjusted mean scores are used*

3.5.1.2.1. Comparisons of Education Levels in Driving Exam

The relationship between education levels and success in driving exam was examined via Chi-square test.

Results showed that, results of the driving exam did not depend on education levels and of participants (see Table 6.2).

Table 6.2. Results of Chi-square Test and Descriptive Statistics for Driving Exam Results by Education Level

	Education Level		
Result of Driving Exam	Elementary	High School	College
Pass	20 (57.1%)	41 (74.5%)	27 (73.0%)
Fail	15 (42.9%)	14 (25.5%)	10 (27.0%)

Note. $\chi^2 = 3.37$, df = 2. Numbers in parentheses indicate column percentages.

3.6.2. Testing of Main Effects

3.6.2.1. Testing the Relationship between Attitudes and Behaviors

Prediction ability of traffic related attitudes of participants on their behaviors which could be observed during driving practices was examined. Attitudes of participants included attitudes toward traffic rules and traffic climate. To be able to test this prediction ability hierarchical regression analysis was conducted. There were 3 dependent variables errors, violations and positive driver behaviors and attitudes were measured twice. Therefore, analysis was done in 6 parts.

In the first analysis, age, gender and km/h during driving practices were controlled for the first step. In the second step, time-1 measurements of Driver Attitude Scale (MDAS) and Traffic Climate Scale (TCS) were included in the analysis. Then, 'errors' was entered as the dependent variable. Results showed that neither control variables nor factors of MDAS and TCS predicted errors (see Table 7.1).

In the second analysis, after controlling age, gender and km/h during driving practices, time-2 measurements of MDAS and TCS were counted in the analysis and 'errors' was entered as the dependent variable again. According to the results, time-2 measurements of MDAS and TCS predicted 'errors' after controlling age, gender and km/h during driving practices (R^2 = .23, F(5, 110) = 5.94, p < .001). In the unique effect examination it was found out that risky-oriented attitudes (β = -.40, t = -4.56, p < .001) and functionality (β = -.20, t = -2.39, p < .05) predicted errors negatively (see Table 7.2).

In the third analysis, age, gender and km/h during driving practices were controlled for the first step and time-1 measurements of MDAS and TCS were included in the analysis in the second step. 'Violations' was the dependent variable in the last analysis. It was seen that, MDAS and TCS predicted 'Violations' after controlling the effects of age, gender and km/h during driving practices (R^2 = .15, F(5, 110) = 3.16, p < .05). The only unique effect belonged to risky-oriented attitudes and it predicted violations negatively (β = -.22, t = -2.30, p < .05) (see Table 7.3)

In the fourth analysis, control variables were same in the first step and time-2 measurements of MDAS and TCS were entered in the second step for 'Violations'. Results showed that, MDAS and TCS predicted 'Violations' (R^2 = .19, $F(5, 110) = 4.28$, $p < .01$). Risky-oriented attitudes (β = -.24, t = -2.71, $p <$ .01), and internality (β = -.25, t = -2.44, $p < .05$) predicted violations negatively and external affective demands predicted positively (β = .21, t = 2.18, $p < .05$) (see Table 7.4).

In the fifth analysis, age, gender and km/h during driving practices were controlled in the first step, time-1 measurements of MDAS and TCS were included in the second step. Dependent variable was 'Positive Driver Behaviors'. According to the results, time-1 measurements of MDAS and TCS predicted 'Positive Driver Behaviors' after controlling age, gender and km/h (R^2 = .23, $F(5, 110) = 5.20$, $p < .001$). Both risky-oriented attitudes (β = .25, t = 2.76, $p < .01$) and internality (β = .32, t = 3.20, $p < .01$) predicted positive driver behaviors positively (see Table 7.5).

In the last analysis, after controlling age, gender and km/h during driving practices in the first step, time-2 measurements of MDAS and TCS included in the analysis in the second step for 'Positive Driver Behaviors'. It was found out that results was significant for time-2 measurements of MDAS and TCS (R^2 = .18, $F(5, 110) = 3.48$, $p < .01$). Also, examination of unique effects showed that only internality predicted positive driver behaviors positively (β = .26, t = 2.48, $p < .05$) (see Table 7.6)

Table 7.1. Hierarchical Multiple Regression Analysis for Prediction Values of Time-1 MDAS and TCS on Errors

	B	*t*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.02	.02	.44	.89
Age	-.10	-1.17	.24				
Gender	-.08	-.89	.37				
Km/h	-.06	-.68	.49				
Step 2				.10	.08	.07	2.08
T1SA	-.02	-.20	.83				
T1RA	-.17	-1.71	.08				
T1IR	-.08	-.75	.45				
T1F	.08	.85	.39				
T1ED	.17	1.70	.09				

Dependent Variable is Errors

T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External-Affective Demands *p<.05, **p<.01, ***p<.001

Table 7.2. Hierarchical Multiple Regression Analysis for Prediction Values of Time-2 MDAS and TCS on Errors

	B	*t*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.02	.02	.44	.89
Age	-.10	-1.17	.24				
Gender	-.08	-.89	.37				
Km/h	-.06	-.68	.49				
Step 2				.23	20	.00	5.94***
T2SA	.06	.62	.53				
T2RA	-.40	-4.56	.00				
T2IR	-.09	-.97	.33				
T2F	-.20	-2.39	.01				
T2ED	.10	1.04	.29				

Dependent Variable is Errors

T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External-Affective Demands *p<.05, **p<.01, ***p<.001

Table 7.3. Hierarchical Multiple Regression Analysis for Prediction Values of Time-1 MDAS and TCS on Violations

	B	*t*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.03	.03	.29	1.26
Age	-.14	-1.57	.11				
Gender	.09	1.05	.29				
Km/h	.00	.06	.94				
Step 2				.15	.12	.01	3.16*
T1SA	-.04	-.46	.64				
T1RA	-.22	-2.30	.02				
T1IR	-.17	-1.66	.09				
T1F	.01	.11	.90				
T1ED	.15	1.54	.12				

Dependent Variable is Violations

T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External Affective Demands *p<.05, **p<.01, ***p<.001

Table 7.4. Hierarchical Multiple Regression Analysis for Prediction Values of Time-2 MDAS and TCS on Violations

	B	*t*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.03	.03	.29	1.26
Age	-.14	-1.57	.11				
Gender	.09	1.05	.29				
Km/h	.00	.06	.94				
Step 2				.19	.15	.00	4.28*
T2SA	-.05	-.60	.54				
T2RA	-.24	-2.71	.00				
T2IR	-.25	-2.44	.01				
T2F	-.02	-.28	.77				
T2ED	.21	2.18	.03				

Dependent Variable is Violations

T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External Affective Demands *p<.05, **p<.01, ***p<.001

Table 7.5. Hierarchical Multiple Regression Analysis for Prediction Values of Time-1 MDAS and TCS on Positive Driver Behaviors

	B	*t*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.05	.05	.10	2.13
Age	.08	.92	.35				
Gender	-.20	-2.20	.03				
Km/h	-.03	-.42	.67				
Step 2				.23	.18	.00	5.20***
T1SA	-.03	-.41	.67				
T1RA	.25	2.76	.00				
T1IR	.32	3.20	.00				
T1F	.11	1.28	.20				
T1ED	-.11	-1.22	.22				

Dependent Variable is Positive Driver Behaviors

T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External-Affective Demands *p<.05, **p<.01, ***p<.001

Table 7.6. Hierarchical Multiple Regression Analysis for Prediction Values of Time-2 MDAS and TCS on Positive Driver Behaviors

	B	*t*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.05	.05	.10	2.13
Age	.08	.92	.35				
Gender	-.20	-2.20	.03				
Km/h	-.03	-.42	.67				
Step 2				.18	.13	.00	3.48**
T2SA	.17	1.73	.08				
T2RA	.04	.45	.65				
T2IR	.26	2.48	.01				
T2F	.09	1.06	.29				
T2ED	-.02	-.24	.80				

Dependent Variable is Positive Driver Behaviors

T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External-Affective Demands *p<.05, **p<.01, ***p<.001

3.6.2.3. Testing the Relationship between Written Exam Scores and Behaviors

Another hierarchical regression analysis was conducted to test that whether written exam scores of participants would predict their behaviors which could be observed during driving practices or not, because written exam scores could be treated as an indicator of acquisition from theoretical part of driver education. Driver behaviors included errors, violations and positive driver behaviors so; analysis was done in 3 parts.

In the first analysis, age, gender and km/h during driving practices were controlled for the first step. In the second step, written exam scores were included in the analysis. Then, 'errors' was entered as the dependent variable. Results showed that both control variables and written exam scored did not affect the errors of the participants (see Table 8.1).

In the second analysis, after controlling age, gender and km/h during driving practices, written exam scores were included in the analysis and 'violations' was entered as the dependent variable. According to the results, written exam scores did not predict violations of participants (see Table 8.2).

In the third analysis, age, gender and km/h during driving practices were controlled for the first step and written exam scores were entered the analysis in the second step. 'Positive driver behaviors' was the dependent variable in the last analysis. In the results it was seen that, written exam scores did not predict 'positive driver behaviors' significantly (see Table 8.3).

Table 8.1. Hierarchical Multiple Regression Analysis for Prediction Values Written Exam Scores on Errors

	B	*T*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.02	.02	.44	.89
Age	-.10	-1.17	.24				
Gender	-.08	-.92	.35				
Km/h	-.06	-.64	.52				
Step 2				.02	.00	.61	.25
WES	-.04	-.50	.61				

Dependent Variable is Errors

WES= Written Exam Scores

Table 8.2. Hierarchical Multiple Regression Analysis for Prediction Values Written Exam Scores on Violations

	B	*T*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.03	.03	.29	1.24
Age	-.14	-1.56	.12				
Gender	.09	1.02	.30				
Km/h	.00	.08	.93				
Step 2				.03	.00	.73	.12
WES	-.03	-.34	.73				

Dependent Variable is Violations

WES= Written Exam Scores

Table 8.3. Hierarchical Multiple Regression Analysis for Prediction Values Written Exam Scores on Positive Driver Behaviors

	β	*T*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.04	.04	.12	1.97
Age	.08	.94	.34				
Gender	-.18	-2.02	.04				
Km/h	-.05	-.57	.56				
Step 2				.06	.01	.24	1.34
WES	.10	1.16	.24				

Dependent Variable is Positive Driver Behaviors

WES= Written Exam Scores

3.6.2.4. Testing the Relationship between Attitudes and Written Exam Scores

Written exam scores was evaluated as an indicator of acquisition from theoretical part of the driver education so possible prediction power of time-1 attitudes on written exam scores was analyzed via hierarchical regression.

In the first step of the analysis, age, gender and education level of participants were entered as control variables. In the second step, time-1 measurements of safety-oriented attitudes, risky-oriented attitudes, internality, functionality and external-affective demands were included in the analysis. Then, 'written exam scores' was entered as the dependent variable. Results showed that not time-1 attitudes but control variables predict written exam scores significantly (R^2 = .12, $F(3, 123) = 5.58$, $p < .01$). However, the only unique effect was education level which predict written exam scores positively (β = .33, t = 3.67, $p < .001$) (see Table 9).

Table 9. Hierarchical Multiple Regression Analysis for Prediction Values Time-1 Attitudes on Written Exam Scores

	B	*T*	*Sig.*	R^2	R^2 Change	*Sig.* R^2 *Change*	*F*
Step 1				.12	.12	.001	5.58*
Age	.04	.51	.61				
Gender	-.07	-.91	.36				
Education	.33	3.67	.00				
Step 2				.16	.04	.34	1.13
T1SA	.08	.90	.36				
T1RA	.04	.43	.66				
T1IR	.04	.42	.66				
T1F	-.17	-1.97	.05				
T1ED	.00	.07	.94				

Dependent Variable is Written Exam Scores

T1SA=Time-1 Safety-oriented Attitudes; T1RA=Time-1 Risky-oriented Attitudes; T1IR=Time-1 Internality; T1F=Time-1 Functionality; T1ED=Time-1 External-Affective Demands *p <.01

3.6.2.5. Testing the Relationship between Driver Behaviors and Result of Driving Exam

A binary logistic regression was conducted to test the relationship between Driver behaviors and driving exam results. Driver behaviors included errors, violations and positive driver behaviors.

Age, gender and km/h during driving practice, errors, violations and positive driver behaviors included in the analysis. Result of driving exam was entered as dependent variable. Results were not significant for the model (see Table 10).

Table 10. Binary Logistic Regression Analysis for Prediction Values of Driver Behaviors on Results of Driving Exam

Source	*B*	*SE B*	e^B
1. Age	.02	.03	1.02
2. Gender	-.30	.62	.74
3. Km/h	-.02	.00	.97
4. Error	.35	.70	1.42
5. Violation	-.17	.76	.83
6.Positive Driver Behavior	-.30	.26	.73

Dependent Variable is Results of Driving Exam

3.6.2.6. Testing the Relationship between Time-2 Measurements of Attitudes and Result of Driving Exam

The last analysis was binary logistic regression and it was conducted to see whether the results of driving exam could be predicted by attitudes of participants which were measured in time-2. Time-2 attitudes included risky-oriented attitudes, safety-oriented attitudes, internality, functionality and external-affective demands.

Age, gender and km/h during driving practice, and time-2 measurements of attitudes were entered and driving exam results was dependent variable. Results showed that model was not significant (see Table 11).

Table 11. Binary Logistic Regression Analysis for Prediction Values of Time-2 MDAS and TCS on Results of Driving Exam

Source	*B*	*SE B*	e^B
1. Age	.02	.03	1.02
2. Gender	.05	.68	1.05
3. Km/h	-.02	.00	.97
4. T2SA	-.07	.48	.92
5. T2RA	-.44	.42	.64
6. T2IR	-.51	.37	.59
7. T2F	.05	.34	1.05
8.T2ED	-.42	.34	.65

Dependent Variable is Results of Driving Exam

T2SA=Time-2 Safety-oriented Attitudes; T2RA=Time-2 Risky-oriented Attitudes; T2IR=Time-2 Internality; T2F=Time-2 Functionality; T2ED=Time-2 External-Affective Demands

CHAPTER IV

DISCUSSION

In the present study it was investigated that attitude changes of learner drivers in Turkey before and after driver education and possible attitude effect on future driver behaviors. In this chapter, evaluations of the findings, contributions of the study to the literature, limitations of the study and suggestions for further research are discussed respectively.

4.1 Evaluations of the Findings

4.1.1. Evaluations of the Factor Analysis of Scales

The purpose of the factor analysis was to validate MDAS, TCS and DBQ on learner drivers due to lack of examples in the literature. Factor structures and item loadings were discussed in this part for all of the scales used in this study.

In the previous study which conducted with larger sample size and experienced drivers, MDAS was found to be four-factor structure in Turkey (Lajunen & Özkan, 2004) while it has two-factor structure in this study both in time-1 and time-2 measurements. Factors were named as safety-oriented attitudes and risky-oriented attitudes. Factor loadings of items, internal consistencies or reliabilities are acceptable and it can be said that MDAS works on learner drivers with a different factor structure than experienced drivers. Also, it may point out that, schemas about specific traffic issues are not ready until people start to use the car because they did not show same attitude categorization with experienced drivers before they had the driver education. However, this situation did not change after

they had the education so it can be said that separating attitudes into more specific categories like attitudes toward speeding, overtaking, drink driving or structural constructions and making schemas about traffic may take a while for the learner driver. Moreover, same factor structure before and after the education may infer that driver education in Turkey do not affect the attitudes of learner drivers. During this study none of the participants were allowed to drive alone and attitudes may develop after get into the traffic culture and drive alone.

Item 1 'Some people can drive perfectly safely after drinking three or four pints of beer', item 3 'I would welcome further use of double white lines to let me know when it is unsafe to overtake' and item 4 'Speed limits are often set too low, with the result that many drivers ignore them' did not load any of the factors in time-1. In the city where data of this study were collected drinking beer is a common behavior between both female and male. Therefore, most of the learner drivers probably see their family members or acquaintances driving after drinking beer. However, they cannot say it is safe at all. It could be the reason why learner drivers did not have clear vision for item 1. One possible explanation for item-3 could be being unfamiliar to roads with double white lines because learner drivers live in a small city where most used roads are generally one-way with one lane. Moreover, people may not pay attention to speed limits until they drive the car so; that could be the reason why item 4 did not load any of the factors in time-1.

In time-2 measurements item 8 'I know exactly how fast I can drive and still drive safely' and item 15 'It's hard to have a good time if everyone else is drinking but you have to limit yourself because you're driving' did not load on any of the factors. Also, they had the lowest loading values in time-1 risky-oriented attitudes. After having the education participants could see themselves more talented in using the car fast and safer although they had alcohol. Education may make them have more self-esteem.

Factor structure of TCS was in line with the original scale and TCS has three dimensions which are externality, internality and functionality. Professional

(Özkan & Lajunen, 2009b) and non-professional driver groups (Özkan & Lajunen, 2009a) showed four-factor structure which depend on the same three dimensions (i.e., functionality, internality, and externality). In this study, learner drivers showed three-factor structure in time-1 and time-2 measurements of TCS. As distinct from other driver groups, learner drivers did not classify the competitiveness factor. Similar with the MDAS, this categorization may point out that learner drivers become clearer about specification of their attitudes about traffic after a while they joined the traffic by themselves. Also, it can be concluded that driving practice process is not enough for learner driver to develop their schemas in detailed. It can be discussed that any of the processes do not help them because driving with another adult may not result with clearer categorization.

First of all, the number of items which did not load any of the factors or loaded with close or same factor loading values into more than one factors got lower in time-2 measurements. Item 36 'Annoying', 42 'Directing your behaviours', 26 'Directed to compensate the things that happened', 15 'Requiring you to obey traffic rules' and 25 'Putting pressure on you' loaded more than one factor, Item 14 'Requiring quickness' and item 27 'Including deterring rules' did not load any of the factors in time-1. However, in time-2 measurements item 36 'Annoying' loaded three factors with close values and item 5 'Exciting' did not load any of the factors. It may show that learner drivers had clearer evaluations about traffic climate after they drive the car even they drive with an instructor. Their evaluations may not be clear or detailed as much as experienced driver but they showed a development after driver education.

Item 14 'Requiring quickness', 15 'Requiring you to obey traffic rules', 25 'Putting pressure on you' loaded on internal requirements factor in time-2 while they did not load clearly in time-1. It may be explained with learner drivers got better understanding of requirements of traffic after they drive a car for a while. Item 42 'Directing your behaviours', item 27 'Including deterring rules' and 26 'Directed to compensate the things that happened' did not load clearly in time-1 and they were classified in functionality in time-2 measurements. One possible

explanation could be that learner drivers describe traffic structure better after they had education and drove the car for 2-3 weeks.

Only item 34 ‘Harmonious’ changed its factor between time-1 and time-2. Learner drivers classified ‘Harmonious’ in external affective demands before education but it loaded on functionality factor after driver education. The plausible explanation for this difference can be resulted from joining the traffic as a driver. Being passenger or pedestrian may make learner drivers think that harmoniousness is formed or arranged by others.

DBQ has a wide place in the literature and factor structure varies from two to six in different samples (Özkan, Lajunen & Summala, 2006). In a cross-cultural study, DBQ showed three-factor structure with ordinary violations, aggressive violations and errors in Finland, Great Britain, Greece, Iran, The Netherlands, and Turkey (Özkan, Lajunen, Chliaoutakis, Parker & Summala, 2006). In an another cross-cultural study, lapses, errors, aggressive violations and ordinary violations were found to be formed DBQ with four-factor structure in Finland, Netherland and Britain (Lajunen, Parker & Summala, 2004). In France, six-factor structure was confirmed with dangerous errors, inattention errors, inexperience errors, ordinary violations, aggressive violations and positive behaviors (Guého, Granié & Abric, 2014) Based on the exploratory analysis, the distinction between errors and violations seems to be robust (Lajunen, Parker & Summala, 2004) and in this study, learner drivers showed this distinction clearly. Violations, errors and positive driver behaviors were compromised three-factor structure of DBQ. It was seen that, learner drivers extricate neither violations as ordinary and aggressive nor errors as lapses and mistakes. Also, item 8 ‘Fail to your rear-view mirror before pulling out, changing lanes etc.’ did not load any of the factors. This can be result of learner drivers are not aware of what they do or do not in the car if there is not any negative consequences. As an example, trying to drive away in third gear could be noticed quickly because car do not move but, if there is no one in the other lane, failure of checking rear-view mirror cannot be recognized by learner drivers. Another reason for non-loading values of item 8 could be the

roads of the city that study was conducted. Lane change probably is not required in the driving practice area and city roads most of the time. Learner drivers may not classify this behavior due to lack of performing. Item 28 ‘Disregard the speed limit on a motorway’, item 7 ‘Sound your horn to indicate your annoyance to another road user’, and item 17 ‘Become angered by another driver and give chase with the intention of giving him/her a piece of your mind’ loaded both violations and errors. It may point out that although learner drivers are clear about distinction of violations and errors, some specific behaviors are hard for them to distinguish. Actually, speed limit in motorway is not an issue that learner drivers face with until they got their driver license so; it is natural that they cannot decide whether it is a violation that is done by free will or an error which is caused by missing the speedometer. Moreover, for item 7 and 17, one possible explanation could be that learner drivers are the ones who other drivers get angry with because they slow down the traffic and more important thing is that, in this study learner drivers filled out DBQ according to their experience in driving practice. In the driving practice process learner drivers, drive the car with an instructor all the time. Therefore, even if they get angry with another driver, they may not express it physically.

It can be said that the most general idea in the evaluations of MDAS, TCS and DBQ, learner drivers cannot classified or specified some of the behaviors or characteristics until they became the part of the traffic as a driver. Also, behaviors which did not performed in the driving practice process may be resulted with undeveloped or non-specified attitudes.

4.1.2. Evaluations of the Comparisons and Main Findings

4.1.2.1. Evaluation of Comparison of Female and Male Learners

In the first examination mean differences were analyzed between female and male. It was seen that, gender groups diverged from each other on three major variables which were time-1 and time-2 internality and positive driver behaviors. Female learners showed higher score all of these variables. It may point out that,

female learner drivers think traffic demands a lot of things from the driver and they should be very talented in driving car. Also, according to the factor structure of TCS, it can be said that traffic creates tension for them because items like stressful, dangerous, complicated etc. present in the internality. Beside this, female learner drivers reported more positive driver behaviors. Actually, it is not surprising because in the literature it is known that male do violations more than female (Reason, Manstead, Stradling, Baxter & Campbell, 1990; Lawton, Parker, Stradling, & Manstead, 1997; Yagil, 1998; Díaz, 2002; Özkan & Lajunen, 2005). Violations and positive driver behaviors may be evaluated as contradictory concepts to each other. Another possible explanation could be that, female may relief from their stress or requirements of traffic by showing more positive behaviors which means having good relationships with other road users.

4.1.2.2. Evaluation of Comparison of Education Levels

The results of the mean differences examination of education levels showed that learner drivers with college degree get higher scores than learner drivers with elementary school degree on written exam. It may point out that learner drivers with college degree are more used to having exams and they do not have difficulties with the written exam as much as learner drivers with elementary school degree. Difficulties related with written exam could be reading and understanding questions quickly, getting used to multiple choice exam and its marking system or time management during the exam and most of the learners with elementary school degree may not be so familiar to these difficulties from their academic life. Safety-oriented attitudes before the driver education are lower for learners with elementary school degree than other education level groups. It can be inferred that learner drivers with college and high school degree are more aware of necessity of traffic rules than learners with elementary school degree. Learners with college degree see more internality in traffic before the driver education and training than other education level groups but after education and training difference between learners with high school degree and college degree is diminish. A possible explanation could be that, learners with higher education

level are more aware of requirements of traffic and its negative characteristics than lower education level groups and after driver education learners with college degree might learn handle these requirements. It means they benefit from driver education. Besides this, learners with elementary school degree evaluate traffic more functional than learners with college degree Moreover, after education and training they continue to think traffic climate is still safe and functional. This result could be inferred that contradictory to learners with college degree, learners with elementary school degree are more aware of positive characteristics of traffic and they found traffic climate more safe and functional. The place where learner driver practice are different from the main roads and they are nearly closed to traffic so if learners did not face with a dysfunctionality of traffic when they were pedestrian or passenger, they may not face dysfunctionalities when they are practicing as a driver because of the type of the road. Even if they realize some problems about functionality they may regress that to their rawness. Another plausible explanation for this result could be that length of the driving practice time is not enough to learner drivers with elementary school degree to see the dysfunctionalities of the traffic as a driver because traffic flow of the city where data was collected is not planned, safe or functional at all. Especially after participated in the traffic flow as a driver problems stand out because roads are not sufficient for the both number of the cars and the population. There were not any difference between education levels in driver behaviors because education level effect on behaviors like speeding and drink driving is more obvious when its interaction with income levels is taken into account (Shinar, Schechtman, & Compton, 2001). However, income levels were not asked in this study.

4.1.2.3. Evaluation of Driver Education Effect

Learner drivers' risky-oriented attitudes increase after driver education and training and this is compatible with study of Helman, Kinnear, McKenna, Allsop, & Horswill (2013) which says some attitudes and intentions of learner drivers become riskier after driver education phase especially the speed and thrill-seeking related ones. Learning to drive the car independently could increase the self-

esteem and self-confidence and in some degree this increase is required to be able to get ready to drive alone. It means practical phase of the driver education and training may lead learner drivers to think that they are talented and skillful enough and some traffic rules could be broken especially if drivers trust their driving skills. However, theoretical part of the driving education should compensate this negative effect. Learner drivers must be taught that rule breaking could be resulted with a disaster even if it is a negligible one. Also in this study, learner drivers become riskier in speed-related item in the item base. Moreover, learner drivers see traffic more dynamic and chaotic but less safe and less dependent on mutual consideration after the education and training. It may point out that, after participating traffic as a driver even if with a supervised driver in the driving course's car, learners notice negative characteristics of traffic climate. Higher stress levels at the beginning of the driving can be another possible explanation to evaluating of traffic climate because regardless of the driver education type, learning to drive is a stressful activity and anxiety seems stable about 5 to 6 months for learner drivers (Harrison, 2004).

4.1.2.4. Evaluation of Relationship between Attitudes and Behaviors

Attitudes of the learner drivers were controlled in terms of their ability to predict future driver behavior and results changed according to time that attitude measurements were taken. Attitudes before the driver education and training did not predict errors but risky-oriented attitudes and functionality among the attitudes that measured after education predict errors negatively. It means after driver education, learners who think taking a little risk is not a problem at all in traffic and evaluate traffic climate as more functional report less errors than other learners. Risky-oriented attitudes predicted violations negatively and solely among the attitudes which were measured before the driver education and training so, learner drivers who reported more risky-oriented attitudes before driver education reported less violation during driving practices. However, after the education and training, learners who had higher scores of internality reported less violations and who had higher scores of external-affective demands reported more

violations. Learner drivers who had high scores of risky-oriented attitudes and internality before the driver education and training reported more positive driver behavior. However after education only the higher scores of internality leaded more positive driver behaviors. These results could be explained by risk homeostasis theory. Risk refers to probability of accident involvement and there is no risk free behavior although the variation of its amount (Simonet & Wilde, 1997). Both reducing the consequences of risky behavior and increasing the severity of consequences of the behavior increase the safety (Wilde, 1998). According to risk homeostasis theory, people have a target risk level which guides their behaviors and they are willing to take that level of risk (Heino, Molen, & Wilde, 1996). Behaviors are arranged according to the discrepancy between perceived and target risk which means safer driving occurs when perceived risk is higher than the target risk or riskier driving occurs when perceived risk is lower than the target risk (Heino, Molen, & Wilde, 1996). This behavioral adaptation is also observed in learner drivers. Learners whose risky-oriented attitudes are high do less error and violation during driving practices probably because of they are aware that some of the drivers could take some risk and they behave safer as a driver. Also, they do less violation when they evaluate traffic as more demanding but do more violation when they think that 'traffic depends on luck, fate' or 'what you done becomes a benefit for you'. Furthermore, more risky-oriented attitudes and higher scores on demanding of traffic leaded more positive driver behavior which means learner drivers deal with risk taking attitudes and requirements of traffic with showing more positive driver behaviors. Lastly, it can be said that risky-oriented attitudes are the strongest predictor for driver behavior regardless of measurement time, before or after the driver education, so it can be inferred that, future driver behaviors, especially errors and violations could be predicted by attitudes of learner drivers related to driving and traffic climate which are measured at the beginning of the driving course or just before they start to drive independently.

4.1.2.5. Evaluation of Relationship between Exam Scores and Behaviors

Written exam which is taken after attending the classes of driving course was evaluated as indicator of acquisition from theoretical part of driver education. Theoretical part of the driver education is expected to provide sufficient level of knowledge, consciousness, attitude and skill to learner driver for driving (Driver Education and New Drivers, 2002). Therefore, future driver behaviors were thought to be shaped according to these knowledge, consciousness, attitude and skill. Written exam scores externalize what a learner driver gain from the theoretical driver education and future driver behaviors are reflectors of these gains. However, none of the driver behaviors were predicted by written exam scores. One possible explanation for this result could be nonattendance to classes which rate is very high in Turkish driver education system because most of the classes could be easily understood by reading from the education book so most of the learner drivers do not attend the classes at least mentally (Driver Education and New Drivers, 2002).

4.1.2.6. Evaluation of Relationship between Attitudes and Written Exam Scores

Attitudes determine the approach or avoid decisions (Chen & Bargh, 1999) so attitudes which are owned by learner drivers before they start taking classes about driving are suggested to predict their gains from the theoretical part of the education. This means attitudes about driving or traffic rules and traffic climate could affect the evaluations of the theoretical part of the education and by this way, written exam scores. However, results did not show prediction effect of attitudes on written exam scores. There could be a lot of possible explanation for this situation, for example, attitudes gained before driver education and practice could not be strong enough to affect learner drivers' perspectives or written exam scores may not be the indicator of the acquisition from theoretical part.

4.1.2.7. Evaluation of Relationship between Driver Behavior and Result of Driving Exam

Driver behaviors have a critical role in evaluation of learner drivers during driving exams. Behaviors such as, obeying the speed, lane keeping and changing rules, and overtaking rules, providing convenience for other road users, and arranging following distance are important to be able to pass driving exam. Therefore, driver behaviors that occur during driving practices are thought to be predictors of driving exam results but results did not support the idea. Differences between DBQ and evaluation form of driving exam might be the plausible explanation for this results and even if both learner drivers and driving supervisors evaluate learner drivers on the same evaluation form, their results would be probably different.

4.1.2.8. Evaluation of Relationship between Time-2 Measurements of Attitudes and Result of Driving Exam

Attitudes that measured after driver education were thought to be predictors of driving exam results because attitudes shape behaviors and driver behaviors of learner drivers are measured by driving exam. However, attitudes were not predictors of driving exam results. It may point out that something else but neither attitudes nor driver behaviors are the predictor of driving exam results. Also, evaluation criterions might be so much different to be able to be predicted by attitudes of learner drivers. In the factor analysis it was seen that learner drivers do not have specific attitudes as much as the experienced drivers so; another reason could be that learner drivers have only general attitudes and their attitudes do not have the prediction ability for driving exam results.

4.2 Contributions and Practical Implications of the Findings

As a first contribution, this study examined learner drivers in terms of their attitudes related with driving and traffic climate in Turkey both before they have driver education and after they complete their driver education for the first time.

Therefore, it is the first follow-up study which examines Turkish learner drivers' attitudes.

Driver education is configured to help learner drivers to have basic skills and abilities to use a car independently and at the same time they are wanted to be safe drivers. Awareness of attitudinal changes of learner drivers is important due to critical role of attitudes on behaviors. Therefore, driving education should affect attitudes of learner drivers in a positive way, which means, at least at the end of the theoretical part of the driver education, learner drivers should start to understand that they should be more careful and safer as a driver. Positive attitudes toward traffic violations should decline with education. Although, higher risky-oriented attitudes lead lower error and violation rate in this study more safe-oriented attitudes and positive driver behaviors are thought to be provide safer traffic environment in the future. Most of the time both the learner drivers and the supervised drivers focus on learner drivers' success in the driving exam but, negative attitudes toward violation of traffic rules should be gained when learner drivers have permit to drive alone. In this study, results showed that, formal driver education and training almost has no effects on learner drivers' attitudes and it is thought to be as a deficiency of the education system. Therefore, in the theoretical part of the education, participants should have another class which includes traffic safety attitudes and their importance. Building a safety traffic culture is hard and needs too much time to develop but giving theoretical classes during driver education could be the first step.

Last contribution of the study is that, testing the factor structure of MDAS, TCS and DBQ for learner drivers. Experienced drivers differ from novice drivers in most of the studied concepts in the literature and it is shown that learner drivers do not have specific attitudes related with driving as much as experienced drivers.

4.3 Limitations and Suggestions for Further Research

This study also has some limitations like all of the other studies. First of all, questionnaires were a little bit long, especially the time-2 measurements, so it may

cause boredom and distraction for participants. Another point for time-2 measurements is that, timing could be stressful because it was fulfilled at a time very close the driving exam for most of the learner drivers and stress may cause some imprecise answers.

Secondly, self-report usage is criticized all the time for psychological research due to probability of leading the biased or socially desirable answers or responds and this situation is also valid for this study. However, for DBQ, public and private settings do not cause significant differences for responses (Lajunen, & Summala, 2003). Still, asking supervised driver to fulfill DBQ for each learner driver could be effective dealing way with self-biased responds in the future research.

In relation to second limitation, third limitation is seen in the positive driver behavior subscale. Participants' ratings were really high in the positive driver behavior subscale. However, most of the behaviors that mentioned in the items were not possible for participants to be performed. For example, items like "Tried to use less frequently your long lights not to disturb the oncoming drivers" or "When parking your car, took into account other road users' needs for space" are not highly possible to be performed by learner driver during driving practice with supervised driver because generally they do not drive open roads. Even if they use open roads they do not park, just drive in the following traffic in the day light so they do not need their long lights. Therefore, it is thought that, participants reflected their ideal driver prototype in the positive driver behavior subscale so providing another observation way for driver behaviors would help to gaining of more clear results. Lastly, attendance records of the learner drivers could be listed. In the official records none of the participants had absenteeism records, they seem to come all of the classes but it is known that attendance rate of Turkish learner driver to driving course is low. Also, even if they attend to all of the classes, participation rate should be controlled to clearly understand that in what degree learner drivers pay attention to classes. By this way, indicators of gaining from the theoretical part of the driver education could be evaluated more clearly.

In the future studies income levels of participants should be taken into consideration due to its possible interaction with education levels and effect on driver behaviors (Shinar, Schechtman, & Compton, 2001). Also, a mini questionnaire could be developed to see the learner drivers' evaluations for their gaining in practical driver education because theoretical classes did not predict the driver behavior.

In the young and novice driver literature, it is seen that sensation seeking, risk perception, hazard perception, confidence and driving skills have an important place. Taking measurements of these variables for the learner drivers could make future follow-up studies more enlightening.

Furthermore, following the accident rates of learner drivers after they became fully drivers could be a better way to enlighten the traffic safety literature about the relationship between attitudes and accident involvement and by this way attitude measurement before registration the driver education system could be a practical solution to identification of attitude orientation for learner drivers.

Lastly, in the comparison analysis, ANCOVA could be used instead of ANOVA to controlling possible confounding variables if studies could be conducted with larger sample sizes.

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APPENDICES

Appendix A: Ethical Permissions

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

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28.02.2014

Gönderilen : Doç. Dr. Türker Özkan
Psikoloji

Gönderen : Prof. Dr. Canan Özgen
IAK Başkanı

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz Psikoloji Bölümü öğrencisi Duygu Özlem Biçer'in "Attitude changes in learner drivers during driver education/ Sürücü adaylarında sürücü eğitimi esnasında ki tutum değişimleri" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

28/02/2014

Prof.Dr. Canan Özgen
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkanı
ODTÜ 06531 ANKARA

04.03.2014

Appendix B: Informed Consent Form for Participants

Gönüllü Katılım Formu

Bu araştırma ODTÜ Trafik ve Ulaşım Psikolojisi bölümü öğrencisi Duygu Özlem Biçer tarafından tez çalışması için yürütülmektedir. Çalışmanın amacı, sürücü kursuna ilk kez katılan adayların sürücü eğitimi sırasında tutum değişikliği gösterip göstermediklerini uygulanan anketlerle araştırmaktır. Çalışmada, kimlik belirleyici hiçbir bilgi istenmemektedir. Mülakat formları gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilecek bilgiler sadece bilimsel yayımlarda kullanılacaktır.

Çalışma genel olarak kişisel rahatsızlık verecek bir etkileşim içermemektedir. Ancak, katılım sırasında her hangi bir nedenden ötürü kendinizi rahatsız hissederseniz çalışmayı bırakmakta serbestsiniz. Çalışmanın sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için Psikoloji Bölümü öğretim üyelerinden Doç. Dr. Türker Özkan (Oda: B123; Tel: 0312 210 5118; E-posta: ozturker@metu.edu.tr) veya öğrencilerinden Duygu Özlem Biçer (Oda: BZ08; Tel: 0312 210 31 54; E-posta: duygu.ozlem.bicer@gmail.com) ile iletişim kurabilirsiniz.

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).

İsim Soyad Tarih İmza

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

Appendix C: Demographic Information Form Time-1

ADAY NO:

Lütfen aşağıdaki soruları size göre doğru cevabı yazarak cevaplayınız

Yaşınız:

Cinsiyetiniz:

Eğitim durumunuz:

Mesleğiniz:

Kursa katılım amacınız:

a) Ehliyet almak
b) Ehliyet sınıfını yükseltmek

Kursa katılmadan önce herhangi biriyle direksiyon çalışması yaptınız mı?

Yaptıysanız kursa katılmadan önce ortalama kaç saat direksiyon çalışması yaptınız?

Appendix D: Demographic Information Form Time-2

ADAY NO:

Lütfen, aşağıdaki soruları size göre doğru olan seçeneği işaretleyerek veya doğru cevabı yazarak cevaplayınız. Seçenekler arasında seçiminizi yaptığınız zaman, lütfen siyah kurşun kalem kullanarak dairenin içerisini karalayınız.

1.Yaşınız:_____

2.Cinsiyetiniz: **O** Kadın **O** Erkek

3.**Direksiyon eğitiminiz sırasında** kaç km araç kullandınız? _____ _____Km

4.En sık kullandığınız araç türü: _____

5.**Direksiyon eğitiminiz sırasında** sürücü olarak başınızdan geçen kaza sayısı (en ufak çarpışmaları dahi sayarak) kaçtır **?**_____

6.**Direksiyon eğitiminiz sırasında,** sürücü olarak başınızdan geçen **aktif kaza** (sizin bir araca yayaya veya nesneye çarptığınız kazalar) sayısı kaçtır **?** _____ _____

7.**Direksiyon eğitiminiz sırasında,** sürücü olarak başınızdan geçen **pasif kaza** (bir başka araç sürücüsünün size çarptığı kazalar) sayısı kaçtır **?** _____

8.**Direksiyon eğitiminiz sırasında,** aşağıda verilen her bir trafik ceza türü ile kaç kere cezalandırıldınız?

a) Park cezası_____b) Hatalı sollama cezası_____c) Aşırı hız cezası____ _____ d) Kırmızı ışıkta geçme cezası _____e) Diğer cezalar_____

9.İyi koşullar altında otobanda kaç kilometre hızla gitmeyi tercih edersiniz?

_____Km/saat

10.İyi koşullar altında şehir içi yollarda kaç kilometre hızla gitmeyi tercih edersiniz?

_____ Km/saat

11.Normal bir seyahatinizde kendinizi diğer sürücülerle kıyaslayınız. Sollandığınızdan daha fazla sollama yapıyor musunuz?

Sollandığımdan daha az sollama yaparım. **O**

Sollandığım kadar da sollama yaparım. **O**

Sollandığımdan daha fazla sollama yaparım. **O**

Appendix E: Driver Attitude Questionnaire

Lütfen, aşağıdaki cümlelerde belirtilen ifadelere ne oranda katıldığınızı cümlelerin karşısındaki rakamlardan uygun olanı işaretleyerek belirtiniz.
1= Kesinlikle katılmıyorum 2= Katılmıyorum 3= Ne katılıyorum ne katılmıyorum 4= Katılıyorum 5= Tamamen katılıyorum

1. Bazı insanlar 3-4 şişe bira içtikten sonra bile son derece güvenli bir şekilde araç kullanabilirler	1	2	3	4	5
2. Yakın takip yaptığı gerekçesiyle polis tarafından durdurulanlar şansız kişilerdir. Çünkü pek çok kişi aynı şeyi yapmaktadır	1	2	3	4	5
3. Sollama yapmanın çok tehlikeli olduğu yollarda çift çizilmiş bölünmüş yol çizgilerinin kullanılması çok iyi olabilir	1	2	3	4	5
4. Genellikle hız sınırlarının çok düşük olması sürücülerin onları göz ardı etmesi sonucunu doğuruyor olabilir	1	2	3	4	5
5. Polislerin eğlence yerlerinin kapanış zamanına yaklaşan vakitlerde alkol muayenelerini artırması gerektiğini düşünüyorum	1	2	3	4	5
6. Sollama yaparken ufak risklerin alınması sürücüler açısından oldukça kabul edilebilir bir şeydir	1	2	3	4	5
7. Aslında yakın takip yapılması ciddi bir sorun olmayabilir	1	2	3	4	5
8. Sürücülerin güvenli araç kullanabilecekleri en yüksek hız sınırını bildiklerini düşünüyorum	1	2	3	4	5
9. Bazı sürücüler diğerleri için riskli olabilecek durumlarda da son derece güvenli sollama yapabilirler	1	2	3	4	5
10. Tek bir alkollü içecek bile sürüş güvenliğini azaltacaktır	1	2	3	4	5
11. Şehir içinde 50 km hız sınırının kesinlikle uygulanması taraftarıyım	1	2	3	4	5
12. Bazı sürücüler öndeki aracı çok yakından takip ettikleri zamanlarda bile son derece güvenli sürüş yapabilirler	1	2	3	4	5
13. Polis kontrollerinin amacı riskli durumlarda sollama yapan mümkün olduğunca çok sayıda sürücüyü durdurmak olmalıdır.	1	2	3	4	5
14. Sürücü olarak hız sınırlarının çok az üzerinde araç kullanmak bile sürüş güvenliğini azaltacaktır	1	2	3	4	5
15. Etrafındaki herkes içki içerken sürücünün araç kullanacağı için istediği gibi içememesi iyi vakit geçirmesini engelleyecektir	1	2	3	4	5
16. Yakın takip kuralları daha katı bir şekilde uygulansaydı daha mutlu olurdum	1	2	3	4	5

17. Şehir içinde 50 km hız sınırının katiyetle uygulanması trafik kazalarının sayısının düşürülmesinde etkili olurdu	1	2	3	4	5
18. Sürücülerin önde giden aracı çok az yakından takip etmesi bile sürüş güvenliğini azaltacaktır	1	2	3	4	5
19. Sürücünün araç kullanma kapasitesi yeterli olduğu sürece riskli durumlarda sollama yapmasının kabul edilebilir olduğunu düşünüyorum	1	2	3	4	5
20. Kanunlar öyle değiştirilmeli ki sürücülerin herhangi bir seviyede alkol almalarına izin verilmemelidir	1	2	3	4	5

Appendix F: Traffic Climate Scale

Ülkemizde trafik nasıldır?

Aşağıda, ülkemizdeki trafik sistemini, ortamını ve atmosferini tanımlamak için bazı kelimeler verilmiştir. Bu kelimelerin, ülkemizdeki trafik durumunu yansıtıp yansıtmadığı hakkındaki düşüncenizi size göre doğru olan seçeneği karalayarak belirtiniz. Her bir soru için cevap seçenekleri:

1 = Hiç tanımlamıyor **2 = Tanımlamıyor** **3= Pek az tanımlıyor**
4= Biraz tanımlıyor **5= Tanımlıyor** **6= Çok tanımlıyor**

	1	2	3	4	5	6		1	2	3	4	5	6
1.Tehlikeli	O	O	O	O	O	O	23.Karşılıklı anlayışa dayalı	O	O	O	O	O	O
2.Dinamik	O	O	O	O	O	O	24.Planlı	O	O	O	O	O	O
3.Karmaşık	O	O	O	O	O	O	25.Üzerinizde baskı yapıcı	O	O	O	O	O	O
4.Saldırgan	O	O	O	O	O	O	26.Olanları telafi etmeye yönelik	O	O	O	O	O	O
5.Heyecan verici	O	O	O	O	O	O	27.Caydırıcı kurallar içeren	O	O	O	O	O	O
6.Hızlı	O	O	O	O	O	O	28. Riskli	O	O	O	O	O	O
7.Stresli	O	O	O	O	O	O	29. Kaotik	O	O	O	O	O	O
8.Monoton	O	O	O	O	O	O	30.Sabır gerektiren	O	O	O	O	O	O
9. Şansa bağlı	O	O	O	O	O	O	31.Tedirgin edici	O	O	O	O	O	O
10. Tetikte olmanızı gerektiren	O	O	O	O	O	O	32.Uyanık olmayı gerektiren	O	O	O	O	O	O
11. Kadere bağlı	O	O	O	O	O	O	33.Beceri gerektiren	O	O	O	O	O	O
12. Tedbirli olunmasını gerektiren	O	O	O	O	O	O	34.Ahenkli	O	O	O	O	O	O
13. Deneyim gerektiren	O	O	O	O	O	O	35.Zaman kaybettiren	O	O	O	O	O	O
14. Çabukluk gerektiren	O	O	O	O	O	O	36.Sinir bozucu	O	O	O	O	O	O
15. Trafik kurallarına uymanızı isteyen	O	O	O	O	O	O	37.Eşitlikçi	O	O	O	O	O	O
16. Yaptığınızın yanınıza kâr kaldığı	O	O	O	O	O	O	38.Güvenli	O	O	O	O	O	O
17. Değersiz olduğunuz hissini veren	O	O	O	O	O	O	39.İşlevsel	O	O	O	O	O	O
18. Hareketli	O	O	O	O	O	O	40. Akışkan	O	O	O	O	O	O
19.Gerginliklere neden olan	O	O	O	O	O	O	41.Trafik kuralları bilgisi gerektiren	O	O	O	O	O	O
20.Önleyici tedbirler içeren	O	O	O	O	O	O	42.Davranışlarınızı yönlendiren	O	O	O	O	O	O
21.Denetim altında	O	O	O	O	O	O	43.Ne olacağı belli olmayan	O	O	O	O	O	O
22.Bir yerden bir yere kolayca seyahat edilen	O	O	O	O	O	O	44.Yoğun	O	O	O	O	O	O

Appendix G: Driver Behavior Questionnaire

Aşağıda verilen durumların her birini ne sıklıkta yaparsınız?

Aşağıda verilen her bir madde için sizden istenen bu tür şeylerin sizin başınıza NE SIKLIKLA geldiğini belirtmaleizdir. Değerlendirmelerinizi **DİREKSİYON EĞİTİMİNİZ** boyunca yaptığınız araç kullanma davranışlarından ne hatırlıyorsanız onları temel alarak yapınız. Lütfen değerlendirmelerinizi size göre doğru olan seçeneği karalayarak belirtiniz. Her bir soru için cevap seçenekleri:

1= Hiç bir zaman 2= Nadiren 3= Bazen
4= Oldukça sık 5= Sık sık 6= Neredeyse her zaman

		1	2	3	4	5	6
1.	Geri geri giderken önceden fark etmediğiniz bir şeye çarpmak	O	O	O	O	O	O
2.	A yönüne gitmek amacıyla yola çıkmışken kendinizi daha alışkın olduğunuz B yönüne doğru araç kullanırken bulmak	O	O	O	O	O	O
3.	Yasal alkol sınırlarının üzerinde alkollü olduğunuzdan şüphelenseniz de araç kullanmak	O	O	O	O	O	O
4.	Dönel kavşakta dönüş istikametinize uygun olmayan şeridi kullanmak	O	O	O	O	O	O
5.	Anayoldan sola dönmek için kuyrukta beklerken, anayol trafiğine dikkat etmekten neredeyse öndeki araca çarpacak duruma gelmek	O	O	O	O	O	O
6.	Anayoldan bir sokağa dönerken karşıdan karşıya geçen yayaları fark edememek	O	O	O	O	O	O
7.	Başka bir sürücüye kızgınlığınızı belirtmek için korna çalmak	O	O	O	O	O	O
8.	Bir aracı sollarken ya da şerit değiştirirken dikiz aynasından yolu kontrol etmemek	O	O	O	O	O	O
9.	Kaygan bir yolda ani fren veya patinaj yapmak	O	O	O	O	O	O
10.	Kavşağa çok hızlı girip geçiş hakkı olan aracı durmak zorunda bırakmak	O	O	O	O	O	O
11.	Şehir içi yollarda hız sınırını aşmak	O	O	O	O	O	O
12.	Sinyali kullanmayı niyet ederken silecekleri çalıştırmak	O	O	O	O	O	O
13.	Sağa dönerken yanınızdan geçen bir bisiklet ya da araca neredeyse çarpmak	O	O	O	O	O	O
14.	"Yol ver" işaretini kaçırıp, geçiş hakkı olan araçlarla çarpışacak duruma gelmek	O	O	O	O	O	O
15.	Trafik ışıklarında üçüncü vitesle kalkış yapmaya çalışmak	O	O	O	O	O	O
16.	Sola dönüş sinyali veren bir aracın sinyalini fark etmeyip onu sollamaya çalışmak	O	O	O	O	O	O
17.	Trafikte sinirlendiğiniz bir sürücüyü takip edip ona haddini bildirmeye çalışmak	O	O	O	O	O	O

		1	2	3	4	5	6
18.	Otoyolda ileride kapanacak bir şeritte son ana kadar ilerlemek	O	O	O	O	O	O
19.	Aracınızı park alanında nereye bıraktığınızı unutmak	O	O	O	O	O	O
20.	Solda yavaş giden bir aracın sağından geçmek	O	O	O	O	O	O
21.	Trafik ışığında en hızlı hareket eden araç olmak için yandaki araçlarla yarışmak	O	O	O	O	O	O
22.	Trafik işaretlerini yanlış anlamak ve kavşakta yanlış yöne dönmek	O	O	O	O	O	O
24.	Trafik ışıkları sizin yönünüze kırmızıya döndüğü halde kavşaktan geçmek	O	O	O	O	O	O
25.	Bazı tip sürücülere kızgın olmak (illet olmak) ve bu kızgınlığı bir şekilde onlara göstermek	O	O	O	O	O	O
26.	Seyahat etmekte olduğunuz yolu tam olarak hatırlamadığınızı fark etmek	O	O	O	O	O	O
27.	Sollama yaparken karşıdan gelen aracın hızını olduğundan daha yavaş tahmin etmek	O	O	O	O	O	O
28.	Otobanda hız limitlerini dikkate almamak	O	O	O	O	O	O
29	Trafikte, diğer sürücülere engel teşkil etmemeye gayret göstermek	O	O	O	O	O	O
30	Geçiş hakkı sizde dahi olsa diğer sürücülere yol vermek	O	O	O	O	O	O
31	Karşıdan gelen araç sürücüsünün görüş mesafesini koruyabilmesi için uzunları mümkün olduğunca az kullanmak	O	O	O	O	O	O
32	Gereksiz yere gürültü yapmamak için kornayı kullanmaktan kaçınmak	O	O	O	O	O	O
33	Arkanızdaki aracın ileriyi iyi göremediği durumlarda sinyal vb. ile işaret vererek sollamanın uygun olduğunu belirtmek	O	O	O	O	O	O
34	Otobanda trafik akışını sağlayabilmek için en sol şeridi gereksiz yere kullanmaktan kaçınmak	O	O	O	O	O	O
35	Önünüzdeki aracın sürücüsünü, onu rahatsız etmeyecek bir mesafede takip etmek	O	O	O	O	O	O
36	Sollama yapan sürücüye kolaylık olması için hızınızı onun geçiş hızına göre ayarlamak	O	O	O	O	O	O
37	Arkamdan hızla gelen aracın yolunu kesmemek için sollamadan vazgeçip eski yerinize dönmek	O	O	O	O	O	O
38	Trafikte, herhangi bir sürücü size yol verdiğinde veya anlayış gösterdiğinde, elinizi sallayarak, korna çalarak vb. şekilde teşekkür etmek	O	O	O	O	O	O
39	Yayaların karşıdan karşıya geçebilmeleri için geçiş hakkı sizde dahi olsa durarak yol vermek	O	O	O	O	O	O
40	Aracınızı park ederken diğer yol kullanıcılarının (yayalar, sürücüler vb.) hareketlerini sınırlamamaya özen göstermek	O	O	O	O	O	O
41	Yeşil ışık yandığı halde hareket etmekte geciken öndeki araç sürücüsünü korna çalarak rahatsız etmemek	O	O	O	O	O	O
42	Aracınızı kullanırken yol kenarında birikmiş suyu ve benzeri maddeleri yayaların üzerine sıçratmamaya dikkat etmek	O	O	O	O	O	O

Appendix H: Observation Form of Driving Exam

DİREKSİYON EĞİTİMİ DERSİ SINAVI DEĞERLENDİRME FORMU
("B", "C", "D", "E", "F" veya "H (Otomobil)" Sınıfları)
T.C.
TEKİRDAĞ İLİ
ÇORLU İLÇESİ
MOTORLU TAŞIT SÜRÜCÜLERİ KURSU MÜDÜRLÜĞÜ

SÜRÜCÜ ADAYININ			
Adı Soyadı	İstediği Sürücü Sertifikasının Cinsi	Sınava Girdiği Aracın Cinsi ve Plaka No	Sınav Güzergahı
	OTOMOBİL -B-	OTOMOBİL	HAVUZLAR PARKI-BÜLENT ECEVİT BULVARI-BELEDİYE KONUTLARI İÇİ

	I. BÖLÜM: AŞAĞIDAKİ MADDELERDEN BİRİNİ HATALI YAPAN ADAY SINAVDA BAŞARISIZ SAYILIR.	
1	Emniyet kemerini takmıyor, ayna ve koltuk ayarlarını kontrol etmiyor.	
2	Aracı çalıştırma ve harekete geçirme usul ve kurallarına uymuyor.	
3	Emniyetli ve rahat kalkış yapamıyor.	
4	Yoldan geçen araçlara geçiş kolaylığı sağlayamıyor.	
5	Kontrolsüz ve sinyal vermeden çıkış yapıyor.	
6	Şerit izleme ve değiştirme kurallarına uymuyor.	
7	Hız kurallarına uymuyor.	
8	Takip mesafesini kurallara uygun olarak ayarlayamıyor.	
9	Öndeki aracı sollayıp geçme kurallarına uymuyor.	
10	Kavşak yaklaşımında ve kavşaklarda kurallara uygun davranış sergilemiyor.	
11	Dönüşlerde (sağa-sola) dönüş kurallarına ve işaretlerine uymuyor, dönüş öncesinde sinyal vermiyor.	
12	Trafik ışık ve işaretlerine dikkat etmiyor, trafiğin polis tarafından yönlendirildiği durumlarda yönlendirmelere uymuyor.	
13	Trafiği tehlikeye düşürecek şekilde araç kullanıyor.	
14	Araç kumanda pedallarına (gaz, fren, debriyaj) yeterince intibak edemiyor.	
15	Vites değiştirme becerisi ve vites değiştirmede araç kontrolü zayıf.	
16	Direksiyon hâkimiyeti zayıf.	
17	Araç kullanımı esnasında heyecanlı ve telaşlı bulundu.	
18	Yaya, okul ve hemzemin geçitlerinde geçiş kurallarına uymuyor.	
19	Aracı geri viteste kullanma kurallarına uymuyor.	
20	Araçların arasına park etme kurallarına uymuyor.	
	II. BÖLÜM: AŞAĞIDAKİ MADDELERDEN İKİ HATALI YAPAN ADAY SINAVDA BAŞARISIZ SAYILIR.	
1	Kendisini geçmek isteyen araçlarla ilgili geçilme kurallarına uymuyor.	
2	Işık, ısıtma ve havalandırma sistemlerine ait kumanda yerlerini bilmiyor ve kullanamıyor. Yakıt, yağ, şarj ve hararet	
3	Durma, duraklama, indirme ve park etme kurallarına uymuyor.	
4	Eğimli yolda aracı durdurma ve kaldırma becerisi yetersiz.	
5	Diğer yol kullanıcılarına (çocuk, yaşlı, engelli ve bisikletli) geçiş hakkı vermiyor.	
6	Geçiş üstünlüğü hakkına sahip olan araçlara geçiş izni vermiyor.	
7	Çevreye duyarlı (korna-gürültü) ve enerji tasarrufu sağlayacak şekilde araç kullanamıyor.	

Hatalı bulunan maddenin satırına dolma kalem veya tükenmez kalemle (X) işareti yazılarak işlem yapılır. Sonuç bölümüne başarılı olan aday için "BAŞARILI", başarısız olan aday için "BAŞARISIZ" ve nedeni yazılır.

SINAV KOMİSYONU			
BAŞKAN Adı-soyadı/İmza		**ÜYE Adı-soyadı/İmza**	
SINAV TARİHİ		**SONUÇ**	
27.12.2014	**BAŞARILI**		
	BAŞARISIZ (NEDENİ)		

Appendix I: Turkish Summary

Trafik kazalarından kaynaklanan ölüm ve yaralanmalar ciddi bir trafik sorunudur. Son 30-35 yıl içinde yol güvenliği görece iyi hale getirilmiş olsa bile bazı güvenlik problemleri kalıcıdır ve çoğu ülke yol güvenliği kayıtlarından memnun kalmamaktadır.

Trafik kazası, insan faktörü, araç faktörünüde kapsayan çevre faktörü ve bu iki faktörün etkileşimi sebebiyle meydana gelmektedir (Özkan, 2006). Sürücüler çevre ve araç ile sürekli etkileşim halindedir (Oppenheim, ve Shinar, 2011) ve bu sebeple kaza, davranış, araç ve çevre ile ilgili faktörlerin bir araya gelmesi sonucu ortaya çıkar (Özkan, ve Lajunen, 2011). 1970 yılında Indiana Üniversitesi'nde yapılan bir çalışmada polis kayıtlarında bulunan 2000' den fazla kaza raporu incelenmiş ve yol kullanıcıları kazaların %57' sinden sorumlu bulunmuştur. Çevresel faktörler kazaların %3'ünden sorumlu iken araçla ilgili faktörlerin sorumluluğu %2 olarak belirlenmiştir (Treat, ve ark., 1979). Ayrıca insan faktörü kazaların %94'ünde tek başına veya diğer faktörlerden herhangi biriyle birlikte rol oynamaktadır (Treat, ve ark., 1979). Kazalarda insan faktörü sürücü davranışları ve sürücülük becerileri olarak iki ana başlıkta incelenmektedir (Elander, West, ve French, 1993). Sürücülük becerileri, sürücünün bilgisi, yetenekleri, algısal ve bilişsel yetenekleri olarak tanımlanır ve aracı çalıştırmak, durdurmak gibi becerilerin aksine sollama yapmak, hızı ve diğer araçlarla olması gereken boşluğu ayarlamak gibi sürüş ile ilgili ileri düzey beceriler kolayca ve kısa sürede öğrenilemez (Evans, 2004). Bu çalışmada sürücü eğitiminin başında olan sürücü adayları ile çalışılacağı için insan faktörlerinden sürücülük becerileri değil sürücü davranışları dikkate alınacaktır.

Sürücü davranışları en basit anlamı ile genel olarak sürücünün neler yaptığıdır (Evans, 2004). Sapkın sürücü davranışları hatalar ve ihlaller olmak üzere iki ana başlıkta incelenir (Reason, Manstead, Stradling, Baxter, ve Campbell, 1990).

Hatalar, planlanan davranışın istenilen sonuca ulaşamaması olarak tanımlanırken, ihlaller tehlike içeren ortamlarda güvenlik için gerekli olan davranışları kasten göstermemek olarak tanımlanır (Reason, ve ark., 1990). Sürücü Davranışları Anketi (SDA) trafik psikolojisi literatüründe sürücü davranışlarını ölçmek için en çok kullanılan ölçektir (Wåhlberg, ve Dorn, 2012). SDA' nın trafik kazalarını yordama gücü hakkında karşıt görüşler olsa da beyana dayalı ölçümlerde sapkın davranışlar SDA ile kesin bir şekilde anlaşılabilir (Winter, ve Dodou, 2010). Sapkın davranışların yanı sıra güvenlik kaygısı olmaksızın, diğer sürücülere karşı nazik olmak, onlara yardım etmek ve onların ihtiyaçlarını gözetmek adına yapılan, hata veya ihlal olarak değerlendirilemeyen bazı olumlu sürücü davranışları da mevcuttur (Özkan, ve Lajunen, 2005). Bu davranışları ölçebilmek adına olumlu sürücü davranışları alt testide SDA' ya eklenmiştir. Türk örnekleminde SDA, hatalar, sıradan ihlaller, ihmaller ve saldırgan ihlaller olmak üzere 4 gruba ayrılmaktadır (Özkan, ve Lajunen, 2004). Sapkın sürücü davranışları ile ilgili birçok çalışma olsa da, çalışmaların örneklemleri genelde deneyimli sürücülerden oluşmakta ve sürücü adaylarını içermemektedir.

Sürücü davranışlarının yanı sıra sürücü tutumları da kazalardaki insan faktörünü detaylıca incelemek için çok önemlidir. Sürüş ile ilgili tutumların önemi sürücülerin ihlal yapma niyetini ve kazaya karışma ihtimalini yordama gücünden gelir (Shinar, 2007). Sollama, hız yapma, alkollü araç kullanma gibi sürüş ile ilgili tutumlar ve davranışlar arasındaki ilişki birçok çalışmaya konu olmuştur (Iversen, 2004; Ulleberg, ve Rundmo, 2003; Chen, 2009; Tronsmoen, 2010). Iversen çalışmasında (2004) ihlal ve hız yapma tutumlarının davranışların en güçlü yordayıcısı olduğunu tespit etmiştir. Ulleberg ve Rundmo (2003) ise kişilik ve tutumların sürücü davranışlarını inceledikleri çalışmalarında riskli sürücü davranışlarının sadece tutumlar ile ilişkili olduğunu görmüşlerdir. Tutum ve riskli sürücü davranışlarının arasındaki direkt ilişki Chen (2009) ve Tronsmoen (2010) tarafından da tespit edilmiştir. Trafik iklimi ile ilgili tutumlarının incelenmesi de sürüş tutumları kadar önemli bulunmaktadır çünkü sürüş aracın içindeki ve dışındaki bütün uyarıcılardan etkilenen karışık bir eylemdir ve mekanik bir işlem

olmanın ötesinde sürücülerin arasında yapılan sosyal bir alışveriştir (Hennessy, 2011). Sürücüler birbirleri ile etkileşime girdikçe polisler tarafından kontrol edilen yasal kurallar haricinde yazılı olmayan kuralları, değerleri ve normları paylaşırlar (Özkan, ve Lajunen, 2011). Bu kurallar, değerler ve normlar trafik kültürünü oluştururlar (Özkan, ve Lajunen, 2011). Trafik kültürü, sürücülerin becerilerini, tutumlarını ve davranışlarını etkileyen faktörlerin toplamıdır (Leviäkangas,1998) fakat trafik iklimi ile çok fazla örtüştüğü için deneysel bir şekilde ölçülmesi zordur (Özkan, ve Lajunen, 2011). Trafik iklimi, yol kullanıcılarının bulundukları bağlamda trafiğe ilişkin tutum ve algıları olarak tanımlanmaktadır (Özkan, ve Lajunen, 2011) ve trafik kültürü veya iklimi gibi konuları çalışmak yol güvenliği için yapılan araştırmalara alternatif bir yöntemdir (Gehlert, Hagemeister, ve Özkan, 2014). Sürüş ve trafik iklimi tutumlarını aynı anda araştırmanın yol güvenliği literatürü için önemli olduğu düşünülmektedir çünkü tutumlar zaman içerisinde değişim gösterebilmektedir. Örneğin Mann ve Lansdown (2009) yaptıkları çalışmada bir farkındalık kampanyası kullanmış, 6 ay boyunca 3 ölçüm almış ve hızlı araç kullanma niyetinin ve emniyet kemeri kullanmama, alkollü araç kullanma gibi ihlallere karşı tutumların azaldığını görmüşlerdir. Bunların yanı sıra gelecekteki sürücü davranışlarının sürücü adaylığı dönemindeki niyetlerle ve tutumlarla alakalı olduğu, bu konularda geliştirilecek müdahalelerin sürücü adaylarını ilerde sapkın sürücü davranışlarından koruyabileceği belirtilmiştir (Mann, ve Lansdown, 2009).

Trafik güvenliği araştırmalarının odak noktası genelde belirli sürücü gruplarının kazaya karışma risklerinin incelendiği çalışmalardır (Massie, Campbell, ve Williams, 1995). Sürücü davranışları ve tutumları ile ilgili çalışmalar ise kazaya yatkınlıkları sebebi ile genç ve acemi sürücüleri işaret etmektedir. Yol güvenliği konusunda her ne kadar ilerleme kaydediliyor olsa da bazı problemler kalıcı gözükmektedir ve genç sürücüler bu problemlerden biridir (Elvik, 2010). Genç sürücülerin kazaya karışma oranları için birçok sebep sıralanabilir fakat genel olarak küçük yaşların deneyimsizliği yani acemiliği beraberinde getirdiği söylenebilir çünkü günümüzde hemen hemen herkes ehliyetini olabildiğince

çabuk alma çabasındadır (Shinar, 2007). Deneyimsizlik özellikle sürücülüğün ilk yıllarındaki kaza riskinde çok etkilidir (McKnight, ve McKnight, 2003) çünkü araç kullanmak psiko-motor, algısal ve bilişsel yeteneklerin birlikte kullanılmasını gerektiren karışık bir işlemdir (Williams, ve Ferguson, 2002). Acemi sürücülerin bilişsel kapasiteleri aracın içinde karşılaştıkları yeni uyarıcılar sebebi ile tükenir fakat zamanla birçok davranış otomatik hale gelir (Gregersen, ve Bjurulf, 1996). Yoldaki tehlikeleri algılayabilmek kazaya karışma riskini azaltır (Derry, 1999) fakat acemi sürücüler bu konuda deneyimli sürücüler kadar iyi değildir (Borowsky, Shinar, ve Oron-Gilad, 2010). Acemi sürücüler tehlike algılama konusunda iyi olmadıkları için riski olduğundan daha az değerlendirebilirler (Derry, 1999). Riski olduğundan daha az değerlendirme durumu kişinin kendi sürüş yeteneklerini olduğundan daha iyi varsayması sebebi ile de ortaya çıkabilir ve bu durum genç sürücülerde oldukça fazladır (Gregersen, 1996). Acemi sürücülerin genelde ergenlikten yetişkinliğe geçiş döneminde olmaları görece daha az olgun olmalarına sebep olur ve bu durum risk alma davranışlarının sıklıkla görülmesine neden olur. Heyecan arayışı içinde olmak ve dürtüsellik gençlik döneminde sıklıkla gözlemlenir (Romer, 2010) ve heyecan arayışı arttıkça riskli davranışlarda artar (Jonah, 1997). Sonuç olarak gençlik ve acemilik trafikte genellikle birlikte görülür ve bu gruptaki sürücülerin gelecekte güvenli sürücüler olabilmeleri için rehberliğe ihtiyaçları vardır. Bu rehberlik onlara sürücü eğitimi ile sağlanır ve sürücü eğitimi trafik kazalarından kaynaklanan ölüm, yaralanma ve maddi hasarları engelleme amacıyla yapılan bir müdahale olarak sayılır (Keskinen, ve Hernetkoski, 2011). Sürücülük için gerekli yetenek ve beceriler acemi sürücülere ebeveynler, sürücü belgesine sahip yetişkinler veya profesyonel sürücü eğitmenleri tarafından verilir (Mayhew, ve Simpson, 2002). Sürücü eğitimi, tek başına araç kullanabilme yetisine sahip olmak isteyen kişiler için bir hazırlık evresidir (Groeger, 2011) fakat sürücü adaylarını geleceğin güvenli sürücüleri haline getirmekteki başarısı zaman kısıtlaması ve sadece araç sürmek için gerekli temel yeteneklere odaklanılması gibi sebepler dolayısıyla kanıtlanamamıştır (Mayhew, ve Simpson, 2002). Ayrıca, güvenli sürüş için

kaygan yollarda araç kontrolü eğitimi verildiğinde genç sürücülerin gerçek yetenek seviyeleri değişmediği halde kaygan yolda araç kullanma becerilerini olduğundan daha iyi değerlendirdikleri görülmüştür (Gregersen, 1996). Sürücü eğitimi konusunda yapılan bazı araştırmalar olsa da sürücü eğitimi boyunca gözlemlenebilen tutum ve davranış konusunda çok fazla çalışma bulunmamaktadır (Helman, Kinnear, McKenna, Allsop, ve Horswill, 2013).

Sürücü eğitimi ülkeler arasında farklılık göstermektedir, örneğin Graduate Driving Licensing System (GDL) Yeni Zelanda, Amerika, Kanada ve Avustralya gibi ülkelerde kullanılmaktadır (Gulliver, Begg, Brookland, Ameratunga, ve Langley, 2013). GDL, Türk sürücü eğitiminin aksine 3 bölümden oluşur, İlk aşamada sürücü adayları yanlarında sürücü belgesi olan bir sürücü olmadan araç kullanamaz, ikinci aşamada ise tek başlarına araç kullansalar bile gece sürüşü yasaktır ve araçlarında taşıyabilecekleri yolcu tipi kısıtlıdır (Hedlund, Shults, ve Compton, 2003), üçüncü aşamaya geçtiklerinde kısıtlamalar kalkar ve asıl sürücü belgesine sahip olurlar. Bu aşamalar ve kısıtlamalar hem yaşlarının büyümesine (McKnight, ve Peck, 2003) hem de kaza risklerinin düşmesine yardım eder (Williams, 2007). Türk sürücü eğitimi ise aşamalar içermez ve daha kısıtlı bir süre içinde eğitim biter. Bu sebeple ‘sürücü adayı’ kavramı bu çalışmada literatürden daha farklı bir anlamda kullanılmaktadır.

Türkiye’de ehliyet sahibi olmak için en düşük başvuru yaşı 17 olarak belirlenmiştir. Adaylar öncelikle sürücü kursuna kayıt olurlar, belirli sağlık kontrollerinden geçtikten sonra istedikleri ehliyet tipine göre teorik derslere katılırlar. Daha sonra Milli Eğitim Bakanlığı’nın hazırlamış olduğu sınava girerler ve sınavdan başarılı olan adaylar direksiyon eğitimlerine katılırlar. Ehliyet tipleri için yeterli olan direksiyon eğitimini tamamladıktan sonra direksiyon sınavına girerler. Bu sınavdan da başarılı olan adaylar ehliyetlerini kazanmaya hak kazanırlar. Yeni yapılan düzenlemeler sonucunda 2016 yılından itibaren stajyer sürücülük yasası getirilmiştir ve bu durumda yeni ehliyet alacak olan kişiler ve herhangi bir trafik suçu sebebiyle ehliyetini kaybetmiş kişiler 2 yıl boyunca stajyer sürücü olarak sayılacaktır.

Sürücü adayları ile ilgili yapılan çeşitli çalışmalar sürücü adaylığının son zamanlarına kadar yeterli deneyimin kazanılmadığını, tehlikeli sayılabilecek durumlarda ve karanlık yollarda çok fazla araç kullanılmadığını tespit etmiştir (Harrison, 2004).

Yapılan farklı bir çalışmada, deneyimli sürücülerin tehlikeli durumlarda acemi sürücülerden 2, sürücü adaylarından 3 kat daha fazla fiziksel ve psikolojik tepki verebildiği gözlemlenmiştir (Kinnear, Kelly, Stradling, ve Thomson, 2013).

Kadın ve erkek sürücü adaylarını karşılaştıran bir çalışma ise kadın sürücü adaylarının erkek sürücü adaylarına nazaran teorik eğitime daha fazla zaman harcadığını, yazılı sınavlardan daha yüksek not aldığını, gün ışığında ve kuru hava şartlarında daha çok araç kullandıklarını tespit etmiştir (Nyberg, ve Gregersen, 2007). Sürücü eğitimine 16-17 yaşlarında başlayan grup ile 18-19 yaşlarında başlayan gruplar karşılaştırıldığında 18-19 yaş grubunun sürücü eğitimi sürecini uzattığı, denetimsiz araç kullandıkları ve polis kontrolünden kaçındıkları görülmüştür (Scott-Parker, Watson, King, ve Hyde, 2013). Kazaya karışma riski en fazla 12 kere denetimsiz araç kullanan adaylarda, denetimsiz araç kullanmayan sürücü adaylarına nazaran %80 daha fazladır ve bu oran 13 kere ve daha fazla denetimsiz araç kullanan adaylarda ikiye katlanmaktadır (Langley, Begg, Samaranayaka, Brookland, ve Weiss, 2013). Sürücü eğitim sistemine dahil olmadan araç kullanan kişiler sürücü adayı olduklarında daha fazla riskli davranış sergilemektedir ve sürücü eğitim sistemine dahil olmadan araç kullanan erkekler bu durumdaki kadınlara nazaran daha riskli araç kullanmaktadırlar (Scott-Parker, Watson, King, ve Hyde, 2012). Sürücü adaylarının eğitimin başındaki hız seçimi ve heyecan arayışı ile ilgili niyetleri direksiyon sınavını geçtikten sonra daha riskli olmakta fakat takip mesafesi ve sollama ile ilgili eğilimleri daha güvenli hale gelmektedir (Helman, Kinnear, McKenna, Allsop, ve Horswill, 2013).

Sürücü eğitimi süresinin uzun tutulması kaza riskinin azalması ile ilgili bulunmuştur (Gulliver, Begg, Brookland, Ameratunga, ve Langley, 2013). Kısa süreli eğitimle ehliyet sahibi olma şansı verilen ülkelerdeki sürücü adaylarının

yeterli olmayan sürüş becerileri sebebiyle normal eğitim sürecini tamamlayan adaylara nazaran daha fazla kaza rapor ettiği bilinmektedir (Craen, & Vlakveld, 2013). Fakat 16 ve 17 yaşlarında sürücü adayı olan kişilerin eğitim süreleri 18 yaşında aday olan kişilerden uzun olsa da kaza riskleri daha fazla olmaktadır (Chapman, Masten, & Browning, 2014). Bütün bu örneklerde görüldüğü üzere, sürücü adayları ile yapılan birçok çalışma vardır fakat Türk örneklemi kullanılarak yapılan çalışma sayısı neredeyse yok gibidir.

Çalışmanın genel amacı Türk sürücü adaylarının tutum değişimini takip çalışması ile incelemek ve sürücü eğitim sisteminin bu tutumlar üzerindeki etkisini incelemektir. Ayrıca sürücü davranışlarının üzerindeki tutum etkisini analiz etmek planlanmaktadır. Bunların yanı sıra;

- Sürücü adaylarında ilk kez kullanılan Manchester Sürücü Tutum Anketi (MSTA), Trafik İklimi Ölçeği (TİÖ), ve Sürücü Davranışları Anketi'nin (SDA) faktör yapısını incelemek
- Kadın ve erkek sürücü adaylarını yaş, direksiyon eğitiminde kat edilen km, direksiyon eğitimindeki kaza sayısı, yazılı sınav sonucu, direksiyon sınav sonucu, MSTA, TİÖ ve SDA puanları açısından karşılaştırmak
- Adayların eğitim seviyelerinin yazılı sınav sonucu, direksiyon eğitim sonucu, direksiyon eğitimindeki kaza sayısı MSTA, TİÖ ve SDA puanları açısından karşılaştırmak
- Sürücü eğitiminin, aday sürücülerin tutumları üzerindeki etkisini incelemek
- Eğitimden önceki ve sonraki tutumların sürücü davranışlarını yordama gücünü test etmek
- Yazılı sınav sonuçlarının sürücü davranışlarını, eğitim öncesi tutumların yazılı sınav sonuçlarını, sürücü davranışlarının direksiyon sınavı sonuçlarını ve eğitim sonrası tutumların direksiyon sınavı sonuçlarını yordama gücünü test etmek.

Çalışmaya yaşları ortalaması 25.26 olan 92 erkek 58 kadın olmak üzere 150 aday sürücü katılmıştır. Sürüş ile ilgili tutumlar Manchester Sürücü Davranışları Araştırma Grubu tarafından geliştirilen Manchester Sürücü Tutum Anketi (MSTA) ile ölçülürken, trafik iklimi ile ilgili tutumlar Trafik İklimi Ölçeği (Özkan, ve Lajunen, yayımlanmamış makale; Gehlert, Hagemaister, ve Özkan, 2014) ile ölçülmüştür. Pozitif sürücü davranışlarını da kapsayan Sürücü Davranışları Anketi (SDA) (Özkan, ve Lajunen, 2005) direksiyon eğitimi sırasındaki davranışları değerlendirmek için kullanılmıştır. Veriler ilk kez ehliyet almak için sürücü kursuna kayıt olan adaylardan, Çorlu' da ki bir sürücü kursundan toplanmıştır. Birbirini takip eden iki veri toplama işlemi yapılmış ve eğitimden önce tutum anketleri, eğitimden sonra ise tutum ve davranış anketleri dağıtılmıştır. Ayrıca, her bir adayın teorik sınav notu ve teorik sınavda başarılı olanların direksiyon sınav sonuçları da kullanılmıştır.

Yapılan analizlere öncelikle sürücü adaylarında ilk kez kullanılan anketlerin faktör yapısını incelemekle başlanmıştır. Takip çalışması için iki kez kullanılan MSTA, zamanlar arasında faktör yapısı farklılığı göstermemiş ve orijinal hali olan 4 faktörlü yapıdan farklı olarak 'risk odaklı tutumlar' ve 'güvenlik odaklı tutumlar' olmak üzere 2 faktörlü yapı göstermiştir. TİÖ, sürücü adaylarında 3 faktörlü yapı göstermiş olup bu faktörler 'içsel gereklilikleri', 'işlevsellik' ve 'dışsal-duygu talepleri' olarak sıralanmıştır. SDA ise sürücü adaylarında en temel yapısına ayrılmış 'hatalar' ve 'ihlaller' boyutlarını göstermiş, olumlu sürücü davranışları ile birlikte 3 faktörlü yapısını göstermiştir.

Daha sonra yapılan detaylı analizlerde kadın ve erkek sürücü adaylarının yaş, direksiyon eğitiminde kat edilen km, direksiyon eğitimindeki kaza sayısı, yazılı sınav sonuçları, MSTA, TİÖ ve SDA puanları arasındaki temel farklılıkları görebilmek amacı ile ANOVA kullanılmıştır. Bu analiz kadın sürücü adaylarının erkek sürücü adaylarına oranla içsel gereklilikler faktöründe daha yüksek puanlar aldığı ve daha fazla olumlu sürücü davranışı gösterdikleri görülmüştür. Bu durum kadınların erkeklere nazaran trafiği daha talepkâr gördükleri, bu taleplerle baş edebilmek için yetenekli olmaları gerektiğini düşündüklerini ve bu durumu telafi

edebilmek için daha çok olumlu sürücü davranışları gösterdikleri şeklinde yorumlanabilir. Kadınların erkeklerden daha az ihlal yapıyor olması da (Reason, Manstead, Stradling, Baxter, ve Campbell, 1990; Lawton, Parker, Stradling, ve Manstead, 1997; Yagil, 1998; Díaz, 2002; Özkan, ve Lajunen, 2005) bu görüşü destekler niteliktedir

Eğitim seviyelerinin etkisini görebilmek amacıyla yapılan karşılaştırmalar için kullanılan ANOVA sonucunda ise, üniversite mezunu olan adayların ilkokul mezunu adaylara nazaran yazılı sınavdan daha yüksek notlar aldığı görülmüştür. İlkokul mezunu olan grubun eğitimden önceki güvenlik odaklı tutumlar alt boyutunda en düşük puanları aldığı, eğitimden önceki içsel gereklilikler alt boyutunda üniversite mezunlarının en yüksek puanları aldığı, eğitimden önceki işlevsellik boyutunda ise ilkokul mezunu adayların üniversite mezunu adaylardan daha yüksek puan aldığı görülmüştür. Bunlara ek olarak, eğitimden sonraki içsel gereklilikler alt boyutunda ilkokul mezunu olan adayların üniversite mezunu olan adaylara nazaran düşük puanlar aldığı görülmüştür. Üniversite mezunlarının yazılı sınavdan daha yüksek not almış olmaları testlere ve sınavlara ilkokul mezunu adaylardan daha çok alışık olmalarıyla açıklanabilir ve eğitimden önceki güvenlik odaklı tutumlarının ilkokul mezunu adaylarda düşük olması yüksek eğitim seviyesine sahip adayların trafik kurallarının gerekliliğini daha iyi kavradığı şeklinde yorumlanabilir. Ayrıca diğer sonuçlara bakarak, eğitim seviyesi yüksek olan adayların trafiğin olumsuz yönlerine daha çok odaklandığı, eğitim seviyesi daha düşük olan adayların ise trafiği daha işlevsel bulduğu söylenebilir. Üniversite ve ilkokul mezunu adayların trafik iklimine yönelik tutumlarının farklı olmasının sebebi direksiyon eğitimi süresinin kısa olması, bu sebeple de trafiği bütün yönleriyle değerlendirebilmek için yeterli vakit olmaması olabilir.

Sürücü eğitimi öncesi ve sonrası tutum farklılıklarını görebilmek amacı ile yapılan bağımlı örneklem t-testi sonuçlarında, faktör bazında sadece eğitimden önceki risk odaklı tutumların eğitim sonrasında arttığı gözlemlenmiştir. Madde bazında MSTA' ya ait olan 'Şehir içinde 50 km hız sınırının kesinlikle uygulanması taraftarıyım', ve TİÖ' ye ait olan 'Dinamik' ve 'Kaotik' maddelerinde eğitimden

sonra daha yüksek puanlar alındığı, 'Karşılıklı anlayışa dayalı' ve 'Güvenli' maddelerinin puanlarının ise azaldığı gözlemlenmiştir. Risk odaklı tutumların artması Helman ve arkadaşlarının çalışması ile paralellik göstermektedir (Helman, Kinnear, McKenna, Allsop, ve Horswill, 2013). Ayrıca, tek başına araç kullanmaya adım atmış olmak adayların kendilerine olan güvenlerini arttırmış ve daha çok risk almalarına yol açmış olabilir.

Regresyon analizleri ise eğitimden sonraki risk odaklı tutumların ve işlevsellik algılarının hata davranışlarını negatif biçimde yordadığını, ihlallerin eğitimden önceki risk odaklı tutumlar ve eğitimden sonraki içsel gereklilikler alt boyutu tarafından negatif ve eğitimden sonraki dışsal-duygu talepleri alt boyutu tarafından pozitif biçimde yordandığını göstermiştir. Olumlu sürücü davranışları ise eğitimden önceki risk odaklı tutumlar ve trafiğin gereklilikleri alt boyutu tarafından pozitif olarak yordanırken, eğitimden sonra sadece trafiğin gereklilikleri alt boyutu tarafından pozitif olarak yordanmıştır. Bu sonuçlar Risk Dengeleme Teorisi'ni çağrıştırmaktadır. Risk Dengeleme Teorisine göre, insanların göze aldıkları belli bir risk seviyesi vardır. Bir durum ya da eylemin sonunda oluşabileceğini tahmin ettikleri risk kişilerin kabul ettikleri risk seviyesinden daha yüksekse tehlikeden korunabilmek için daha güvenli davranmaya başlarlar fakat durum ya da hareket göze alınan risk seviyesinden daha risksiz ise davranışlar daha riskli olmaya başlayacaktır. (Heino, Molen, ve Wilde, 1996). Risk odaklı tutumları fazla olan sürücü adaylarının daha az hata ve ihlal yapması, trafiği talepkar gören adayların daha çok pozitif sürücü davranışı göstermesi gibi sonuçlar Risk Dengeleme Teorisi ile paralel gözükmektedir.

Diğer bir regresyon analizi yazılı sınav notunun hiçbir sürücü davranışını yordamadığını göstermiştir. Bu regresyon yazılı sınav sonucunun teorik derslerden elde edilen kazanımın göstergesi olduğu düşünülerek yapılmıştır fakat Türk sürücü adaylarının teorik derslere katılım oranının çok düşük olması da bu sonucu doğurmuş olabilir (Sürücü Eğitimi ve Yeni Sürücüler, 2002). Eğitimden önceki tutumların, adayların yazılı sınav sonucunu yordayıp yordamadığına bakıldığında ise sadece kontrol değişkenlerinden olan adayın eğitim seviyesinin

anlamlı bir yordama gücü gösterdiği fark edilmiştir. Bu analiz de sürücü adaylarının teorik eğitimden edindikleri kazanımların eğitimden önce var olan tutumlarından etkileneceği düşünülerek yapılmıştır ama var olan tutumlar kazanımları etkileyecek kadar güçlü olmayabilir ve daha da önemlisi yazılı sınav teorik eğitimden edinilen kazanımların bir göstergesi sayılmıyor olabilir. Bunlarla birlikte sürücü davranışlarının direksiyon sınav sonucu üzerinde etkisini görebilmek için regresyon analizi kullanılmış fakat anlamlı bir etki bulunamamıştır. Bu sonucun sebebi SDA' nın ve direksiyon sınavı değerlendirme formunun farklı yapılar içermesi olabilir. Üstelik adaylar ve sınav gözetmenleri adayları aynı kâğıt üstünden değerlendirseler bile sonuçların birbirinden çok farklı çıkması muhtemeldir. Ayrıca eğitimden sonraki tutumlarda direksiyon sınavı sonucunda anlamlı bir yordama gücüne sahip değildir. Bu analiz tutumların davranışları yordama gücünden yola çıkılarak yapılmıştır fakat sonucun anlamsız olmasının sebebi direksiyon sınav sonucunun yordayıcısının tutumlar ve davranışlardan başka bir etken olması olabilir.

Türk sürücü adaylarını örneklem olarak kullanarak yapılan ilk takip çalışması olması ve literatürde az yer verilen bir grupta yapılması bu çalışmanın literatüre en büyük katkılarından biridir. Sürücü adaylarının tutum değişimi Türkiye'de ilk kez analiz edilmiş ve eğitimin tutum değişiminde ki rolü incelenmiştir. Ayrıca, MSTA, TİÖ ve SDA' nın faktör yapısı sürücü adayları için ilk kez incelenmiştir.

Çalışmada bulunan ilk kısıtlayıcı etmen ölçeklerin beyana dayalı olması olarak görülmüştür. Ayrıca olumlu sürücü davranışları alt ölçeğindeki bazı davranışlar sürücü adayları tarafından direksiyon eğitimi sırasında sergilenemeyecek olsa da yüksek puanlar dikkat çekmektedir. Bu durum sürücü adaylarının oldukları değil olmak istedikleri sürücüyü göstermiş olmalarından kaynaklanıyor olabilir. Teorik derslere devamlılık durumu da ciddi bir kısıtlayıcı etmendir. Resmi kayıtlarda bütün adaylar bütün derslere devam ediyor olarak rapor edilmiştir fakat devamlılık oranının gerçekte çok düşük olduğu tahmin edilmektedir ve devamsızlık yapılmamış olsa bile derse devam ve katılım farklı şeylerdir. Adayların derse ne kadar katılım yaptığını ve dikkat ettiği ölçmek ileriki

çalışmalarda dikkat edilmesi gereken bir husustur ve bu kontrol teorik derslerden edinilen kazanım hakkın da daha iyi yorumlar yapabilme konusunda yarar sağlayabilir. İlerde yapılacak olan çalışmalarda dikkat edilmesi gereken bir diğer hususta adayların gelir seviyesini kontrol etmektir çünkü gelir seviyesi ve akademik eğitim seviyesinin davranışlar üzerinde etkisi olduğu görülmüştür (Shinar, Schechtman, ve Compton, 2001). Ayrıca adayların asıl sürücü olmaya hak kazandıktan sonraki kaza sayılarının takip edilmesinin tutumlar ve kazaya karışma oranı arasında ki ilişki hakkında değerli bilgiler vereceği düşünülmektedir.

Appendix J: TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ☐

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı :
Adı :
Bölümü :

TEZİN ADI (İngilizce) :

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: