THE EFFECT OF ROAD SAFETY ADVERTISEMENTS ON SPEEDING BEHAVIOR OVER TIME: A SIMULATOR STUDY

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ABSTRACT

THE EFFECT OF ROAD SAFETY ADVERTISEMENTS ON SPEEDING BEHAVIOR OVER TIME: A SIMULATOR STUDY

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Countermeasures to prevent death and injury in traffic are important for traffic safety. Human error is a critical component associated with road traffic accidents. Therefore, various organizations and decision-makers are trying to prevent risky behaviors via different methods. One of the most used methods of raising awareness and creating behavioral change is traffic safety campaign videos. The focus of the present study is speeding, which is one of the most dangerous violations on the road. The study aimed to investigate the effect of anti-speeding advertisements with different contents (fear, sad emotion, and factual information) on young drivers' speeding behavior. A total of 124 drivers (84 males, 40 females) aged between 18 to 26 (M = 22.81, SD = 1.80) participated in the study. Participants completed a questionnaire package including a demographic form, Driver Behavior Questionnaire, and drove the simulator scenario. The measurements were taken three times as baseline level and two follow-up levels to observe short and long time effects of the videos. According to the results, a general pattern was observed that the average speed of the drivers decreased immediately post-exposure, and it was measured as the highest after two weeks. On the contrary, drivers reported more

frequent speed violations right after the manipulation than their baseline measurements. Significant time-dependent differences were observed in the emotional groups. Results were discussed in the context of related literature. Since social media campaigns may affect behaviors and attitudes, the results can help make more effective awareness videos about traffic safety.

Keywords: road safety advertisements, speeding, driver behavior, behavioral change

ÖZ

YOL GÜVENLİĞİ REKLAMLARININ HIZ YAPMA DAVRANIŞINA ZAMAN İÇİNDE OLAN ETKİSİ: BİR SİMÜLATÖR ÇALIŞMASI

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Trafikte ölüm ve yaralanmaları engellemek adına alınacak tedbirler trafik güvenliği açısından önem teşkil etmektedir. Trafik güvenliği söz konusu olduğunda ise, insan hatası kavramı önemlidir. Bu yüzden çeşitli organizasyonlar ve karar vericiler çeşitli yöntemlerle riskli sürücü davranışlarının önüne geçmeye çalışmaktadırlar. Farkındalık ve davranış değişikliği yaratmak adına en sık kullanılan yöntemlerden biri de trafik güvenliği ile ilgili videolardır. Bu çalışma, yolda yapılan en tehlikeli ihlallerden biri olan hız yapma davranışına odaklanmaktadır. Araştırmanın amacı, farklı içeriklere sahip (korku, üzücü duygu ve olgusal bilgiler) hız karşıtı reklamların genç sürücülerin hız yapma davranışı üzerindeki etkisini incelemektir. Çalışmaya 18 ile 26 yaş (*Ort.* = 22.81, *SS* = 1.80) arasında toplam 124 sürücü (84 erkek, 40 kadın) katılmıştır. Katılımcılar, demografik form ve Sürücü Davranışları Ölçeği'nden oluşan bir anket formunu doldurup simülatör senaryosu sürmüşlerdir. Videoların kısa ve uzun süreli etkilerini gözlemlemek amacıyla ölçümler temel düzey ve manipülasyondan sonraki iki takip seviyesi olmak üzere üç kez alınmıştır. Bulgular, sürücülerin ortalama hızlarının videoyu izledikten hemen sonra düştüğü ve iki hafta sonraki ölçümlerde en yüksek seviyeye ulaştığı genel bir örüntüyü

ortaya çıkarmıştır. Bunun tersine sürücüler, manipülasyondan hemen sonra temel ölçümlerine göre daha sık hız ihlalleri bildirmişlerdir. Elde edilen sonuçlar ilgili literatür bağlamında tartışılmıştır. Sosyal medya kampanyaları tutum ve davranış üzerinde etkili olabileceğinden, sonuçlar trafik güvenliği hakkında daha etkili farkındalık videoları oluşturmaya yardımcı olabilir.

Anahtar Kelimeler: yol güvenliği reklamları, hız yapma, sürücü davranışı, davranış değişikliği

Nobody gonna take my car
I'm gonna race it to the ground
Nobody gonna beat my car
It's gonna break the speed of sound
Oooh it's a killing machine
It's got everything
Like a driving power big fat tires
And everything

I love it, and I need it
I bleed it
Yeah it's a wild hurricane
Alright hold tight
I'm a highway star

(Deep Purple-Highway Star)

To my parents, my sister

and my grandmother

with love…

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CHAPTER 1

INTRODUCTION

Speeding is characterized as fun and exhilarating by drivers of all time. Especially young drivers consider speeding as a way to pose to other road users with their 'fancy and powerful' cars (Thomas et al., 2007). Besides, faster speeds seem to have some advantages, such as reducing travel time, increasing free time, and it is thought to reduce stress and strain while increasing productivity (Berry et al., 2011). Due to its attractiveness, speeding has been most resistant to change as a contributing factor of young driver crashes. Although interventions have been performed for prevention over the years with different methods, it is still a significant threat among road users- drivers, pedestrians, and passengers (Elvik, 2010).

Furthermore, traffic accidents are the first cause of death among those aged between 5 and 29 years, and speeding is one crucial potential factor in a fatal crash when the driver is under 25 years old (World Health Organization [WHO], 2007). Therefore, focusing on speed management essential to improve road safety conditions. To do so, decision-makers and practitioners are using various tools such as classifying roads, limiting speeds, engineering the road to encourage lower speeds and using some interventions to change driver behaviors (WHO, 2008). One of the most effective ways to change behavior is public education, which can be applied via different methods. With the rise of TV ownership, road safety advertisements become popular to reach the public to increase awareness about risky behaviors. In the present study, the effect of road safety advertisements on driver behaviors was investigated. At this point, it is essential to understand the role of human behaviors on road traffic safety in the general framework.

1.1. Human Factors in Driving

Human factor is one of the critical components that may directly cause road traffic accidents. According to Lewin (1982), the reason for more than half of all accidents is solely human factors, while the remaining is caused by the combination of human factors and others such as environmental and mechanical factors. It has been studying to reduce accident involvement and provide safety on the road (Evans, 1991). In the context of the traffic environment, the human factor refers to psychical, cognitive, metacognitive and emotional characteristics of drivers that may influence their behavior. Any factors such as motivation, fatigue, drugs, distraction, and travel time may cause a driver to show a lower level of capability. Like driver competence, speed choice is also affected by human factors (Fuller, 2005; Pêcher et al., 2011).

Driver performance and driver behavior are two main components of human factors that affect driving. The first one refers to what drivers "can" do while driving, such as motor and safety skills or perceptual, cognitive abilities. The latter reflects what drivers generally "do" while driving (Elander et al., 1993; Evans, 1991). In a broad sense, driver behavior is the way how individuals choose to drive. It includes behaviors such as preferred speed, preferred following distance, overtaking frequencies, scanning the environment for potential dangers, and following the traffic rules (Lajunen & Özkan, 2021).

Figure 1 demonstrates a pathway to clarify the background of a crash (Lajunen & Özkan, 2011; 2021). According to this model, driving skills, in other words, driver performance is affected by a driver's general cognitive abilities and experience, which is related to the likelihood of errors. On the other hand, driving style (driver behavior) is characterized by violations against safe driving. These kinds of risk behaviors reduce safety margins. In another saying, risky driver behaviors come with narrower safety margins the driver accepts. Since both errors and safety margins contribute to crash risk, precautions should include both components. The present study was focused on one of these main components, driver behavior, as the outcome.

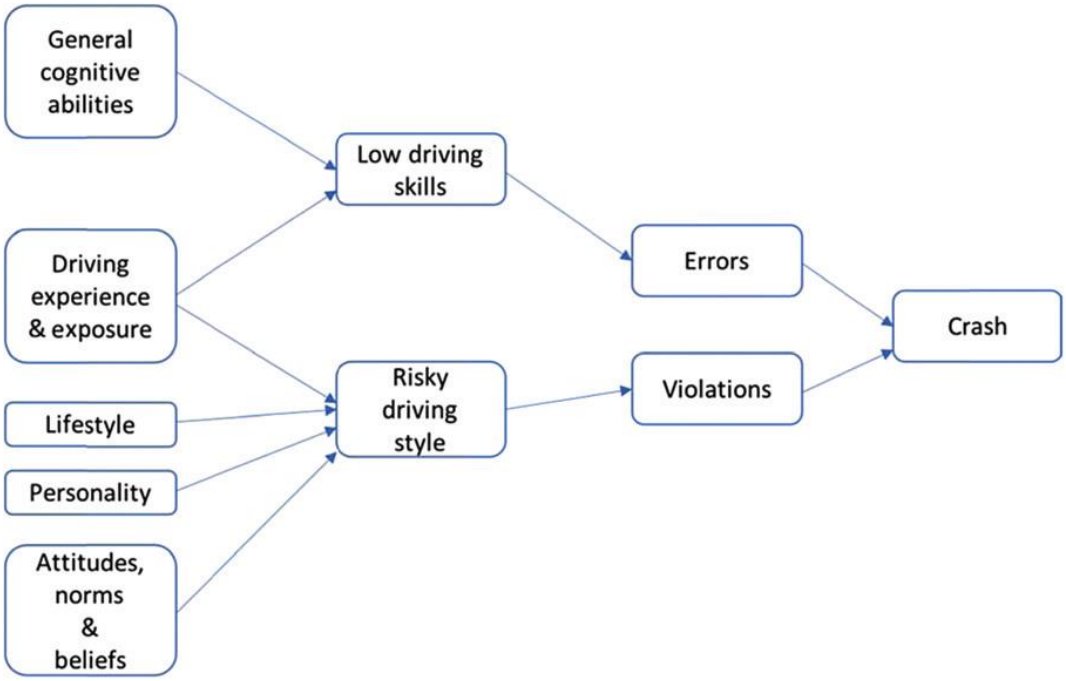


Figure 1. *Two pathways to crash (Lajunen & Özkan, 2021)*

1.1.1. Driver Behaviors

Various taxonomies evaluate human errors from different perspectives. One of the widely used taxonomy is Reason, et al.'s (1990) classification of unsafe acts. According to this approach, driver behaviors are divided into two categories as errors and violations. These categories have different psychological origins and distinct from each other in terms of intention.

Errors are defined as "failure of planned actions to achieve their intended consequences" (Reason et al., 1990, p. 1315) and divided into two categories as slips and lapses, and mistakes. Slips are referred to attentional or perceptual failures. It is related to psychomotor components of driving (e.g., switching on the headlights when you intended to active wipers). Here, the intention is correct, but the execution is erroneous. Besides, lapses are commonly associated with memory failures (e.g., having no clear recall of the road just traveled or forget where you left the car). It refers to forgetting to do something, although fully intended to do so.

On the contrary, a mistake occurs when a driver intentionally performs a wrong action (e.g., getting into the wrong lane on approaching a roundabout or junction). Mistakes arise at the planning level rather than at the execution level. More clearly, slips are the performance of an action that was not intended. It is a form of error in

the execution of an intention. On the other hand, mistakes are errors of intention (Norman, 1981; Oppenheim & Shinar, 2011; Reason et al., 1990; Woods, 1983). Violations are described as "deliberate deviations from those practices believed necessary to maintain the safe operation of a potentially hazardous system" (Reason et al., 1990, p. 1316). Later, a further distinction was introduced by Lawton et al., (1997) between two forms of violations as ordinary violations and aggressive violations. The former consists of highway code violations such as speeding, running a red light, while the latter refers to acting aggressively toward other road users, such as giving chase with the intention of giving them a piece of your mind.

There have been different self-report instruments to measure unsafe driver behaviors. The aberrant driver behaviors are most frequently measured by the Driver Behavior Questionnaire (DBQ), which is based on Reason et al.'s theoretical taxonomy of aberrant behavior mentioned above (de Winter & Dodou, 2010). The first factor structure of the DBQ has three factors as deliberate violations, dangerous errors and silly errors (Reason et al., 1990). Also, the DBQ has been translated into different languages and used in different cultures. According to de Winter and Dodou (2010), at least 174 studies have used the DBQ or different versions of the scale. In most of these studies, 'violations' and 'errors' factors remained stable, but the factor structures showed some differences among studies and cultures. The possible underlying reason for this situation might be that each country has its culture-based traffic problems as well as global problems like speeding (Özkan et al., 2006b).

Furthermore, driver behavior is affected by some driver characteristics. For example, in the DBQ literature, it has been reported that female drivers tend to commit errors and lapses more, while young male drivers are more prone to violate than females (Özkan et al., 2006c). Also, male drivers likely to engage in risky behaviors such as speeding, drinking and driving. As a result, they over-represented in accident statistics (Clarke et al., 2005; Laapotti et al., 2001; Özkan et al., 2006c).

In general, young drivers seem to be less concerned with the negative outcomes of violations or are less aware of the danger. Also, older drivers reasonably tend to evaluate some outcomes as more negative (e.g., that speeding endangers others' lives), while younger drivers describe these outcomes as more positive (e.g., that

overtaking in risky circumstances helps arrive at the destination more quickly). Social context also affects young drivers' behaviors that they see their relatives and friends as less likely to expect them not to violate. As a result, they have extra motives to show off their skills and find it hard to resist committing the violations (Parker et al., 1992a). It is not surprising that young drivers are considered risky, they are more often involved in accidents than older drivers. Besides, older drivers cope with certain situations in traffic better. Competitiveness reduces with age and experience so that older drivers commit fewer violations than younger drivers (Laapotti et al., 2001; Mesken et al., 2002; Özkan et al., 2006c; Reason et al., 1990; Vassallo et al., 2007). All these risky situations have made young drivers a risky group that is needed to be examined.

1.1.1.2. Speeding

Speeding has a complex and multicausal nature. Over time, it has become an intractable key problem behavior in traffic (Elvik, 2010; Laapotti et al., 2001; Vassallo et al., 2007). Even its benefits are easily noticeable, the risks and problems are not always perceptible (Elvik, 2010). So, nearly 40-50% of drivers drive faster than the recommended speed limit and exceeding the speed limit more than 10 km/h is very prevalent among drivers. Besides, driving at an inappropriate speed increases not only the probability of crashes but also the likelihood of death or severe injuries (European Commission [EC], 2021; Truelove et al., 2017). Probably, speeding has a larger effect than any other risk factor on road safety because the speed at the time of collision is the key factor for the severity of the crash (Ulleberg et al., 2009). Furthermore, mortality and morbidity rates due to speeding change across countries. For instance, in high-income countries, speeding contributes 30% of deaths in accidents. Simultaneously, it is the main contributor to traffic accidents in low and middle-income countries with a half proportion of all traffic accidents (WHO, 2004b).

Despite the risks, drivers commit speeding violations for various reasons such as getting to the destination in time, gaining more free time, or revealing positive feelings. Moreover, improvements in road standards and vehicles can lead individuals to drive faster (Berry et al., 2011; Mesken et al., 2002). From this point of view, speeding has many causes that can be discussed from different perspectives.

To identify and integrate variables influencing speeding, Berry et al. (2011) applied drivers' speeding behavior to the Ishikawa diagram (also called fishbone diagram), which shows the causes and effects of a specific event (see Figure 2). In this diagram, speeding is considered a nexus variable because of the mediation role between multidimensional causes and possible positive and negative consequential effects. Antecedents of speeding are examined in two main fields as driver factors and environmental factors. Driver factors comprise of three causal factors as culture, behavior and person. On the other hand, environmental factors include two causal factors as roadway dynamics and vehicle systems and control. Since the current study is focused on human factors, three primary causal factors will be presented in detail.

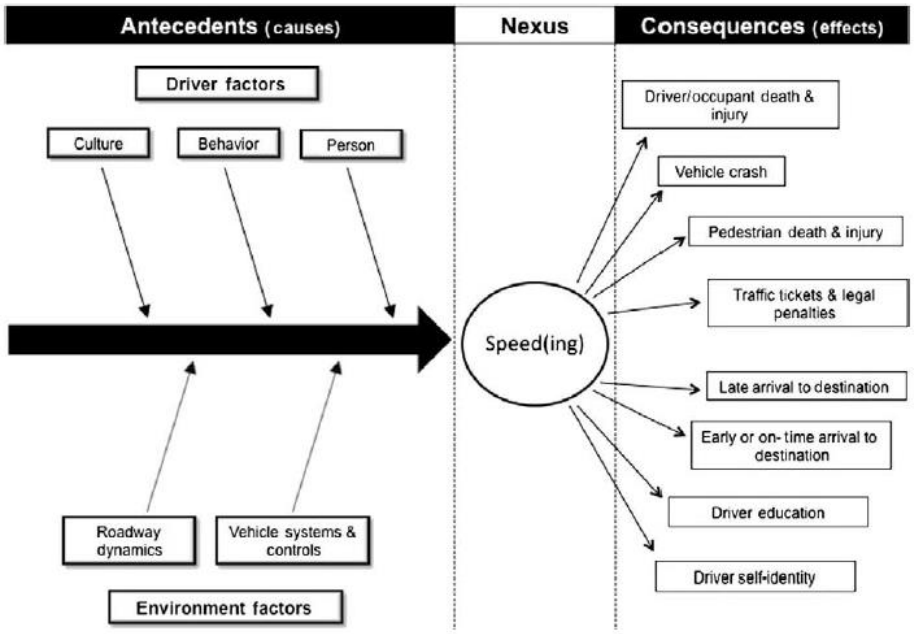


Figure 2. *Ishikawa diagram for speeding behavior (Berry, et al., 2011)*

First, personal factors on driving comprise of three subbranches as demographic, personality and information processing. According to official traffic records and many studies in the field, demographic characteristics are descriptive of speeding behavior. For instance, male drivers report more violations than females and have high accident involvement rates as stated in researches from different nations (e.g., Constantinou et al., 2011; Elvik, 2010; Özkan & Lajunen, 2006a; Özkan et al., 2006c). Besides, gender seems to be a strong predictor of drivers' speeding. Males are more involved in speeding-related crashes and more speed-related fatalities than

are females. Unsurprisingly, they are also more inclined to accept speeding by the driver (Berry et al., 2011; Cordellieri et al., 2016; Truelove et al., 2017).

Among demographic factors, age is another strong predictor of speeding behavior. Accident involvement of young drivers is about 2.5 times higher than older drivers. More or less, their accident characteristics have some differences. For instance, young drivers generally include single-car accidents involving excess speed limit and loss of control (Clarke et al., 2002). Also, age and mileage were predictors of speeding tickets. Young drivers and those with high mileage are generally fined for excessing the speed limits (Mesken et al., 2002). Besides, speeding is 'cool and preferable' on the roads among young drivers and they tend to violate not only as single-car users but also in the presence of other passengers (Simons-Morton, et al., 2005). From this perspective, speeding seems the most common violation on the road among young drivers (Clarke et al., 2002) and they are more inclined to violate speed limits (Moller & Haustein, 2014; Özkan et al., 2006a; Williams et al., 2006). The present study was focused on young drivers because, as stated in the literature, they are more prone to underestimate the risks. At the same time, they overestimate their own abilities as drivers (De Craen et al., 2011; Elvik, 2010; Sümer et al., 2006).

Traffic psychology also relies on personality traits because some are believed to be more dangerous than others. People who possess these traits may constitute a greater risk in the traffic environment. For instance, driving provides a suitable atmosphere for the drivers who have high sensation seeking to satisfy their desire for arousal, excitement, speed and competition (Hennessy, 2011). As expected, high sensation seeking can cause dangerous behaviors such as speeding and indirectly predict accidents (Sümer, 2003; Schwebel et al., 2006). Constantinou et al. (2011) revealed that impulsivity is related to ordinary violations such as speeding. Similarly, disinhibition, sensitivity to reward are also related to traffic violations and offenses. Some other behavior patterns, such as angry/hostile behavior are also related to risky driving (Schwebel et al., 2006).

Lastly, it is essential which information is processed in what ways for determining driver behavior. Information processing is like a black box between the observable stimuli and the response. Driving is mainly an information process that shapes driver behavior. Drivers process various types of information at multiple levels and

regulate their actions in different ways by considering their driving style, abilities and associated risks. As a result, this process shapes driver behavior hence qualities of speeding and related consequences (Berry et al., 2011; Shinar, 2017). People need time to process information and respond. At higher speeds, drivers need more time to process information to decide whether or not to react. As a result, avoiding a collision becomes more challenging as speed increases (van Schagen et al., 2018)

Behavioral factors also shape risky situations in traffic. Drivers adjust their speed according to the complexity of distractions such as turning on FM radio, cell phone using, eating and drinking, talking with other passengers. These kinds of critical distractions divert attention away from the primary task of driving. They may impair the drivers' performance within the context of dual-task inference, self-regulation and compensation and cognitive capacity (Berry et al., 2011). These risky behaviors pose a danger to not only drivers but also other road users. Moreover, distracted driving contributes to accident fatalities and injuries. Young drivers are involved in this kind of distracted-effected crashes more than older drivers (National Center for Statistics and Analysis [NCSA], 2017; Schroeder et al., 2018). In general, distracted driving, especially texting, may play a significant role in reducing safety. This kind of behavior also negatively influences traffic flow and traffic operations (Stavrinos et al., 2013).

The cultural context we live in is another piece of the diagram. Drivers are a kind of community who shares the roads. Driving includes our evaluations about ourselves and how others evaluate us as drivers. So, each individual is influenced by this social environment, including other road users, general social norms, traffic rules (Lonero, 2007; Zaidel, 1992). This cognition guides and motivates cultural-based behaviors that are deliberate reflections of the culture. For example, the belief structures of a given culture affect the decision-making process so that the driver’s risk perception. Attitudes and beliefs related to high benefits and costs may specify drivers' decision to engage in that behavior (Ward, 2007). Some studies used Theory of Planned Behavior (TPB) to explain violations such as speeding and they found that attitudes towards behavior, subjective norms and perceived behavioral control, together determine driver’s behavior via their speeding intention (Forward, 2009; Parker et al., 1992b; Wallén Warner & Åberg, 2008; Wallén Warner et al., 2009). Forward

(2010) stated that positive attitudes about speeding were predictors of speeding behaviors and drivers who intended to speed also had positive beliefs about its outcome, such as arriving at the destination quicker and an enjoyable driving experience. Consistently, Conner et al. (2007) revealed that attitudes, moral norms anticipated regret and past behaviors are predictors of intention to speed. Moreover, intentions and moral norms also predictors of speeding behavior.

It is obvious that countries have different traffic cultures and this social context influences driving styles and attitudes in various degrees (Lonero, 2007). For example, Özkan et al. (2006b) stated that Southern European and Middle Eastern drivers reported more aggressive violations than Western Europe drivers. In the study of Nordfjærn et al. (2014), it was found that Norwegians have safer attitudes towards traffic safety and driver behavior when compared to countries from Sub-Saharan Africa, Near East (Turkey and Iran) and Russia/India. Some cross-cultural differences were also reported by Wallén Warner et al. (2009) on speeding. According to their study, Swedish drivers have a more positive attitude towards complying with the speed limit, higher perceived behavioral control and more positive subjective norm than Turkish drivers. From this point of view, culture and its influence need to be discussed within the frame of both the attitudes and beliefs of individuals and norms of the community shared by individuals (Ward et al., 2010).

All in all, many factors determine speeding behavior in a broad sense. Obviously, enforcement is an effective way to reduce the tendency of speeding (Hoekstra & Wegman, 2011; Zhao et al., 2019). However, if the psychological factors beyond driver behaviors can be determined, more reliable interventions may lead to changes in speeding behavior. Since young drivers tend to exaggerate their driving skills and assess others as worse than themselves (De Craen et al., 2011; Deery, 1999), they may be the drivers who need safety campaign messages more than others. These driver behavior campaigns on media can lead them to reassess their own driving behaviors. Consistently, it is stated that this kind of media campaign effectively changes attitudes and beliefs about speeding (Stead et al., 2005). Therefore, the contents of media campaigns should be formed carefully with regard to their effectiveness.

1.2. Behavioral Change in Road Safety

The effectiveness of an intervention is the main factor the designers should consider. Therefore, the content of the intervention and determining using techniques are crucial. Researchers, road safety organizations and communities are working together in applying research to interventions to change risky behavior. Some theories and behavioral models have been used while forming interventions that might change behavior by targeting different factors (Fylan & Stradling, 2014; Ulleberg et al., 2009). However, while these theories lead to which psychological constructs should be handled to change behavior, their guidance on handling these constructs is insufficient. Therefore, the issue of how interventions aim to change behavior has become remarkable (Fylan & Stradling, 2014).

Abraham and Michie (2008) stated that it is hard to identify the intervention techniques that contribute to effectiveness without standardizations and definitions. To clarify this problem, they exhibited a taxonomy that defines the contents of an intervention. Later, these behavioral change techniques were applied in the road safety setting for young people by Fylan and Stradling (2014). In this study, 27 behavioral change techniques were determined, and they grouped as:

- giving information about the negative consequences of the unwanted behaviour;
- teaching people how to undertake the target behaviour;
- planning how to undertake the target behaviour;
- agreeing to undertake the target behaviour;
- supporting people to undertake the target behaviour;
- implementing the acquisition and maintenance of the target behaviour;
- monitoring progress in developing and maintaining the target behaviour;
- managing and coping with change;
- feeling good through identifying incentives to acquiring and maintaining the target behaviour (Fylan & Stradling, 2014, p.127).

According to the literature, the most commonly used techniques are related to the negative consequences of crashes (Delhomme et al., 2009; Fylan & Stradling, 2014; Ulleberg et al., 2009). These techniques aim to inform young people about the risks (e.g., the risk of crashing if you speed) and physical, psychological, and financial results of unwanted behaviors. Education programs in schools generally present crash scenes involving young people images to help them understand their physical

damages (Fylan & Stradling, 2014). Besides, mass media campaigns have a significant role in improving road safety. Hence, it is essential to understand what elements improve the effectiveness of a road safety campaign and how future campaigns can be more effective (Delhomme et al., 2009; Vaa et al., 2009; Wundersitz et al., 2010).

1.3. Road Safety Campaigns

Road safety campaigns can be defined as any intervention programs to inform, persuade or motivate the whole population or a specific group of people to change their beliefs, attitudes and/or behaviors with intent to reduce risk in traffic, using organized communications involving specific media channels within given a time period. These purposeful attempts have various goals: providing information about laws, improving knowledge and awareness, modifying problem behaviors, maintaining safe behaviors, and decreasing the frequency of crashes and their severities (Delhomme et al., 2009; Vaa et al., 2009).

Despite many road safety campaigns worldwide, only a few of them are formally and thoroughly evaluated (Boulanger et al., 2007). According to a meta-analysis, the campaigns were mainly mass media campaigns conducted in industrialized countries, mainly with speeding and drunk-driving themes. The same study also revealed that road safety campaigns reduce accidents by 9% (Phillips et al., 2011). However, some reports indicated that road safety campaigns are more effective on behavior when used in conjunction with education, legislation and law enforcement (WHO, 2004a; Vaa et al., 2004; Vaa et al., 2009; Wundersitz et al., 2010). Besides, the effectiveness of the campaign can be improved by tailoring the message content to the characteristics of the target audience and using different forms of media to reach the target audience (Wundersitz et al., 2010). Lastly, besides rational contents, emotional contents are widely used in safety campaigns because emotions are important determinants of behavior (Phillips et al., 2011; Ulleberg et al., 2009). Particularly, fear appeals have generated a great deal of interest, although using them in road safety remains contentious. Since fear appeal effects are far from unequivocal, it was discussed in detail in the next section with the other manipulation elements in the study.

1.3.1. Negative Emotional Approaches in Road Safety Campaigns

Drivers may experience various emotions behind the wheels, and these emotional states and frequency of emotions affect driving and its outcomes (Pêcher et al., 2011). As a result, emotions may cause a traffic accident through aberrant driver behaviors. Traffic safety research generally focuses on negative emotions because especially strong negative emotions may cause dangerous behavioral patterns on the road. (Mesken et al., 2007; Roidl et al., 2014). Besides, emotional arousal can affect different body components as bilateral activity in the brain and force-producing in the body (Schmidt et al., 2009). Also, it has an impact on memory (Anderson et al., 2006). Emotion-evoking stimuli influence risk perception. For instance, fear is associated with higher risk perception and lack of control, affecting driver performance (Mesken et al., 2007). Besides its direct effect on driver behaviors, emotions also have been used in interventions because from attitudes, beliefs to behavior, emotions have an impact on a wide range. Hence, it is essential to understand the outputs and consequences of exposing emotions. In the present study, two negative emotions (fear and sadness) were used for arousal to observe their effects on simulated driver behaviors and self-report aberrant driver behaviors.

1.3.1.1. Fear and Behavioral Change

Threat appeals have been studied in psychological research since the 1950s and fear is a widely used emotion in behavioral change interventions. It was the primary focus of research between 1953 and 1975 (Witte, 1992; Witte, 1996; Witte & Allen, 2000). Fear has been characterized as an emotional state which motivates protective behavior, accompanied by a high level of arousal (Janis, 1967; Witte, 1996).

However, ‘fear appeal’ is defined as a persuasive message for motivating people to take any action that protects them from potential danger or harm by changing their attitudes and behavior (Maddux & Rogers, 1983; Rogers, 1975). Fear appeal is used in threatening health messages on social media campaigns such as drug and alcohol use, unsafe sex or safety-related concerns as behaviors on road and so on (Ruiter et al., 2014). In countries like Canada, Australia or the UK, many road safety campaign videos are broadcasted frequently on media, demonstrating bloody consequences of traffic accidents. These campaigns aim to decrease risky behaviors on the road hence, deaths and injuries. These kinds of videos create fear arousal and this

unpleasant emotional state force people to take precautions against risky situations. Additively, anti-speeding campaigns mostly use fear-based approaches for the compliance with speed limits like showing the deathly consequences of speeding on the road (e.g., Kaye et al., 2016; Lewis et al., 2007a; Plant et al., 2017).

1.3.1.1.1. Some Theories on Fear Appeals

Some theories examine the effect of fear and threat on attitudes and behavior. For example, Janis and Feshbach (1954) suggested the "defensive avoidance" hypothesis that if a persuasive message stimulates fear but does not include necessary relief, people tend to deny the importance of threat; they may ignore or disdain it. This hypothesis asserted a negative linear relationship such that lower levels of fear resulted in more persuasion. After that, a curvilinear (inverted 'u') relationship was proposed by Janis (1967). In this theory, the "reflective fear" concept was suggested that people specified their fear according to the anticipated harm and threat. So, they adjust their behavior by the level of their reflective fear. As a result, they may deny the threat or make high optimistic expressions about the threat, and they take no action (mild reflective fear). On the other hand, people may feel a momentary rise in emotional tension, and they likely to planning for emergency situations (moderate reflective fear). Lastly, they may feel high emotional tension, show jittery reactions. They may be highly defensive, and their cognitive constriction can be marked (strong reflective fear) (Janis, 1967). In other words, this view suggested that higher levels of fear increase persuasion until some critical point, but after that point, the level of the fear becomes so high so that defensive avoidance reactions arise. As a result, rejection of the message more likely to occur (Lewis et al., 2007b). This curvilinear view revealed that some optimal level of fear exists (Janis, 1967).

In the Parallel Response Model, Leventhal (1970) focused on both cognitive 'danger control response' and emotional 'fear control response' factors as two separate reactions to fear appeal. The danger control process includes promoting protective behavior. In this case, people more likely to regulate their attitudes, intentions and behaviors in line with the message's recommendations. The fear control process comprise of finding responses to decrease the emotional threats by minimizing the threat with various mechanisms (deny, avoidance) or rejecting the message.

Besides, perceived threat and perceived efficacy were first identified as important variables by Rogers (1975; 1983) within the concept of the Protection Motivation Theory. Perceived threat is a concept that also plays a role during the decision-making, which has two dimensions. The first one is perceived susceptibility to the threat; in another saying, the degree that individual's feelings and beliefs about the chance of experiencing the threat. The second dimension, perceived severity, refers to the belief about the seriousness of the threat. Lastly, perceived efficacy also has two dimensions as perceived self-efficacy and perceived response efficacy. The former refers to the individual's belief about their ability to perform the recommended action, while the latter contains the beliefs of the effectiveness of the response on prevention (Rogers, 1975; 1983; Witte, 1992; Witte, 1996). According to this theory, higher levels on these dimensions influence peoples' beliefs, intentions and behavior changes. In other words, when the severity and susceptibility are high in a message, beliefs, intentions and behaviors are more likely to change. Besides, when the response efficacy and self-efficacy are expressed in a strong way by the message, beliefs, intentions and behaviors are more likely to close to the recommended response (Rogers, 1975; 1983; Witte & Allen, 2000).

Lastly, the Extended Parallel Process Model combines the Protection Motivation Theory and the Parallel Response model. This theory asserted that when both perceived threat and efficacy are high, danger control processes arise with adaptive and protective behavior. In other words, adaptive behaviors emerge and the appeal is applied successfully. On the other hand, when the perceived threat is high but efficacy is low, fear control processes arise with maladaptive behavior. In this case, individuals may ignore the message (Witte,1992; Witte & Allen, 2000).

In conclusion, theoretical development in the fear-persuasion literature reveals the complex relationship between the two and changing nature of the perceived fear in different models. Different models also exhibit that fear appeals can be effective in specific situations, and many factors must be considered (Delhomme et al., 2009). For the effectiveness of the fear appeal, the message must be realistic and credible and suggest a coping strategy to avoid the threat. Besides, the audience should perceive it as effective and useful to avert the threat (i.e., high response efficacy). After the exposure, the target audience should believe their competence to carry out

suggested actions (i.e., high self-efficacy) (Donovan et al., 1995, as cited in Wundersitz et al., 2010).

1.3.1.2. Sadness and Behavioral Change

Although it is not as broadly studied as fear, one of the other emotions associated with fear in road safety campaigns is sadness. It is a negative emotion that may arise from loss or failure, such as separation, death of a relative, or an object of interest. This loss can have an impact not only on self but also on others and it may contain a large interval of time from childhood to the present. Also, people can respond to sadness to varying degrees, from less intense to very intense, such as tears and shouts (Rottenberg et al., 2002). Some studies investigate the effect of sadness on other risky behaviors like smoking (Durkin et al., 2018). It was reported that greater exposure to this kind of advertisement leads to increase quit attempts. Some studies have shown that television programs involving sadness are more effective on young adults than on older adults (Droulers et al., 2015). When it comes to driving, only a small number of studies have researched the role of sadness. This negative emotion leads to ruminations. Rumination is a perseverative thinking process about the feelings and problems of individuals. So, people who are ruminating fixate on these said problems and feelings without taking any action (Nolen-Hoeksema et al., 2008). Consistently, in the study of Rosenblatt (2004) the effect of grieving while driving was also revealed. In this study, the majority of the participants who reported that they were grieving while driving declared that they had experienced forgetfulness about what they had done in traffic and did not realize what they were doing. Finally, sadness leads to a psychomotor disturbance in driving control and impairment in driving caused by self-focus and rumination (Pêcher et al., 2011). To the best of our knowledge, the solo effect of sadness in road safety interventions has not been studied yet. In the present study, this effect was also examined.

1.3.2. Emotional vs. Factual Information in Road Safety Campaigns

Campaign message content is one of the essential components for the success of any campaign because it is directly related to the campaign's aim, the target audience, behavioral change and the benefits of safe behavior (Delhomme et al., 2009). The content of the campaigns can be constituted by using cognitive and rational information versus emotional and non-factual elements (Delhomme et al., 2009;

Ulleberg et al., 2009; Wallén Warner & Forward, 2016). Campaigns with rational information include objective information, deductive logic and cognitive processing to present logical reasons why the target should change their behavior. On the other hand, campaigns with emotional information emphasize feelings and images; in other words, they "play" with emotions. Briefly, both rational and emotional appeals motivate action and they have chosen to convey the message to the target audience (Delhomme et al., 2009; Ulleberg et al., 2009; Wallén Warner & Forward, 2016).

However, some studies showed that the effect could be larger when emotional messages are used (Lewis et al., 2007b; Ulleberg et al., 2009). Because in the peripheral route to persuasion, emotions are more critical than cognition. Therefore, presenting emotional messages can be remarkable and persuasive for the receivers and help to pay attention to the quality of arguments in the message (Ulleberg et al., 2009). Conversely, a meta-analysis revealed that campaigns that manage to use both emotional and rational content are more effective than those focusing on one or the other (Vaa et al., 2009). In the present study, driver behavior was manipulated by using road safety advertisements created with both emotional and factual elements to contribute to illuminating this ambiguous situation.

1.4. Aim of the Present Study

Since road safety campaigns have been examining during recent years, there are still deficiencies and ambiguous information about the issue. Hence, the information about how a road safety campaign can be effective is insufficient. This situation makes it hard to determine if and how a road safety campaign might be improved. Evaluations of road safety campaigns may enlighten the deficiencies of current practices (such as using emotional arousal) and help to see if these road safety campaigns are effective (Hoekstra & Wegman, 2011).

Following the literature, the main aim of the current research was to determine whether road safety advertisements with emotional and factual content can directly impact speeding behavior. Therefore, the objectives of this study were to i) determine whether anti-speeding advertisements evoking negative emotions (sadness and fear) reduce young drivers' simulated and self-reported speeding behavior immediately post-exposure ii) examine whether any immediate effects of the anti-speeding advertisements are maintained two weeks later. Since young

drivers are considered risky and more inclined to speed, the sample of the present study was comprised of these participants.

To the best of our knowledge, this is the first study examining both short-term and long-term effects of advertisements with factual and emotional context on simulated and self-report driver behaviors. Based on previous empirical findings, it was expected that the manipulation with both emotional and factual elements would reduce speeding behavior together with expecting more reduction in emotional conditions.

CHAPTER 2

METHOD

2.1. Procedure of the Present Study

First, experimental and control group videos were specified and measurement tools were formed (see Appendix). Ethical approval was obtained from the Middle East Technical University Ethical Committee. After that, an announcement was prepared and posted on Facebook groups. Also, it was hung up on noticeboards on Middle East Technical University campus. After receiving the participants' consent, they were asked to send their e-mail and contact information for appointments. Data collection was consist of three phases with two weeks time interval as time 1 (baseline level), time 2 (immediately post-exposure), and time 3 (after two weeks). After completing all the measurements, participants got a debriefing form and were informed about the study. In the end, they were paid 30 TL for their participation, and the procedure was completed. The first session took 40 minutes (baseline level simulator measurement and Time 2 measurements) and the second session (Time 3 measurements) took 20 minutes approximately. The design of the study can be seen in detail in the following section.

2.2. Design of the Study

For the baseline level, the online survey link was sent to fill before the lab session. After that, participants were asked to come to the Human Factor Lab at their appointment time. When they arrived, they were invited to sit on the simulator and adjust the seat. Then, the simulator equipment was presented, and participants drove the training scenario. After getting approval to move on, the experimenter gave the following instructions: “Now, I request you to drive the experiment scenario. This is an urban road as you saw in the training scenario. The data regarding the experiment scenario will be recorded. Please drive as similar as possible your

driving style on the road." After the participant drove the simulator, the first step of the measurement was completed.

After the baseline level was completed, participants were randomly assigned to the conditions and asked to watch the videos that belonged to their assigned condition. After that, the same measurements were taken for time 2 to observe the manipulation effect in a short time. As a result of this process, participants were given a second appointment and the first session was completed. When the participants came back two weeks later, the same self-report and simulator measurements were taken from the participants again in order to collect data on the possible long-term effect of the video they watched, and the process was completed.

Two participants reported that they had an accident between two lab sessions, so their third measurements were excluded from the data. Four participants dropped out in the second lab session, so their Time 3 measurements could not be recorded. The flow can be seen in Figure 3.

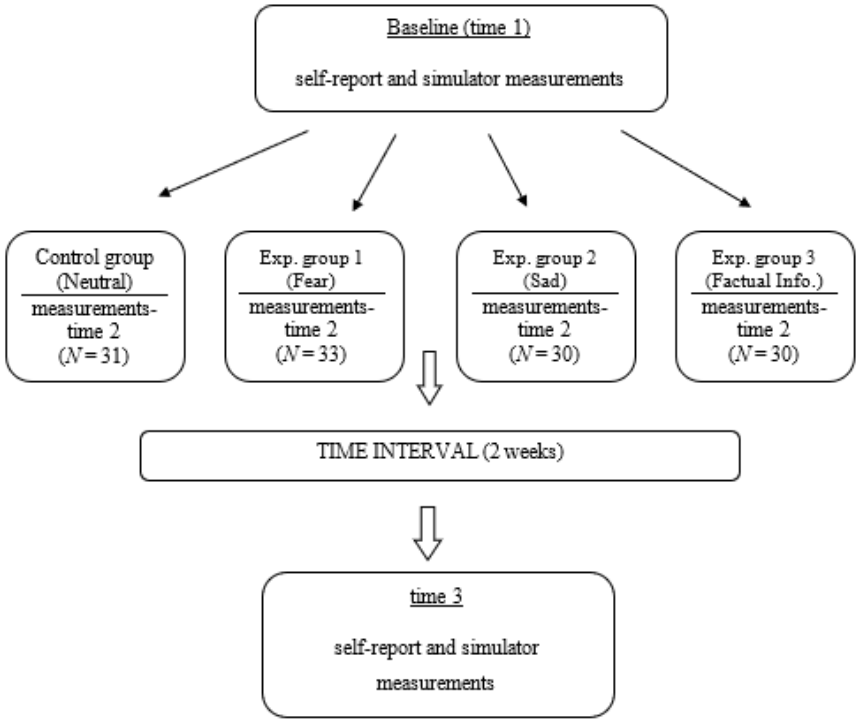


Figure 3. *The flow of the study*

2.3. Participants

84 males and 40 females, a total of 124 university students between the ages of 18 to 26 (*M* = 22.81, *SD* = 1.80) participated in the study. All participants have B type driving license minimum of 8 months to 9 and a half years (*M* = 3.95, *SD* = 1.86). Last year mileage ranged from 500 to 100000 km (*M* = 10397.18, *SD* = 12312.50) and total mileage ranged from 3000 to 400000 km (*M* = 37763.71, *SD* = 54057.83).

2.4. Measures

2.4.1. Demographic Information Form

In this section, participants were asked to state their demographic information such as age, gender, education. Besides, traffic-related information such as years of having a driving license, total mileage, previous year's mileage, driving frequency, active and passive accidents, a total number of offenses (speeding, running the red light, etc.), and their speed preferences for urban roads and motorways were gathered.

2.4.2. Driver Behavior Questionnaire (DBQ)

The Driver Behavior Questionnaire was developed by Reason et al. (1990) to measure aberrant driver behaviors. The DBQ was adapted to Turkish by Sümer, Lajunen, and Özkan (2002). The DBQ has 28 items and four factors as aggressive violations, ordinary violations, errors, and lapses. Responses were recorded on a six-point Likert-type scale (from 1 = Never to 6 = Always). A higher score in a given factor represents higher frequency of the related behaviors. In the present study, Cronbach's Alpha internal consistency values were found as .77 (time 1-baseline level), .80 (time 2) and .84 (time 3) for aggressive violations, .80 (time 1-baseline level), .81 (time 2), and .84 (time 3) for ordinary violations, .53 (time 1-baseline level), .61 (time 2), and .68 (time 3) for errors, .43 (time 1-baseline level), .57 (time 2) and .57 (time 3) for lapses.

2.4.3. Driving Simulator

STISIM Drive® Model 100 Wide Field-of-View Complete System with the software of STISIM DRIVE-M100W-ASPT was used in the present study to test the driver's speeding behaviors. The simulator has three 22'' LCD screens with game-type driving controls (see Figure 4).

Before the data collection, four active drivers drove the training and the experiment scenarios to see if a factor must be fixed or changed. After the driving procedure, some minor arrangements were made at the events in the experiment scenario. Additionally, the training scenario was extended from one to three kilometers according to four participants' feedback. Data regarding this part was not collected.



Figure 4. *Driving Simulator and scenario*

2.4.3.1. The Training Scenario

Before the experiment scenario, a training scenario was presented to the participants to introduce the simulation equipment. The training scenario was three kilometers long urban area with three lines road, which is the same road shape as the main scenario. The training scenario consisted of pedestrians and parking cars on the roadside, one traffic light and a crosswalk, a pedestrian crossing the road, a right turn curve, and ongoing low-density traffic. The environment was also similar to the main scenario.

After one test driving, participants were asked if they are ready for the experiment scenario or not. Some participants drove the scenario twice because of having difficulties in understanding the equipment or the scenario. None of the participants reported any physiological problems based on motion sickness, and they continued with the main scenario. The training scenario data was not collected.

2.4.3.2. The Experiment Scenario

The experiment scenario was an urban area with three lines road and one of them was the opposite direction line. The road's length was 8.5 km, and it takes seven to eight minutes to complete for a driver who speeds 70-80 km/h approximately. There were plenty of buildings, trees and sidewalks with walking pedestrians on the roadside. Besides, bus stops were placed near the road with waiting passengers. Some parked cars were also placed randomly near the road and in front of the houses. There was an ongoing low-density traffic flow in the scenario with automobiles and buses.

The scenario was created in order to observe the speed selection of the drivers, including some events that could differentiate the speed of the drivers (see Figure 5). In the first and ninth events, a pedestrian was crossing the road between two parking cars. Those events were triggered when the driver got close to the pedestrians. In the second event, there was a crosswalk and two pedestrians waiting near the road. If the driver gave way and stop, pedestrians crossed over. If the driver continued to drive, they kept waiting near the road. In the third event, a traffic light turns yellow and then red when the driver gets closer to force them to stop or change the speed. In the fourth and seventh events, vehicles were located as parking cars on different roadside parts. They departed from the roadside just before the driver's car reached those cars. In the fifth event, there was a slightly sharp left turn with a 600m length. The same curve was placed with a right turn as the eighth event. A crossroad with a red light was placed as the sixth event and there was also a car run the red light. There was a crosswalk with two pedestrians in the tenth event. At the end of the scenario, the road shape was changed as no overtaking two-line road. A slow truck was placed on the road to force the driver to overtake despite the rules. There was no speed limit in the scenario to observe the speed changes with said events.

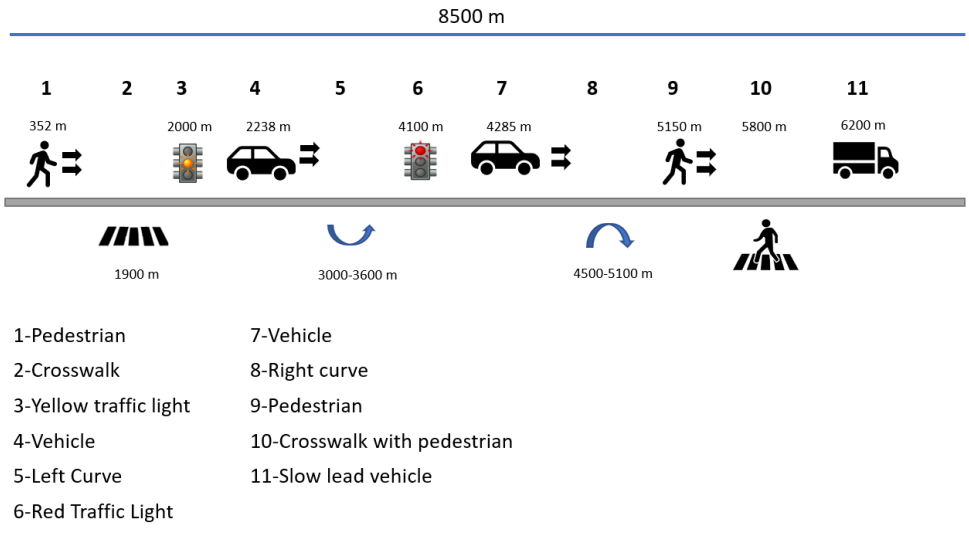


Figure 5. *The diagram of the scenario*

2.5. Selection of the Videos for the Experimental Manipulation

2.5.1. Procedure

In order to determine anti-speeding advertisements in the experimental groups, 11 experts participated a pre-study. In this part of the study, Positive and Negative Affect Schedule (PANAS) was used to evaluate the affective components of ten videos selected by the researcher. Besides, a question was added to evaluate the video's informativeness about traffic rules and the outputs of the accidents. In the end, experts were asked to classify videos into the most appropriate condition (fear, sad, factual information, other).

2.5.1.1. Positive and Negative Affect Schedule (PANAS)

Positive and Negative Affect Schedule was developed by Watson et al. (1998) to measure affective component of subjective well-being. PANAS was adapted into Turkish by Gençöz (2000). The scale has two subscales. The first subscale is the positive affect scale (PA) with ten positive mood-related items such as strong and active. The second subscale is the negative affect scale (NA), which comprises ten negative-mood-related items such as guilty and scared. The participants were asked to rate a 5-point Likert-type scale (from 1 = very slightly or not at all to 5 = very much). Following the purpose of the study, an additional "sad" item was added.

2.5.2. Results

In order to determine experiment videos, frequency analysis was conducted with the following steps: First, three videos with the highest afraid/sad/factual information means from PANAS were chosen for each condition. In order to reduce the confounding effect, the means of the other groups were also evaluated. For example, for the fear group, three videos with the highest means of “afraid” were taken. Then, out of these three videos, the video with the lowest means of “sad” and “factual information” was chosen. This procedure was applied for all experimental conditions (see Table 1).

Table 1. *Means and standard deviations of the anti-speeding campaign advertisements obtained from negative affect scale*

Ads	Distressed	Upset	Guilty	Scared	Hostile	Jittery	Ashamed	Nervous	Irritable	Afraid	Sad	Factual Info.
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
1	3.55 (1.37)	4.00 (1.10)	1.64 (1.29)	2.36 (1.36)	1.45 (1.21)	1.45 (1.21)	1.36 (0.92)	2.27 (1.68)	3.09 (1.51)	2.73 (1.62)	3.82 (1.40)	3.00 (1.10)
2	3.64 (1.21)	3.82 (1.17)	1.64 (1.03)	1.91 (1.22)	1.36 (1.21)	1.36 (0.92)	1.36 (0.67)	1.64 (1.43)	2.64 (1.36)	2.36 (1.43)	4.09 (0.83)	2.73 (1.01)
3	3.00 (1.48)	3.55 (1.21)	1.91 (1.04)	2.64 (1.63)	1.36 (1.21)	1.82 (1.40)	1.82 (0.98)	2.18 (1.60)	2.82 (1.47)	2.91 (1.51)	3.91 (1.22)	3.82 (0.87)
4	2.00 (1.00)	1.91 (1.30)	1.27 (0.65)	2.09 (1.38)	1.27 (0.65)	1.27 (0.65)	1.36 (0.81)	1.27 (0.65)	2.91 (1.45)	2.64 (1.50)	2.64 (1.21)	3.91 (0.94)
5	2.00 (1.00)	1.64 (0.92)	1.27 (0.47)	2.09 (1.14)	1.09 (0.30)	1.27 (0.65)	1.18 (0.40)	1.27 (0.47)	2.09 (1.14)	1.73 (0.90)	1.45 (0.82)	4.09 (0.83)
6	1.55 (0.82)	1.82 (0.98)	1.09 (0.30)	1.91 (1.14)	1.55 (1.21)	1.36 (0.92)	1.36 (0.81)	1.45 (0.93)	2.00 (1.10)	2.00 (1.00)	2.18 (1.47)	3.00 (1.34)
7	3.64 (1.29)	4.18 (1.08)	1.82 (1.33)	3.73 (1.56)	2.09 (1.70)	1.82 (1.40)	1.55 (0.93)	2.55 (1.69)	3.64 (1.50)	3.64 (1.63)	4.36 (1.03)	3.00 (1.18)
8	3.18 (1.08)	3.36 (1.50)	1.55 (1.04)	2.91 (1.76)	1.45 (1.21)	1.45 (1.21)	1.55 (0.93)	2.09 (1.51)	3.09 (1.45)	2.91 (1.51)	3.45 (1.57)	2.55 (0.93)
9	3.82 (1.17)	3.82 (1.17)	2.18 (1.33)	3.64 (1.43)	1.82 (1.25)	1.82 (1.08)	1.91 (1.22)	2.09 (1.38)	3.64 (1.43)	3.73 (1.35)	4.00 (1.18)	3.18 (1.08)
10	3.55 (1.51)	3.55 (1.44)	1.73 (1.27)	3.64 (1.36)	2.18 (1.66)	2.18 (1.54)	1.64 (1.12)	2.45 (1.69)	3.18 (1.54)	3.64 (1.57)	3.55 (1.51)	3.00 (1.18)

In the second step, the classification of the experts was also taken into the process. Both evaluations were considered and the most appropriate videos were chosen for the experimental conditions. The frequencies of the videos were presented in Table 2.

Table 2. *Frequencies of the anti-speeding campaign advertisements*

Ads	Fear		Sad		Factual Info.		Control	
	Freq.	*%*	*Freq.*	*%*	*Freq.*	*%*	*Freq.*	*%*
1	0	0	10	90.9	0	0	1	9.1
2	0	0	11	100	0	0	0	0
3	0	0	4	36.4	5	45.5	2	18.2
4	0	0	0	0	11	100	0	0
5	0	0	0	0	11	100	0	0
6	0	0	0	0	11	100	0	0
7	5	45.5	5	45.5	0	0	1	9.1
8	6	54.5	4	36.4	0	0	1	9.1
9	7	63.6	2	18.2	2	18.2	0	0
10	4	36.4	3	27.3	2	18.2	2	18.2

Three videos were specified for the experimental procedure, and they were classified into conditions. According to the results, the second video was selected for the "sad" condition. The fifth video was selected for the factual information condition, and the tenth video was selected for the fear condition. Turkish subtitles were added to all the videos in experimental groups to avoid loss in the meaning or the message of the video.

For the control condition, a "how to make" video about natural paper production was chosen with three experts. It was considered that the control video should be neutral in order not to result in any positive or negative emotion. The control condition video was in Turkish. The descriptions of the videos were presented in Table 3.

Table 3. *Description of the anti-speeding campaign advertisements*

Ad Name	Condition	Description
Pictures of you	Sad	There are families and relatives in the video who lost their relatives in traffic accidents caused by speeding. People hold the pictures while looking at the camera or watch videos of their losses. Ad link: https://youtu.be/DOYEuEiNBKE
What happens when you wipe off 5?	Factual Information	A professor explains the damages and differences when a driver has an accident while driving at 60 km/h and 65 km/h. Ad link: https://youtu.be/SuY_VHzKdjc
The faster the speed, the bigger the mess	Fear	A young couple has an accident while sitting near the road. The man dies, and the woman becomes disabled after the accident. The accident moment is shown explicitly. Ad link: https://youtu.be/OfLExHWT7lQ
How to make natural paper	Control/Neutral	The video describes the process of papermaking. Ad link: https://youtu.be/g24pqETLMI4

CHAPTER 3

RESULTS

3.1. Descriptive Analysis

3.1.1. Self-Reported Driver Behaviors

The descriptive statistics (means, standard deviations, minimum and maximum values) for The Driver Behavior Questionnaire were presented in Table 4 below.

Table 4. *Descriptive statistics of the self-reported driver behavior for baseline level and both follow-up levels*

		M	*SD*	*Min.*	*Max.*
Time 1 (Baseline)	Lapses	1.61	.34	1.00	2.63
	Errors	1.53	.40	1.00	2.50
	Aggressive Violations	2.30	.89	1.00	5.33
	Ordinary Violations	2.13	.68	1.13	4.63
Time 2	Lapses	1.62	.38	1.00	2.88
	Errors	1.58	.41	1.00	2.63
	Aggressive Violations	2.39	1.05	1.00	6.00
	Ordinary Violations	2.19	.71	1.00	5.00
Time 3	Lapses	1.60	.39	1.00	2.75
	Errors	1.49	.41	1.00	2.63
	Aggressive Violations	2.41	1.11	1.00	5.67
	Ordinary Violations	2.17	.78	1.00	4.88

Note: The DBQ is a six-point scale from 1 (never) to 6 (always)

3.1.2. Driving Simulator Based Behaviors

The descriptive statistics (means, standard deviations, minimum and maximum values) for simulated driver behaviors of the participants were presented in Table 5 below.

Table 5. *Simulated driver behaviors of participants for baseline level and both follow-up levels*

		M	*SD*	*Min.*	*Max.*
Time 1 (Baseline)	Longitudinal Velocity (Average Speed) *(M)*	66.71	13.08	40.79	121.65
	Longitudinal Velocity *(SD)*	15.58	5.84	5.56	36.55
	Longitudinal Acceleration *(M)*	.07	.06	.01	.28
	Longitudinal Acceleration *(SD)*	.79	.27	.31	1.67
Time 2	Longitudinal Velocity (Average Speed) *(M)*	66.39	13.86	40.02	125.86
	Longitudinal Velocity *(SD)*	15.91	6.51	4.67	39.05
	Longitudinal Acceleration *(M)*	.06	.07	.01	.39
	Longitudinal Acceleration *(SD)*	.78	.29	.33	1.56
Time 3	Longitudinal Velocity (Average Speed) *(M)*	68.71	14.34	38.97	121.88
	Longitudinal Velocity *(SD)*	16.78	7.11	4.96	41.99
	Longitudinal Acceleration *(M)*	.06	.06	.01	.29
	Longitudinal Acceleration *(SD)*	.84	.31	.26	1.86

3.2. Correlations

For the study variables in all three times, bivariate correlations were computed. In this section, the associations between variables will be presented in detail (see Table 6)

First, age was only positively correlated with total kilometers and errors. Annual kilometer was found to be positively correlated with total kilometers, passive accidents, the number of speeding tickets, preferred speed on urban roads and intercity and negatively correlated with driving frequency. For driver behaviors, the annual kilometer was positively correlated with ordinary violations in all three phases and only positively correlated with aggressive violations in time 1. Total kilometer was positively correlated with passive accidents, the number of speeding tickets, preferred speed on urban roads and intercity and negatively correlated with driving frequency. Besides, the total kilometer was positively correlated with

ordinary violations in all phases and only positively correlated with longitudinal velocity in time 1. Driving frequency only negatively correlated with longitudinal acceleration in time 1.

Active accidents were positively correlated with lapses in time 1 and time 3. Moreover, it was positively correlated with errors in all three times. Passive accidents were positively correlated with preferred speed on urban roads and intercity. It is also positively correlated with ordinary violations in all three phases. The number of speeding tickets was positively correlated with both preferred speed on urban roads and preferred speed on intercity. Also, it was positively correlated with longitudinal velocity in time 1 and time 3, and positively correlated with longitudinal acceleration in time 2 and time 3.

Preferred speed on urban roads was positively correlated with preferred speed on intercity. Both preferred speed on urban roads and preferred speed on intercity were positively correlated with ordinary violations, aggressive violations, longitudinal velocity and longitudinal acceleration in all three times.

Lapses in all phases were positively correlated with each other and they are also positively correlated with errors in all three times. Besides, lapses in time 1 were positively correlated with ordinary violations. Lapses in time 3 were positively correlated with aggressive violations and ordinary violations.

Errors in all phases were positively correlated with each other. Errors in time 1 were positively correlated with ordinary violations. Errors in time 2 were positively correlated with aggressive violations and ordinary violations. Lastly, errors in time 3 were positively correlated with ordinary violations, longitudinal velocity and longitudinal acceleration.

Aggressive violations in all three times were positively correlated with each other and aggressive violations were also positively correlated with ordinary violations and longitudinal velocity in all phases. Besides, aggressive violations were positively correlated with longitudinal acceleration in time 3. Ordinary violations were positively correlated with each other, longitudinal velocity and longitudinal acceleration in all three times.

Lastly, longitudinal velocity and longitudinal acceleration were positively correlated with each other and their measurements in other phases.

Table 6. *Correlations between Variables*

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age	1											
2.Annual kilometer	.075	1										
3.Total kilometer	.226*	.901**	1									
4.Driving frequency	.041	-.337**	-.295**	1								
5.Active accidents (last 3 years)	-.094	.072	.039	.025	1							
6.Passive accidents (last 3 years)	.030	.438**	.375**	-.154	.029	1						
7.Tickets-Speeding (last 3 years)	-.029	.307**	.377**	.015	.009	.068	1					
8.Preferred.Speed-Urban roads	-.113	.372**	.309**	-.166	-.008	.233**	.180*	1				
9.Preferred.Speed-Intercity	-.076	.325**	.324**	-.028	.055	.196*	.230*	.620**	1			
10.Lapses-T1	-.040	.012	-.059	.075	.186*	-.076	-.001	-.035	-.058	1		
11. Lapses-T2	-.020	-.034	-.111	.076	.151	-.161	-.097	-.020	-.049	.738**	1	
12. Lapses-T3	-.140	-.054	-.100	.085	.258**	-.144	-.030	-.029	.003	.667**	.796**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed); 1; T1: Time 1; T2: Time 2; T3: Time 3.

Table 6. *Correlations between Variables (Continue)*

	1	2	3	4	5	6	7	8	9	10	11	12
13.Errors-T1	.209*	-.062	-.031	.027	.215*	-.035	-.002	-.123	.001	.273**	.269**	.276**
14.Errors-T2	.085	.085	.107	-.085	.348**	.000	.053	-.038	.170	.380**	.348**	.384**
15. Errors-T3	.023	.165	.151	.016	.352**	-.010	.149	.041	.173	.346**	.331**	.441**
16. Aggressive Violations-T1	-.098	.177*	.115	-.148	.058	.108	.115	.207*	.194*	.004	.003	.062
17. Aggressive Violations-T2	-.091	.163	.099	-.134	.123	.108	.084	.267**	.216*	-.009	.117	.107
18. Aggressive Violations-T3	-.079	.123	.055	-.102	.099	.051	.112	.306**	.238**	.077	.131	.200*
19.Ordinary Violations-T1	-.091	.286**	.252**	-.059	.013	.193*	.021	.278**	.501**	.200*	.131	.133
20.Ordinary Violations-T2	-.141	.347**	.310**	-.075	.162	.200*	.148	.300**	.431**	.135	.103	.101
21.Ordinary Violations-T3	-.126	.377**	.314**	-.065	.142	.241**	.177	.339**	.484**	.135	.092	.185*
22. Longitudinal Velocity *(M)*-T1	.004	.159	.220*	-.149	-.033	.045	.182*	.369**	.370**	-.026	-.016	-.038
23. Longitudinal Velocity *(M)*-T2	-.096	.131	.152	-.090	.010	.035	.161	.324**	.364**	-.060	-.067	-.050
24. Longitudinal Velocity *(M)*-T3	-.149	.163	.156	-.071	.068	.091	.305**	.381**	.380**	-.033	-.083	.019
25. Longitudinal Acceleration *(M)*-T1	-.069	.155	.169	-.221*	.047	.064	.133	.352**	.345**	.081	.084	.062
26. Longitudinal Acceleration *(M)*-T2	-.027	.168	.164	-.106	.025	.031	.206*	.204*	.253**	-.066	-.059	-.057
27.Longitudinal Acceleration *(M)*-T3	-.169	.134	.132	-.041	-.058	.089	.267**	.328**	.317**	-.011	-.019	.037

Note: **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed); 1; T1: Time 1; T2: Time 2; T3: Time 3.

Table 6. *Correlations between Variables (Continue)*

	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
13.Errors-T1	1														
14.Errors-T2	.684**	1													
15. Errors-T3	.530**	.669**	1												
16. Aggressive Violations-T1	.143	.258**	.124	1											
17. Aggressive Violations-T2	.109	.205*	.168	.840**	1										
18. Aggressive Violations-T3	.055	.245**	.170	.809**	.878**	1									
19.Ordinary Violations-T1	.247**	.367**	.311**	.486**	.475**	.495**	1								
20.Ordinary Violations-T2	.166	.375**	.371**	.505**	.581**	.582**	.844**	1							
21.Ordinary Violations-T3	.149	.374**	.453**	.445**	.464**	.530**	.810**	.893**	1						
22. Longitudinal Velocity *(M)*-T1	.152	.163	.223*	.273**	.322**	.303**	.372**	.432**	.453**	1					
23. Longitudinal Velocity *(M)*-T2	.195*	.132	.187*	.199*	.244**	.228*	.349**	.408**	.415**	.879**	1				
24. Longitudinal Velocity *(M)*-T3	.095	.172	.254**	.269**	.281**	.324**	.378**	.441**	.496**	.747**	.844**	1			
25. Longitudinal Acceleration *(M)*-T1	.145	.131	.182*	.167	.240**	.219*	.283**	.336**	.401**	.843**	.775**	.684**	1		
26. Longitudinal Acceleration *(M)*-T2	.135	.056	.130	.046	.150	.111	.141	.227*	.270**	.696**	.817**	.656**	.742**	1	
27.Longitudinal Acceleration *(M)*-T3	.073	.075	.210*	.184*	.178	.220*	.235*	.317**	.405**	.661**	.783**	.836**	.697**	.700**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed); 1; T1: Time 1; T2: Time 2; T3: Time 3.

3.3. Results of The Driving Simulator Based Behavior Measurements

3.3.1. Longitudinal Velocity

3 x 4 mixed design repeated measures analysis of variance (ANOVA) was conducted to compare the main effects of time and condition; and the interaction effect between time and condition on the speeding behavior of the drivers. The condition consists of four different components (fear, sad, factual information and control) and the time includes three levels (time-1, time-2, time-3). Mauchly's test indicated that the assumption of sphericity had been violated, $\chi 2(2) = 25.15$, $p = .000$; therefore Greenhouse–Geisser corrected tests are reported ($\varepsilon = .83$).

For longitudinal velocity in all conditions, the main effect of time was significant, $F(1.67, 190.07) = 4.87$, $p = .013$, $\eta_p^2 = .041$. It was revealed that the longitudinal velocity on time-3 ($M = 68.71$, $SD = 14.34$) was significantly higher than time-2 ($M = 66.53$, $SD = 14.02$). Additively, Bonferroni post hoc tests was conducted to observe the main effect of time on group basis. According to the results, the main effect of time was significant only for second (sad) group, Wilks' $\lambda = .939$ $F(2,113) = 3.65$, $p = .029$, $\eta_p^2 = .061$. Namely, the longitudinal velocity on time-3 ($M = 68.39$, $SD = 15.20$) was significantly higher than the longitudinal velocity time-2 ($M = 64.54$, $SD = 15.46$) in second group.

The main effect of condition was not significant in all conditions, $F(3, 114) = 1.73$, $p = .164$, $\eta_p^2 = .044$. Lastly, the interaction effect of time and condition was not statistically significant, $F(5, 190.07) = .60$, $p = .697$, $\eta_p^2 = .016$.

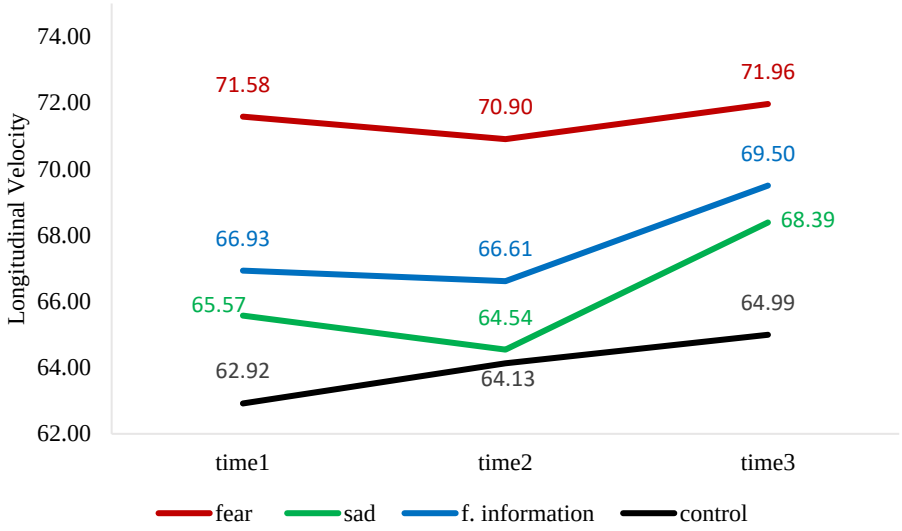


Figure 6. *The effect of time and condition on longitudinal velocity*

3.3.2. Longitudinal Acceleration

3 x 4 mixed design repeated measures analysis of variance (ANOVA) was conducted to compare the main effects of time and condition; and the interaction effect between time and condition on the longitudinal acceleration of the drivers. The condition consists of four different components (fear, sad, factual information and control) and the time includes three levels (time-1, time-2, time-3). Mauchly's test indicated that the assumption of sphericity was assumed, $\chi 2(2) = 1.36$, $p = .506$.

For longitudinal acceleration in all conditions, the main effect of time was significant, $F(2, 228) = 3.62$, $p = .028$, $\eta_p^2 = .031$. It was observed that the longitudinal acceleration on time-1 ($M = .068$, $SD = .059$) was significantly higher than the longitudinal acceleration on time 3 ($M = .057$, $SD = .059$). Bonferroni post hoc tests was conducted to observe the main effect of time on group basis. According to the results, the main effect of time was significant only for the first (fear) group, Wilks' $\lambda = .913$ $F(2,113) = 5.41$, $p = .006$, $\eta_p^2 = .087$. The longitudinal acceleration on time-1 ($M = .091$, $SD = .064$) was significantly higher than time-2 ($M = .064$, $SD = .051$) in the first group.

The main effect of condition was not statistically significant in all conditions, $F(3, 114) = 1.01$, $p = .391$, $\eta_p^2 = .026$. The interaction effect of time and condition was not statistically significant, $F(5.92, 225.30) = 1.73$, $p = .115$, $\eta_p^2 = .044$.

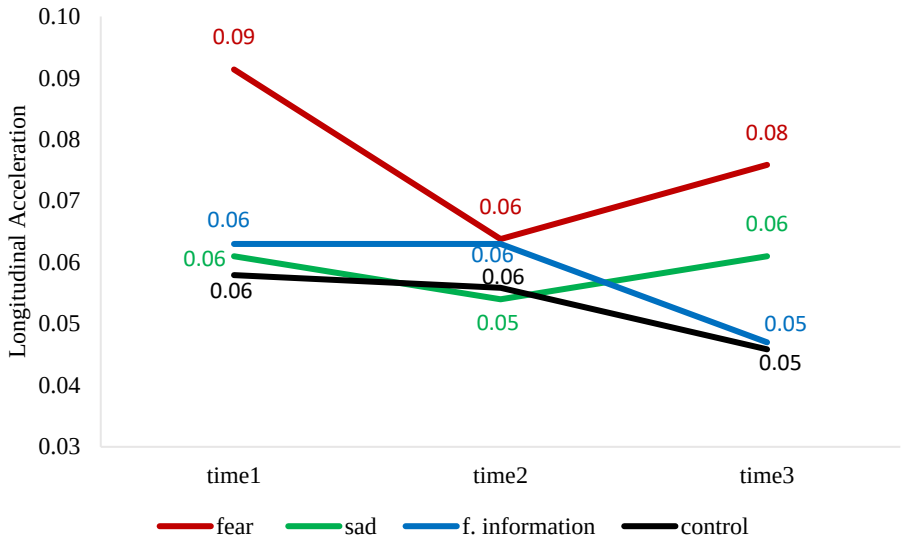


Figure 7. *The effect of time and condition on longitudinal acceleration*

3.4. Results of the Item Based Self-Reported Behavior Measurements

3 x 4 mixed design repeated measures analysis of variance (ANOVA) was conducted to compare the main effects of time and condition; and the interaction effect between time and condition on self-reported speeding behavior of the drivers. The condition consists of four different components (fear, sad, factual information and control) and the time includes three levels (time-1, time-2, time-3). In this part of the analysis, two speed-related items of the Driver Behavior Questionnaire were included as the dependent variable. First, the 11th item of the DBQ (disregard the speed limit on a residential road) was entered as the dependent variable. Mauchly's test indicated that the assumption of sphericity was assumed, $\chi 2(2) = 5.15$, $p = .076$.

For the item "disregard the speed limit on a residential road", the main effect of time was significant, $F(2, 228) = 3.08$, $p = .048$, $\eta_p^2 = .026$. It was revealed that self-report speeding violation on a residential road was significantly more frequent on time-2 ($M = 3.02$, $SD = 1.22$) than time-1 ($M = 2.83$, $SD = 1.23$). Bonferroni post hoc tests was conducted to observe the main effect of time on group basis. According to the results, the main effect of time was significant only for the first (fear) group, Wilks' $\lambda = .944$ $F(2,113) = 3.37$, $p = .038$, $\eta_p^2 = .056$. The given responds on time-2 ($M = 3.59$, $SD = 1.40$) was significantly higher than the responds on time-1 ($M = 3.17$, $SD = 1.28$). It means that participants expressed more speeding violation on a residential road after watching the video.

The main effect of condition was not statistically significant in all conditions, $F(3, 114) = 2.15$, $p = .098$, $\eta_p^2 = .054$. The interaction effect of time and condition was not statistically significant, $F(6, 228) = .87$, $p = .520$, $\eta_p^2 = .022$.

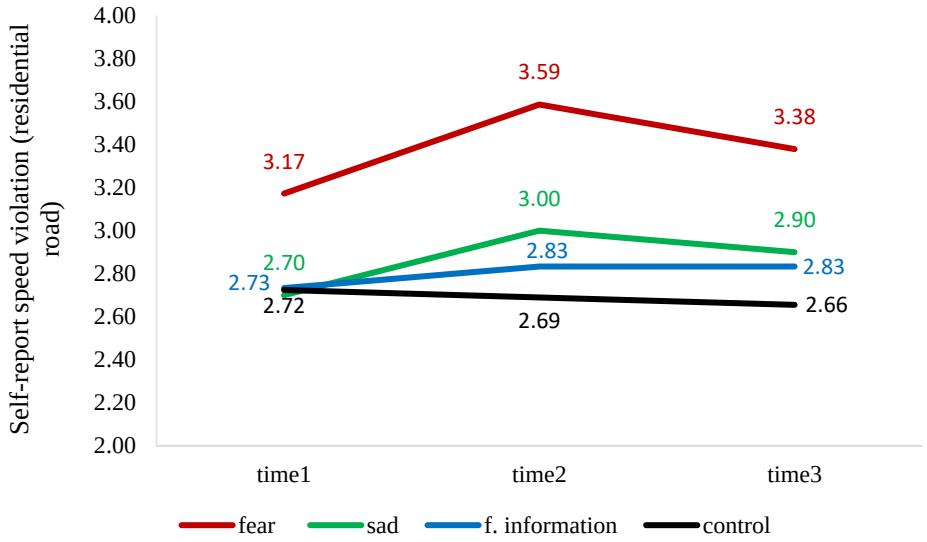


Figure 8. *The effect of time and condition on self-report speed violation on a residential road*

28th item of the Driver Behavior Questionnaire (disregard the speed limit on a motorway) was entered as the dependent variable and the same analysis was repeated. Mauchly's test indicated that the assumption of sphericity was assumed, $\chi 2(2) = 4.91$, $p = .086$. The main effect of time was statistically significant, $F(2, 228) = 7.87$, $p = .000$, $\eta_p^2 = .065$. It was observed that self-report speeding violation on a motorway was significantly more frequent on time-2 ($M = 2.52$, $SD = 1.38$) and time-3 ($M = 2.49$, $SD = 1.44$) than time-1 ($M = 2.20$, $SD = 1.26$). The main effect of condition was not statistically significant in all conditions, $F(3, 114) = 1.07$, $p = .362$, $\eta_p^2 = .028$. The interaction effect of time and condition was not statistically significant, $F(6, 228) = 1.21$, $p = .303$, $\eta_p^2 = .031$.

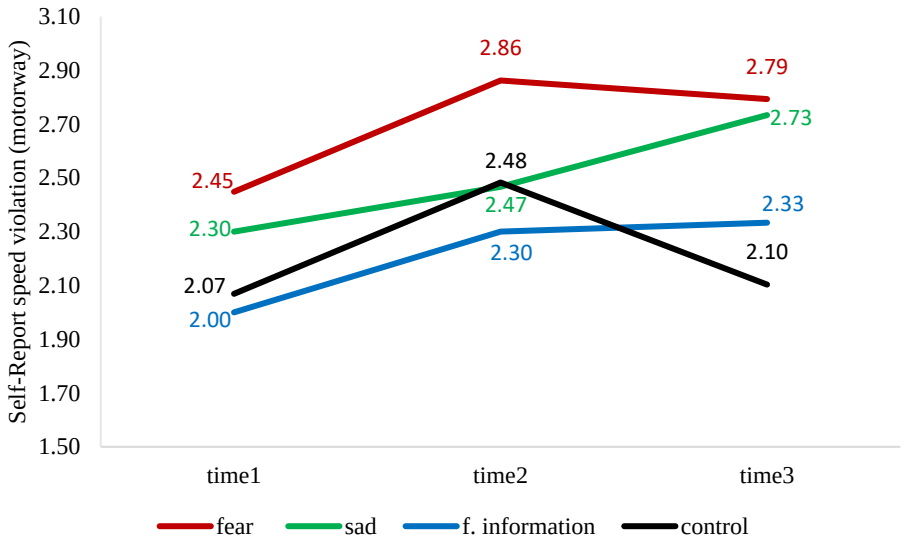


Figure 9. *The effect of time and condition on self-report speed violation on a motorway*

CHAPTER 4

DISCUSSION

4.1. Overview

Speeding is the major problem behavior in traffic among young drivers (Clarke et al., 2002). Risky driving behaviors such as speeding are directly associated with increased road accidents, injuries, and fatalities, so that they are the primary concern for road safety professionals. Together with law enforcement, education, and training, road safety campaigns are used worldwide to decrease the number and/or severity of crashes and provide a safer traffic environment (Delhomme et al., 2009; Hoekstra & Wegman, 2011).

The determination of the campaign effectiveness is essential because it benefits future campaigns, specifies the budget, facilitates future fundraising, and so forth (Boulanger et al., 2007; Boulanger et al., 2009). However, lack of scientific evaluations, confounding elements, some methodological problems and lack of documentation of campaign activities make it difficult to determine the effectiveness of road safety campaigns (Wundersitz et al., 2010). In order to fill this gap, it is essential to provide scientific evaluations on what elements of road safety advertising are more effective. In line with this aim, the present study investigated the effect of anti-speeding advertisements on young driver behaviors. First of all, 11 experts participated in the video selection study before the experimental procedure. Frequency analysis was conducted, and the videos in the experimental groups and the control group were determined. Following that, descriptive statistics and correlations between variables were examined. After that, 3 x 4 mixed design repeated measures analysis of variance (ANOVA) were conducted to investigate the short-term and the long-term effect of anti-speeding advertisements on simulated and self-report young driver behaviors. In the following section, the results will be

summarized and discussed. Following that, limitations, implications and suggestions for future research were highlighted.

4.2. Summary and Discussion of the Results

Descriptive analysis was conducted for both self-report and simulated behaviors in all phases. In terms of self-reported driver behaviors, compared to time 1 and time 3, drivers reported more lapses, errors, aggressive violations and ordinary violations in time 2, immediately after they viewed an anti-speeding advertisement. Except for aggressive violations, other aberrant behaviors were reported as lower than time 2 in time 3. Participants reported an increasing behavioral pattern through the phases for the aggressive violations. Conversely, for the simulated driver behavior, the average speed of the drivers was lowest in time 2 and highest in time 3 for all conditions.

Correlation analysis was also conducted for the study variables in all three phases. Some of them should be mentioned in terms of some similarities and differences. Annual kilometer and total kilometer were positively correlated with the number of speeding tickets, preferred speed on urban roads and intercity. Annual kilometer and total kilometer were also positively correlated with ordinary violations in all three phases, and these correlations were found to be stronger after the manipulation. On the other hand, aggressive violations were positively correlated with the annual kilometer only at the baseline level. Results were consistent with the literature that annual and total kilometers were crucial contributors of self-reported violations and preferred speed (de Winter & Dodou, 2010; Martinussen et al., 2013). Besides, younger drivers and drivers with higher mileage tend to report more violations (Stradling et al., 2004). The reason may be that these more experienced drivers tend to exaggerate their driving skills, see themselves as “better” drivers, and show higher violations (de Winter & Dodou, 2010; Guého et al., 2014).

Furthermore, self-reported speeding on both urban roads and intercity were positively correlated with aggressive violations, ordinary violations, and average speed and acceleration on the simulator. The relationship between self-reported speeding and simulated speeding became weaker right after watching the videos, but the relationship was the highest in the last phase.

In terms of aberrant driver behaviors, there were negative correlations between lapses and simulated speeding behavior in baseline level and time 2 and positive correlations in time 3. However, these relationships were not significant. Errors were positively correlated with simulated speeding behavior, but the relationship was significant only in the last phase. Lastly, speeding-related simulated behavior was positively correlated with aggressive and ordinary violations in all phases, and these correlations were stronger in the last phase measurements. The said relationship and behavioral pattern between violations and simulated speeding behavior might be explained by cognitive dissonance theory (Festinger, 1957). This theory postulates that underlying psychological stress is created when a person's behaviors or thoughts are inconsistent. In other words, people feel discomfort when their beliefs are conflicted, or their actions contradict their beliefs, and they do their best to change them until they become consistent. Bivariate correlation analyses revealed higher correlations between participants' behaviors and their statements on speeding after the manipulation. Consistent with the theory, watching the videos may increase the self-awareness of the participants about their behavior. As a result, their behaviors and thoughts about themselves became more consistent after watching the videos.

Lastly, mixed-design repeated measures ANOVA's were conducted to observe these behavioral patterns and their relations in detail. There was no significant difference between the experimental groups and the control group (i.e., the main effect of condition) in terms of speeding. Besides, none of the interaction effects revealed significant results. However, the time interval between baseline level and follow up-levels (i.e., the main effect of time) revealed some significant results in terms of simulated and self-reported driving behavior.

For the driving simulator-based speeding behavior, a general pattern was observed for all experimental conditions: average speed decreased immediately post-exposure, yet these speed reductions were not significant. Still, the driver's average speed was measured as the highest after two weeks, and they were significantly higher than time 2. On the basis of groups, the said deceleration was significant only in sad condition, between time 3 and time 2. Namely, the speed of the drivers was

significantly higher in the last phase than right after watching the video in sad condition.

For the longitudinal acceleration, the main effect of time revealed some significant results. In detail, the longitudinal acceleration on the baseline level was significantly higher than the longitudinal acceleration on the last phase. In terms of groups, there was a significant difference in the fear condition that the longitudinal acceleration in baseline level was significantly higher than the longitudinal acceleration in time 2. Longitudinal acceleration refers to the linear increase in speed of the driver. When evaluated in this context, it can be said that the watched videos have a general effect on speeding behavior. That is, drivers speed up at the baseline level in less time, but it took them more time to gain speed immediately after the manipulation.

However, the manipulation effect varies between self-report and simulator measurements. Namely, drivers reported more frequent speed violations on a residential road right after watching the videos than their baseline measurements. When evaluated on a group basis, the said difference was only significant for the fear group. Moreover, drivers reported more frequent speed violations on a motorway shortly after and two weeks after watching the video than their baseline statements. In brief, it can be said that drivers reported more frequent speed violations on both residential roads and motorways right after watching the video.

Although the manipulation effect on videos is not at the targeted level, it is still possible to mention the effect of these videos as a general pattern. The significant time-dependent behavior differences within emotional groups are consistent with the literature that negative emotions affect driving (e.g., Mesken et al., 2007; Pêcher et al., 2011; Roidl et al., 2014). However, this effect is multifaceted and indirect in some ways. One possible explanation might be that negative emotions, especially anger and anxiety, change individual risk assessment, which explains differences in drivers' speed (Mesken et al., 2007). Besides, the effect of anxiety is ambiguous because it has an influence on information processing, so that driver performance, but this effect differs depending on the anxiety level of the drivers and coping strategies. Therefore, anxiety may deteriorate, help, or have no effect on driver behaviors (Pêcher et al., 2011).

According to Fylan and Stradling (2014), the most commonly used behavior change techniques are those that contain information about the risks and consequences of a collision. In these interventions, videos and pictures of crash scenes are used to help people understand these consequences. These visuals increase threat appraisals but generally do not refer coping appraisals about how effective the new type of behavior will be in reducing the danger or increasing self-efficacy. According to Protection Motivation Theory, when the perceived threat and efficacy are high in a message, people are more likely to change their behavior in the desired direction. Self-efficacy influences behavior to adopt the recommended coping behavior (Maddux & Rogers, 1983; Rogers, 1975). Likewise, the Extended Parallel Process Model states that the message is likely to be ignored when it includes both high perceived threat and low efficacy (Witte,1992; Witte & Allen, 2000). In the present study, the video with fear emotion includes an accident scene in which some people died, and a woman was left permanently disabled. Additionally, some people who lost their relatives in accidents due to speeding are featured in the sad emotion video. Both emotional videos create an unpleasant emotional state as they are intended. According to Janis (1967), this kind of strong-fear-arousing communication is less effective than milder version, the outcome behavior has a potential to reverse. Moreover, the negative emotion videos do not suggest a coping strategy to take precautions. When this situation is applied to the theories above, it can be observed that the perceived threat of the videos was high. However, due to the lack of perceived efficacy elements in the videos, the effectiveness of the videos on driver behaviors might be limited. Therefore, the effect of the videos may not have been at the desired level.

Another issue that should be mentioned is that the participants' speed reached the highest point in the last measurements. This finding can be discussed from different perspectives. One explanation might be the degree of threat perception, which is consistent with the theories discussed earlier. In some cases, people change their attitudes in an opposite to the intention of the communicator instead of the intended consequence, and high threat perception may result in the opposite of the desired behavior. This phenomenon which is called “the boomerang effect,” can occur when (a) the communication is delivered by a negative source with no good arguments, (b) the audiences anticipate that their conclusions will be contrary to their interests,

(c) the persuasive communication produces aggression and unassuaged emotional arousal (d) the given message is too far removed from an individual's attitude or belief will produce a "contrast effect," while a slight removed may have a positive effect (Hovland et al., 1953 as cited in Cohen, 1962). The present study revealed that behavioral speed peaked at the last measurements for all experimental conditions. Besides that, participants reported more frequent speed violations right after watching the videos. The negative emotion videos contain high negative emotional arousal and do not contain any positive arguments or solutions. Moreover, speeding is considered desirable among young drivers (Thomas et al., 2007), contrary to the intended message. Consistent with this concept, drivers may ignore the message or behave and declare contrary to what is desired.

Familiarity with the scenario can be shown as another explanation for the speed height in the last phase. Some simulator-based studies (Martens, 2018; Martens & Fox, 2007) and on-road observations (Colonna et al., 2016) revealed that drivers increase their speed over time on a route they are familiar with. Similarly, the participants of the present study drove the driving scenario three times according to the within-subject design of the study. Even if the short-term effect of the experimental conditions was observed on the drivers, the speed of the control group was observed to increase in line with this situation. Thus, it can be concluded that participants became familiar with the scenario, and this situation may lead them to speed.

Since the same measurements were taken three times from the same participants, there is a possibility that a previous measurement may alter behavior in a subsequent measurement. This is known as a carryover effect that is challenging for within-subject designs. Carryover effects can arise from several sources such as learning, habituation, sensitization, or adaptation (Bordens & Abbott, 2002). Even though there are several ways to deal with carryover effects, some permanent changes proceed from learning inescapably carry over into subsequent treatments and affect behavior. In order to ensure standardization in this study, the simulator scenario was given to the participants three times without any changes. This may lead to the emergence of the learning effect and an increase in participants' speed in the last measurement.

In the present study, the short-term and long-term effect of providing factual information was measured for the first time with both simulator and self-report. There was no significant difference between baseline and follow-up levels for both measurements for the factual information group. Still, it is possible to mention a specific pattern in self-report measures. Immediately after watching the video, participants reported slightly more speed violations in the follow-up levels than the baseline level. The possibility that the video they watched has increased the awareness of individuals about their own driving styles may be a reason for this small difference. However, providing only factual information in videos seems to be less effective than videos with emotional content.

4.3. Limitations and Suggestions for Future Studies

The present study has provided valuable insights on the effect of road safety campaigns on driver behavior, but several limitations and suggestions should be noted. First of all, gender could be equally distributed between groups, but there was male dominance in gender distribution within groups. So, an equal gender distribution within the groups could not be achieved. However, it should be noted that gender was taken into account as selection criteria so that there were nearly equal numbers of male and female participants in groups. However, future studies may achieve more generalizable results with more equal numbers of participants in terms of gender.

Secondly, factors that could affect driver behaviors, such as personality traits, demographic variables, attitudes were not controlled during the analysis. Future studies examining similar issues may consider these characteristics as a control variable. Thus, the mere effect of the manipulation on behavior may be observed more clearly. In addition, considering and repeating the study by accepting such characteristics as a variable may also contribute to the literature on which individuals are more affected by such messages.

Considering the pattern of the self-report and simulated behaviors, it can be said that the speed compliance of the drivers might affect the results. More clearly, the sample of the present study may already have been risky drivers with a tendency and intention to speed. Therefore, they may not have been affected sufficiently by the manipulation. If future studies conduct a preliminary study to determine potentially

risky drivers in this way, the difference between the baseline measurements and after manipulation measurements may be more pronounced.

As another limitation, the present study focused on the outcomes of the experimental conditions as driver behavior rather than the persuasive process of such appeals. Due to the shortage of explanatory frameworks for the operation of such effects, future studies may focus on explaining the persuasive process to explain how, why, and when these interventions may work in road safety advertisements. Besides, speeding behavior was the primary outcome in this research. Although the results have drawn practical conclusions, the possible effect of the advertisements may appear in different ways in other types of violations. Thus, future studies may be expanded in this direction to obtain more comprehensive results.

Emotions such as fear, anger, and sadness are almost impossible to separate from each other. This was considered in the frequency analysis conducted during the video selection process of the study. For example, for the fear group video, the videos with the lowest sad and factual information means were selected among the three videos with the highest mean fear values. In addition, the evaluations of the experts were taken into account. Although the said analyzes were helpful in distinguishing the target emotion from others, this may create an unavoidable confounding effect.

A critical point noticed in the video selection process was that most of the reviewed traffic safety videos had not been made as suggested by the techniques and theories mentioned above. At this point, some steps that may be useful to implement can be recommended. Since the evaluation of road safety advertisements seems insufficient (Hoekstra & Wegman, 2011), developers of interventions should keep records of what behavior change technique they use in intervention manuals and evaluation reports. In this way, it will be easier to determine which technique is more effective on driver behavior and thus contribute to reducing deaths and injuries on the road. Consequently, sufficient data on the subject can ensure that future traffic safety videos will be made more effective in the light of theories and recommendations.

Last but not least, some studies have suggested that gain-framed messages are more effective than loss-framed messages (Latimer et al., 2010), and these kinds of

messages increased the acceptance of safety messages for reward-sensitive young drivers (Kaye et al., 2014). In addition, road safety messages with positive affect might be more effective in changing behavior towards positive. For example, Lewis and colleagues (2008) revealed that negative appeals are more persuasive immediately after exposure while greater improvement of positive appeals over time. From this point of view, it can be said that positive appeals are a remarkable alternative to fear appeals that are worth investigating in terms of persuasiveness. Fylan and Stradling (2014) also argued that since young drivers overestimate their skills, behavioral change techniques targeted at raising their awareness about their perceived and actual safety margin could be effective in reducing accident rates in young drivers. Besides, since clear messages about what exactly needs to change are more effective than general encouragement about safe driving, road safety videos can be more persuasive if they are made by considering this situation. In brief, road safety videos that convey the message more clearly and through positive affect can be particularly effective on younger drivers. If future studies focus on this issue as well as negative affect, content that may last longer in terms of persuasiveness can be produced.

4.4. Contributions and Implications

Previous studies have compared the effectiveness of different contents, but not all took the outcome measures after a time interval. The current study provides a direct comparison of the effectiveness of fear-evoking, sadness-evoking, and factual information-containing messages over time, together with immediately after exposure. As such, the current study provides insight into the relative duration of the persuasive effects of negative emotional appeal and factual information in the road safety advertising context. Moreover, the mere effect of sadness and factual information was studied for the first time with such comprehensiveness. This study also represents one of only a limited number of studies that have compared the persuasiveness of the road safety advertisements addressing the same behavior (i.e., speeding).

The results of both the current and previous studies revealed that emotional road safety advertisements affect driver behavior and drivers' self-reports about their driving. It is obvious that mass media have an advantage in terms of audience reach.

However, this influence created by such advertisements seems to be insufficient in terms of long-term effects on speeding. As stated before, speeding is a type of behavior whose costs are sometimes ignored due to its many potential benefits (e.g., reaching the target point on time, positive self-representation). Since mass media campaigns are more effective in conveying the message and forming attitudes rather than changing behavior, it may be beneficial to keep expectations from these campaigns at a more realistic level. On the other hand, as stated in the "two pathways to crash" model (Lajunen & Özkan, 2011; 2021), behavior change can result from attitude change which might be observed after many years. For this reason, focusing on attitudes, norms and beliefs may be beneficial in the long run, even though these long-term effects are hard to measure (Wundersitz et al., 2010).

Since safety campaigns may have a different effect on each driver group, studying the said effect on young drivers makes a significant contribution to the literature. In addition, the findings of the study showed that the short-term effect of traffic safety advertisements was more pronounced and in the desired direction. For this reason, presenting different advertisements to the audience at more frequent intervals may help to bring about behavioral changes in the desired direction.

The content of the advertisements and how they try to convey the message is an important issue that needs to be addressed. The present study used road safety advertisements with emotional and factual information, and their mere effect was examined separately. According to Wallén Warner and Forward (2016), the combination of an emotional and factual message has a larger effect on intervention in some cases. Although a small behavioral and self-report differentiation was observed in the present study, an intervention consisting of a combination of these contents could have been more effective. Lastly, the campaign effect may be improved with other activities such as enforcement, education and legislation. In the light of this information, decision-makers can change or improve their policies on this issue, followed by enforcement of the new policies and changing the attitudes of the public to make them compatible with the behavior. Finally, components such as making a prior research, using a theoretical model, choosing a single theme and addressing a specific target of audience may help to increase the effectiveness of the road safety campaigns.

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APPENDICES

A. ETHICS COMMITTEE APPROVAL FORM

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

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08 KASIM 2018

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Türker ÖZKAN

Danışmanlığını yaptığınız doktora öğrencisi Özgün ÖZKAN'ın **"Investigating Reckless Driving and Driver Skills within the Frame of Terror Management Theory"** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2018-SOS-183** protokol numarası ile **08.11.2018 - 31.12.2019** tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Halil TURAN
Başkan V

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

Prof.Dr. Yaşar KONDAKÇI
Üye

Doç. Dr. Zana ÇITAK
Üye

Doç. Dr. Emre SELÇUK
Üye

Doç.Dr. Üyesi Pınar KAYGAN
Üye

B. INFORMED CONSENT FORM

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Bu çalışma, ODTÜ Psikoloji Bölümü öğretim üyelerinden Prof. Dr. Türker ÖZKAN danışmanlığında, doktora öğrencisi Özgün ÖZKAN tarafından doktora tezi kapsamında yürütülmektedir. Söz konusu form, sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Çalışmanın amacı, farklı içeriklere sahip videoların sürücü davranışları üzerindeki kısa ve uzun vadeli etkisini incelemektir.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Gönüllü olan katılımcının, öncelikle çevrimiçi ortamda anket doldurması beklenmektedir. Bu anket yaklaşık 15 dakika sürmektedir. Daha sonra katılımcının, MODSIMMER binasında bulunan İnsan Faktörü Laboratuvarı'nda iki hafta arayla ilki yaklaşık olarak 40, ikincisi 20 dakikalık iki oturuma katılması beklenmektedir. Bu oturumlarda birkaç dakikalık kısa bir video izlemeniz, araç simülasyonunu kullanmanız ve verilecek anketi doldurmanız beklenmektedir. Elde edilen sonuçların yorumlanabilmesi adına katılımcı her iki oturuma da katılmalıdır.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız?

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

Katılımınızla ilgili bilmeniz gerekenler:

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

Araştırmayla ilgili daha fazla bilgi almak isterseniz:

Bu çalışmaya katıldığınız için şimdiden çok teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için araştırmacılar ile iletişim kurabilirsiniz.

Özgün Özkan

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum.

İsim Soyad Tarih İmza

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C. DEMOGRAPHIC INFORMATION FORM

Demografik Bilgi Formu

Her iki oturumda vereceğiniz cevapları eşleştirebilmek adına bir rumuz yazmanız gerekmektedir. Bu yüzden soyadınızın ilk iki harfi ile doğum tarihinizin ay ve gününü birleştirerek rumuzunuzu oluşturunuz.

Örneğin, ÖZKAN ve 26 Ağustos için rumuz, öz2608 olacaktır.

Rumuz:_____

1. Yaşınız: 2.Cinsiyetiniz:

3. Eğitim durumunuz:

☐ Okur-yazar
☐ İlkokul
☐ Ortaokul
☐ Lise
☐ Üniversite (Lisans)
☐ Üniversite (Lisansüstü)

4. Ehliyetiniz var mı? ☐ Evet ☐ Hayır

5. Ne kadar süredir ehliyet sahibisiniz? _____yıl _____ay

6. Kaç yıldır aktif olarak araç kullanıyorsunuz? _____yıl _____ ay

7. Son bir yılda yaklaşık olarak toplam kaç kilometre araç kullandınız? _____km

8. Bütün hayatınız boyunca yaklaşık olarak toplam kaç kilometre araç kullandınız? _____km

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

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

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

12. Son üç yılda aşağıdaki trafik cezalarını kaç kere aldığınızı belirtiniz. Ceza almadıysanız sıfır ‘0’ yazınız.

Yanlış park etme	:_____	Emniyet kemeri	: _____
Hatalı sollama	:_____	Alkol kullanma	: _____
Hız ihlali	:_____	Trafik işaretlerine uymama:	_____
Kırmızı ışıkta geçme	:_____	Diğer	: _____

13. Hava ve yol koşulları uygun olduğunda, şehiriçi yollarda ortalama kaç kilometre hızla gidersiniz? _____ km/s

14. Hava ve yol koşulları uygun olduğunda, şehirlerarası yollarda ortalama kaç kilometre hızla gidersiniz? _____ km/s

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

16. Hız limitinin 90 km/s olduğu yollarda kaç km/s hızla gitmeyi tercih edersiniz?
_____ km/s

17. Hız limitinin 120 km/s olduğu yollarda kaç km/s hızla gitmeyi tercih edersiniz?
_____ km/s

D. DRIVER BEHAVIOR QUESTIONNAIRE (DBQ)

Aşağıda verilen durumların her birini ne sıklıkta yaparsınız ?

Aşağıda verilen her bir madde için sizden istenen bu tür şeylerin sizin başınıza NE SIKLIKLA geldiğini belirtmenizdir. Değerlendirmelerinizi geçtiğimiz yıl boyunca kendinizin 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**
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**
23.	Acil bir durumda duramayacak kadar, öndeki aracı yakın takip etmek	**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**

E. DRIVING SIMULATOR SCENARIO

METRIC

0, ROAD, 3, 3, 2, 1, 1, 3, 3, .12, .12, 0, -1,-1, 0,1.8,0,1.8, 0,1.5,0,1.5, 0, 0,0,
C:\STISIM\Data\Textures\Grass08.Jpg,25,C:\STISIM\Data\Textures\Road07.Jpg,12,C:\STISIM\D
ata\Textures\Grass08.Jpg,25

0, TREE, 30, 0, *1~18, 10 {0}, 35 {0}, 0

0, V, 0, 73, 5, 0, 3

0, V, 0, 85, 5, 0, *18~35

0, V, 0, 140, 5, 0, *18~35

0, V, 0, 145, 5, 0, *18~35

0, V, 0, 152, 5, 0, *18~35

0, V, 0, 173, 5, 0, 3

0, V, 0, 185, 5, 0, *18~35

0, V, 0, 240, 5, 0, *18~35

0, V, 0, 245, 5, 0, *18~35

0, V, 0, 252, 5, 0, *18~35

0,A, *5, 400, 1.9{2}, *18~35

0,V, 20, 100, -4.5{1}, 1, *18~35, 2500{14}, -4.5{1}, *10, 2

0, BLDG, 0, 7 {1}, H1

0, BLDG, 34, 7 {1}, H2

0,CT, 44, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 58, 7 {1}, H3

0, BLDG, 81, 7 {1}, H4

0, BLDG, 98, 7 {1}, H5

0, BLDG, 113, 7 {1}, B14

0, BLDG, 130, 7 {1}, H13

0, BLDG, 152, 7 {1}, H14

0, BLDG, 175, 7 {1}, H15

0,CT, 187, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 234, 7 {1}, B12

0, BLDG, 262, 7 {1}, H7

0, BLDG, 293, 7 {1}, H8

0, BLDG, 324, 7 {1}, H9

0, BLDG, 347, 7 {1}, H10

0, BLDG, 370, 7 {1}, H10

0, BLDG, 397, 7 {1}, H11

0, BLDG, 434, 7 {1}, H2

0,CT, 444, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 458, 7 {1}, H3

0, BLDG, 481, 7 {1}, H4

0, BLDG, 498, 7 {1}, H5

0, BLDG, 513, 7 {1}, B1

0, BLDG, 530, 7 {1}, H13

0, BLDG, 552, 7 {1}, H14

0, BLDG, 575, 7 {1}, H15

0,CT, 587, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 602, 7 {1}, H16

0, BLDG, 634, 7 {1}, B12

0, BLDG, 662, 7 {1}, H7

0, BLDG, 693, 7 {1}, H8

0, BLDG, 724, 7 {1}, H9

0, BLDG, 747, 7 {1}, H10

0, BLDG, 770, 7 {1}, H6

0, BLDG, 797, 7 {1}, H11

0, BLDG, 820, 7 {1}, H4

0, BLDG, 837, 7 {1}, H5

0, BLDG, 852, 7 {1}, B14

0,CT, 859, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 869, 7 {1}, H13

0, BLDG, 900, 7 {1}, H1

0, BLDG, 934, 7 {1}, H2

0,CT, 944, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 958, 7 {1}, H3

0, BLDG, 981, 7 {1}, H4

0, BLDG, 998, 7 {1}, H5

0, BLDG, 1013, 7 {1}, B15

0, BLDG, 1030, 7 {1}, H13

0, BLDG, 1052, 7 {1}, H14

0, BLDG, 1075, 7 {1}, H15

0,CT, 1087, 5, 6 {1}, 0, L, *19~35, 1

0, BLDG, 02, -7 {2}, H16

0,CT, 17, 5, -6 {2}, 0, R, *19~35, 1

0, BLDG, 34, -7 {2}, B5

0, BLDG, 62, -7 {2}, H7

0, BLDG, 93, -7 {2}, H8

0,CT, 112, 5, -6 {2}, 0, R, *19~35, 1

0, BLDG, 124, -7 {2}, H9

0, BLDG, 147, -7 {2}, H10

0, BLDG, 170, -7 {2}, B4

0, BLDG, 197, -7 {2}, H11

0, BLDG, 234, -7 {2}, H2

0, BLDG, 258, -7 {2}, H3

0, BLDG, 281, -7 {2}, H4

0, BLDG, 398, -7 {2}, H5

0, BLDG, 313, -7 {2}, B14

0, BLDG, 330, -7 {2}, H13

0, BLDG, 352, -7 {2}, H14

0, BLDG, 375, -7 {2}, H15

0, BLDG, 402, -7 {2}, H16

0,CT, 417, 5, -6 {2}, 0, R, *19~35, 1

0, BLDG, 434, -7 {2}, B5

0, BLDG, 462, -7 {2}, H7

0, BLDG, 493, -7 {2}, H8

0,CT, 512, 5, -6 {2}, 0, R, *19~35, 1

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0, BLDG, 547, -7 {2}, H10

0, BLDG, 570, -7 {2}, H6

0, BLDG, 597, -7 {2}, H11

0, BLDG, 620, -7 {2}, H4

0, BLDG, 637, -7 {2}, H5

0, BLDG, 652, -7 {2}, B1

0, BLDG, 669, -7 {2}, H13

0, BLDG, 700, -7 {2}, H1

0, BLDG, 734, -7 {2}, H2

0, BLDG, 758, -7 {2}, H3

0, BLDG, 781, -7 {2}, H4

0, BLDG, 798, -7 {2}, H5

0,CT, 807, 5, -6 {2}, 0, R, *19~35, 1

0, BLDG, 813, -7 {2}, B14

0, BLDG, 830, -7 {2}, H13

0, BLDG, 852, -7 {2}, H14

0, BLDG, 875, -7 {2}, H15

0, BLDG, 934, -7 {2}, H2

0, BLDG, 958, -7 {2}, H3

0, BLDG, 981, -7 {2}, H4

0, BLDG, 998, -7 {2}, H5

0, BLDG, 1013, -7 {2}, B1

0,CT, 1020, 5, -6 {2}, 0, R, *19~35, 1

0, BLDG, 1030, -7 {2}, H13
0, BLDG, 1052, -7 {2}, H14
0, BLDG, 1075, -7 {2}, H15
0, PED, 100, 20, 4, -2{2}, F, *1~10
0, PED, 88, 20, 4, 2{1}, B, *1~10
0, PED, 90, 20, 4, 2{1}, F, *1~10
0, BLDG, 230, 0 {1}, U6, 0
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0, SL, -4100, 10{0}, 3, 30, 1, 4.50, 5, 2, 1
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100, V, 0, 173, 5, 0, 3
100, V, 0, 185, 5, 0, *18~35
100, V, 0, 240, 5, 0, *18~35
100, V, 0, 245, 5, 0, *18~35
100, V, 0, 252, 5, 0, *18~35
100, V, 0, 276, 5, 0, *18~35
100, BLDG, 1002, 7 {1}, H16
100, BLDG, 1034, 7 {1}, B12
100, BLDG, 1062, 7 {1}, H7
100, BLDG, 1093, 7 {1}, H8
100, BLDG, 1124, 7 {1}, H9
100, BLDG, 1147, 7 {1}, H10
100,CT, 1159, 5, 6 {1}, 0, L, *19~35, 1
100, BLDG, 1170, 7 {1}, B13
100, BLDG, 1197, 7 {1}, H11
100, BLDG, 1002, -7 {2}, H16
100,CT, 1017, 5, -6 {2}, 0, R, *19~35, 1
100, BLDG, 1034, -7 {2}, B5
100, BLDG, 1062, -7 {2}, H7
100, BLDG, 1093, -7 {2}, H8
100,CT, 1112, 5, -6 {2}, 0, R, *19~35, 1
100, BLDG, 1124, -7 {2}, H9
100, BLDG, 1147, -7 {2}, H10
100, BLDG, 1170, -7 {2}, B4
100, BLDG, 1197, -7 {2}, H11
100, PED, 100, 20, 4, -2{2}, F, *1~10
100, PED, 88, 20, 4, 2{1}, B, *1~10
100, PED, 90, 20, 4, 2{1}, F, *1~10
200, V, 0, 185, 5, 0, *18~35

200, V, 0, 240, 5, 0, *18~35
200, V, 0, 252, 5, 0, *18~35
200, V, 0, 276, 5, 0, *18~35
200, V, 0, 288, 5, 0, 3
250,A, *3, 400, 1.9{2}, *18~35
300, BLDG, 1034, 7 {1}, H2
300, BLDG, 1058, 7 {1}, H3
300, BLDG, 1181, 7 {1}, H4
300, BLDG, 1098, 7 {1}, H5
300, BLDG, 1113, 7 {1}, B1
300,CT, 1120, 5, 6 {1}, 0, L, *19~35, 1
300, BLDG, 1130, 7 {1}, H13
300, BLDG, 1152, 7 {1}, H14
300, BLDG, 1175, 7 {1}, H15
300,CT, 1187, 5, 6 {1}, 0, L, *19~35, 1
300, BLDG, 1034, -7 {2}, H2
300, BLDG, 1058, -7 {2}, H3
300, BLDG, 1081, -7 {2}, H4
300, BLDG, 1098, -7 {2}, H5
300, BLDG, 1113, -7 {2}, B14
300,CT, 1120, 5, -6 {2}, 0, R, *19~35, 1
300, BLDG, 1130, -7 {2}, H13
300, BLDG, 1152, -7 {2}, H14
300, BLDG, 1175, -7 {2}, H15
300, BLDG, 1202, -7 {2}, H16
400, V, 0, 173, 5, 0, 3
400, V, 0, 185, 5, 0, *18~35
400, V, 0, 240, 5, 0, *18~35
400, V, 0, 252, 5, 0, *18~35
400, V, 0, 276, 5, 0, *18~35
400, V, 0, 288, 5, 0, *18~35
500, BLDG, 1002, 7 {1}, H16
500, BLDG, 1034, 7 {1}, B5
500, BLDG, 1062, 7 {1}, H7
500, BLDG, 1093, 7 {1}, H8
500, BLDG, 1124, 7 {1}, H9
500, BLDG, 1147, 7 {1}, H10
500, BLDG, 1170, 7 {1}, B4
500, BLDG, 1197, 7 {1}, H11
500, BLDG, 1034, -7 {2}, H2

500, BLDG, 1058, -7 {2}, H3

500, BLDG, 1081, -7 {2}, H4

500, BLDG, 1098, -7 {2}, H5

500, BLDG, 1113, -7 {2}, B1

500,CT, 1120, 5, -6 {2}, 0, R, *19~35, 1

500, BLDG, 1130, -7 {2}, H13

500, BLDG, 1152, -7 {2}, H14

500, BLDG, 1175, -7 {2}, H15

500, PED, 100, 20, 4, -2{2}, F, *1~10

500, BLDG, 1000, 0 {1}, U6, 0

500, PED, 1000, 0, 0, -0.5{1},R,*1~8

500,PED, 378, 50{4}, 3, 7, -3,*1~8, L, 6

550, BLDG, 1100, 0 {2}, U6, 0

600, V, 0, 185, 5, 0, *18~35

600, V, 0, 252, 5, 0, *18~35

600, V, 0, 276, 5, 0, *18~35

600, V, 0, 288, 5, 0, *18~35

600,A, 25, 400, 1.5{2}, 56

700, BLDG, 1034, 7 {1}, H2

700,CT, 1044, 5, 6 {1}, 0, L, *19~35, 1

700, BLDG, 1058, 7 {1}, H3

700, BLDG, 1081, 7 {1}, H4

700, BLDG, 1113, 7 {1}, B14

700, BLDG, 1130, 7 {1}, H13

700, BLDG, 1152, 7 {1}, H14

700, BLDG, 1175, 7 {1}, H15

700,CT, 1187, 5, 6 {1}, 0, L, *19~35, 1

700, BLDG, 1034, -7 {2}, H2

700, BLDG, 1058, -7 {2}, H3

700, BLDG, 1081, -7 {2}, H4

700, BLDG, 1113, -7 {2}, B14

700, BLDG, 1130, -7 {2}, H13

700, BLDG, 1152, -7 {2}, H14

700, BLDG, 1175, -7 {2}, H15

700, PED, 88, 20, 4, 2{1}, B, *1~10

700, PED, 90, 20, 4, 2{1}, F, *1~10

740, V, 0, 185, 5, 0, *18~35

740, V, 0, 252, 5, 0, *18~35

740, V, 0, 276, 5, 0, *18~35

740, V, 0, 288, 5, 0, *18~35

900, BLDG, 1002, 7 {1}, H16
900, BLDG, 1034, 7 {1}, B5
900, BLDG, 1062, 7 {1}, H7
900, BLDG, 1083, 7 {1}, H2
900, BLDG, 1124, 7 {1}, H9
900, BLDG, 1147, 7 {1}, H10
900,CT, 1159, 5, 6 {1}, 0, L, *19~35, 1
900, BLDG, 1170, 7 {1}, H9
900, BLDG, 1197, 7 {1}, H11
900, BLDG, 1220, 7 {1}, H4
900, BLDG, 1237, 7 {1}, H5
900, BLDG, 1252, 7 {1}, B14
900, BLDG, 1269, 7 {1}, H13
900, BLDG, 1002, -7 {2}, H16
900, BLDG, 1034, -7 {2}, B5
900, BLDG, 1062, -7 {2}, H7
900, BLDG, 1082, -7 {2}, H13
900, BLDG, 1124, -7 {2}, H9
900,CT, 1135, 5, -6 {2}, 0, R, *19~35, 1
900, BLDG, 1147, -7 {2}, H10
900, BLDG, 1170, -7 {2}, H12
900, BLDG, 1197, -7 {2}, H11
900, PED, 88, 20, 4, 2{1}, B, *1~10
900, PED, 90, 20, 4, 2{1}, F, *1~10
1000,A, *3, 400, 1.9{2}, *18~35
1000, PED, 90, 20, 4, -2{2}, F, *1~10
1000, PED, 90, 20, 4, -1.5{2}, F, 11
1050, V, 0, 252, 5, 0, *18~35
1050, V, 0, 276, 5, 0, *18~35
1050, V, 0, 288, 5, 0, *18~35
1100, BLDG, 1034, -7 {2}, H2
1100, BLDG, 1058, -7 {2}, H3
1100, BLDG, 1081, -7 {2}, H4
1100, BLDG, 1098, -7 {2}, H5
1100, BLDG, 1113, -7 {2}, B1
1100, BLDG, 1130, -7 {2}, H13
1100, BLDG, 1152, -7 {2}, H14
1100, BLDG, 1175, -7 {2}, H15
1100,CT, 1187, 5, -6 {2}, 0, R, *19~35, 1
1100, BLDG, 1202, -7 {2}, H16

1200,V, *-4, 200, -4.5{1}, 1, *18~35,1800{14}, -4.5{1}, *10, 2
1200, BLDG, 1000, 7 {1}, H1
1200, BLDG, 1034, 7 {1}, H2
1200,CT, 1044, 5, 6 {1}, 0, L, *19~35, 1
1200, BLDG, 1058, 7 {1}, H3
1200, BLDG, 1081, 7 {1}, H4
1200, BLDG, 1098, 7 {1}, H5
1200, BLDG, 1113, 7 {1}, B13
1200,CT, 1120, 5, 6 {1}, 0, L, *19~35, 1
1200, BLDG, 1130, 7 {1}, H13
1200, BLDG, 1152, 7 {1}, H14
1200, BLDG, 1175, 7 {1}, H15
1300, V, 0, 252, 5, 0, *18~35
1300, V, 0, 276, 5, 0, *18~35
1300, V, 0, 288, 5, 0, *18~35
1300, V, 0, 252, 5, 0, *18~35
1300, V, 0, 276, 5, 0, *18~35
1300, V, 0, 288, 5, 0, *18~35
1300, BLDG, 1034, -7 {2}, H2
1300, BLDG, 1058, -7 {2}, H3
1300, BLDG, 1081, -7 {2}, H4
1300, BLDG, 1098, -7 {2}, H5
1300, BLDG, 1113, -7 {2}, B1
1300,CT, 1120, 5, -6 {2}, 0, R, *19~35, 1
1300, BLDG, 1130, -7 {2}, H13
1300, BLDG, 1152, -7 {2}, H14
1300, BLDG, 1175, -7 {2}, H15
1300,CT, 1187, 5, -6 {2}, 0, R, *19~35, 1
1300, PED, 100, 20, 4, -2{2}, F, *1~10
1300, PED, 88, 20, 4, 2{1}, B, *1~10
1300, PED, 90, 20, 4, 2{1}, F, *1~10
1350, V, 0, 252, 5, 0, *18~35
1350, V, 0, 276, 5, 0, *18~35
1350, V, 0, 288, 5, 0, *18~35
1400, V, 0, 252, 5, 0, *18~35
1400, V, 0, 276, 5, 0, *18~35
1400, V, 0, 288, 5, 0, *18~35
1400, BLDG, 1002, 7 {1}, H16
1400, BLDG, 1034, 7 {1}, B5
1400, BLDG, 1062, 7 {1}, H7

1400, BLDG, 1093, 7 {1}, H8
1400, BLDG, 1124, 7 {1}, H9
1400, BLDG, 1147, 7 {1}, H10
1400,CT, 1159, 5, 6 {1}, 0, L, *19~35, 1
1400, BLDG, 1170, 7 {1}, B4
1400, BLDG, 1197, 7 {1}, H11
1500, BLDG, 1002, -7 {2}, H16
1500, BLDG, 1034, -7 {2}, B5
1500, BLDG, 1062, -7 {2}, H7
1500, BLDG, 1093, -7 {2}, H8
1500,CT, 1112, 5, -6 {2}, 0, R, *19~35, 1
1500, BLDG, 1124, -7 {2}, H9
1500, BLDG, 1147, -7 {2}, H10
1500, BLDG, 1170, -7 {2}, B4
1500, BLDG, 1197, -7 {2}, H11
1500, PED, 100, 20,   4, -2{2}, F, *1~10
1500, PED, 88, 20,   4, 2{1}, B, *1~10
1500, PED, 90, 20,   4, 2{1}, F, *1~10
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1550, PED, 1100, 0, 0, 0.5{2},L, 3
1600, BLDG, 1034, 7 {1}, H2
1600,CT, 1044, 5, 6 {1}, 0, L, *19~35, 1
1600, BLDG, 1058, 7 {1}, H3
1600, BLDG, 1081, 7 {1}, H4
1600, BLDG, 1098, 7 {1}, H5
1600, BLDG, 1113, 7 {1}, B14
1600, BLDG, 1130, 7 {1}, H13
1600, BLDG, 1152, 7 {1}, H14
1600, BLDG, 1175, 7 {1}, H15
1600, BLDG, 1202, 7 {1}, H16
1600, PED, 193, 3{22}, 3, -1{1},R,*4
1600, PED, 190, 3{22}, 3, -1{1},R,*1
1700, BLDG, 1034, -7 {2}, H2
1700, BLDG, 1058, -7 {2}, H3
1700, BLDG, 1081, -7 {2}, H4
1700, BLDG, 1098, -7 {2}, H5

1700, BLDG, 1113, -7 {2}, B1

1700,CT, 1120, 5, -6 {2}, 0, R, *19~35, 1

1700, BLDG, 1130, -7 {2}, H13

1700, BLDG, 1152, -7 {2}, H14

1700, BLDG, 1175, -7 {2}, H15

1700,CT, 1187, 5, -6 {2}, 0, R, *19~35, 1

1700, BLDG, 1202, -7 {2}, H16

1700,I,2,100,0,4,0

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.12,19.8122402879568,0,0,0,1.8,0,1.8,0,1.5,0,1.5, 0

1800, V, 0, 252, 5, 0, *18~35

1800, V, 0, 276, 5, 0, *18~35

1800, V, 0, 288, 5, 0, *18~35

1800, BLDG, 1052, 7 {1}, U4

1800, PED, 100, 20, 4, -2{2}, F, *1~10

1800, PED, 88, 20, 4, 2{1}, B, *1~10

1800, PED, 90, 20, 4, 2{1}, F, *1~10

1800,CT, 200, 5, 10 {1}, 15, L, 9, 1

1800,CT, 200, 5, 30 {1}, 20, R, *19~35, 1

1800,CT, 200, 5, 150 {1}, 20, R, *47~51;7;-49, 1

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1950, V, 0, 276, 5, 0, *18~35

1950,V, 0, 288, 5, 0, *19~27, 25{4}, -4.5{1}, 20, 1.25, 2350{14}, -4.5{1}, 35, 5

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2000, TBox, 980, 10, 300, 7, 150

2000,A, *5, 400, 1.9{2}, *18~35

2000, PED, 100, 20, 4, -2{2}, F, *1~10

2000, PED, 88, 20, 4, 2{1}, B, *1~10

2000, PED, 90, 20, 4, 2{1}, F, *1~10

2000, BLDG, 1382, 7 {1}, G3

2000, BLDG, 1400, 7 {1}, S2

2000, BLDG, 1427, 7 {1}, S1

2000, BLDG, 1463, 7 {1}, S3

2000, BLDG, 1497, 7 {1}, S4
2000, BLDG, 1519, 7 {1}, B1
2000, BLDG, 1539, 7 {1}, G6
2000, BLDG, 1560, 7 {1}, G3
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2050, V, 0, 252, 5, 0, *18~35
2050, V, 0, 276, 5, 0, *18~35
2050, V, 0, 288, 5, 0, *18~35
2050, V, 0, 300, -1.5{1}, 0, 56
2100, V, 0, 252, 5, 0, *18~35
2100, V, 0, 276, 5, 0, *18~35
2100, V, 0, 288, 5, 0, *18~35
2150, V, 0, 252, 5, 0, *18~35
2150, V, 0, 276, 5, 0, *18~35
2150, V, 0, 288, 5, 0, *18~35
2200, V, 0, 252, 5, 0, *18~35
2200, V, 0, 276, 5, 0, *18~35
2200, V, 0, 288, 5, 0, *18~35
2300, V, 0, 252, 5, 0, *18~35
2300, V, 0, 276, 5, 0, *18~35
2300, V, 0, 288, 5, 0, *18~35
2350, V, 0, 252, 5, 0, *18~35
2350, V, 0, 276, 5, 0, *18~35
2350, V, 0, 288, 5, 0, *18~35
2400, BLDG, 963, -7 {2}, G26
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2400, BLDG, 1045, -7 {2}, G32
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3500, BLDG, 1046, -7 {2}, S16
3500, BLDG, 1077, -7 {2}, S17
3500, BLDG, 1101, -7 {2}, B4
3500, BLDG, 1118, -7 {2}, B1
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3700, PED, 100, 20, 4, -2{2}, F, *1~10

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3700, BLDG, 1207, 7 {1}, S2

3700, BLDG, 1229, 7 {1}, S6

3700, BLDG, 1257, 7 {1}, S10

3700, BLDG, 1289, 7 {1}, S11

3700, BLDG, 1316, 7 {1}, S12

3700, BLDG, 1340, 7 {1}, S13

3700, BLDG, 1370, 7 {1}, S6

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3700, BLDG, 1027, -7 {2}, S1

3700, BLDG, 1063, -7 {2}, S3

3700, BLDG, 1097, -7 {2}, S4

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3700, BLDG, 1139, -7 {2}, G6

3700, BLDG, 1160, -7 {2}, G3

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3900, BLDG, 1142, -7 {2}, G38

3900, BLDG, 1181, -7 {2}, S17

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4300, BLDG, 1265, -7 {2}, G26

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4300, V, 0, 576, 5, 0, *18~35

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7600, PED, 100, 20, 4, -2{2}, F, *1~10
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C:\STISIM\Data\Textures\Grass08.Jpg,25,C:\STISIM\Data\Textures\Road07.Jpg,12,C:\STISIM\D
ata\Textures\Grass08.Jpg,25
7700, PED, 88, 20, 4, 2{1}, B, *1~10
7700, PED, 90, 20, 4, 2{1}, F, *1~10
7700, BLDG, 1034, 7 {1}, H2
7700, BLDG, 1058, 7 {1}, H3
7700, BLDG, 1081, 7 {1}, H4
7700, BLDG, 1098, 7 {1}, H5
7700, BLDG, 1113, 7 {1}, B14
7700, BLDG, 1130, 7 {1}, H13
7700, BLDG, 1152, 7 {1}, H14
7700, BLDG, 1175, 7 {1}, H15
7700,CT, 1187, 5, 6 {1}, 0, L, *19~35, 1
7700, BLDG, 1202, 7 {1}, H16
7700, BLDG, 1034, -7 {2}, H2
7700, BLDG, 1058, -7 {2}, H3
7700, BLDG, 1081, -7 {2}, H4
7700, BLDG, 1098, -7 {2}, H5
7700, BLDG, 1113, -7 {2}, B15
7700, BLDG, 1130, -7 {2}, H13
7700, BLDG, 1152, -7 {2}, H14
7700, BLDG, 1175, -7 {2}, H15
7700,CT, 1187, 5, -6 {2}, 0, R, *19~35, 1
7700, BLDG, 1202, -7 {2}, H16

7800, PED, 100, 20,   4, -2{2}, F, *1~10

7800, PED, 88, 20,   4, 2{1}, B, *1~10

7800, PED, 90, 20,   4, 2{1}, F, *1~10

7900, BLDG, 1034, 7 {1}, H2

7900, BLDG, 1058, 7 {1}, H3

7900, BLDG, 1081, 7 {1}, H4

7900, BLDG, 1034, -7 {2}, H2

7900, BLDG, 1058, -7 {2}, H3

7900, BLDG, 1081, -7 {2}, H4

8000, TREE, 30, 0, *1~18, 10 {0}, 35 {0}, 0

8000,A, *5, 400, 2.50{2}, *18~35

8500,A, *5, 400, 2.50{2}, *18~35

8500, BLDG, 1000, 0 {1}, U6, 0

8500, PED, 1000, 0, 0, -0.5{1},R,*1~8

8500, ESAV

8500, ES

F. DEBRIEFING FORM

Katılım Sonrası Bilgilendirme Formu

Bu araştırma, daha önce de belirtildiği gibi, ODTÜ Psikoloji bölümü Trafik ve Ulaşım Psikolojisi doktora programı öğrencisi Özgün Özkan tarafından Prof. Dr. Türker Özkan danışmanlığında yürütülmektedir.

Araştırmanın amacı, farklı içeriklere sahip trafik güvenliği ile ilgili olan videoların sürücü davranışları üzerinde, videoyu hemen izledikten sonra ve iki hafta geçtikten sonraki etkileri arasında farklılaşma olup olmadığının incelenmesidir. Bununla beraber, söz konusu videoları izleyen katılımcıların gruplar arası karşılaştırılması yapılarak, video içeriğine bağlı olası farklılaşmanın incelenmesi çalışmanın bir diğer amacıdır.

Bu çalışmadan elde edilecek bilgiler, sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışmanın sağlıklı ilerleyebilmesi ve güvenilir bulgular elde edilebilmesi adına, çalışmanın içeriği ile ilgili detayları diğer kişilerle paylaşmamanızı dileriz.

Çalışmamıza katıldığınız için tekrar teşekkür ederiz.

Araştırma ile ilgili daha fazla bilgi almak için araştırmacılarla iletişime geçebilirsiniz.

G. CURRICULUM VITAE

ÖZGÜN ÖZKAN

1. EDUCATION

2015-present	PhD., Middle East Technical University, Traffic and Transportation Psychology
2010-2013	M.S., Ankara University, Social Psychology
2005-2009	B.S., Ege University, Department of Psychology

2. WORK EXPERIENCE

2017-Present	Research Assistant, Department of Psychology, Ufuk University **Courses:** • Traffic Psychology • Readings in Psychology • Statistical Methods in Psychology
2014-2015	Instructor, Department of Sociology, Kırıkkale University **Courses:** • Learning Psychology • Developmental Psychology • Introduction to Psychology • Social Psychology • Psychology of Youth

3. RESEARCH INTEREST

Driver behaviors, human factors in traffic and transportation, traffic culture and safety, cross-cultural psychology, social identity

4. PUBLICATIONS

4.1. Thesis:

- **Özkan, Ö.** (2013). İnternet kullanımı ile ilgili değişkenlerin cinsiyet, kişilik özellikleri, yaşam doyumu ve bağlanma stilleri açısından incelenmesi [Investigation of variables related to internet use with gender, personality, life satisfaction and attachment styles]. Unpublished Master's Thesis, Ankara University, Ankara.

4.2. Publications:

- Yılmaz, Ş., Arslan, B., Öztürk, İ., **Özkan, Ö.,** Özkan, T., & Lajunen, T. (2022). Driver social desirability scale: A Turkish adaptation and examination in the driving context. *Traffic and Transportation Research Part F: Traffic Psychology and Behaviour,* 84, 53-64. https://doi.org/10.1016/j.trf.2021.11.009
- Öztürk, İ., **Özkan, Ö.,** & Öz, B. (2021). Investigating sex, masculinity and femininity in relation to impulsive driving and driving anger expression. *Transportation Research Part F: Traffic Psychology and Behaviour*, 81, 14-26. https://doi.org/10.1016/j.trf.2021.05.009
- **Özkan, Ö.,** & Öz, B. (2019). Sürücü demografik özelliklerinin trafikte kaçınma davranışı ile ilişkisi [Traffic avoidance in relation to demographic characteristics]. *Trafik ve Ulaşım Araştırmaları Dergisi*, 2 (2), 108–122 https://doi.org/10.38002/tuad.621367
- **Özkan, Ö.,** Öztürk, İ., & Öz, B. (2018). Trafik güvenliği bağlamında dürtüsel sürücülüğün sürücü öfke ifadesi ile ilişkisi [The relationship between impulsive driving and driving anger expression in traffic safety context]. *Güvenlik Bilimleri Dergisi, 7*(2), 329–354. https://doi.org/10.28956/gbd482092

4.3. Oral Presentations:

- **Özkan, Ö.,** & Öz, B. (2019). The relationship between time perspective and driving avoidance. 16. European Congress of Psychology, July 2-5, Moscow, Russia.

- **Özkan, Ö.,** & Öz, B. (2019). The mediator role of driving and riding avoidance in the relationship between traffic locus of control and driver behaviors. 16. European Congress of Psychology, July 2-5, Moscow, Russia.
- Öztürk, İ., **Özkan, Ö.,** & Öz, B. (2017). Anger expression on road in relation to impulsive driving. 15th European Congress of Psychology, July, 11-14, Amsterdam, Netherlands.
- **Özkan, Ö.,** Öztürk, İ., & Öz, B. (2016). Sürücü dürtüselliğinin cinsiyet ve trafikteki öfke ifadeleri bağlamında incelenmesi [The analysis of driver impulsivity in the context of gender and anger expression in traffic]. 19th National Congress of Psychology, September, 5-7, İzmir, Turkey.
- Öztürk, İ., **Özkan, Ö.,** & Öz, B. (2016). Yolda öfke ifadesi: Sürücü dürtüselliği ve cinsiyet rolleri [Anger expression on road: Driver impulsivity and gender roles]. 19th National Congress of Psychology, September, 5-7, İzmir, Turkey.
- **Özkan, Ö.** (2016) MS'te bilişsel tutuluma nöropsikolojik yaklaşım: Görsel-uzamsal işlevler, yönetici işlevler. Symposium of Cognition in Multiple Scleosis, November 12-13, İzmir, Turkey.

4.4. Poster Presentations:

- **Özkan, Ö.** (2017). The analysis of the Birgen Air Flight 301 crash with Haddon Matrix. 15th European Congress of Psychology, July, 11-14, Amsterdam, Netherlands.
- **Özkan, Ö.,** Dalkıç, G., & Lajunen, T. (2017). The effect of altruism, personality traits and general ecological behavior on driver behaviors. 15th European Congress of Psychology, July, 11-14, Amsterdam, Netherlands.
- **Özkan, Ö.,** & Hasta, D. (2013). The predictors of non-Muslims' attitudes living in Turkey towards Muslims. 27. European Federation of Psychology Students Associations (EFPSA) Congress, April 21-28, Özdere, Turkey.

5. ACTIVITIES

5.1. Editorial:

- Trafik ve Ulaşım Araştırmaları Dergisi [Journal of Traffic and Transportation Research], Member of Editorial Board, 2018-present

5.2. Reviews for Journals

- Trafik ve Ulaşım Araştırmaları Dergisi [Journal of Traffic and Transportation Research]
- Psikiyatride Güncel Yaklaşımlar [Current Approaches in Psychiatry]

5.3. Research Groups:

- Member of Safety Research Unit (2015-present)

5.4. Skills and Abilities:

- SPSS, Driving Simulator, Psychotechnical Assessment

5.5. Financial Supports

- 2224-A TUBITAK International Conference Presenter Support, 2020-1

5.6. Memberships

- Turkish Psychological Association

H. TURKISH SUMMARY / TÜRKÇE ÖZET

Giriş

Hız yapmak, tarih boyunca sürücüler tarafından eğlenceli ve keyif veren bir davranış olarak nitelendirilmiştir. Özellikle genç sürücüler, hız yapma davranışını diğer sürücülere "havalı ve güçlü" araçlarıyla gösteriş yapmanın bir yolu olarak değerlendirmektedirler (Thomas ve diğ., 2007). Bununla birlikte hız yapmanın seyahat süresini kısaltarak sürücüye zaman kazandırma gibi bazı avantajları da vardır (Berry ve diğ., 2011). Hız, bu tür çekici görünen bazı özellikleri sebebiyle özellikle genç sürücülerin trafik kazalarında ölümüne en çok sebebiyet veren ve tüm yol kullanıcıları için ciddi bir tehdit oluşturan, değişime dirençli bir risk faktörü olarak karşımıza çıkmaktadır (Elvik, 2010). Bu yüzden yol güvenliğini artırmak adına hız yönetimine odaklanmak gereklidir. Karar vericiler ve uygulayıcılar bu amaçla yol sınıflandırması yapmak, hız limiti belirlemek, yolları daha düşük hızlarda seyahat etmeye yönelik düzenlemek ve sürücü davranışını değiştirmeye yönelik müdahalelerde bulunmak gibi farklı araçlarla aşırı hız davranışının önüne geçmeye çalışmaktadırlar. Bu çalışmada da müdahale öğelerinden biri olan yol güvenliği kampanyalarının sürücü davranışı üzerine etkisi incelenmiştir. Bu noktada insan davranışına daha yakından bakmak sürücü davranışını da anlamak adına önemlidir.

Sürücülükte İnsan Faktörü

İnsan faktörü, trafik kazalarına direkt olarak sebebiyet verebilen en önemli öğe olarak karşımıza çıkmaktadır. İnsan faktörü ile çevre ve araç faktörleri ve bu öğelerin etkileşimleri de kazaya sebebiyet verebilmektedir (Lewin, 1982). Diğer pek çok sürücü davranışı gibi, hız tercihi de insan faktörüyle birlikte şekillenmektedir ve yol güvenliğini sağlamak adına sıkça çalışılmaktadır (Evans, 1991; Fuller, 2005; Pêcher ve diğ., 2011). Bu yüzden hız yapma odağında sürücü davranışı bu çalışmanın temel çıktısı olarak ele alınmıştır.

Reason ve diğerlerinin (1990) sınıflandırmasına göre, sürücülerin yollarda sergiledikleri güvenli olmayan davranışlar niyet temelinde birbirinden ayrılmaktadır. Bu bağlamda düşünüldüğünde de hız yapmanın niyetli sergilenen bir tür "ihlal" davranışı olduğu görülmektedir. Bununla birlikte genç sürücüler genel olarak ihlallerin olumsuz sonuçları hakkında daha az endişe etmektedirler ya da tehlikenin daha az farkındadırlar. Bu kişiler, sürücülük becerilerini sergilemek adına daha fazla güdülenmişlerdir bu sebeple ihlallere karşı koymakta da zorlanırlar (Parker ve diğ., 1992a). Genç sürücüleri, daha yaşlı sürücülere kıyasla daha riskli bir yere koyan bu bulgular, genç sürücülerin trafik ortamındaki davranışlarının araştırılması gerekliliğini doğurmuştur (Laapotti ve diğ., 2001; Mesken, ve diğ., 2002; Özkan, ve diğ., 2006c; Reason ve diğ., 1990; Vassallo ve diğ., 2007).

Hız Yapma Davranışı

Hız yapma davranışı karmaşık ve çok nedenlidir ve zamanla trafikte problem bir davranış haline gelmiştir (Elvik, 2010; Laapotti ve diğ., 2001; Vassallo ve diğ., 2007). Daha önce de bahsedildiği gibi, hız yapmanın olumlu gibi görünen yanları her ne kadar daha kolay fark edilebilir olsa da bu davranışın riskleri sürücüler tarafından göz ardı edilmektedir (Elvik, 2010). Bu sebeple çoğu sürücü hız limitlerinin üzerinde araç kullanmaya devam etmektedir. Hız yapmak sadece kaza yapma olasılığını arttırmakla kalmayıp, gerçekleşen kazalardaki ölüm ve ciddi yaralanma oranlarını da arttırmaktadır (Avrupa Komisyonu, 2021; Truelove ve diğ., 2017).

Bahsedilen tüm risklere rağmen sürücüler yine de gidecekleri yere zamanında varabilmek, daha fazla zaman kazanabilmek ve hız yapmanın hissettirdiği olumlu duygular sebebiyle hız limitlerini aşmaya devam etmektedirler. Ayrıca, yol standartlarındaki ve araçlardaki iyileştirmeler de bireylerin daha hızlı araç kullanmalarına sebep olabilmektedir (Berry ve diğ., 2011; Mesken ve diğ., 2002). Bu noktadan bakıldığında hız yapma davranışının farklı yönlerden tartışılabilecek pek çok sebebi bulunmaktadır. Bu sebepleri tanımlamak ve bir araya getirmek adına Berry ve diğerleri (2011) sürücülerin hız yapma sebeplerini ve hız yapmanın sonuçlarını bir araya getiren bir diyagram oluşturmuşlardır (Bkz. Şekil 2). Bu diyagramda sürücülerin hız yapması ile ilgili öncüller sürücü temelli nedensel faktörler (kültür, davranış ve kişi) ve çevre temelli nedensel faktörler (yol

dinamikleri, araç sistemleri ve kontrolleri) olarak iki ayrı temel başlık altında incelenmiştir. Bu çalışmada temel olarak insan faktörüne odaklanıldığından, sürücü temelli nedensel faktörler daha detaylı bir biçimde ele alınmıştır.

Kişi temelli faktörler demografik özellikler, kişilik özellikleri ve bilgi işleme olarak üç ayrı alt başlık altında incelenebilir. İlk olarak, demografik özelliklerin sürücülerin hız yapma davranışında betimleyici bir rol oynadığı söylenebilir. Örneğin farklı ülkelerde yapılan bazı çalışmalar, erkek sürücülerin kadın sürücülere kıyasla daha fazla ihlal yaptıklarını ve kazaya dahil olma sıklıklarının da kadınlardan daha fazla olduğunu rapor etmişlerdir (Örn., Constantinou ve diğ., 2011; Elvik, 2010; Özkan ve Lajunen, 2006a; Özkan ve diğ., 2006c). Ayrıca, cinsiyetin hız yapma davranışının güçlü bir yordayıcısı olduğu belirlenmiştir. Yine beklenen şekilde, erkekler sürücü tarafından hız yapılmasını kabul etmeye daha meyillidirler (Berry ve diğ., 2011; Cordellieri ve diğ., 2016; Truelove ve diğ., 2017).

Sürücülerin yaşının da hız yapma davranışının güçlü bir yordayıcısı olduğu görülmektedir. Yapılan çalışmalara göre genç sürücülerin, yaşlı sürücülere kıyasla kazaya karışma oranları 2,5 kat daha fazladır. Bununla birlikte az ya da çok bu iki grubun kaza özellikleri de bazı farklılıklara sahiptir. Örneğin genç sürücüler hız limitini aşma ve kontrol kaybı içeren kazalara daha fazla karışmaktadır (Clarke ve diğ., 2002). Ayrıca yaş ve sürücünün araç kullanma sıklığı, hız cezalarının bir yordayıcısıdır. Araba kullanma sıklığı fazla olan genç sürücüler genellikle hız limitini aşmak sebebiyle ceza almaktadırlar (Mesken ve diğ., 2002). Bununla birlikte hız yapmak genç sürücüler tarafından "havalı ve tercih edilir" bir davranış olarak değerlendirilmektedir ve bu sürücüler sadece yalnızken değil, başka yolcuların varlığında da hız limitlerini aşmaya eğilimlidirler (Simons-Morton ve diğ., 2005). Tüm bu bulgular bir arada değerlendirildiğinde genç sürücüler arasında en sık görülen ihlal davranışının hız yapmak olduğu (Clarke ve diğ., 2002) ve genç sürücülerin hız limitlerini daha çok aştıkları görülmektedir (Moller ve Haustein, 2014; Özkan ve diğ., 2006; Williams ve diğ., 2006). Bu çalışma da hız yapma davranışı temelinde genç sürücülere odaklanmaktadır çünkü bu sürücüler riskleri daha az ciddiye alma eğilimindedirler. Aynı zamanda, kendi sürücülük becerilerini de olduğundan daha iyi değerlendirirler (De Craen ve diğ., 2011; Elvik, 2010; Sümer ve diğ., 2006).

Kişilik özelliklerinin etkisi de riskli sürücülük bağlamında incelenen bir konudur çünkü bazı kişilik özellikleri, o özelliğe sahip sürücüyü trafikte daha riskli hale getirebilmektedir. Örneğin araç kullanmak uyarılma, heyecan, hız ve rekabet arzusunu tatmin eder ve yüksek heyecan arama düzeyine sahip sürücüler için uygun bir ortam oluşturur (Hennessy, 2011). Tahmin edilebileceği gibi, yüksek heyecan arama düzeyi hız yapma gibi tehlikeli davranışlara yol açıp dolaylı da olsa kazalara sebep olabilmektedir (Sümer, 2003; Schwebel ve diğ., 2006). Constantinou ve diğerlerinin (2011) çalışmasında da dürtüselliğin hız yapma davranışı gibi sıradan ihlallerle ilişkili olduğu bulgulanmıştır. Benzer şekilde, disinhibisyon, ödüle duyarlılık da trafik ihlalleri ve alınan cezalarla ilişkilidir. Ek olarak, öfke, düşmanca davranışlar gibi davranış örüntüleri de riskli sürücülükle ilişkilidir (Schwebel, ve diğ., 2006).

Son olarak, hangi bilginin nasıl işlendiği de sürücü davranışının şekillenmesinde önemli bir rol oynar. Sürücüler, çeşitli türdeki bilgileri farklı düzeylerde işlerler ve sürüş tarzlarını, yeteneklerini, ilgili riskleri göz önünde bulundurarak yapacakları eylemleri farklı şekillerde düzenlerler. Sonuç olarak bu süreç sürücülerin davranışlarını, dolayısıyla hızlarını ve buna bağlı sonuçları şekillendirir (Berry ve diğ., 2011; Shinar, 2017). Ayrıca insanlar genel olarak bilgiyi işlemek ve buna tepki vermek için zamana ihtiyaç duyarlar. Yüksek hızlarda sürücüler davranışlarına karar verebilmek için daha fazla zamana ihtiyaç duyacağından, hız arttığında kazadan kaçınmak daha zor hale gelir (van Schagen ve diğ., 2018).

Sürücülerin diğer davranışları da trafikteki riskli durumlara sebep olabilen bir faktördür. Sürücüler hızlarını radyoyu karıştırmak, telefonla ya da diğer yolcularla konuşmak, bir şeyler yemek ve içmek gibi dikkat dağıtıcı faktörlerin karmaşıklığına göre ayarlarlar. Bu tür kritik dikkat dağıtıcılar sürücünün dikkatini birincil görev olan sürüşten ayırmalarına sebep olur. Bu durum da kişinin sürüş performansını olumsuz yönde etkileyebilir ve kişi hem kendini hem de diğer yol kullanıcılarını tehlikeye atmış olur (Berry ve diğ., 2011). Araştırmalar genç sürücülerin dikkat dağınıklığına bağlı bu tür kazalara, yaşlı sürücülere oranla daha sık dahil olduklarını göstermiştir (NCSA, 2017; Schroeder ve diğ., 2018).

Bireylerin içinde bulundukları kültür de diyagramın bir başka parçasıdır. Sürücüler, yolları paylaşan bir topluluğun üyeleridirler. Sürücülük, kişilerin kendi sürüşleri ve diğer sürücüler hakkındaki değerlendirmelerini içerir. Bu sebeple her bir birey

içinde bulundukları ve diğer yol kullanıcılarını, sosyal normları ve trafik kurallarını içeren bu sosyal ortamdan etkilenir (Lonero, 2007; Zaidel, 1992). Örneğin içinde bulunulan kültürün inanç ve düşünce kalıpları kişilerin karar verme süreçlerini ve risk algılarını etkiler. Ayrıca fayda ve zararla ilgili tutum ve inançlar da sürücülerin davranış kararlarını etkileyebilir (Ward, 2007). Forward ve diğerleri (2010), hız ile ilgili pozitif tutumların hız yapma davranışının yordayıcısı olduğunu ve hız yapmaya istekli olan sürücülerin varılacak yere daha erken gitmek, eğlenceli bir sürüş deneyimi gibi daha pozitif öğeleri ön plana çıkardıklarını ortaya koymuşlardır. Son olarak, farklı trafik kültürüne sahip ülkelerin sosyal bağlamları da kişilerin sürüş stillerini ve hız yapma davranışı hakkındaki tutumlarını farklı derecelerde etkilemektedir (Lonero, 2007; Nordfjærn ve diğ., 2014; Wallén Warner, 2009; Ward ve diğ., 2010).

Sonuç olarak hız yapma davranışını etkileyen faktörler geniş bir yelpazede ve çok çeşitli olarak karşımıza çıkmaktadır. Kuşkusuz kanuni uygulama ve yaptırımlar hız yapma eğilimini azaltan etkili müdahalelerdir (Hoekstra ve Wegman, 2011; Zhao ve diğ., 2019). Ancak sürücü davranışının ardındaki psikolojik faktörler daha belirgin hale gelirse, hız yapma davranışında değişikliklere yol açabilecek daha güvenilir ve etkili müdahaleler oluşturulabilir. Çeşitli medya kanallarında gösterilen trafik güvenliği ile ilgili kampanyalar sürücülerin konu hakkındaki tutum ve düşüncelerini değiştirmede etkilidir (Stead ve diğ., 2005). Ancak bu kampanyaların içerikleri, etkililikleri bağlamında dikkatli bir şekilde oluşturulmalıdır.

Yol Güvenliğinde Davranış Değişikliği

Müdahalenin etkililiği, tasarımcıların özellikle üzerinde durması gereken temel faktördür. Bu sebeple, müdahalenin içeriği ve kullanılacak tekniği belirlemek kritiktir. Araştırmacılar, yol güvenliği kuruluşları ve topluluklar riskli davranışı değiştirmeye yönelik olan bu müdahaleler için birlikte çalışırlar. Farklı faktörleri hedef alarak davranış değişimine yönelik müdahaleler oluşturulurken çeşitli teoriler ve davranış modelleri kullanılır (Fylan ve Stradling, 2014; Ulleberg ve diğ., 2009). Fakat bu teoriler, davranış değişikliğine giderken hangi psikolojik yapıların ele alınması gerektiği konusunda yol gösterirken, bu yapıların nasıl ele alınacağı konusundaki rehberlikleri yetersiz kalır. Bu sebeple müdahalelerin davranışı nasıl değiştirmeyi amaçladığı konusu dikkat çekici bir hale gelmiştir (Fylan ve Stradling,

2014). Abraham ve Michie (2008) standardizasyon ve tanımlamalar olmadan etkililiğe katkıda bulunan müdahale tekniklerini belirlemenin zor olduğunu vurgulamışlar ve bu sorunu çözmek için müdahalelerin içeriğini tanımlayan bir sınıflandırma oluşturmuşlardır. Daha sonra Fylan ve Strandling (2014) tarafından söz konusu davranış değiştirme teknikleri genç sürücülere uyarlanmıştır. Genel olarak bakıldığında, en çok kullanılan tekniğin kazaların olumsuz çıktılarını vurgulamak ile ilgili olduğu görülmektedir (Delhomme ve diğ., 2009; Fylan ve Stradling, 2014; Ulleberg ve diğ., 2009). Bu teknikler genç sürücüleri istenmeyen davranışların fiziksel, psikolojik ve finansal sonuçları ve riskleri hakkında bilgilendirmeyi amaçlar. Bu noktada kitle iletişim araçları üzerinden yürütülen kampanyaların yol güvenliğini artırmada önemli bir rolü olduğu görülmektedir. Bu nedenle bir karayolu güvenliği kampanyasının etkililiğini hangi unsurların iyileştirdiğini ve gelecekteki kampanyaların nasıl daha etkili olabileceğini anlamak önemlidir (Delhomme ve diğ., 2009; Vaa ve diğ., 2009; Wundersitz ve diğ., 2010).

Yol Güvenliği Kampanyaları

Yol güvenliği kampanyaları, belirli bir süre içinde ve medya kanalları aracılığıyla trafikte kaza riskini azaltmak amacıyla, tüm nüfusu ya da belirli bir grup insanı inanç tutum ve/veya davranış değişikliğine yönelik bilgilendirmek, ikna ve motive etmek amacıyla oluşturulan müdahale programları olarak tanımlanabilir. Bu kampanyaların amaçları yasalar hakkında bilgilendirmek, genel olarak bilgi ve farkındalığı geliştirmek, sorunlu davranışı değiştirmek, güvenli olan davranışı sürdürmek ve kazaların sıklık ve şiddetini azaltmak olarak sıralanabilir (Delhomme ve diğ., 2009; Vaa ve diğ., 2009). Dünya genelinde birçok karayolu güvenliği kampanyası olmasına rağmen, bunlardan çok az bir kısmı resmi ve kapsamlı bir şekilde değerlendirilmiştir (Boulanger ve diğ., 2007). Örneğin bir meta analiz çalışması, özellikle endüstrileşmiş ülkelerdeki medya kampanyalarının genellikle hız yapma davranışı ve alkollü araç kullanma hakkında olduğunu, bununla birlikte bu medya kampanyalarının kazaları azaltmada %9'luk bir etkisi olduğunu ortaya koymuştur (Phillips ve diğ., 2011). Yine de bazı raporlar yol güvenliği kampanyalarının eğitim, mevzuat ve yaptırımlarla kullanıldığında davranış üzerinde daha etkili olduğunu vurgulamışlardır (Peden ve diğ., 2004; Vaa ve diğ., 2004; Vaa ve diğ., 2009; Wundersitz ve diğ., 2010). Ek olarak, kampanyada verilen mesajın

içeriği hedef kitlenin özelliklerine uyarlanarak ve bu kitleye ulaşmak için farklı medya araçları kullanılarak kampanyanın daha etkili olması sağlanabilmektedir (Wundersitz ve diğ., 2010).

Son olarak, rasyonel içeriklerin yansıra duygu içerikli güvenlik kampanyaları da sıklıkla kullanılmaktadır çünkü duygular davranışın önemli bir belirleyicisidir (Phillips ve diğ., 2011; Ulleberg ve diğ., 2009). Özellikle korku içerikli kampanyalar davranış değiştirme amacıyla medya kampanyalarında sıklıkla kullanılmaktadır ancak bunun karayolu güvenliğinde kullanılması tartışmalı olmaya devam etmektedir. Korku içerikli bu kampanyaların etkinliği kesin olmaktan uzak olduğundan bu çalışmada da diğer manipülasyon unsurları ile ayrıntılı olarak tartışılmıştır.

Yol Güvenliği Kampanyalarında Olumsuz Duygu İçerikli Yaklaşımlar

Sürücüler, araç kullanırken pek çok farklı duygu deneyimleyebilirler ve bu durum araç kullanma biçimini etkileyebilir (Pêcher ve diğ., 2011). Sonuç olarak da duygular sapkın sürücü davranışları aracılığıyla kazalara sebebiyet verebilir. Trafik güvenliği araştırmacıları özellikle negatif duyguların trafikte tehlikeli davranış örüntülerine sebep olması nedeniyle bu duyguların sürücü davranışı üzerindeki etkisine daha fazla odaklanmışlardır (Mesken ve diğ., 2007; Roidl ve diğ., 2014). Genel olarak olumsuz duyguların açığa çıkmasının sürücüye etkisi ve sonuçlarını anlamak önemlidir. Bu sebeple bu çalışmada iki olumsuz duygu (korku ve üzüntü) ile uyarılmanın sürücülerin hız yapma davranışına ve hız yapma ile ilgili öz bildirimlerine etkisini incelemiştir.

Korku, yüksek düzeyde uyarılmanın eşlik ettiği koruyucu davranışı motive eden duygusal bir durum olarak tanımlanmıştır ve davranış değişikliği müdahalelerinde geniş çapta kullanılmaktadır (Janis, 1967; Witte, 1996). Bununla birlikte, "korku çekiciliği", insanları tutum ve davranışlarını değiştirerek onları potansiyel tehlike veya zarardan koruyan eylemlerde bulunmaya motive eden ikna edici mesaj olarak tanımlanır (Maddux ve Rogers, 1983; Rogers, 1975). Korku çekiciliği içeren kampanyalar, yolda da riskli davranışı ve dolayısıyla ölüm ve yaralanmaları azaltmak amacı taşırlar. Medyada da bu amaçla hazırlanan videolar korku duygusunu uyandırarak bu hoş olmayan duygu durumu ile insanları riskli durumlara

karşı önlem almaya zorlar. Ek olarak, hız yapma davranışını azaltmaya yönelik kampanyalar da sürücülerin hız limitlerine uyumlarını artırmak amacıyla daha çok hız yapmanın ölümcül sonuçlarını açıkça göstermek gibi korku temelli yaklaşımları kullanırlar (Örn., Kaye ve diğ., 2016; Lewis ve diğ., 2007; Plant ve diğ., 2017).

Alan yazında korku temelli yaklaşımları ele alan farklı teoriler bulunmaktadır. Genel olarak incelendiğinde, korku-ikna alan yazınındaki gelişmeler, bu iki öğe arasındaki karmaşık ilişkiyi ve algılanan korkunun değişen doğasının farklı modellerde ortaya çıktığını göstermektedir. Özetle, korku çekiciliğini ele alan farklı modeller bu olgunun belirli durumlarda etkili olabileceğini ve bu temelde bir müdahale geliştirilirken birçok faktörün dikkate alınması gerektiğini ortaya koymaktadır (Delhomme et al., 2009).

Korku kadar geniş kapsamlı bir biçimde incelenmemiş olsa da yol güvenliği kampanyalarında korkuyla da ilişkilendirilen diğer bir duygu da üzüntüdür. Üzüntü, ayrılık, bir yakının ölümü, bir nesnenin kaybı veya başarısızlık gibi durumlardan kaynaklanabilecek olumsuz bir duygudur. Bu durum sadece kişinin kendisini değil, başkalarını da etkileyebilir ve geniş bir zaman aralığını kapsayabilir. Ayrıca insanlar üzüntüye az yoğundan, gözyaşı ve bağırışlar gibi çok yoğuna doğru farklı derecelerde tepkiler verebilirler (Rottenberg ve diğ., 2002). Bazı araştırmalar, üzüntü duygusu içeren televizyon programlarının genç yetişkinler üzerinde yaşlı yetişkinlerden daha etkili olduğunu göstermiştir (Droulers ve diğ., 2015). Araç kullanma bağlamında çok az sayıda çalışma üzüntünün etkisini araştırmıştır. Bu olumsuz duygu, kişide ruminasyonlara sebep olabilir. Ruminasyon, bireylerin duyguları ve sorunları hakkında tekrarlayıcı bir düşünme sürecidir. Bu nedenle bu tür düşüncelere dalan insanlar herhangi bir işlem yapmadan ya da harekete geçmeden bu duygulara ve sorunlara takılırlar (Nolen-Hoeksema ve diğ., 2008). Bu bilgiyle tutarlı şekilde, Rosenblatt (2004) da çalışmasında araç kullanırken yas sürecinde olmanın etkisini araştırmıştır. Bu çalışmaya katılan sürücülerin büyük çoğunluğu trafikte davranışlarına dair unutkanlık yaşadıklarını ve ne yaptıklarının farkında olmadıklarını ifade etmişlerdir. Son olarak üzüntü, kendine odaklanma ve ruminasyondan kaynaklanan sürüş kontrolünde bozukluğa ve doğal olarak sürüşte bozulmaya yol açabilir (Pêcher ve diğ., 2009). Üzüntünün bireyin düşüncelerinde

ve sürüşünde yarattığı bu tür değişikliklerden dolayı bu çalışmada da söz konusu olumsuz duygunun etkisi incelenmiştir.

Yol Güvenliği Kampanyalarında Duygusal Bilgilere Karşı Olgusal (Gerçekçi) Bilgiler

Kampanya mesajının içeriği; kampanyanın amacı, hedef kitlesi, hedeflenen davranış değişikliği ve güvenli olan davranışın faydaları ile doğrudan ilişkili olduğu için kampanyanın temel bileşenlerinden biri olarak görülmektedir (Delhomme ve diğ., 2009). Kampanyanın içeriği duygusal ve olgusal olmayan öğeler ya da bilişsel ve rasyonel öğeler içerecek şekilde oluşturulabilir (Delhomme ve diğ., 2009; Ulleberg ve diğ., 2009; Wallén Warner ve Forward, 2016). Rasyonel bilgi öğeleriyle oluşturulan kampanyalar, hedefin davranışlarının neden değiştirmesi gerektiğine dair mantıklı nedenler sunarlar. Öte yandan duygusal bilgi içeren kampanyalar duygu ve görüntüleri kullanırlar; diğer bir deyişle duygularla "oynarlar". Kısacası her iki şekilde oluşturulan yol güvenliği kampanyaları mesajı hedef kitleye iletir ve hedefi güvenli eyleme motive eder (Delhomme ve diğ., 2009; Ulleberg ve diğ., 2009; Wallén Warner ve Forward, 2016). Ancak bazı araştırmalar, duygusal mesajlar kullanıldığında etkinin daha büyük olabileceğini göstermiştir (Lewis ve diğ., 2007a; Ulleberg ve diğ., 2009). Bu nedenle, duygusal mesajların sunulması alıcılar için dikkat çekici ve ikna edici olabilir (Ulleberg ve diğ., 2009). Bu çalışmada da bu muğlak durumu aydınlatmaya katkıda bulunmak amacıyla hem duygusal hem de olgusal öğelerle oluşturulan yol güvenliği reklamları kullanılarak sürücü davranışı manipüle edilmiştir.

Çalışmanın Amacı

Karayolu güvenliği kampanyaları son yıllarda daha yoğun şekilde çalışılmaya başladığından, konu hakkında eksiklikler ve muğlak bilgiler bulunmaktadır. Bu durum bir yol güvenliği kampanyasının nasıl etkili olabileceğine dair bilgiyi de yetersiz kılmaktadır. Bu bilgi yetersizliği kampanyaların daha etkili bir hale nasıl getirileceğini belirlemeyi zorlaştırmaktadır. Yol güvenliği kampanyalarının değerlendirilmesi, mevcut uygulamaların (duygusal uyarılmanın kullanılması gibi) eksikliklerini aydınlatabilir ve bu karayolu güvenliği kampanyalarının etkili olup olmadığını görmeye yardımcı olabilir (Hoekstra ve Wegman, 2011).

Alan yazın ile ele alındığında, mevcut çalışmanın temel amacı duygusal ve olgusal içerikli yol güvenliği reklamlarının hız davranışını ve sürücülerin hızları ile ilgili öz bildirimlerini doğrudan etkileyip etkilemediğini belirlemektir. Daha detaylı bir şekilde açıklanacak olursa, bu çalışmada i) olumsuz duygular (üzüntü ve korku) uyandıran hız reklamlarının, genç sürücülerin bu reklamlara maruz kaldıktan hemen sonra davranışlarında ve hız yapma ile ilgili öz bildirimlerinde bir azalma olup olmadığı ii) reklamların kısa süreli muhtemel etkisinin iki hafta sonra da devam edip etmediği belirlenmeye çalışılmıştır. Genç sürücüler trafikte daha riskli ve dolayısıyla hız yapmaya daha eğilimli olduklarından, çalışmanın örneklemini de genç sürücüler oluşturmuştur.

Bilindiği kadarıyla bu çalışma, olgusal ve duygu içerikli reklamların sürücü davranışları ve davranış öz bildirimleri üzerinde hem kısa hem uzun vadede etkisini inceleyen ilk çalışmadır. Daha önceki çalışmaların bulgularına dayanarak bu çalışmada hem duygu hem de olgusal içerikle yapılan manipülasyonun, olumsuz duygu koşullarında daha fazla olmakla birlikte, deney gruplarında genel olarak hız davranışının azaltması beklenmiştir.

Yöntem

İşlem

İlk olarak deney ve kontrol grubu videoları belirlenmiş ve ölçme araçları oluşturulmuştur. Orta Doğu Teknik Üniversitesi Etik Kurulu'ndan etik onay alındıktan sonra çalışma duyurusu hazırlanarak paylaşılmıştır. Veri toplama, zaman 1 (temel düzey ölçümü), zaman 2 (manipülasyondan hemen sonraki ölçüm) ve zaman 3 (manipülasyondan yaklaşık iki hafta sonraki ölçüm) olmak üzere iki haftalık zaman aralığı ile üç aşamadan oluşturulmuştur. Tüm ölçümler tamamlandıktan sonra katılımcılara çalışma hakkında bilgi verilmiş ve katılımları karşılığında 30 TL ödeme yapılarak işlem tamamlanmıştır.

Çalışma Tasarımı

Temel düzey ölçümü için ilk oturuma gelmeden önce doldurabilmeleri için katılımcılara çevrimiçi ortamda anket bağlantısı gönderilmiştir. Daha sonra katılımcılardan randevu saatinde çalışmanın yürütüleceği İnsan Faktörü Laboratuvarı'na gelmeleri istenmiştir. Katılımcılar geldiklerinde ilk önce simülatör

ölçümleri alınmıştır. Temel düzey ölçümü tamamlandıktan sonra katılımcılar gruplara rastgele atanıp, koşula ait videoyu izlemişlerdir. Daha sonra manipülasyonun kısa süreli etkisini gözlemek amacıyla aynı ölçümler zaman 2 için alınmıştır. Katılımcıya bu işlem sonucunda ikinci bir randevu verilerek ilk oturum tamamlanmıştır. İki hafta sonra katılımcılar tekrar geldiklerinde izledikleri videonun olası uzun süreli etkisi hakkında veri toplamak amacıyla katılımcılardan aynı öz bildirim ve simülatör ölçümleri tekrar alınarak süreç tamamlanmıştır.

Katılımcılar

84 erkek, 40 kadın olmak üzere toplam 124 kişi çalışmaya katılmıştır. Katılımcıların yaşları 18 ve 26 (*Ort.* = 22.81, *SS* = 1.80) arasında değişmektedir. Tüm katılımcılar B sınıfı ehliyet sahibidir (Ehliyet süresi *Ort.* =3.95, *SS* = 1.86). Katılımcılar son bir yılda ortalama 10397,18 kilometre (*SS* = 12312.50) ve tüm hayatları boyunca ortalama 37763,71 kilometre (*SS* = 54057.83) araç kullandıklarını beyan etmişlerdir.

Veri Toplama Araçları

Demografik Bilgi Formu

Katılımcılara yaş, cinsiyet, ehliyet sahibi olunan yıl, araç kullandığı kilometre bilgisi gibi değişkenleri içeren form sunulmuştur.

Sürücü Davranışları Ölçeği

Sürücü Davranışları Ölçeği, Reason ve diğerleri (1990) tarafından geliştirilip Lajunen ve Özkan (2002) tarafından Türkçeye uyarlanmıştır ve trafikteki sapkın sürücü davranışlarını ölçmeyi amaçlar. Toplam 28 maddeden ve dört alt boyuttan (saldırgan ihlaller, sıradan ihlaller, ihmaller ve hatalar) oluşan altılı (1 = Hiçbir zaman, 6 = Neredeyse her zaman) Likert tipi bir ölçektir. Bir alt boyutta daha yüksek puan, ilgili davranışların daha sık yapıldığını belirtir.

Sürüş Simülatörü

Sürüş Simülatörü olarak STISIM M100W kullanılmış ve katılımcılardan ilk olarak simülatöre alışmaları ve taşıt tutması yaşamadıklarından emin olmak amacıyla 3 km uzunluğunda bir test senaryosunu sürmeleri istenmiştir. Daha sonra katılımcılar 8,5

km uzunluğunda biri zıt yön olmak üzere üç şeritli bir şehir senaryosunu sürmüşlerdir. Senaryo sürücülerin hız seçimini gözlemlemek amacıyla, sürücülerin hızlarını farklılaştırabilecek bazı olayları da içerecek şekilde oluşturulmuştur. Senaryoda sürücülerin hız değişimlerinin de gözlemlenmesi amacıyla herhangi bir hız limiti belirlenmemiştir.

Video Seçimi

Deney gruplarında katılımcılara gösterilecek reklamları belirlemek için 11 uzman bir ön çalışmaya katılmıştır. Bu çalışmada uzmanlar, kendilerine sunulan trafik güvenliği reklamlarını izlemişlerdir. Sonrasında bu videoların duygusal bileşenlerini değerlendirmek amacıyla Pozitif ve Negatif Duygu Ölçeği (PANAS), çalışmanın amacına uygun şekilde "üzgün" maddesi de eklenerek uzmanlara verilmiştir. Ayrıca bir soruyla izledikleri videonun bilgilendirici içeriğini de puanlamaları istenmiştir. Son olarak uzmanlardan videoları verilen en uygun koşula göre (korku, üzüntü, olgusal bilgi, diğer) sınıflandırmaları istenmiştir.

Deney gruplarında kullanılacak videoları belirlemek amacıyla uzmanların değerlendirmeleri üzerinden frekans analizi yapılmıştır. Analiz sonuçlarına göre videolar belirlenip koşullara atanmıştır. Kontrol koşulu için ise üç uzmanın da değerlendirmeleri sonucunda duygu içeriği bakımından "nötr" olan doğal kağıt üretimi ile ilgili bir video seçilmiştir (Bkz. Tablo 3).

Bulgular ve Tartışma

Hız, genç sürücüler arasında trafikteki en önemli sorunlu davranışlardandır (Clarke ve diğ., 2002). Bu sebeple hız sebepli kazaların sayısını ve/veya şiddetini azaltmak ve daha güvenli bir trafik ortamı sağlamak amacıyla dünyanın farklı ülkelerinde karayolu güvenliği kampanyaları kullanılmaya devam etmektedir (Delhomme ve diğ., 2009; Hoekstra ve Wegman, 2011). Ancak bu kampanyalarla ilgili yapılan bilimsel değerlendirmelerin eksikliği, bazı metodolojik sorunlar ve kampanya faaliyetlerinin belgelenmemesi gibi durumlar kampanyaların etkinliğinin belirlenmesini zorlaştırmaktadır (Wundersitz ve diğ., 2010). Söz konusu kampanyaların etkinliğinin belirlenmesi gelecekteki kampanyalara da fayda sağlaması ve konu ile ilgili bütçenin belirlenmesi açısından önemlidir (Boulanger ve diğ., 2007; Boulanger ve diğ., 2009). Bu sebeple yol güvenliği kampanyalarının

etkinliğinin belirlenmesi gerekli görünmektedir. Bu amaç doğrultusunda bu çalışma, hız yapma davranışını azaltmaya yönelik oluşturulmuş farklı içeriklerdeki yol güvenliği reklamlarının genç sürücülerin hız yapma davranışı üzerindeki etkisini araştırmıştır. Öncelikle 11 uzmanın katılımıyla deneysel işlemde kullanılacak videolar belirlenmiştir. Uygulamadan sonra tanımlayıcı istatistikler ve değişkenler arası ilişkiler incelenmiştir. Daha sonra izlenen videoların genç sürücü davranışları üzerindeki kısa ve uzun vadeli etkisine bakmak için 3 x 4 tekrarlı ölçümler için karışık dizayn varyans analizi (ANOVA) yapılmıştır.

Betimsel analizlerin sonuçlarına göre, sürücüler öz bildirimlerinde videoyu izledikten hemen sonra (zaman 2), zaman 1 ve zaman 3'e kıyasla daha fazla sapkın davranış rapor etmişlerdir. Agresif ihlaller dışında diğer sapkın davranışların bildiriminde zaman 2'den sonra azalma gözlenmiştir. Bunun tersine sürücülerin simülatörden elde edilen ortalama hızları tüm koşullar için zaman 2'de en düşük ve zaman 3'te en yüksek olarak bulgulanmıştır.

Her üç aşamada da çalışmanın değişkenleri üzerinden yapılan korelasyon analizlerinde bahsedilmesi gereken bazı benzerlikler ve farklılıklar bulunmaktadır. Öncelikle söz konusu analizlerde sürücülerin bir yılda ve tüm hayatları boyunca aldıkları mesafenin (km), hız cezası ve şehir içi yollar ile şehirlerarası yollarda tercih ettikleri hız ile pozitif ilişkili olduğu görülmüştür. Bununla birlikte sürücülerin hem tüm hayatları boyunca hem de son bir yılda katettikleri kilometrenin üç aşamada da sıradan ihlallerle pozitif olarak ilişkili olduğu ve bu ilişkinin katılımcılar videoları izledikten sonra daha da güçlendiği görülmüştür. Diğer taraftan, saldırgan ihlaller sadece temel düzey ölçümlerinde sürücülerin son bir yılda katettikleri kilometre ile pozitif ilişkili bulunmuştur. Bu bulgular, alan yazında yer alan hem yıllık hem de hayat boyu katedilen kilometrenin sürücülerin öz bildirimlerinde beyan ettikleri ihlaller ve tercih ettikleri hıza etki eden önemli faktörler olduğu bilgisiyle tutarlı görünmektedir (de Winter ve Dodou, 2010; Martinussen ve diğ., 2013). Ayrıca, daha genç sürücülerin ve yüksek kilometre performansına sahip sürücülerin daha fazla ihlal yapma eğilimde olduğu görülmüştür (Stradling ve diğ., 2020). Bunun nedeni, deneyimli sürücülerin sürüş becerilerini olduğundan daha iyi değerlendirmeleri ve daha fazla ihlal yapmaları olabilir (de Winter ve Dodou, 2010; Guého ve diğ., 2014).

Ek olarak hem şehir içi hem de şehirlerarası yollarda sürücülerin bildirdikleri hız, saldırgan ihlaller, sıradan ihlaller ve simülatördeki ortalama hız ve hızlanmalarıyla pozitif ilişkili olarak bulunmuştur. Bununla birlikte, katılımcıların videoları izledikten hemen sonra beyan ettikleri hız ve simülatördeki hızları arasındaki ilişki zayıflamıştır ancak bu ilişki son aşamada en yüksek seviyeye gelmiştir.

Sapkın sürücü davranışları açısından bakıldığında, katılımcıların beyan ettikleri ihmal davranışları ile simülatörde ölçülen hızları arasında temel düzeyde ve videoyu izledikten hemen sonra negatif ilişki olduğu görülürken, uzun süreli etki ölçümlerinde pozitif ilişki olduğu görülmüştür. Ancak bu ilişkiler istatistiksel olarak anlamlı değildir. Hatalar ise sürücülerin simülatörde alınan hız ölçümleri ile pozitif ilişkili ancak bu ilişki yalnızca son ölçümde istatistiksel olarak anlamlı bulunmuştur. Son olarak simülatördeki hız davranışı hem saldırgan ihlaller hem de sıradan ihlaller ile tüm ölçümlerde pozitif olarak ilişkilidir ve bu ilişkinin son ölçümlerde daha da güçlendiği bulgulanmıştır. Genel olarak bu bulgulara bakıldığında, ihlaller ve sürücülerin simülatördeki hızları arasındaki davranış örüntüsü ilişkisini bilişsel çelişki kuramıyla açıklamak mümkün olabilir (Festinger, 1957). Bu kuram, kişilerin davranış ve düşünceleri tutarlı olmadığında, bu durumun psikolojik stres yarattığını öne sürer. Bireyler inançları çeliştiğinde ya da inançları ve davranışları çeliştiğinde rahatsızlık hissederler ve söz konusu iki öğe tutarlı hale gelene kadar ellerinden geleni yaparlar. Çalışmadaki iki değişkenli korelasyon analizleri, katılımcıların hız konusundaki beyanları ve hız yapma davranışları arasında manipülasyondan sonra daha yüksek ilişki olduğunu ortaya çıkarmıştır. Buradan hareketle söz konusu kuramla da tutarlı olarak, yol güvenliği videolarını izlemek katılımcıların davranışlarına ilişkin öz farkındalıklarını arttırmış ve sonuçta kendileri hakkındaki düşünceleri ve davranışları daha tutarlı hale gelmiş olabilir.

Yukarıda bahsedilen ilişkileri daha detaylı olarak ele alabilmek amacıyla 3 x 4 tekrarlı ölçümler için karışık dizayn varyans analizi (ANOVA) yapılmıştır. Hız açısından deney grupları ve kontrol grubu arasında (koşul ana etkisi) istatistiksel olarak anlamlı bir farklılaşma bulunmamıştır. Ayrıca etkileşim etkisi de istatistiksel olarak anlamlı bir sonuç vermemiştir. Bununla birlikte temel düzey ölçümleri ve video izlendikten sonra alınan ölçümler arasında (zamanın ana etkisi) sürücülerin

beyan ettikleri hızları ve simülatörden alınan hız ölçümleri bağlamında bazı önemli sonuçlar vermiştir.

Sürüş simülatöründen alınan hız ölçümlerinde tüm deney grupları için genel bir örüntü gözlemlenmiştir: katılımcıların ortalama hızları videoları izledikten hemen sonraki ölçümlerde düşmüştür, ancak bu azalma istatistiksel olarak anlamlı değildir. Yine de sürücülerin hızları videoyu izledikten iki hafta sonra en yüksek olarak ölçülmüştür ve bu uzun süreli ölçümlerden alınan hız ortalamalarının, videoyu izledikten hemen sonraki kısa süreli ölçümlerde alınan hız ortalamalarından anlamlı olarak yüksek olduğu görülmüştür. Grup temelinde incelendiğinde ise, zaman 3 ve zaman 2 arasındaki bu fark, sadece üzüntü koşulunda istatistiksel olarak anlamlıdır. Diğer bir deyişle, üzüntü koşulundaki sürücülerin ortalama hızları son aşamada, videoyu izledikten hemen sonra alınan ölçümlerden anlamlı olarak yüksektir.

Araştırmanın bulguları, sürüş sırasındaki ivmelenmenin de zaman temelinde değişkenlik gösterdiğini ortaya koymuştur. Detaylı olarak bahsedilecek olursa, temel düzey ölçümlerdeki ivme, son aşamadaki ivme ölçümlerinden anlamlı olarak daha yüksek bulunmuştur. Grup temelinde ele alındığında da korku koşulunda temel düzeydeki ivmelenmenin, manipülasyondan hemen sonraki ivmelenmeden anlamlı olarak yüksek olduğu görülmüştür. İvmenin sürücünün hızındaki doğrusal artış olduğu göz önünde bulundurulursa, sürücülerin temel ölçümlerde daha kısa sürede hızlandıkları, bununla birlikte manipülasyondan sonra hızlanmalarının daha fazla vakit aldığı söylenebilir.

Bununla birlikte, manipülasyon etkisinin öz bildirim ve simülatör ölçümleri arasında da farklılık gösterdiği görülmüştür. Çalışmaya katılan sürücüler, temel düzey ölçümlerine kıyasla videoyu izledikten hemen sonra şehir içi yollarda daha sık ihlal davranışında bulunduklarını bildirmişlerdir. Grup temelinde incelendiğinde söz konusu farkın sadece korku koşulu için anlamlı olduğu görülmüştür. Ayrıca katılımcılar, manipülasyondan sonraki iki ölçümde de şehirlerarası yollarda temel düzey ölçümüne göre daha fazla hız ihlali yaptıklarını bildirmişlerdir. Özetle, katılımcıların genel olarak videoları izledikten sonra hem şehir içi hem şehirlerarası yollarda daha fazla hız ihlali beyan ettikleri söylenebilir.

Videoların manipülasyon etkisi hedeflenen seviyede olmasa da genel bir örüntüden bahsetmek mümkündür. Genel olarak bakıldığında olumsuz duygu durumun sürüşü etkilediği bulgusu literatürle tutarlı görünmektedir (örn., Mesken ve diğ., 2007; Pêcher ve diğ., 2009; Roidl ve diğ., 2014). Ancak bu etki çok yönlü ve bazı açılardan dolaylıdır. Olası bir açıklama; olumsuz duyguların, özellikle de öfke ve kaygının sürücülerin hızlarındaki farklılıkları açıklayabilecek risk değerlendirmesini değiştirmesi olabilir (Mesken ve diğ., 2007). Ayrıca kaygının etkisi de bilgi işleme, dolayısıyla sürücü performansı üzerinde etkisi olduğu için belirsizdir ve bu etki sürücülerin kaygı düzeyine ve başa çıkma stratejilerine bağlı olarak farklılık göstermektedir. Bu yüzden kaygı sürücü davranışını kötüleştirebilir, yardım edebilir ya da hiç etkisi olamayabilir (Pêcher ve diğ., 2009).

Fylan ve Stradling'e (2014) göre, en yaygın kullanılan davranış değiştirme teknikleri, çarpışmanın riskleri ve sonuçları hakkında bilgi içerenlerdir. Bu tür bilgileri içeren müdahalelerde insanların sonuçları daha iyi anlayabilmeleri adına çarpışma sahnelerinin görselleri kullanılır. Bu görseller genellikle kişilerin bu riskli davranışlar hakkındaki tehdit değerlendirmelerini arttırır ancak genellikle yeni davranışın tehlikeyi azaltmada veya öz yeterliği arttırmada ne kadar etkili olacağına dair başa çıkma değerlendirmelerinde bulunmaz. Koruma Motivasyonu Teorisi'ne göre bir mesajda algılanan tehdit ve etkinlik yüksek olduğunda, insanların davranışlarını istenen yönde değiştirme olasılığı daha yüksektir. Öz-yeterlik, önerilen başa çıkma davranışını benimsemeyi etkiler (Maddux ve Rogers, 1983; Rogers, 1975). Benzer şekilde Genişletilmiş Paralel Süreç Modeli, yüksek algılanan tehdit ve düşük etkinlik içerdiğinde mesajın göz ardı edilebileceğini öne sürer (Witte, 1992; Witte ve Allen, 2000). Bu çalışmada korku içerikli video, bazı kişilerin hayatını kaybettiği ve bir kadının da kaza sonucunda engelli hale geldiği bir kaza sahnesini içermektedir. Üzüntü içerikli videoda ise kazalarda aşırı hız nedeniyle yakınlarını kaybeden bazı kişiler görülmektedir. Her iki video da amaçlandığı gibi hoş olmayan bir duygusal durum yaratmaktadır. Janis'e (1967) göre bu tür güçlü olumsuz duygular uyandıran iletişimler, daha hafif olumsuz duygular uyandıranlara nazaran daha az etkili olabilmektedir çünkü sonuç davranışının istenenin aksi bir şekilde ortaya çıkma potansiyeli vardır. Ayrıca bu çalışmadaki olumsuz duygular içeren videolar önlem almak adına herhangi bir baş etme stratejisi de önermemektedir. Bu durum yukarıda bahsedilen teorilerle

değerlendirildiğinde, videolardaki algılanan tehdidin yüksek olduğu görülmektedir. Ancak videolarda algılanan öz yeterlik unsurlarının olmaması nedeniyle videoların sürücü davranışları üzerindeki etkililiği sınırlı olabilir. Bu nedenle de videoların etkisi istenilen düzeyde olmayabilir.

Bahsedilmesi gereken bir diğer konu da katılımcıların ortalama hızlarının son ölçümde en yüksek seviyeye ulaşmasıdır. Bu durum farklı perspektiflerden ele alınabilir. Bu durumla ilgili bir açıklama, daha önce tartışılan teorilerle tutarlı olarak algılanan tehdidin derecesi olabilir. "Bumerang etkisi"ne göre bazı durumlarda kişiler, amaçlananın tersi yönde tutumlarını değiştirir ve yüksek tehdit algısı, istenen davranışın tam tersi ile sonuçlanabilir (Hovland ve diğ., 1953 akt. Cohen, 1962). Bu çalışmada da tüm deney gruplarının ortalama hızlarının son ölçümlerde en yüksek seviyeye ulaştığı görülmüştür. Bunun yanı sıra katılımcılar videoları izledikten hemen sonra daha sık hız ihlali bildirmişlerdir. Daha önce de bahsedildiği gibi bu çalışmadaki negatif duygu içeren videolar, yüksek düzeyde uyarılma içermekle birlikte herhangi bir pozitif argüman ya da çözüm içermemektedir. Ayrıca mesajlarda amaçlananın aksine, hız yapmanın özellikle genç sürücüler arasında cezbedici bir etkisi olduğu bilinmektedir (Thomas ve diğ., 2007). Tüm bu durumlar çerçevesinde düşünüldüğünde, sürücülerin mesajı görmezden gelmesi veya istenilenin aksi yönde davranıp bu şekilde beyanda bulunmaları olası görünmektedir.

Senaryoya aşinalık da son aşamadaki ölçümlerde katılımcıların hızlarının yükselmesine başka bir açıklama olabilir. Bazı simülatör temelli çalışmalar (Martens, 2018; Martens ve Fox, 2007) ve yol gözlemi çalışmaları (Colonna ve diğ., 2016), sürücülerin aşina oldukları bir rotada zamanla hızlarını artırdıklarını ortaya koymuştur. Benzer şekilde bu çalışmaya katılan sürücüler de senaryoyu araştırmanın deseni gereği üç kere sürmüşlerdir. Deney gruplarında her ne kadar manipülasyon etkisiyle sürücüler kısa süreli ölçümlerde hızlarını azaltsa da kontrol grubunda hızın her ölçümde arttığı gözlemlenmiştir. Buradan hareketle, katılımcıların senaryoya aşina olduklarından ötürü hızlarını arttırabilecekleri düşünülebilir.

Aynı ölçümler aynı katılımcılardan üç defa alındığından, önceki bir ölçümün sonraki bir ölçümde davranışı değiştirme olasılığı da vardır. "Taşınma etkisi" adı

verilen bu durum, tekrarlanan ölçümlerde zorlayıcı bir etki olarak karşımıza çıkmaktadır. Taşınma etkisi, öğrenme, alışma, duyarlılık ve adaptasyon gibi çeşitli durumlardan ortaya çıkabilir (Bordens ve Abbott, 2002). Bu etkiyle başa çıkmanın yolları olsa da bazı kalıcı değişiklikler öğrenmenin de etkisiyle sonraki ölçümlere taşınıp davranışı etkileyebilir. Bu çalışmada da standardizasyonu sağlamak amacıyla ölçümler herhangi bir değişiklik yapılmadan aynı katılımcıdan üç kere alındığından söz konusu öğrenme etkisi katılımcının son aşamadaki hız artışına sebep olmuş olabilir.

Bu çalışmada, olgusal bilgi vermenin kısa ve uzun süreli etkisi hem simülatör hem de öz bildirim araçları ile ilk kez ölçülmüştür. Bu grup için bakıldığında her iki ölçüm çeşidi için temel ölçüm seviyesi ve manipülasyondan sonraki ölçümler arasında anlamlı bir farklılaşma bulunmamıştır. Yine de bu gruptaki öz bildirim ölçümlerinde belirli bir örüntüden bahsetmek mümkündür. Olgusal bilgi içeren yol güvenliği videosunu izledikten hemen sonra katılımcılar, manipülasyondan sonraki iki bildiriminde de temel ölçüm düzeyine göre biraz daha fazla hız ihlali bildirmişlerdir. İzledikleri videonun bireylerin kendi sürüşleri hakkında farkındalıklarını artırmış olma ihtimali bu küçük farkın nedeni olabilir. Ancak sonuç olarak bakıldığında videolarda yalnızca olgusal bilgiler sunmak, duygusal içerikli videolardan daha az etkili görünmektedir.

Bu çalışma, yol güvenliği kampanyalarının sürücü davranışı üzerindeki etkisi hakkında önemli bilgiler sunmaktadır. Bununla birlikte bazı sınırlılıklar ve önerilerden bahsetmek gerekir. Öncelikle tüm gruplarda erkek katılımcılar, kadın katılımcılardan daha fazladır. Bu sebeple gruplar içinde eşit bir cinsiyet dağılımı sağlanamamıştır ancak kadın ve erkek katılımcıların her grupta eşit oranda olmasına dikkat edilmiştir. İleride yapılacak çalışmalarda cinsiyet açısından daha yakın sayılarda katılımcı ile daha genellenebilir sonuçlara ulaşılabilir.

Sınırlılıklarla ilgili bir diğer konu da analiz sırasında kişilik özellikleri, demografik değişkenler, tutumlar gibi sürücü davranışlarını etkileyebilecek faktörlerin kontrol edilmemiş olmasıdır. Benzer konuları inceleyecek olan çalışmalar bu özellikleri bir kontrol değişkeni olarak ele alabilir. Böylece, manipülasyonun davranış üzerindeki etkisi daha net bir şekilde gözlemlenebilir.

Sürücülerin hız limitlerine genel olarak uyup uymadığı da sonuçları etkileyebilecek bir unsurdur. Daha açık bir ifadeyle, bu çalışmanın örneklemi, zaten hız yapma eğilimi ve niyeti olan riskli sürücüler olabilir. Bu nedenle manipülasyondan yeterince etkilenmemiş olabilirler. Gelecekteki çalışmalar bu şekilde potansiyel risk faktörlerini belirlemek için bir ön çalışma yaparsa, başlangıç ölçümleri ile manipülasyon sonrası ölçümler arasındaki fark daha doğru bir şekilde ortaya çıkabilir.

Bahsedilmesi gereken başka bir durum da bu çalışmanın ikna sürecinden ziyade sürücü davranışı olarak deneysel koşulların sonuçlarına odaklanmış olmasıdır. Bu açıdan bakıldığında gelecek çalışmalar müdahalelerin nasıl, neden ve ne zaman etkili olabileceğine dair açıklamalar yapabilmek adına ikna edici süreci açıklamaya odaklanabilir.

Korku, öfke ve üzüntü gibi duyguları birbirinden tamamen ayırmak neredeyse imkansızdır. Her ne kadar bu durum video seçme prosedüründe titizlikle ele alınmış ve frekans analizleri de videolardaki hedef duyguyu diğerlerinden ayırmaya yardımcı olmuş olsa da duygularla ilgili bahsedilen bu özellik kaçınılamaz bir karıştırıcı etki yaratmış olabilir.

Video seçim sürecinde fark edilen kritik bir nokta, incelenen trafik güvenliği videolarının çoğunun daha önce bahsedilen teknikler ve teorilerin önerdiği şekilde yapılmamış olmasıdır. Yol güvenliği reklamlarının değerlendirilmesi yetersiz olduğundan (Hoekstra ve Wegman, 2011), müdahale geliştiricileri kılavuzlarında ve değerlendirme raporlarında hangi davranış değişikliği tekniğini kullandıklarının kayıtlarını tutmalıdır. Bu sayede sürücü davranışları üzerinde hangi tekniğin daha etkili olduğunu belirlemek daha kolay olacak ve yoldaki ölüm ve yaralanmaların azaltılmasına katkı sağlanacaktır. Sonuç olarak, konuyla ilgili yeterli veri, teoriler ve öneriler ışığında gelecekteki trafik güvenliği videolarının daha etkin hale getirilmesi sağlanacaktır.

Bazı araştırmalar kazanç odaklı reklamların kayıp odaklı reklamlardan daha etkili olabileceğini öne sürmüştür (Latimer ve diğ., 2010). Ayrıca olumlu etkiye sahip yol güvenliği mesajları, davranışları olumluya çevirmede daha etkili olabilmektedir (Lewis ve diğ, 2008). Bu açıdan değerlendirildiğinde bu tür pozitif içeriklere sahip

videoların etkililiğinin de çalışmaya değer olduğu söylenebilir. Bununla birlikte Fylan ve Stradling (2014), genç sürücülerin sürücülük becerilerini olduğundan daha iyi görmek eğilimde olduklarından, sürücülerin bu algıları ve gerçekteki güvenlik ile ilgili beceri farkındalıklarını artırabilecek tekniklerin kullanılmasının genç sürücülerdeki kaza oranlarını azaltmada etkili olabileceğini öne sürmüşlerdir. Ayrıca, yol güvenliği ile ilgili genel teşviklerden ziyade tam olarak neyin değişmesi gerektiğine dair net mesajlar verildiğinde yol güvenliği videoları daha ikna edici hale gelebilir. Özetle, mesajı daha net ve olumlu bir etkiyle ileten yol güvenliği videoları özellikle genç sürücüler üzerinde etkili olabilir. İleride yapılacak çalışmalar olumsuz etkinin yanı sıra bu konuya da odaklanırsa, ikna edicilik açısından daha uzun etkiye sahip içerikler üretilebilir.

Genel olarak bu çalışma, farklı zamanlarda ölçümleri alınan korku içerikli, üzüntü içerikli ve olgusal bilgi sunan yol güvenliği reklamlarının etkililiğinin direkt olarak karşılaştırmasını yapmıştır. Bu açıdan bakıldığında çalışma, bu tür içeriklere sahip yol güvenliği reklamlarının ikna ediciliğinin göreli süresi hakkında fikir vermektedir. Ayrıca, üzüntü duygusunun ve olgusal bilgilerin salt etkisi ilk kez bu kadar kapsamlı bir şekilde incelenmiştir. Bu çalışma aynı zamanda, aynı davranışı (hızlanma) ele alan farklı yol güvenliği reklamlarının ikna ediciliğini karşılaştıran sınırlı sayıdaki çalışmalardan biridir.

Hem mevcut çalışma hem de önceki çalışmaların sonuçları duygu içerikli yol güvenliği reklamlarının sürücü davranışlarını ve kişilerin sürüşleri hakkındaki beyanlarını etkileyebildiğini ortaya koymuştur. Ancak bu tür reklamların yarattığı etki, hız üzerindeki uzun vadeli etkiler açısından yetersiz görünmektedir. Daha önce de belirtildiği gibi hız, kolay fark edilen birçok potansiyel faydası nedeniyle (hedefe zamanında ulaşma, olumlu benlik tasarımı vb.) riski çoğu zaman göz ardı edilen bir davranış türüdür. Kitle iletişim kampanyaları, davranışı değiştirmekten ziyade mesajı iletme ve tutum oluşturmada daha etkili olduğu için bu kampanyalardan beklentileri daha gerçekçi bir düzeyde tutmak faydalı olabilir. Öte yandan, davranış değişikliği, yıllar sonra gözlemlenebilecek tutum değişikliğinden kaynaklanabilir. Bu nedenle, bu uzun vadeli etkileri ölçmek zor olsa da tutumlara, normlara ve inançlara odaklanmak uzun vadede faydalı olabilir (Wundersitz ve diğ., 2010).

Güvenlik kampanyalarının her sürücü grubu üzerinde farklı etkileri olabileceğinden, söz konusu etkinin bu çalışmada genç sürücüler üzerinde araştırılması literatüre önemli bir katkı sağlamaktadır. Ayrıca çalışmanın bulguları, trafik güvenliği reklamlarının kısa süreli etkisinin daha belirgin ve istenilen yönde olduğunu göstermiştir. Bu nedenle farklı güvenlik reklamlarının daha sık aralıklarla izleyiciye sunulması, istenilen yönde davranış değişikliklerinin gerçekleşmesine yardımcı olabilir.

Son olarak, yol güvenliği reklamların içeriği ve mesajı nasıl iletmeye çalıştıkları, ele alınması gereken önemli bir konudur. Bu çalışmada da duygusal ve olgusal reklamların etkileri ayrı ayrı incelenmiştir. Wallén Warner ve Forward'a (2016) göre, bazı durumlarda duygusal ve olgusal mesajların birleşimi müdahale üzerinde daha büyük bir etkiye sahiptir. Bu çalışmada da bu içerikler ayrı ayrı ele alındığında çıktılarda küçük bir davranışsal ve öz bildirim farklılaşması gözlemlenmesine rağmen, bu içeriklerin birleşiminden oluşan bir müdahale daha etkili olabilir. Son olarak, kampanyanın etkisinin uygulama, eğitim ve mevzuat gibi diğer faaliyetlerle geliştirilmesinin de mümkün olduğu söylenebilir. Bu bilgiler ışığında karar vericiler bu konudaki politikalarını değiştirebilir veya geliştirebilir, ardından yeni politikaların uygulanması ve halkın tutumlarını davranışa uygun hale getirmek için değiştirebilir. Ayrıca müdahale oluşturulurken konu ile ilgili önceden araştırma yapmak, teorik bir model kullanmak, tek bir tema seçmek ve belirli bir hedef kitleye hitap etmek gibi bileşenler, karayolu güvenliği kampanyalarının etkinliğini artırmaya yardımcı olabilir.

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