DECIDING ON SPEED:
"DO KNOWLEDGE OF SPEED LIMITS AND OTHER FACTORS
INFLUENCE OUR WAY OF DRIVING?"

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Approval of the Graduate School of Social Sciences

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

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ABSTRACT

DECIDING ON SPEED:
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The problem of Road Traffic Accidents is a growing epidemic all over the world; with an annual bill of 1.3 million lost lives (WHO, 2014). Human factors contribute more than 90% of errors causing these accidents; the main cause being speeding (Oppenheim and Shinar, 2011). Speeding was found to be the cause of 43% of all fatal and injury accidents in Turkey (TurkStat, 2013). Hence, understanding the underlying factors of speeding is of utmost importance for improving traffic safety.

This study investigated whether awareness of speed limits on a certain road, along with other factors affected speed choice, analysing the data obtained from Road Safety 10 (RS10) project conducted in Turkey. RS10 project was funded by Bloomberg Philanthropies under the scope of Global Road Safety Program to reduce deaths and serious injuries on the roads of 10 low and middle income countries (LMICs), including Turkey, between 2010 and 2014. Data collected from Ankara and Afyonkarahisar, in three different waves was used for the analyses. Overall, 755 drivers from Afyonkarahisar, and 1581 drivers from Ankara were interviewed using

a standardized speeding survey. Hierarchical regression analyses revealed significant effects of age, gender, education level and annual mileage on excessive speeding behaviour. Perception of speed fines as governmental income, setting a safe margin of speed above the speed limit; and perception of excessive speed as a cause of traffic accidents also significantly affected the drivers' choice of speed. However, no significant effect of knowing the speed limits on excessive speed was observed.

Keywords: Speed choice, speed limits, excessive speed

ÖZ

ARAÇ KULLANMA HIZINA KARAR VERMEK: HIZ SINIRINI BİLMEK, VE DİĞER FAKTÖRLER, ARAÇ KULLANMA HIZIMIZI ETKİLER Mİ?

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Trafik kazaları, her geçen gün büyüyen bir salgın haline gelmekte ve Dünya üzerinde her yıl 1.3 milyondan fazla insanın hayatına malolmaktadır (WHO, 2014). Temelinde hız davranışı olmak üzere, insan faktörü bu kazalara neden olan hataların %90'ını oluşturmaktadır (Oppenheim and Shinar, 2011). Türkiye özelinde hız davranışı, yaralanmalı ve ölümlü kazaların %43'ünde temel neden olarak görülmektedir. Bu açıdan, insanların hız seçimlerinin ve davranışlarının altında yatan nedenlerin ortaya çıkarılması trafik güvenliğinin iyileştirilebilmesi adına büyük önem taşımaktadır.

Bu çalışmada, yasal hız sınırını bilip bilmemenin, diğer faktörlerle birlikte, araç kullanma hızına etkisi araştırılmıştır. Bu kapsamda, Road Safety 10 (RS10) projesi süresince Ankara ve Afyonkarahisar illerinde üç dalga halinde toplanmış olan veriler kullanılmıştır. RS10 projesi, Bloomberg Philanthropies tarafından yürütülen Küresel Yol Güvenliği programı kapsamında 2010-2014 yılları arasında gerçekleştirilmiştir. Bu proje, Türkiye'nin de aralarında bulunduğu 10 orta ve düşük gelir grubu ülkesinde, yaralanmalı ve ölümlü trafik kazalarının azaltılması amacını taşımaktadır.

Bu çalışmada kullanılan veriler, Afyonkarahisar'da 755; ve Ankara'da 1581 sürücünün 22 soruluk standart bir hız anketine verdiği cevaplardan oluşmaktadır. Sorular; demografik bilgiler, hız seçimi ve ilgili değişkenler üzerine hazırlanmıştır. Bu veriye dayanarak yapılan hiyerarşik regresyon sonucunda; yaş, cinsiyet, eğitim durumu ve yıllık araç kullanma miktarının yasal limitlerin üzerindeki hızlarda araç kullanma davranışına anlamlı etkisi olduğu görülmüştür. Hız cezalarının devletin gelirlerini artırmak amacı taşıdığı algısı, yasal limitin üzerinde araç kullanmanın kazaya sebebiyet vereceğine dair algı, ve yasal hızın üzerinde bir hızda güvenli şekilde araç kullanılabileceği algısı da, hızlı araç kullanma değişkenini anlamlı şekilde yordamaktadır. Buna karşın, yasal hız sınırlarını biliyor olmanın hız seçimine anlamlı bir etkisi olmadığı gözlemlenmiştir.

Anahtar Kelimeler: Hız seçimi, hız sınırları, hızlı araç kullanma

To Kara Şimşek

and

all the mothers on Earth

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INTRODUCTION

Road traffic accidents (RTAs), claiming lives of 3500 people each day; is ranked as the 9th leading cause of global human death, listed right after HIV/AIDS and diabetes mellitus. This figure sums up to 1.3 million fatalities annually, and RTAs continue to be among ten leading causes of death; from the poorest country to the wealthiest (Evans, 2004; WHO, 2014; Zhao and Wu, 2012). Even worse, fatalities resulting from RTAs are projected to increase by 66% over next 20 years (Kopits & Cropper, 2005). The situation holds the same in Turkey, with almost 3700 lives lost in RTAs during year 2013 (TurkStat, 2013). Statistics revealed that 90% of these accidents were attributable to human error; with failing to adjust speed (inappropriate speed) and excessive speeding as the main contributors, representing the cause of 43% of all fatal and injury accidents (TurkStat, 2013). Hence, it would not be wrong to state that excessive speeding is like an epidemic for traffic safety; and understanding the reasons behind it can cure the disease.

Having this perspective in mind, this study aimed to investigate the reasons of speeding behaviour; and whether it is related to the knowledge of speed limits, along with other factors.

1.1 Speeding

The phenomenon of "Speeding" is actually composed of two different elements; namely *excessive speed* and *inappropriate speed.* Excessive speeding is the case of driving above the speed limits; whereas inappropriate speed is driving above the speed that "environmental, vehicular, and personal" conditions permit; which still is within the speed limits (OECD, 2006). Though inappropriate speed also has adverse effects on traffic safety; excessive speed is the main contributor to fatal and injury

accidents. Drivers exceeding the speed limits also have a higher probability of having an accident (Maycock, Brocklebank, & May, 1998; Parker et al., 1995a,b). Furthermore, Nilsson (2004) proposed in his Power Model that, "a 5% increase in average speed led to approximately 10% increase in all injury accidents, and 20% increase in fatal accidents" (as cited in Elvik et al., 2004; Elvik, 2009).

Regarding the relation of speed and severity of accidents; the simple formula for kinetic energy dissipated during a collision demonstrates that effect of speed on the severity of an accident is exponential:

$E_k = 1/2 \ (mv^2)$ where, (Formula 1)

E_k : kinetic energy dissipated

m: mass of vehicle

v^2: velocity of the vehicle, squared.

This energy is exerted to the object of crash during a collision; so that the impact on the object (e.g: another vehicle or a human being), would also be exponentially greater.

Excessive speed is also found to increase the perception time of a road risk (i.e.; perception distance); decision distance (i.e.; the distance the vehicle travels while the driver decides to take an action towards the perceived risk), and braking distance (i.e. distance travelled from the moment the driver hits the brake until the vehicle completely stops) (Navon, 2003).

Despite all these vital information on excessive speeding, Transport Research Center's Speed Management report (2006) stated that at any given time, 50% of all the drivers in U.S.A were driving above the speed limits. Therefore, it is hypothysed in this study that awareness of speed limits had no significant effect on excessive speeding (Hypothesis A).

These findings demonstrate how critical it is to control speeding behaviour, since any deviation from the speed limits result in significant adverse effects on traffic safety, causing people to lose their lives or get injured. As Wallén Warner and Åberg (2008) explained better, "1 out of 5 people out of all the people killed in RTAs would have been alive, if all the drivers complied with the speed limits!"

1.2 Factors affecting Speeding Behaviour

Road safety and speeding is like the two sides of the mirror that result from intertwined relationships between human motivation, cognition and affect related to lifestyles, perception of cars and accidents; on individual, community and humanity levels; that is surfaced through exposure to systems, environment or sociological elements in presence of internal (gender, personality, etc.) and contextual (time-pressure, mental overload, road/vehicle conditions, etc.) factors. Thus, understanding the deep-rooted causes of speeding, as the main threat for road safety, is nothing but complicated.

Within the context of this study; demographic factors, personal factors mainly related to motivations behind speeding, and perception of speed and speed limits will be covered. Perceptional factors to be covered can further be listed as follows;

- perception of excessive speeding as a cause of accidents,
- perception of "safe speed"; and
- perception of speed limits as a political issue.

1.2.1 Demographic factors

Demographic factors include age, gender, education level and social status. Smart et al., (2004) have found that age and gender were important predictors of excessive speeding; where younger males were the usual suspects of violations. Lawton (1997) also claimed that younger people, males, less experienced drivers and drivers that conduct less annual mileage were more prone to excessive speeding behaviour. Kanellaidis et al. (1995), on the other hand, found that younger drivers, drivers with higher levels of education and mileage were more likely to exceed the speed limits; that conflicted with Lawton's (1997) findings, in terms of mileage effect.

Interestingly, Shinar (2007) also claimed that observing the speed limit was inversely related to education level and income. The better educated people tended to speed more than the less educated. He coined that this fact might be explained by the

greater exposure of more educated people to the conflicting arguments on the relationship between speed and safety.

Studying drivers' behaviour of setting a safety margin above the speed limit; i.e believing that it would be legitimate to drive above the speed limits, as long as the person is driving safely, Mannering (2009) claimed that age and gender were significant factors; where the male and the young were found to be more inclined to drive above the speed limits; that they consider to be safe.

1.2.2 Personal factors: Motivations behind speeding behaviour

Elander et al. (1993), suggested that driving errors related to people were mainly consequences of behavioural factors; which could be categorized as driving style and driving skills. How people generally drive, including the choice of speed, was referred as the "driving style"; and was expected to be influenced by attitudes and beliefs regarding driving, as well as driver's motives and values (Elander et al., 1993; Oppenheim and Shinar, 2011). However, driving usually encompassed two conflicting motives: mobility and safety (Wickens, Lee, Liu and Becker, 2004). Mobility motives involved reaching the target point without any time-delays; and safety motives involved avoiding accidents. Hence, this thoery suggested that mobility motives might lead to speeding; especially when people were in a hurry, and when their perception of speeding as a cause of accidents was absent or weak. It would be wise to note here that, while making the speed choice in favor of mobility motives; people tended to overestimate the time to be gained by accalarating, which was called the "time-saving bias" (Svenson, 2009). The reason why mobility motives outweighed the safety motives, could be the strong bias on time-saving combined with the misperception of consequences of speeding.

To further explain the "motive" component of speeding choices, Summala (1998) claimed that people conducted a cost/benefit analysis regarding a certain driving style before their motivation for driving was created. This analyses also included the self-image that driving style created. Benefits included "pleasure, thrill, sense of control and image management; whereas costs could be listed as distress, damage to

self-esteem, annoyance and life-endangerment" (Taubman and Ben-Ari, 2008; Fuller, 2005; 2011). The driver made his/her choice of driving style according to the value of either the cost or the benefit that driving style provided or demanded.

Examplifying this idea; Wilde (1998) in his Risk Homeostasis Theory implied that people would speed, if the following virtual conditions were fulfilled:

a) they would reach the target point on time (benefit of risk);

b) speeding fines were low / chances of receiving a fine were low (cost of risk);

c) they did not believe that they would avoid accidents by driving slowly (benefit of safety); and

d) they would run late for the target point (cost of safety).

Summala (1988) explained this behaviour by stating that different kinds of motives people had would actually increase the drivers' tendency to drive faster, and they would do so, if the conditions permitted them to.

Despite the logical correlation between speed and mobility; perception of the relationship between speeding and accidents was found to be varied. Obviously, as the speed increases; time to reach the target point decreases under normal circumstances; however people do not experience an accident every time they speed. Indeed, experiencing a traffic accident is a rare event in people's lives. Shinar (2007) stated that, according to a survey conducted in U.S.A about Americans' health maintenance habits, it was observed that people's behaviour of exceeding the speed limit actually increased from the year 1985 to year 1995, whereas drunk driving decreased and seat belt usage increased. As such, it could be concluded that most people did not believe that speeding was a major cause of traffic accidents.

Demonstrating effects of motivation on speed choice from "safety" perspective, Shinar's study (2001; cited from Shinar, 2007) with Israeli drivers showed that drivers' selection of speed when their motivation was avoiding accidents, was significantly lower than their "habitual" driving speed; which could be interpreted as the strength of different motives had a direct impact on speed choice. Hence, if the drivers believed that driving slower, or complying with speed limits would prevent

them from having accidents, they would actually do so; even when they had time-constraints.

1.2.3 Personal Factors: Perception of speed and speed limits

The most well known theory used to explain driver behaviour is the Theory of Planned Behaviour (TPB), which stated that "a behavioural intention was formed by a combination of: an attitude towards the intended behaviour, a subjective or personal norm regarding the behaviour, and perceived behavioural control" (Ajzen, 1991).

Perceived norms of driving could be explained as the behaviours that were often included in traffic law/regulations or unwritten social norms. For instance, excessive speeding violates traffic law, but not the social norms. However, tailgating does not violate the traffic law, but violates the social norms of driving. Taking these normative norms into consideration, drivers construct a virtual "ideal" behaviour, and compare their own behaviour with that "ideal" one (Lajunen and Özkan, 2011). Reading between the lines, this would imply that if most of the drivers tend to exceed the legal speed limits; this behaviour then would become the perceived ideal norm, and a driver with an intention to speed would then perceive his behaviour as "normal", comparing his behaviour to the general driving behaviour. Hence, the drivers would select their speed not according to the speed limits, but according to the traffic flow.

Selection of vehicle speed according to traffic flow might also be the result of perceived behavioural control of drivers, which was actually found to be the main predictor of excessive speeding in many studies (Åberg & Wallén Warner, 2008; Reason, Manstead, Stradling, Baxter, & Campbell, 1990). Lheureux (2012), in her study of determining reasons for excessive speeding, stated that the drivers violating the speed limits perceived themselves to have less control over the situation, compared to the drivers who complied with speed limits. Therefore, it would not be surprising that a driver going with the traffic flow would exceed speed limits; it

would not be their own fault, since they had relatively low control on their speed choice.

Thus, it is hypothysed in this study that drivers' speed choice mainly depends on traffic conditions, rather than safety implications (Hypothesis B).

Perception of excessive speeding as a cause of accidents

Tarko (2009) suggested that the speed choice was a trade-off between subjective time, that was perceived to be gained by excessive speed; perceived risk of an accident; and perceived risk of receiving a fine via speed enforcement. Thus, a person would choose to speed, when the perceived time to be gained by excessive speed overweighed the total perceived risk of an accident and receiving a speeding ticket.

Another interesting model proposed by Schmidt-Daffy (2014) utilized only two parameters for the speed choice: Acceleration or Deceleration. He suggested that people either traded deceleration that would lead to a negative outcome (e.g. running late) for acceleration that would lead to a positive outcome (e.g. arriving on time); or they would trade acceleration that would lead to a negative outcome (e.g having an accident) for deceleration that would lead to a positive outcome (e.g. avoiding an accident). Accordingly, acceleration increased the probability of a positive outcome, and deceleration decreased the probability of a negative outcome.

Perception of "safe speed"

Mannering's (2009) research with 998 drivers from Indiana/USA investigated how fast above the speed limits the drivers could drive before they felt their safety was threatened; i.e. their perception of "setting a safe margin above speed limits"; or rather "perception of safe speed".

He found that drivers' perception of receiving a fine because of excessive speed significantly affected their perception of safe speed. According to this study, males perceived speed 5 or 20 mph above the speed limit to be safety-threatening; whereas 68% of females perceived speeds of 5 mph above the speed limit to be safety-

threatening speed. As the age increased, belief of safety-threatening speed to be above 20 mph above the speed limit decreased.

A similar study conducted in the Netherlands by Goldenbeld and Van Schagen (2007), revealed that drivers chose to drive at a speed 8 km/h above the 80 km/h speed limit, and they also chose to drive at a speed 4-5 km/h faster than the "safe speed". Mannering (2009) explained this phenomenon by drivers' perception of "safe speed" to be the speed where sanctions were enforced.

Furthermore, Lheureux (2012) proposed that at any given time, drivers made a choice between "risky speed", "safe speed" and "pleasurable speed", according to their own assessments; where they usually perceived "safe speed" as the speed proposed by the speed limits (just as Mannering proposed). However, she also claimed that extra attention should be paid on the variance between "safe speed" and "risky speed", which was found to be high in drivers having negative attitudes towards speed limits, and positive attitudes toward speeding.

Perception of speed limits as a political issue

Perception of speed limits also had an important effect on choosing speeding behaviour. Kanellaidis et al.'s (1995) study demonstrated that there was a strong relationship between complying with speed limits and believing in speed limits could reduce accidents. This study also suggested that people perceived speed limit violations on a "self and others" approach, where they found themselves "better" and "safer" than the average driver, and labelled them as "others". According to this study, excessive speeding according to oneself, depended on mistrust in speed limits; meaning that the people believed that these limits were defined actually not for preventing the accidents, but for political reasons, such as raising governmental income. When judging others, perception of main reason behind excessive speeding of others was found to be that other drivers were in a hurry.

The "self and others" perception mentioned above was also found to be an important factor affecting speed choices of people. Perceiving themselves as more skillful than the others, people then tend to lose their ability to assess hazardous situations in

traffic environment; underestimating the risks and overestimating their skills. This notion is called the "self-enhancement bias" (Sumer et al., 2006). Hence, since they are better then the others, they think that the speed limits are for the "others" and they have the right to drive faster than the speed limits allow. Walton and Bathurst (1998) conducted a study where they asked 86 drivers from New Zealand about how they perceived their own speed and others' speed under two different speed conditions; namely 50 km/h and 100 km/h. Results showed that 85% to 90% of all the drivers perceived themselves driving slower and safer than the average "other" driver. This study was in line with Svenson's (1981), who also concluded that people tended to believe that they were more skillful and safer than other drivers.

Dinh and Kubota (2013) also coined that people who had negative beliefs about speed limits, and who believed it was acceptable for themselves to drive above the speed limits actually failed to comply with the limits. As proposed by SafetyNet (2009), speed limits should be "credible", in order for drivers to comply with them. What was meant by credible is that, the limits should be defined as the safe speed that should be kept according to the road and environmental characteristics; ensuring that they are determined on the sole basis of safety considerations. If the speed limits were not perceived to be credible; than chances would be high that they would be violated (Kanellaidis, 1995; Mannering, 2009).

Concluding the context of "perception factors" it was hypothysed that excessive speeding behaviour could successfully be predicted from drivers' perception of excessive speeding to be the leading cause of accidents, intention of driving at a safe margin over the speed limit, and perception of speeding fines as governmental income (Hypothesis C).

1.3 Background information on RS10 Project, Turkey and Project Sites
1.3.1 The RS10 Project
RS10 Project was conducted in 10 low and middle income countries, including Turkey, during the time period of 2010-2014, with technical support from a group of consortium partners including the Association for Safe International Road Travel

(ASIRT), WRI Center for Sustainable Transport (EMBARQ), Global Road Safety Partnership (GRSP), Johns Hopkins University (JHU), World Bank, and World Health Organization (WHO) (WHO, 2010).

The aim of RS10 project was reducing fatalities and serious injuries in these countries, since the number of people dying in road traffic accidents in these countries constituted 48% of all global deaths (WHO, 2010). This value further increased to 66%, when the scope was narrowed from being global to the middle and low income countries within WHO European Region (Mitis and Sethi, 2013). A comparative study of 10 causes of death across income groups, where the crucial role of improving traffic safety in low and middle income countries could better be observed can be found on Figure 1 (WHO, 2010). According to the figures, 20 out of 22 (91%) fatalities from traffic accidents occured in low and middle income countries.
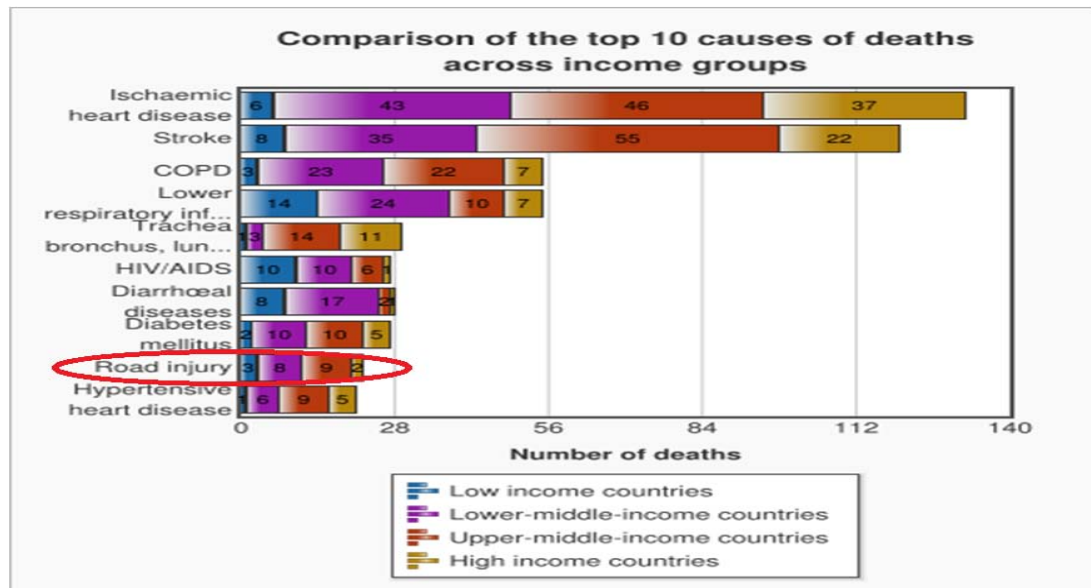
Figure 1. Comparison of Top 10 Causes of Deaths Across Income Groups
Source: WHO, 2010

1.3.2 Background information: Turkey

Being a part of WHO European Region, Turkey is a middle income country; with an area of 783,562 square kilometers and a population of 77.7 million inhabitants (TurkStat, 2013). The country consists of 81 cities, that are located in 7 geographical regions. The capital city is Ankara; and the largest city in terms of population is Istanbul. Map of the country is provided in Figure 2.

Figure 2.Map of Turkey

Source: http://www.mapsofworld.com/turkey/turkey-political-map.html

Road safety is a major problem in Turkey; where road traffic accidents constitute 2% of all the deaths; that claimed lives of 3685 people during year 2013 (TurkStat, 2013). Road traffic accidents are the sixth leading cause of death during age 0-14; and the third leading cause during 15-59 years of age; see Table 1 (Ministry of Health, 2004)

Table 1. *Causes of death by age groups in Turkey*

	All Age Groups	%	0 -14 Years	%	15 - 59 Years	%
1	Ischaemic Heart Disease	21.7	Prenatal Causes	37.6	Ischaemic Heart disease	22.2
2	Cerebrovascular Disease	15.0	Lower Respiratory Infections	14.0	Cerebrovascular disease	10.2
3	COPD	5.8	Congenital Anomalies	10.3	**Road traffic accidents**	**5.2**
4	Prenatal Causes	5.8	Diarrhoeal Diseases	8.4	Rheumatic heart disease	3.6
5	Lower Respiratory Infections	4.2	Meningitis	2.7	Trachea, bronchus and lung cancers	3.4
6	Hypertensive Heart Disease	3.0	**Road Traffic Accidents**	**2.5**	Diabetes Mellitus	2.6
7	Trachea, Bronchus and Lung Cancers	2.7	Measles	2.2	Nephritis and nephrosis	2.3
8	Diabetes Mellitus	2.2	Tuberculosis	1.4	Lower respiratory infections	2.1
9	**Road Traffic Accidents**	**2.0**	Upper Respiratory Infection	1.2	Tuberculosis	2.0
10	Inflammatory Heart Diseases	1.9	Protein- Energy Malnutrition	1.2	Leukaemia	2.0

Number of vehicles registered to traffic almost doubled during the period of year 2003 to 2013; being 8.9 million registered vehicles in 2003; and 17.9 million in 2013. The accident rate also increased from 456 /100,000 population to 1207 /100,000 during the same years (TurkStat, 2013).

Investigating the gender and age factors in accidents; it was observed that males were more likely to be involved in accidents. 225,000 males were involved in fatal

and injury accidents; whereas only 14,000 females were involved these (TurkStat, 2013). People between ages 25-64 were found to be by far the most effected group, compared to all other age groups.

Categorizing road traffic accidents by regions; it was observed that majority of RTAs occured in Istanbul, Central Anatolia (including Ankara) and Aegean (including Afyon) regions. These three regions constituted 52% of all the accidents occured in Turkey (Figure 3).
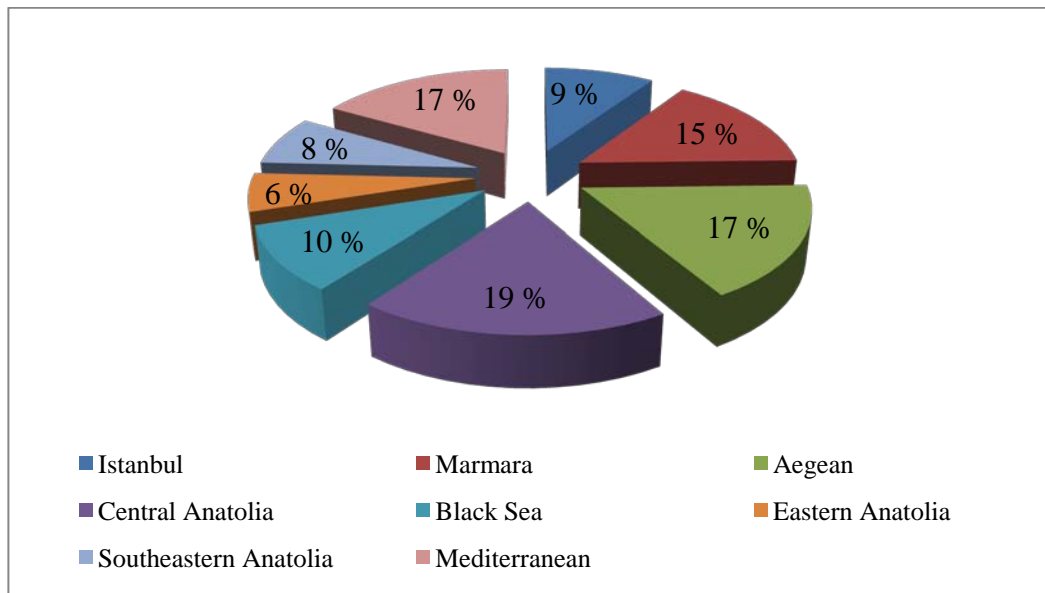
Figure 3. Distrubution of RTAs by geographical regions

Human factors were found to be the leading cause of traffic accidents, where 90% of all the accidents were related to human error. Speed related errors, including inappropriate and excessive speeding was by far the main contributor to these accidents; followed by right of way violations at junctions and improper overtaking maneuvers. The top five human errors that caused road traffic accidents in Turkey during year 2013 are depicted in Figure 4 (TurkStat, 2013).
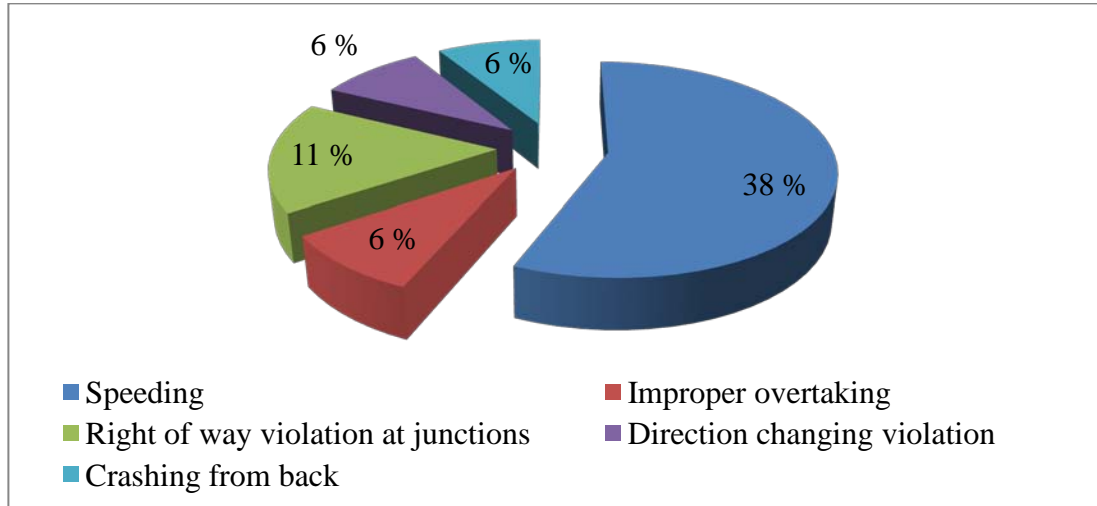
Figure 4. Top 5 Human errors that cause Road Traffic Accidents

1.3.3 Background information: RS10 Sites in Turkey

Ankara and Afyon were selected to be studied under the scope of RS 10 project; and data from these cities was collected in six different waves. The first three waves were examined by Doğruyol et al. (2015) and last three waves (namely 4th, 5th and 6th waves) were analysed in this research; with the permission of related parties.

Ankara, located in Central Anatolian region of Turkey is the Capital city, where 5 million people reside.

Afyon on the other hand, is located in Aegean region, having 707,000 inhabitants.

Location of these two cities on map of Turkey is provided in Figure 5.

Figure 5. RS 10 Project Sites in Turkey

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Source: tr.wikipedia.org

Cities of Afyonkarahisar (Afyon) and Ankara were selected to be studied for RS10 project since they represented an overburden of fatal and injury accidents; in addition to being smaller and controllable districts where countermeasures would be easier to implement (Hyder et. al., 2010). By the time the sites were being selected, in year 2008, accident rate in Afyon was 409 per 100,000 population; whereas the national accident rate was 207 per 100,000 population. Similarly, accident rate in Ankara was observed to be 317 per 100,000 population which was also higher than the national average (Hyder et. al., 2010).

Afyon experienced 1777 fatal and injury accidents in year 2013, where 92 people were dead; and 3610 people were injured; whereas Ankara experienced 11883 fatal and injury accidents; that resulted in 160 fatalities and 19327 injuries. Comparing these data with Turkey country average; it was observed that injury and fatality rate of Afyon was much higher than the country average; and injury rate of Ankara was higher than the average, with fatality rate just below the country average. Data is depicted in Table 2 (TurkStat, 2013).

Table 2. *Afyon and Ankara Injury and Fatality Rates*

City	Population	Injuries	Injury Rate	Fatalities	Fatality rate
Afyon	707,000	3610	5.11	92	0.13
Ankara	5,045,000	19237	3.83	160	0.003
Turkey	76,668,000	274829	3.58	3665	0.005

1.4 Aim of the Study

Aim of this study was to investigate the underlying reasons of excessive speeding behavior, by analysing an extensive set of data collected from two cities in three waves, by means of testing the three hypotheses stated in above sections.

Excessive speeding is known to be by far the important traffic violation; which leads to fatal and injury accidents, also affecting the severity of any traffic accident.

Therefore understanding what really causes this behaviour is vital in terms of traffic safety.

Data to be analysed is a great source of information for this purpose, since it contains six samples collected from two different cities in three different periods, reaching to a large number of participants from different backgrounds.

It is anticipated that, outcome of this study would help policy makers correct the perception of constructs such as "speed limits"; and "excessive speeding" in general, by identifying the causes that lead to misperception.

Furthermore relevant enforcement and training programmes that target the problematic causes of excessive speeding can be constructed, once the reasons are identified.

CHAPTER 2

METHOD

Data used in this study was excerpted from answers given to questions of the Standardized Speeding Survey (see Appendix A) applied to random participants/drivers under the scope of Road Safety 10 (RS10) project conducted in Turkey. RS10 project was funded by Bloomberg Philanthropies under the scope of Global Road Safety Program to reduce deaths and serious injuries on the roads of low-and-middle-income countries (LMICs) between 2010 and 2014. Turkey was one of the 10 countries being part for this project.

Standardized Speeding Survey was applied to participants as a part of the project, via face-to-face interviews. Interviews were performed in Afyon and Ankara, during 3 different periods (waves). Time period between the waves were six months for both the cities.

2.1 Participants

Participants were drivers randomly selected in parking lots, shopping centers and on the road side, where they were interviewed on how they selected their driving speed and related demographic variables.

2.2 Data Collection

2.2.1 Speeding survey

Speeding survey to be used for the project was prepared by experts on traffic safety and traffic psychology, that included 18 questions related to demographic variables, general speeding behaviour of the driver, perceptions on the speed limits, and on reasons behind the speeding behaviour; plus 4 questions related to the vehicle and

road type and presence of passangers for the researcher to answer. The standardized speeding survey can be found in Appendix A.

Ethical approval from the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) in Baltimore, Maryland, USA and the Applied Ethics Research Centre of Middle East Technical University (METU) in Ankara, Turkey was obtained before the commencement of studies.

2.2.2 Interviews

2.2.2.1 Researchers

A group of undergraduate and graduate students from METU were trained as researchers/interviewers and received information on the project, the parameters to be observed, and on interview techniques before the project started; and this information was refreshed on toolbox talks that took place before each interview session.

2.2.2.2 Interview locations

Interviews locations were designated parking lots, shopping centers and road sides in cities of Ankara and Afyon.

2.2.2.3 Interviewing procedure

Trained researchers used the standard speeding survey for interviewing drivers randomly selected at interview points. Data collection was performed on two consecutive days in order to control the environmental effects such as time and weather. Researchers spent 2 days at each point - Tuesday and Saturday, and Wednesday and Sunday for observation points in Afyon and Ankara, respectively. Since more researchers were required in Ankara because of the size of the city, three more researchers were appointed for the points in need (Hyder et. al., 2010) .

2.3 Data analyses

Data analyses was conducted in two ways; namely descriptive analyses and regression analyses as introduced below.

2.3.1 Descriptive analyses

Descriptive analyses included the analyses of demographic variables (age, gender, education, driving time and mileage), along with the accidents that the participants encountered and speeding tickets they received. This data was obtained from the answers given to questions 10 to 16, plus question 18 of the Speeding Survey (see Appendix A).

Speed related data was obtained from the answers given to questions 1, 4, 7 and 9; and how people made their speed choice was analysed by the answers given to question 2.

2.3.2 Regression analyses

Hierarchical Regression analyses was performed to in order to judge whether excessive speeding behaviour could be predicted by people's knowledge of speed limits and their perceptions of speed and speed limits. The DV was selected to be the answer given to question 3; which is "driving 10 km/h or more over the speed limit". The margin over the speed limit was selected to be a 10 km/h; since this margin pointed to the speed 10% above the legal speed limits, where people would receive a speeding ticket. IVs were questions 1, 4, 5 and 6; namely: "knowing the speed limits"; "agreeing that speeding is a cause of accidents", "perceiving speeding fines as governmental income" and "setting a safe margin above speed limits". Detailed information on DV and IVs are provided in Table 3

Table 3. *Variables investigated in Hierarchical Regression Analyses*

Variable		Parameter	Definition	Survey Question No.	Measure	Scale
DV		Exceeding the speed limit by 10 km/h or over	Frequency of the driver exceeding the speed limit by 10 km/h or over	Q3	5-point Likert Scale	1-Always 2-Nearly always 3-Half the time 4-Occasionally 5-Never
IVs		Age	Age of driver	Q10	Numeric	
		Gender	Sex of driver	Q18	Male/ Female	
	Control Block	Mileage	Annual mileage that the driver conducts	Q13	Km	
		Education	Education of the driver	Q11		1-No schooling 2- Primary school 3- Secondary or high school 4- University education
		Knowing the speed limits	Whether the driver knows the speed limits on that particular segment of the road	Q1	Yes/No	
		Perception of speed fines	Whether the driver perceives speed fines as a source of governmental income	Q5	6-point Likert Scale	1-Strongly agree 2- Somewhat agree 3- Indifferent 4- Somewhat disagree 5- Strongly disagree 6- Not sure
	Second Block	Perception of speeding	Whether the driver perceives speeding as a cause of road traffic accidents	Q4	3- point Likert Scale	1-agree 2-disagree 3-Not sure
		Setting safe margin above speed limit	Whether the driver thinks that it is okay to exceed the speed limit if driving safely	Q6	6-point Likert Scale	1-Strongly agree 2- Somewhat agree 3- Indifferent 4- Somewhat disagree 5- Strongly disagree 6- Not sure

CHAPTER 3

RESULTS

3.1 Descriptive statistics: Participants

2336 participants were interviewed in total, as a result of the three waves studies conducted in cities of Afyon and Ankara. Participants from Afyon summed up to 255, 220 and 280 people during 4th, 5th and 6th; and participants from Ankara summed up to 381, 540 and 660 people during 4th, 5th and 6th waves respectively.

3.1.1 Participant Demographics

Of the participating drivers; 1968 were male (84%), and 345 were female (15%); with ages ranging from 18 to 80; with a mean of 37.73 ($Sd = 11.89$). Inspecting the educational levels, it was observed that 223 people (10%) were graduated from elementary school; 795 people (34%) from high school; and 1156 people (50%) had university graduation. 163 participants (7%) did not report their education levels. Table 3 demonstrates the data obtained from demographic part of speeding survey conducted for each city and each wave; and related survey questions from which the data is obtained is denoted as "Q_x" underneath the related variable. The speeding survey is provided in Appendix A.

Table 4. *Demographic Characteristics*

Variables and (related survey question)	Afyon (4) N = 255	Afyon (5) N = 220	Afyon (6) N = 280	Ankara (4) N = 381	Ankara (5) N =540	Ankara (6) N =660
Gender (Q18)						
Male	246	205	258	302	420	537
Female	9	15	21	59	118	123
Age (Q10)	40.04 (12.50)	38.96 (10.99)	38.63 (12.47)	36.46 (11.52)	35.76 (11.40)	38.48 (12.03)
Education (Q11)						
Below High School	33	40	48	39	31	34
High School	80	86	121	115	188	206
Above High School	91	83	111	175	304	392
Driving time (Q12)	18.20 (11.51)	17.46 (10.29)	16.26 (10.90)	17.07 (12.59)	14.26 (10.25)	16.00 (10.72)
Mileage (Q13)	25269 (29805)	35769 (67539)	26752 (47428)	36512 (67863)	33032 (52988)	28599 (51755)
Active accident (Q14)	.27 (.85)	.30 (.83)	.14 (.53)	.42 (.79)	.39 (.73)	.33 (.68)
Passive accident (Q15)	.48 (.78)	.43 (.96)	.55 (.91)	.70 (1.22)	.56 (.83)	.61 (1.15)
Tickets (Q16)	1.70 (.46)	1.73 (.46)		1.80 (.41)	1.99 (.14)	1.74 (.35)

3.1.2 Driving Time and Mileage

The time period for which the participants were actively driving a vehicle was defined as the driving time; and it ranged from 5 months to 67 years ($M = 16.21$, $Sd = 11.02$). The annual mileage participants have driven ranged from 100 kilometers to 600000 kilometres ($M = 33609$, $Sd = 119166$).

3.1.3 Accident Involvement

67% of the participants (N = 1571) reported that they were never involved in an active accident during the past three years; and 16% (N=369) of the participants reported that they were involved in one active accident (i.e., the driver crashed into another vehicle or an entity).

More than half of the participants (N=1295, 55%) reported they did not experience any passive accidents (i.e., another driver crashed driver's vehicle) during the past three years; whereas 21% (N=502) experienced one passive accident, and 11.3% (N=268) experienced at least two passive accidents, where the maximum number of passive accidents a participant encountered was observed to be 15.

3.1.4 Sanctions

The majority of the participants ($N = 1700$, 72.6%) reported they were never fined during past three years; and 630 (26.9%) of them reported they received at least one ticket.

3.2 Descriptive Analyses: Speed limits and speeding

3.2.1 Speed limits

Knowledge of speed limits on the road segment, which the participants were driving was questioned during the interview, and overall, 89% of the participants reported that they knew the speed limits on that particular segment of the road.

Results for each wave and for the overall study can be found in Table 4. On the other hand, this data should be treated with caution, since it refers to the participant's "own" knowledge of the speed limit but not the "actual" speed limit.

3.2.2 Excessive Speeding

Almost all of the participants (90.4%, N= 2111) agreed that speeding was the main cause of traffic accidents. 27% of the participating drivers, (N= 630) reported that they received a speeding ticket during past year and 2% (N=46) of them reported being involved in a speed related accident. Percentage of drivers being aware of the speed limits and drivers agreeing that speeding was the main cause of accidents were consistent within waves, as supported by the chi-square tests. Pearson's chi-square values were found to be significant in Afyon at $\chi^2 = 4.9$, for knowing the speed limits; and at $\chi^2 = 10.68$ for agreeing that excessive speeding was the main cause of accidents. The same pattern was observed in Ankara, where chi-square values were $\chi^2 = 8.09$ for knowing the speed limits, and $\chi^2 = 24.96$ for agreeing that excessive speeding was the main cause of accidents. Table 4 summarizes the speed related data across three waves for Afyon and Ankara, including the comparison of waves and overall percentages of variables. Related survey questions from which the data is obtained is denoted as "Q_x" underneath the related variable. The speeding survey is provided in Appendix A.

Table 5. *Speed related data*

	Afyon (4) N = 255	Afyon (5) N = 220	Afyon (6) N = 280	χ^2	Ankara (4) N = 381	Ankara (5) N =540	Ankara (6) N =660	χ^2	Overall
Do you know the speed limit at this part? (Q1)	90.4%	91.8%	85.7%	4.90[*]	89.8%	90.7%	85.8%	8.09[**]	88.6%
Would you agree that speeding is a cause of traffic crashes? (Q4)	92.7%	90.0%	92.1%	10.68[**]	92.4%	85.4%	92%	24.96[**]	90.4%
In the past year, have you ever received tickets for speeding? (Q7)	30.1%	27.7%	31.9%	3.40	20.0%	27.6%	26.8%	11.06	26.9%
In the past year, have ever been involved with a crash because of speeding? (Q9)	4.6%	3.6%	0.8%	8.31	3.3%	1.2%	2.6%	7.12	2.0%

[*] $p \leq .001$ [**] $p \leq .05$

3.2.3 Speed choice

Drivers reported that they decided on their driving speed by taking into account variables such as 'depending on the traffic', followed by 'following the signs' and thirdly depending on whether they were in a hurry', analysing the answers given to the Speeding Survey Question Number 2. (The speeding survey is provided in Appendix A). Results for waves and cities are given at Table 5, and graphed for better interpretation in Figure 6.
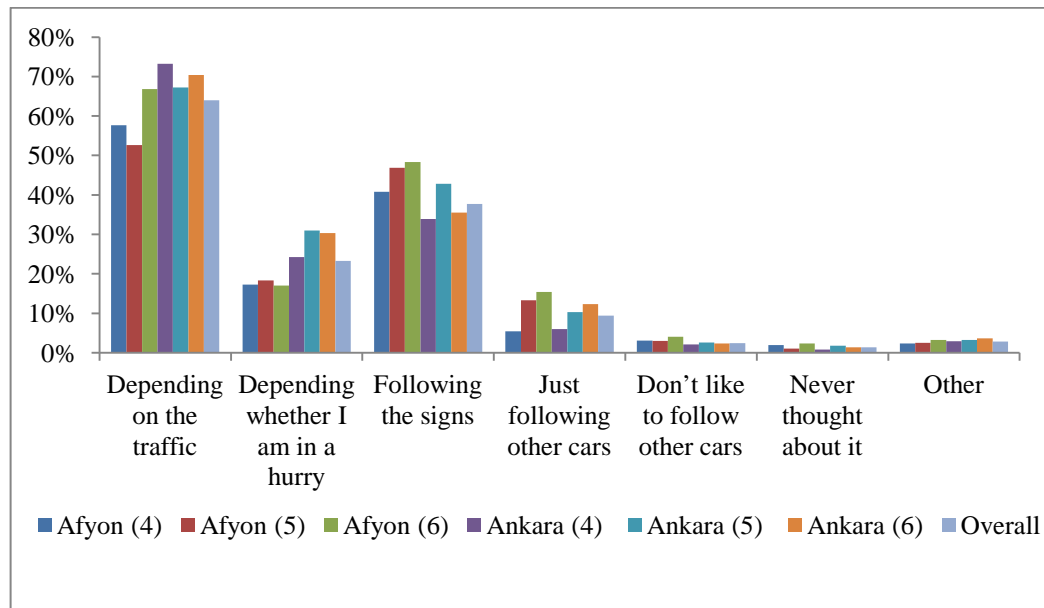
Figure 6. *How do people select their driving speed?*

Table 6. *How do people make their speed choices?*

	Afyon (4)	Afyon (5)	Afyon (6)	Ankara (4)	Ankara (5)	Ankara (6)	Overall
	N = 255	*N* = 220	*N* = 280	*N* = 381	*N* =540	*N* =660	N= 2336
Depending on the traffic	57.7%	52.6%	66.8%	73.2%	67.2%	70.4%	64.0%
Following the signs	40.8%	46.9%	48.3%	33.9%	42.8%	35.5%	37.7%
Depending whether I am in a hurry	17.3%	18.3%	17.0%	24.2%	31.0%	30.3%	23.3%
Just following other cars	5.4%	13.3%	15.4%	6.0%	10.3%	12.3%	9.4%
Don't like to follow other cars	3.1%	3.0%	4.0%	2.1%	2.6%	2.3%	2.4%
Never thought about it	1.9%	1.0%	2.3%	0.8%	1.8%	1.4%	1.4%
Other	2.3%	2.5%	3.2%	2.9%	3.2%	3.6%	2.8%

Note: Participants select more than one choice

Descriptive statistics: Excessive Speeding

Participants were asked how often they drove at least 10 km/h or more above the legal speed limit (Speeding Survey Question Number 3); and the results were obtained as follows:

- 221 drivers (9.4%) reported that they always;
- 290 drivers (12.4%) reported that they almost always;
- 438 drivers (18.7%) stated that they half of the time;
- 1083 drivers (46.3%) reported that they occasionally and,
- Only 305 drivers (13.1%) reported that they never exceeded speed limits at least 10 km/h or more

Means of the waves and cities were compared via one-way between subjects ANOVA ; and the procedure yielded insignificant results.

Figure 7 summarizes these results in graphic form.
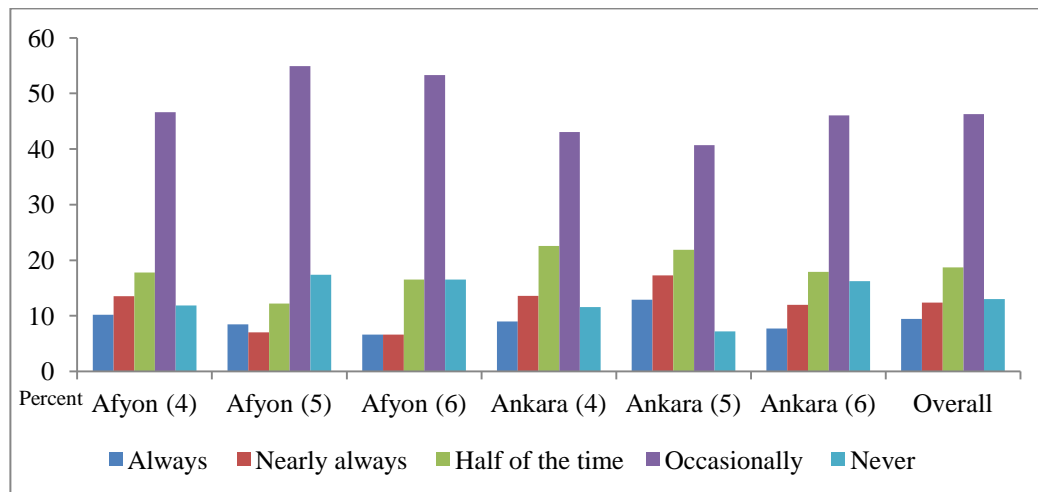
Figure 7. Frequency of drivers exceeding the speed limits across waves and cities

3.3 Regression Analyses

Hierarchical regression analyses were conducted for each wave of the study (i.e.; 4th, 5th, and 6th waves) for both cities of Afyon and Ankara; for city total, and for the whole sample.

Drivers' reports on driving 10 km/hr above the speed limit (Speeding Survey Question No.3) was utilized to be the dependent variable (DV); and independent variables (IVs) were defined as knowing the speed limit (Speeding Survey Question No.1), agreeing that speeding is a cause of accidents (Speeding Survey Question No.4), perceiving speed fines as a source of governmental income (Speeding Survey Question No.5), and setting a safe margin above the speed (Speeding Survey Question No.6); that were investigated after controlling the effects of age, gender, mileage and education. The only difference in the control block existed in analyses of Afyon 4th wave; where no data for "female" category existed. Thus, "gender" variable was eliminated from the control block for the sake of reliability in the analyses.

Furthermore, one more regression analysis was conducted with having the "city" as the dependent variable, where the independent variables remained the same. Aim of this analysis was to see if the size of the city made any difference in terms of IVs.

Summary of the variables and measurement methods is demonstrated in Table 6; and results of the regression analyses can be found in Table 7.

3.3.1 Ankara 4th Wave

The model yielded significant results for both blocks of the analysis ($F(4, 345)=9.064$, $p =.001$; and $\Delta F (8, 345) = 6.968$, $p = .001$) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 10% of the variance and the second block explained a further 4% of the variance. Overall, the model accounted for 14% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being male ($\beta = .16$, $p = .05$); being older ($\beta = .19$, $p = .001$), and having a lesser amount of annual mileage ($\beta = -.15$, $p = .05$) were significantly related with speeding. Furthermore, perception of speed fines as a source of governmental income ($\beta = .16$, $p = .05$) was found to be significantly related to speeding, as the second block of analyses was inspected.

3.3.2 Ankara 5th wave

The model yielded significant results for both blocks of the analysis ($F(4, 525)=14.622$, $p =.001$; and $\Delta F (8, 525) = 20.667$, $p = .001$) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 10% of the variance and the second block explained a further 14% of the variance. Overall, the model accounted for 24% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being male ($\beta = .08$, $p = .05$); being older ($\beta = .13$, $p = .05$), being less educated ($\beta = -0.09$, $p = .05$)and having a lesser amount of annual mileage ($\beta = -.15$, $p = .05$) were significantly related with speeding. Three independent variables from the second block were also significantly related to speeding; that were: perceiving speeding as a cause of accidents ($\beta = -.10$, $p = .05$), perception of

speed fines as a source of governmental income ($\beta = .12$, $p = .05$), and agreeing on setting a safe margin of speed above speed limits ($\beta = .32$, $p = .001$).

3.3.3 Ankara 6th wave

The model yielded significant results for both blocks of the analysis ($F(4, 637)=17.923$, $p = .001$; and $\Delta F (8, 637) = 13.259$, $p = .001$) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 10% of the variance and the second block explained a further 4% of the variance. Overall, the model accounted for 14% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being male ($\beta = .13$, $p = .001$); being older ($\beta = .22$, $p = .001$), being less educated ($\beta = -0.08$, $p = .05$) and having a lesser amount of annual mileage ($\beta = -.12$, $p = .05$) were significantly related with speeding. Furthermore, perceiving speeding as a cause of accidents ($\beta = -.10$, $p = .05$), perception of speed fines as a source of governmental income ($\beta = .10$, $p = .05$), and agreeing on setting a safe margin of speed above speed limits ($\beta = .13$, $p = .001$) were significantly related to speeding behaviour.

3.3.4 Ankara Total

The model yielded significant results for both blocks of the analysis

($F(4, 1475)= 46.244$, $p = .001$); and $\Delta F (8, 1475) = 42.894$, $p = .001$) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 11% of the variance and the second block explained a further 8% of the variance. Overall, the model accounted for 19% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being male ($\beta = .11$, $p = .001$); being older ($\beta = .19$, $p = .001$), and

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having a lesser amount of annual mileage (β = -.15, p = .001) were significantly related with speeding. Furthermore, perceiving speeding as a cause of accidents (β = -.10, p = .001), perception of speed fines as a source of governmental income (β = .12, p = .001), and agreeing on setting a safe margin of speed above speed limits (β = .20, p = .001) were significantly related to speeding behaviour.

3.3.5 Afyon 4th wave

First block of the model yielded an insignificant result; where the second block remained significant in predicting the speeding behaviour ΔF (7, 174) = 3.809, p = .05).

The second block explained 8% of the variance and overall, the model accounted for 11% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs, it was found that the only parameter having a significant effect on speeding behaviour was "agreeing on setting a safe margin of speed above speed limits" (β = .20, p = .05).

3.3.6 Afyon 5th wave

The model yielded significant results for both blocks of the analysis (F(4, 212)= 7.013, p = .001 ; and ΔF (8, 212) = 16.145, p = .001) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 10% of the variance and the second block explained a further 15% of the variance. Overall, the model accounted for 27% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being male (β = .16, p = .05); being older (β = .17, p = .001), and having a lesser amount of annual mileage (β = -.15, p = .001) were significantly related with speeding. Furthermore, not perceiving speeding a cause of accidents (β = -.37, p = .001); and setting a safe margin of speed above speed limits (β = .24,

p = .001) were found to be significantly related to speeding, as the second block of analyses was inspected.

3.3.7 Afyon 6th wave

The model yielded significant results for both blocks of the analysis ($F(4, 271)=6.958$, *p* =.001 ; and $\Delta F (8, 271) = 6.219$, *p* = .001) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 10% of the variance and the second block explained a further 6% of the variance. Overall, the model accounted for 16% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being older (β = .22, *p* = .001) was significantly related with speeding. Furthermore, perception of speed fines as a source of governmental income (β = .12, *p* = .05) and not perceiving speeding a cause of accidents (β = -.20, *p* = .001); were found to be significantly related to speeding, as the second block of analyses was inspected.

3.3.8 Afyon Total

The model yielded significant results for both blocks of the analysis ($F(4, 645) =14.042$, *p* =.001 ; and $\Delta F (8, 645) = 22.182$, *p* = .001) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 8% of the variance and the second block explained a further 14% of the variance. Overall, the model accounted for 22% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being older (β = .14, *p* = .001), and having a lesser amount of annual mileage (β = -.13, *p* = .05) were significantly related with speeding. Furthermore, not perceiving speeding a cause of accidents (β = -.26, *p* = .001); and

setting a safe margin of speed above speed limits ($\beta = .20$, $p = .001$) were found to be significantly related to speeding, as the second block of analyses was inspected.

3.3.9 Afyon and Ankara Total

The model yielded significant results for both blocks of the analysis ($F_{(4, 2078)} = 59.366$, $p = .001$; and $\Delta F_{(8, 2078)} = 59.237$, $p = .001$) which demonstrated that the predictors chosen were successful in predicting the dependent variable of driving 10 km/h or more over the speed limit .

The control block explained 10% of the variance and the second block explained a further 9% of the variance. Overall, the model accounted for 19% of the variance, in explaining the speeding behaviour.

Examining the individual effects of IVs of control block on speeding behaviour, it was observed that being male ($\beta = .08$ $p = .001$); being older ($\beta = .18$, $p = .001$), being less educated ($\beta = -.08$, $p = .001$) and having a lesser amount of annual mileage ($\beta = -.14$, $p = .001$) were significantly related with speeding. Furthermore, not perceiving speeding a cause of accidents ($\beta = -.13$, $p = .001$), setting a safe margin of speed above speed limits ($\beta = .20$, $p = .001$) perception of speed fines as a source of governmental income ($\beta = .10$, $p = .001$) were found to be significantly related to speeding, as the second block of analyses was inspected.

Table 7 Results of Regression Analyses

Exceeding speed limit by 10 km/h or over	Afyon 4		Afyon 5		Afyon 6		Ankara 4		Ankara 5		Ankara 6	
Variables	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		.03		.12*		.09*		.10*		.10*		.10*
Age	.09		.17**		.22*		.19*		.13**		.22*	
Education	-.07		-.01		-.11		-.10		-.09**		-.08**	
Mileage	-.03		-.15**		-.07		-.15**		-.13**		-.12**	
Gender			-.02		.01		.16**		.08**		.13*	
Step 2		.08**		.27*		.07*		.05*		.14*		.04*
Do you know the speed limit at this segment of the road	.12		-.08		.01		.08		-.01		.02	
Would you agree that speeding is a cause of road traffic crashes	-.14**		-.37*		-.20*		-.01		-.10**		-.10**	
Fines for speeding are mainly intended to raise revenue for the government	-.10		.09		.12**		.16**		.12**		.10**	
I think it is okay to exceed speed limit if you are driving safely	.20**		.24*		.04		.10		.32**		.13*	
R^2		.11**		.39*		.16*		.15*		.24*		.14*

* $p = .001$ ** $p = .05$

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Table 7. *Results of Regression Analyses* (continued)

Exceeding speed limit by 10 km/h or over	Afyon Total		Ankara Total		Overall (Ankara & Afyon)	
Variables	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		.08[*]		.11[*]		.10[**]
Age	.14[*]		.19[*]		.18[*]	
Education	-.02[*]		-.09[*]		-.08[*]	
Mileage	-.13[*]		-.15[*]		-.14[*]	
Gender	-.03		.11[*]		.08[*]	
Step 2		.14[*]		.08[*]		.09[**]
Do you know the speed limit at this segment of the road	-.02		.18		.01	
Would you agree that speeding is a cause of road traffic crashes	-.26[*]		-.10[*]		-.13[*]	
Fines for speeding are mainly intended to raise revenue for the government	-.03		.12[*]		.10[*]	
I think it is okay to exceed speed limit if you are driving safely	.20[*]		.20[*]		.20[*]	
R^2		.22[*]		.19[*]		.19[**]

[*] $p = .001$ [**] $p = .05$

CHAPTER 4

DISCUSSION

4.1 Overview

This study aimed at investigating underlying causes of excessive speeding, by conducting hierarchical regression analyses to predict the behaviour of exceeding speed limit by at least 10 km/h (i.e. excessive speeding behaviour). Data collected from Afyon and Ankara in three waves were used for the analyses. Thorough inspection and evaluation of demographic variables, along with assessment of how drivers made their speed choices was also investigated in order to further understand the problem.

Regression analyses revealed that gender, age, education, annual mileage (control block), perception of excessive speeding as a cause of accidents, perceiving speed fines as governmental revenue, and setting safe margin over speed limits were statistically significant in predicting drivers' behaviour of driving 10 km/h or more above the speed limits, whereas "knowing the speed limits" variable remained non-significant. Control block explained 10% of the variance and the second block explained a further 9% of the variance. Overall, the model explained 19% of variance in predicting excessive speeding behaviour. Although, 19% of variance may seem to be a low value explained in predicting the behaviour, it should be kept in mind that speeding behaviour has many deep roots in personal, society and humanity levels that surface under exposure to different circumstances, which makes it highly complicated to understand and explain.

Analyses showed similar results for each wave, for each city and for the whole sample. Results of this study was also in line with Doğruyol et allies' (2015) findings that was conducted for the first three waves of RS 10 project.

Therefore, instead of discussing results of regression analyses related to six samples separately, discussion of the results obtained from the analyses of whole sample regarding excessive speeding and speeding choice of drivers will be provided.

4.2 Excessive speeding

An important finding was that only 13% of the drivers from Afyon and Ankara reported that they never exceeded the speed limit; while 41% of all the drivers reported they exceeded the limits more than half the time. This result actually was expected, since problem of excessive speeding is as old as the invention of tyre; and many studies have mentioned that most of the drivers generally tended to drive above the speed limits (Mannering, 2009; Ossiender, 2002; Ryeng, 2012).

4.2.1 Perception of excessive speeding as a cause of accidents

Counterintuitive to explaining excessive speeding behaviour, 89% of participating drivers stated that they were aware of the speed limits, and 90% of them believed that excessive speeding was the main reason for accidents. This finding was found to be consistent among all the waves for both cities, as supported by the chi-square tests. (Pearson's chi-square values were found to be significant in Afyon at $\chi^2 = 4.9$, for knowing the speed limits; and at $\chi^2 = 10.68$ for believing that excessive speeding was the main cause of accidents. The same pattern was observed in Ankara, where chi-square values were $\chi^2 = 8.09$ for knowing the speed limits, and $\chi^2 = 24.96$ for believing that excessive speeding was the main cause of accidents).

On the other hand, 73% of the interviewed drivers reported that never received a fine; and 67% of them were not involved in an accident during the course of past year. However, it should be noted that response rate for these two questions might be low since people might not have wanted to answer a question of how many speeding tickets they received; and people that had speeding accidents might not be alive.

Combining the facts that drivers exceeded speed limits despite being aware of them; and still not being involved in accidents or receiving a fine; the interpretation of this behaviour could be made as the perceived low cost of exceeding speed limits (i.e. no accidents or sanctions observed) versus perceived high benefit achieved (i.e. fullfilment of motivations for speeding such as being on time, having a thrilling drive, etc.) as Summala (1988) and Wilde (1998) suggested in their motivational theories of driving. According to Tarko (2009), this would be the trade-off between

subjective time, that is perceived to be gained by excessive speed; and corresponding perceived low risks of an accident; or receiving a fine.

It would also be wise to recall that road traffic environment is generally forgiving, in sense that people make many mistakes and generally these mistakes are tolerated by the traffic system itself and its components. As such, most of the time people do not experience the negative outcome of speeding, whereas they immediately can experience the positive outcome, such as the excitement of excessive speed (Rebecca Lawton, 1997). Consequently, it can be concluded that drivers in question tended to choose excessive speeding instead of driving safely, since the outcome was perceived to be rewarding. One intervention to change this behaviour might be raising awareness on adverse effects of excessive speeding; since according to prospect-balancing theory, people tended to choose safety for excessive speed, when there existed a motivational conflict between speed and safety (Schmidt-Daffy, 2014).

Another interesting fact was that participants did not hesitate exceeding the speed limits and reporting they did so, which actually was a socially deviant behaviour. This could be explained by the perceived social norms on driving, suggesting that a driving behaviour could be perceived socially acceptable, if it was acceptable according to unwritten norms. In this case, reporting excessive speeding would be socially acceptable in Turkish culture, where a "good driver" was protyped as the one with good maneuvering skills but not a positive attitude toward safe driving as Sumer et al. proposed (Sumer, Ozkan, & Lajunen, 2006). Futhermore Gaygısız (2010), suggested that these social norms passed from one generation to other and they were actually related to national cultural norms. Hence, this behaviour might be the representation of a society where enforcement of traffic law was not strictly emposed, and governance quality was low. Supporting this statement, an investigation of differences in speeding behaviour of Swedish and Turkish drivers could be referred to. According to the outcome of this study, Swedish drivers had a more positive intention towards complying with the speed limits, and they actually complied to speed limits more than their fellow Turkish drivers; explained by

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differences found in attitude, subjective norm and perceived behavioural control (Wallen Warner, Ozkan, & Lajunen, 2009).

4.2.2 Perception of speed limits as governmental revenue

Regression analyses for Afyon and Ankara demonstrated that perception of speed limits as governmental revenue to be a significant predictor of excessive speeding. Accordingly, drivers might have felt free to drive above the speed limit and report this violation since they did not perceive speed limits as a measure to prevent accidents; but as a means of raising governmental revenue.

Mistrust in government, along with combined effects of a weak safety culture, low level of enforcement, social norms that approve excessive speeding, and perception of speed limits not as "credible" could be the reasons why drivers tended to perceive speed limits as a source of governmental income.

The hardest one to solve among these reasons would be the mistrust in the government, that has many facets concerning various fields of study and commenting on this would be out of this study's scope. Still, proposing that the Traffic Services Department's budget should be transparent so that all the citizens could learn how the revenue raised from traffic fines was spent, would be a smart solution to gain trust of speeders who think that fines were only for the utilization of government. Demonstrating that money collected from the violators is spent on road safety improvements, campaigns and training would encourage the drivers to comply with the speed limits. Special attention must also be paid to the way the message is given via these media; since most of the drivers would think that the message is not for themselves but for the drivers that are less safe and skillful than themselves (Svenson, 1981).

4.2.3 Setting safe margin above speed limits

Setting a safe margin above speed limits was also found to be one of the predictors of excessive speeding. According to the studies conducted on this topic; this

behaivor might be resulting from three main causes, among many, that can be listed as:

a) "perception of safe speed" ,

b) "perception of speed enforcement", and

c) "self-enhancement bias".

These three causes are actually intertwined; i.e. presence of one generally leads to the presence of the other. Perception of speed enforcement has been discussed above, thus the remaining two reasons would be included in this section.

Perception of safe speed

Mannering (2009), in his study found out that the drivers' percevied the "safe speed" as the speed where they would receive a speeding ticket, thus this was the critical parameter in drivers' perception of speed limit. Accordingly, enforcement played an important role in predicting safety behaviour. Furthermore, Lheureux (2012) also proposed that drivers usually perceived "safe speed" as the speed proposed by the speed limits, and added that the variance between safe speed and risky speed was higher in people having negative attitudes towards speed limits. These findings pointed to the fact that special attention should be paid to build a "concrete" notion of "safe speed" instead of a "perceived safe speed" in people minds. This could be achieved via proper education and enforcement.

There is also an interesting finding on (Tarko, 2009), which stated that the drivers tended to think they were losing time when they were driving below the speed limits; which made them to create a "safe margin" above the speed limit, that increased as the speed increases. Therefore, drivers should be made aware that the speed limits were not the "average" speed designed for the certain road, but rather the speed that is the "safe" speed to drive on that road.

Self-enhancement bias

Most of the drivers tend to perceive themselves as being "safer" and "more skillful" than the others; and this fact was coined as the "self" and "other" perception

(Kanellaidis, 1995; Svenson, 1981).This perception led to self-enhancement bias, as mentioned earlier in the study; making people think that they had the privilige to exceed speed limits.

4.2.4 Effect of demographic variables

Last but not the least, regression analyses of Afyon and Ankara demonstrated that excessive speeding behaviour increased with increasing age and being male, along with low levels of education and lower kilometers driven annually. Gender parameter was excluded from Afyon's 4th wave,since no female data was left after the assumption check for regression analysis; and running the analysis with only one gender would have violated the assumptions.

This findings were of great importance, since they demonstrated the most vulnerable groups of drivers that we should focus on: the male with low education and lower mileage. The effect of age was found to be counter-intuitive in this study, claiming that the speeding behaviour increased with age. Inspecting participant demographics, it was observed that only 13% of the participants were in the age range of 18 to 24. Regression analyses were rerun by first splitting participants into two groups with one being drivers aged 24 or below; and the other being drivers over 24. Age was observed to have insignificant effect for both groups in this case. Therefore, it was concluded that the young drivers (aged 18-24) were underrepresented in this study, so that speeding behaviour increased with increasing age within the remaining age group.

Tarko (2009) explained male drivers' tendency of excessive speeding by their overestimation of their driving skills, underestimation of an accident risk; and their belief of being better than the other drivers. Ryeng's (2012) study on effect of enforcement on drivers' choice of speed also demonstrated that male drivers having a tendency to drive at a speed more than 10 km/h above the speed limit were the most challenging segment of drivers.

Since, different genders and age groups have different motives for speeding; enforcement methods should be tailored specifically for those groups. Examplifying this concept; Forward (2009), argued in her study that violators of speed limits,

whether male or female, received approval of the male, having the same age as themselves. Therefore she proposed that, in order to transmit these violators the right message for "safe driving", men of their age should be included in campaigns that advocate safe driving.

On the effect of mileage on excessive speeding, Lawton's (1997) and Kanellaidis et al.'s (1995) studies demonstrated different results, the former stating that driving speed was greater for drivers with high annual mileage; and the latter stated that these drivers tended to comply with speed limits more. Hence, findings of this study was in line with supported Kanell Kanellaidis et al.'s (1995) research.

4.3 Speed choice

Speed choice of drivers from Afyon and Ankara was investigated by asking drivers how they decided on their speed, providing them 7 options, allowing them to make multiple choices. Overall, 64% of the drivers stated that their choice depended on the traffic; followed by 38% of drivers following the traffic signs, and another 23% stating that they decided on their speed according to whether they were in a hurry.

The results signified that most of the drivers made their speed choice regarding the state of traffic; that could be interpreted in two ways. Either they suggested they would involuntarily drive slow in case of a congestion; and had the choice to speed when traffic was free flowing; or they suggested a general behaviour of following others. Haglund and Aberg (2000) claimed that a driver's behaviour in traffic was strongly related to other drivers' behaviour; and speed choice of drivers was largely determined by other people's influences. People tended to drive faster when the average speed of traffic was high; and slower when it was low. One reason of this might be that the drivers participated in this study tended to perceive that they had low behavioural control over the speed limits, as proposed by Letirand and Delhomme (2005). Furthermore, following others could also be explained by different traffic locus of control mechanisms people had (as proposed by Özkan & Lajunen, 2005). People with internal traffic locus of control would take the responsibility of their actions (i.e. high desirability of control), and thus believe that

the accidents are consequences of their own driving skills and style. However, people with external locus of control believe in the opposite; i.e. accidents happen because of other's faulty driving skills & style (i.e. low desirability of control). Hence, behaviour of "following the others" could be classified as a behaviour belonging to people having external locus of control and in order to have these drivers drive at a safe speed, they should be made aware by proper training that accidents actually do occur because of their own behaviour.

Another reason might be that people were pressured to increase their speed in order to able to keep up with the flowing traffic as discussed by Fleiter, Lennon and Watson (2010).

It was surprising that "following the traffic signs" was found to be the second important measure for drivers' speed choices, since the most of the people belonging to the same population of data stated that they did not comply with speed limits most of the time. Therefore, this finding might be attributed to motivation of social acceptance.

Third measure of making a speed choice was determined as the state of being in a hurry or not. It would be logical to claim that time pressure created a need for increasing driving speed; since the law of physics state that travel time decreases with increasing speed. Accordingly, Dinh and Kubota (2013) suggested that most of the drivers exceeded the speed limit as a means of reducing their travel time.

However, what people usually tended to overlook is the "time-saving bias". Time-saving bias is the overestimation of time saved by driving at excessive speed; while trying to be at the target point on time (Svenson, 2008). In order to correct this bias, people should be taught how much time they would gain by accelerating; along with the increasing risk of an accident.

4.4 Conclusions

Keeping in mind that changing speeding behaviour actually requires a general revolution in all facets of human life; starting from lifestyles to per capita income; and ranging to high levels of enforcement to hightech training programmes;

summary of discussion points stated above, and comments on how to decrease excessive speeding behaviour could be listed as follows:

- Firstly, traffic law should be strictly enforced, since most of the time speed violations go unpunished. Consequently, people tend to perceive the benefit of speeding to be higher than the cost, making them more prone to violating the speed limits. Moreover, attention must be paid to the consistency of the enforcement;

- Secondly, trust on traffic law enforcement systems could be improved by utilization of money on road safety projects and acknowleding public on these;

- Awareness of speed limits has no effect on driving behaviour, as long as people do not believe in the credibility of the speed limits. Hence, "Concrete safe limits" to fit road and user characteristics should therefore be constructed, and their evaluation methods should be transparent to public. This is of vital importance, since drivers should firstly accept the validity of speed limits, in order to comply with them;

- Lastly, driving safety education should be incorporated to driver licensing programmes so that the novice drivers will not only master driving skills, but also safe driving styles. This educational programme should also aim to correct the self enhancement bias that causes people to set a safe margin above the speed limits; and the time-saving bias that leads them to drive faster when they are in a hurry.

4.5 Contributions and Practical Implications

This research was conducted by analysing an extensive data related to speeding behavior and speed choices of 2336 drivers, collected in two different cities and three different waves. Analyses of data revealed consistent results throughout waves and cities, demonstrating the strength of findings. Therefore, outcomes of this study would have valuable contributions to the literature.

The study mapped the speeding behaviour and perceptions of a good range of people; highlighting that the Turkish drivers are generally people that have external locus of control, actually aware of the speed limits; but they intentionally do not comply. Hence, this points to a problem in both in the enforcement of traffic law and in the safety culture; that should be changed.

4.6 Limitations and Suggestions for Further Research

Although this research had high strength because of the consistency within the results obtained, in addition to the size of participant population interviewed; the data obtained relied only on self-reports; having the probability of including various biases depending on the nature of the study.

Since RS 10 study also included field speed measurements, the results obtained in this study might be supported with observational data; which would both improve the quality and the power of the interpretations made.

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APPENDIX A. Standardized Speeding Survey Questionnaire

Part A - Interviewed administered questionnaire

Participant willing to undertake interview: Yes _____

No _____ *Skip to Part B*

Questions about speeding

1. Do you know the speed limit at this part of the road?

   Yes, it is _____km/hr

   No. _____

2. Usually, how do you decide on your speed? *Tick as many responses as are relevant*

   Depending on the traffic   _____

   Depending whether I am in a hurry _____

   Following the signs   _____

   Just following other cars   _____

   Don't like to follow other cars   _____

   Never thought about it   _____

   Other   _____

3. How often do you drive at 10 km/hr or more over the speed limit?

   Always _____

   Nearly always _____

   Half of the time _____

   Occasionally _____

   Never _____

4. Would you agree that speeding is a cause of road traffic crashes?

Yes _____

No _____

Not sure _____

5. Please tell me do you agree with the following statement: "Fines for speeding are mainly intended to raise revenue for the government." *Tick one response only*

Strongly agree _____

Somewhat agree _____

Indifferent _____

Somewhat disagree _____

Strongly disagree _____

Not sure _____

6. Please tell me do you agree with the following statement: "I think it is okay to exceed the speed limit if you are driving safely." *Tick one response only*

Strongly agree _____

Somewhat agree _____

Indifferent _____

Somewhat disagree _____

Strongly disagree _____

Not sure _____

7. In the past year, have you ever received tickets for speeding?

Yes _____ If yes, how many times _____

No _____ *skip to question 13*

 Don't remember _____

8. If yes, how did you get the ticket?

Stopped by police _____

Recorded by cameras _____

Others_____

9. In the past year, have you ever been involved with a crash because of speeding?

Yes _____

No _____

Demographic questions

10. How old are you?

Age in years _____

11. What is the highest level of education that you have attained? Tick one response only

No schooling _____

Primary school _____

Secondary or high school _____

Post school education (such as college or university) _____

12. How many years have you been driving?

Years _____

13. What is the annual mileage you have made since last year? _____km

14. How many active accidents were you involved during the last 3 years?

(active accident: e.g.: cases where you crash a pedestrian or any object)

_____ times

15. How many active accidents were you involved during the last 3 years?

(passive accident: e.g.: cases where you were hit by another vehicle or a pedestrian_____ times

16. How many times have you received the below listed fines during last 3 years?

Faulty parking_____ Faulty overtaking _____ Excess speed_____

Other: _____

Part B – Interviewer observed information

Questions about the vehicle

17. What type was the vehicle?

Sedan _____

 Taxi _____

Truck _____

SUV/Van _____

 Motorcycle _____

 Bus _____

Other _____

Demographic and other questions

18. Sex of driver

Male _____

Female _____

Don't know _____

19. How many individuals were in the vehicle?

One person _____

Two persons _____

More than two persons _____

Questions about the site

20. Kind of street:

One-way street with two lanes _____

One-way street with four lanes _____

Two-way street with four lanes _____

Two-way street with eight lanes _____

Others, please specify _____

21. Posted Speed Limit per hour:

50km/hr _____

60km/hr _____

70km/hr _____

80km/hr _____

90km/hr _____

100km/hr _____

110km/hr _____

Others, please specify _____

22.Traffic flow per hour:

<30vehicles _____

31~60 vehicles _____

61~90 vehicles _____

>90 vehicles _____

APPENDIX B. ETHICAL APPROVAL FORMS

Sayı: B.30.2.ODT.0.AH.00.00/126/ 110 -2667

9 Aralık 2010

Gönderilen: Yrd.Doç.Dr. Türker Özkan

Psikoloji Bölümü

Gönderen : Prof. Dr. Canan Özgen

IAK Başkan Yardımcısı

İlgi : Etik Onayı

"Yol Güvenliği 10 - Türkiye" başlığı ile yürüttüğünüz çalışmanız "İnsan Araştırmaları Etik Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

9/12/2010

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

58

Sayı: B.30.2.ODT.0.AH.00.00/126/19 - 2514

4 Şubat 2011

Gönderilen: Yrd. Doç. Dr. Türker Özkan

Psikoloji Bölümü

Gönderen : Prof. Dr. Canan Özgen

IAK Başkan Yardımcısı

İlgi : Etik Onayı

"Yol Güvenliği 10 - Türkiye" isimli araştırmanız "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

04/02/2011

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08.02.2011   0003

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TÜRKÇE ÖZET

Trafik kazaları her gün 3500 insanın hayatına malolmaktadır; ve ortalamayla, küresel ölüm nedenleri sıralamasında HIV/AIDS ve Diyabet gibi ciddi hastalıkların hemen ardından 9. neden olarak sıralamaya girmiştir (WHO, 2014). Bundan daha da vahim olan gerçek ise, önümüzdeki 20 yıl içerisinde trafik kazalarının yüzde 66 oranında artmasının bekleniyor olmasıdır (Kopits ve Cropper, 2005). Türkiye özeline baktığımızda, 2013 yılı içerisinde 3700 kişinin hayatını trafik kazalarında kaybettiğini görebiliriz .

Türk İstatistik Kurumu verilerine göre, uygunsuz ve aşırı hız ölümlü ve yaralanmalı kazaların yüzde 43'ünde temel neden olarak saptanmıştır. Bu açıdan baktığımızda, yasal hız sınırının üzerinde araç kullanma davranışının altında yatan nedenlerin ortaya çıkarılması trafik güvenliğinin iyileştirilebilmesi adına büyük önem taşımaktadır.

Hızlı araç kullanma problemi, aslında iki şekilde tezahür etmektedir. Birincisi, "yol ve hava koşullarına uygun olmayan hızda" araç kullanımı; ikincisi ise "yasal limitlerin üzerindeki hızlarda" araç kullanımıdır. İlk duruma "uygunsuz hız" adı verilir, ve bu hız hala yasal hız limitlerinin içerisinde olabilir; ikinci durum ise "aşırı hız" olarak adlandırılır (OECD, 2006). Uygunsuz hızda araç kullanmanın da trafik güvenliği açısından olumsuz sonuçları olmasına rağmen; ölümlü ve yaralanmalı kazalara neden olan temel faktör "aşırı hız"dır. Aşırı hızlı araç kullanan bireylerin trafik kazasına karışma ihtimalleri aynı ölçüde artmaktadır (Maycock, Brocklebank, & May, 1998; Parker et al., 1995a,b). Ulaşım araştırmaları merkezi'nin 2006 yılında yayınladığı rapora göre (Transport Research Center, 2006) Amerika Birleşik Devletleri'nde araç sürücülerinin yarısı herhangi bir zamanda aşırı hız yapmaktadır,

ve Nilsson'ın Güç Modeli'ne göre, ortalama hızdaki yüzde beş oranındaki bir artış, yaralanmalı kazaları yüzde on; ölümlü kazaları ise yüzde yirmi oranında artırmaktadır (Elvik ve ark., 2004'ten alıntı; Elvik, 2009).

Bunun yanında, araç kullanma hızı yükseldikçe, herhangi bir yol riskini algılama süresi de yükselmekte; ve aksine, karar mesafesi (yavaşlamaya karar verme ve frene basma anı arasında geçen süre) ve fren mesafesi (frene basıldığı andan, araç tam olarak durana kadar geçen süre) de azalmaktadır. Aşırı hızla ilgili bütün bu olumsuzluklar, bu davranışın altında yatan nedenlerin ortaya çıkarılmasının ne derece büyük bir önem taşıdığını göstermektedir. Wallen Warner ve Aberg'in (2008) de çalışmalarında belirttiği gibi, " eğer sürücüler hız limitlerine uysalardı; trafik kazalarında ölen her beş insandan biri şu anda yaşıyor olabilirdi".

Aşırı hız davranışının nedenleri, insan; çevre ve araç nedenli olmak üzere sınıflansa bile; bütün bunların kökleri, yaşam standartlarından, insan algısına; duruma özgü nedenlerden (zaman baskısı, beynin aşırı yüklenmesi), insan kişiliğine kadar birçok farklı faktörün bir araya gelmesiyle açıklanabilir; ve bu yüzden de oldukça karmaşıktır. Bu çalışma içerisindeyse, demografik etmenler, motivasyon, algı ve duygusal etkilenim faktörlerinin hız davranışı üzerine etkisi öncelikle açıklanmıştır.

Demografik etmenler; yaş, cinsiyet, öğrenim düzeyi ve sosyal statü olarak sınıflandırılabilir. Smart ve arkadaşlarının (2004)çalışmasına göre yaş ve cinsiyet, hız davranışı üzerinde anlamlı etkiye sahiptir. Özellikle genç erkekler, daha hızlı araç kullanma eğilimindedir (Smart ve ark. 2004; Lawton, 1997). Yaş ve cinsiyet faktörü aynı zamanda hız limitinin üzerindeki bir hızın "güvenli" olduğunu düşünerek bu hızda araç kullanma davranışı üzerinde de anlamlı etkiye sahiptir (Mannering, 2009). Elander ve arkadaşlarının (1993) savunduğu üzere, araç kullanma deneyimde insan hatası çoğunlukla davranışsal etmenlerden kaynaklanmaktadır ve bu etmenler de kendi içlerinde sürüş tarzları ve sürüş yetileri olarak sınıflandırılabilir. "Sürüş tarzı", sürücünün genellikle nasıl araç kullandığını betimler, ve sürücünün sürüş amacı ve

değerlerinden etkilenir (Elander ve ark., 1993; Oppenheim ve Shinar, 2011). "Sürüş yetileri" ise motor yetilerle ilintilidir.

İnsanlar araç kullanırken, herhangi bir sürüş tarzının kendilerine sağlayacağı faydayı ve zararı ölçerek, faydası en yüksek olan tarzı seçerler. Örneğin, araç hızını artırmak bir yere erken ulaşmalarını sağlayacaksa; ve bunun karşılığında ceza almayacaklarını veya kaza yapmayacaklarını düşünüyorlarsa, sürücüler tercihlerini hızlanmaktan yana kullanacaklardır (Wilde, 1998; Summala, 1998). Bu bağlamda fayda ve zarar etmenleri, aynı zamanda kişilerin kendilerini nasıl algıladıklarını (cesur, kendine güvenli veya agresif) da içermektedir (Taubman and Ben-Ari, 2008; Fuller, 2005; 2011).

Başka bir davranışsal teoriye göre ise, davranışsal bir niyet, bu davranışa dair bir tutum, öznel veya nesnel bir norm ve bu davranış üzerinde algılanan davranışsal kontrolden oluşmaktadır. Bu teoriye Planlı Davranış Teorisi denir (Ajzen, 1991) ve sürüş davranışları üzerinde, algılanan normların etkisini özellikle ele almaktadır. Algılanan normlar, genel davranış kuralları veya yasalar içerisinde bulunmasalar da, bir ortam için normal kabul edilen davranışların bütünüdür. Örneğin, hız ihlali yasal değildir, ancak sosyal olarak kabul görür; fakat makas atmaya dair yasal bir düzenleme olmamasına rağmen, bu davranış sosyal olarak onaylanmaz. Sürücüler bu değişken normları değerlendirerek, kendilerine "ideal" bir davranış modeli belirlerler ve herhangi bir anda, kendi davranışlarını bu idealle karşılaştırırlar (Lajunen ve Özkan, 2011). Açmak gerekirse, eğer belirli bir yolda sürücülerin çoğu hız ihlali yapıyorsa, diğer sürücüler de onlara ayak uyduracaktır.

Algılanan davranışsal kontrol ise, kişinin bir durum üzerinde ne kadar kontrol kapasitesinin bulunduğuna dair değerlendirmesidir ve birçok çalışmaya göre aşırı hız davranışının altında yatan temel nedenlerden biridir (Åberg & Wallén Warner, 2008; Reason et al., 1990). Lheureux (2012)'nin teorisine göre, hız ihlali yapan sürücüler, yapmayanlara oranla; durum üzerinde daha az kontrolü olduğunu düşünen sürücülerdir.

Mannering (2009), A.B.D'de 998 sürücüyle yaptığı bir çalışmada, sürücülere yasal hız sınırının kaç kilometre üzerindeki bir hızda kendilerini tehlikede hissettiklerini

sormuştur ve vardığı sonuç takdire şayandır. Sürücülerin çoğunluğu "yasal hız sınırını", "güvenli hız" olarak algılamaktadır, ve bu hızın 5 veya 20 mil/saat üzerinde kendilerini tehlikede hissetmektedirler. Goldenbeld ve Van Schagen (2007) de Hollanda'da yaptıkları çalışmada benzer bir sonuca ulaşarak, 80 km/h hız limiti olan bir yolda, sürücülerin yüzde 10 daha hızlı araç kullanmayı tercih ettiklerini saptamışlardır. Bu durum "güvenli marj belirleme" olarak adlandırılabilir.

Bu çalışmada, diğer faktörlerle birlikte, yasal hız sınırını bilip bilmemenin, araç kullanma hızına etkisi araştırılmıştır. Bu kapsamda, Road Safety 10 (RS10) projesi süresince Ankara ve Afyonkarahisar'da üç dalga halinde toplanmış olan veriler kullanılmıştır. RS10 projesi, Bloomberg Philanthropies Tarafından yürütülen Küresel Yol Güvenliği programı kapsamında bütçesi sağlanmış olan bir projedir. Bu proje, Türkiyenin de aralarında bulunduğu 10 adet orta ve düşük gelir grubu ülkesinde, ağır yaralanmalı ve ölümlü trafik kazalarının azaltılması amacıyla 2010-2014 yılları arasında yürütülmüştür. Zira, orta ve düşük gelir grubundaki ülkelerde trafik kazaları yüzünden gerçekleşen ölümler, küresel ölümlerin yüzde 48'ini oluşturmaktadır (WHO, 2010). Kapsam küresel olmaktan çıkartılıp sadece Avrupa bölgesi değerlendirildiğindeyse, bu rakam yüzde 66'ya kadar çıkmaktadır (Mitis ve Sethi, 2013). Bu çalışma için Afyon ve Ankara illeri seçilmiştir. Bu seçimin nedeniyse, bu illerde gerçekleşen kaza oranlarının Türkiye ortalamalarının üzerinde olmasıdır. Bu değer Türkiye geneli için 100,000 nüfusta 207 kaza olmasına rağmen; Afyon için 409; ve Ankara için 317 kaza olarak gerçekleşmiştir (TÜİK, 2013).

Bu çalışma kapsamında, Ankara ve Afyon illerinde üçer dalga halinde toplanan verilerin değerlendirilmesi yoluyla aşağıda sıralanan hipotezlerin sınanması öngörülmüştür:

Hipotez A: Hız limitlerini biliyor olmanın hız davranışı üzerinde bir etkisi bulunmamaktadır;

Hipotez B: Aşırı hız davranışı; aşırı hızın kaza nedeni olarak görülmesi, hız cezalarının hükümete gelir sağlamak amacıyla kesildiği algısı ve yasal hız sınırının

belli bir miktar üzerinde "güvenli" bir şekilde araç kullanılabileceği algısı parametreleri üzerinden yordanabilir;

Hipotez C: Sürücülerin hız seçimi, güvenlik kaygılarından daha çok, trafiğin durumuyla ilintilidir.

Bu hipotezlerin test edilebilmesi için, trafik güvenliği uzmanları ve psikologlar tarafından hazırlanmış olan 22 soruluk standart bir hız anketi, yüzyüze görüşmeler yoluyla katılımcılara uygulanmıştır. Sorular; demografik bilgiler, hız seçimi ve ilgili değişkenler üzerine hazırlanmıştır. Anketlerin yapıldığı noktalar, her iki şehirde de, yerel otoritelerin sorunlu noktalar olarak gösterdiği lokasyonların değerlendirilmesi yoluyla seçilmiştir. Anketi yapan araştırmacılarsa, özellikle bu konuda eğitim almış olan lisans veya yüksek lisans öğrencilerinden oluşmaktadır.

Çalışma sonucunda, Afyonkarahisar'da 755; ve Ankara'da 1581 sürücünün olmak üzere 2336 katılımcıya ulaşılmıştır. Katılımcıların yüzde 84'ü erkek; yüzde 15'i kadın olup; yaşları 18 ila 80 arasında değişmektedir (M=37.73, Sd= 11.89). Bu sürücülerin yüzde 10'u ilkokul, yüzde 34'ü ortaokul veya lise, yüzde 50'si ise üniversite mezunudur. Aktif olarak araç kullanma süreleri ise 5 ay ila 67 sene arasında değişmekte olup ($M = 16.21$, $Sd = 11.02$), yıllık sürüş miktarları ise 100 ila 600,000 km arasında değişmektedir ($M = 33609$, $Sd = 119166$). Sürücülerin yüzde 67'si geçtiğimiz üç yıl içerisinde hiç aktif bir kaza (herhangi bir şeye - insan ya da obje- çarpma)geçirmemiş; yüzde 16'sı ise sadece bir aktif kaza geçirmiştir. Katılımcıların yüzde 55'i, geçtiğimiz üç yıl içerisinde hiç pasif kaza (bir başkasının araca çarpması) geçirmemiş; yüzde 11'i ise en az iki pasif kazaya uğramıştır. Ceza verilerine baktığımızdaysa, katılımcıların yüzde 73'ünün geçtiğimiz yıl içerisinde hiç hız cezası almadığını, ve yüzde 27'sinin de en az bir kere hız cezası aldığını görebiliriz.

Hızla ilgili verilere göre ise, katılımcıların yüzde 89'u araç kullandıkları yol üzerindeki hız sınırlarını bildiklerini söylemişlerdir; ancak dikkat edilmelidir ki, bu değer "yasal" hız sınırı değil, sürücünün bildiğini söylediği hız sınırıdır. 2111 kişi

(%90); aşırı hızın kazaya sebebiyet verdiğine inandığını söylemiştir. Bunun yanında katılımcıların yüzde 64'ü hız seçimlerini yol durumuna; yüzde 38'i trafik işaretlerine; ve yüzde 23'ü de acelelerinin olup olmamasına göre yaptıklarını belirtmişlerdir. Sürücülerin sadece yüzde 13'ü hız sınırını hiçbir zaman ihlal etmediklerini; ve yüzde 40'ı ise araç kullandıkları zamanın yarısından çoğunda hız ihlali yaptıklarını beyan etmiştir. Bu veriler, her şehrin kendi içinde, ve iki şehir arasındaki sonuçlarda da tutarlılık göstermektedir.

Bu verilere dayanarak yapılan hiyerarşik regresyon sonucunda; yaş, cinsiyet, eğitim durumu ve yıllık araç kullanma miktarının (kontrol bloğu) yasal limitlerin üzerindeki hızlarda araç kullanma davranışına anlamlı ölçüde etkisi olduğu görülmüştür. Hız cezalarının devletin gelirlerini artırmak amacı taşıdığı algısı, yasal limitin üzerinde araç kullanmanın kazaya sebebiyet vereceğine dair algı, ve yasal hızın üzerinde bir hızda güvenli şekilde araç kullanılabileceği algısı da, hızlı araç kullanma değişkenini anlamlı şekilde yordamaktadır ($F_{(4,2078)} = 59.366$, $p = .001$; ve $\Delta F_{(8, 2078)} = 59.237$, $p = .001$). Buna karşın, yasal hız sınırlarını biliyor olmanın hız seçimine anlamlı bir etkisi olmadığı gözlemlenmiştir. Kontrol bloğu, aşırı hız davranışındaki değişimin yüzde 10'unu; ve ana blok da yüzde 19'unu açıklamaktadır.

Bağımsız değişkenlerin aşırı hız üzerindeki bireysel etkilerini incelediğimizdeyse, erkek olmanın ($\beta = .08$ $p = .001$); ilerleyen yaşın ($\beta = .18$, $p = .001$), düşük eğitim düzeyinin ($\beta = -.08$, $p = .001$) ve yıllık araç kullanma miktarının düşük olmasının ($\beta = -.14$, $p = .001$) aşırı hız üzerinde anlamlı etkisi olduğu görülmüştür. Bunun yanında, aşırı hızı kaza nedeni olarak algılamamak ($\beta = -.13$, $p = .001$), hız sınırının üzerindeki güvenli bir hızda araç kullanmak ($\beta = .20$, $p = .001$); ve hız cezalarının devlete gelir sağlamak amacıyla kesildiği algısı da ($\beta = .10$, $p = .001$) aşırı hız davranışının üzerinde anlamlı etkiye sahip olduğu gözlemlenmiştir.
Böylelikle, varsayılan üç hipotez de kabul edilmiştir.
Aşırı hız davranışıyla ilgili en önemli bulgulardan biri; katılımcıların yüzde 89'unun hız sınırlarından haberdar olduklarını söylemesine ve yüzde 90'ının aşırı hızın trafik

kazalarının temel nedeni olduğuna inanmasına rağmen; sadece yüzde 14'ünün hız sınırlarına her zaman riayet ettiğini belirtmiş olmasıdır. Bunun yanında, katılımcıların yüzde 40'ından fazlası, sürüş yaptıkları sürenin yarısından çoğunda hız sınırlarını ihlal ettiklerini söylemişlerdir. Hız sınırlarına riayet edilmemesi, birçok farklı çalışmada ele alınmış genel bir davranış şeklidir (Mannering, 2009; Ossiender, 2002; Ryeng, 2012). Ancak, bunun bir kaza nedeni olduğuna inanmakla beraber neden süregeldiğini araştırmak gerekir. Bu noktada, hız cezası ve kaza istatistiklerini incelediğimizde, sürücülerin sadece yüzde 27'sinin geçtiğimiz sene içinde hız cezası aldığını, ve yüzde 67'sinin hiç trafik kazasına karışmadığını görebiliriz. Bu bağlamda, hızlı araç kullanmanın faydasının, zararından daha yüksek olduğunu gözlemlemiş oluruz. Hızlı araç kullanmanın bedeli (ör. hız cezası almak); sağlayacağı faydadan (ör. randevuya yetişmek) daha düşüktür. Bu durumda da Summala (1998) ve Wilde'nin (1998) de belirttiği üzere, insanlar hızlı araç kullanma davranışını tercih edeceklerdir. Lawton (1997) ise bu konuda, trafik ortamının genellikle affedici olduğunu, ve insanların hatalarının bedellerini hemen ödememelerinin yanında, ihlallerinin ödülünü anında aldıklarını ve bu yüzden de ihlallerin bu derece yaygın olduğunu söylemiştir.

Başka ilgi çekici bir bulgu da, katılımcıların hız ihlali yaptıklarını söylemekten imtina etmemiş olmalarıdır. Bu da, bir yandan hız davranışının kabul edilebilir bir sosyal norm olmasından; bir yandan da yasal hız limitlerinin "güvenilir" addedilmemesinden kaynaklanmaktadır (Sümer, Özkan ve Lajunen, 2006; SafetyNet, 2006).

Hız cezalarının nasıl algılandığına baktığımızda, sürücülerin cezaları genellikle devlete gelir sağlayan yöntemler olduğunu düşündüklerini görebiliriz. Zira sürücüler, hız limitlerinin araç, yol ve insan güvenliğini korumak amacıyla belirlendiğine inanmıyor olabilirler. Bu da hız limitlerinin güvenilir olarak algılanmamasına ve bu yüzden de limitlere uyulmamasına yol açabilir. Bunun yanında yasal denetim

mekanizması da zayıf olduğunda, sürücülerin hız cezalarını devlete gelir sağlama yöntemi olarak görmeleri açıklanabilir hale gelmektedir.

Hız sınırının üzerinde "güvenli" bir hız belirleyerek aracı bu hızda kullanma davranışı ise üç farklı nedenden kaynaklanıyor olabilir; "güvenli hız algısı", "hız denetimi algısı" ve "kendini olduğundan daha iyi görme yanılgısı". Bu üç neden de aslında birbirine bağlıdır; yani birinin varlığında diğerinin de ortaya çıkması olasıdır. Mannering'in (2009) çalışmasında saptadığı üzere, çoğu sürücü, "güvenli hız"ın tam da "yasal hız sınırı" olduğunu düşünmektedir. Yasal denetim mekanizmalarının doğru bir şekilde işlemediği durumlarda bu algı daha da güçlenmektedir. Lheureux'ün (2012) çalışması da, bu saptamayı doğrulamakta, ve bunun üzerine önemli bir ekleme yapmaktadır. Şöyle ki, "güvenli hız" ve "riskli hız" arasındaki varyans, hız davranışı üzerinde anlamlı etkiye sahiptir ve hız ihlaline dair olumsuz tutuma sahip sürücülerde bu varyans yüksekken, olumlu tutuma sahip sürücülerde varyans düşük olarak bulunmaktadır. Bir başka çalışma da, sürücülerin yasal hız sınırının altında araç kullandıklarında, zaman kaybettiklerini düşündüklerini ortaya çıkarmıştır (Tarko, 2009). Bu açıdan, sürücülere "güvenli hız"ın yasal hız sınırı olmadığının doğru ve etkin bir şekilde anlatılması büyük önem taşımaktadır.

Trafikte araç kullanan birçok sürücü; kendilerini diğer sürücülerden daha iyi ve daha güvenli olarak tanımlama eğilimindedir (Kanellaidis, 1995; Svenson, 1981). Bu algı yüzünden de, trafikteki tehlikeli durumları algılama yetileri zayıflamakta; riskleri daha az olarak görürken kendi yetilerini daha fazla olarak görme ihtimalleri yükselmektedir. Bu durum, "kendini olduğundan daha iyi olarak görme yanılgısı" olarak adlandırılır. Kendisinin diğerlerinden daha iyi ve daha güvenli olduğunu düşünen bireylerin de, hız sınırlarının kendileri için değil "diğer" sürücüler için olduğunu düşünmeleri beklenebilir bir davranış hale gelmektedir. Böylelikle de, "üstün" olan sürücüler, kendilerine hız limitlerinin üzerinde bir sürüş hızı belirleyerek, o hızda araç kullanmakta beis görmezler.

Regresyon analizlerine dair son parametre olarak demografik etmenleri incelediğimizde; erkek olmanın, ilerleyen yaşın, düşük eğitim düzeyinin ve yıllık araç kullanma miktarının düşük olmasının hızlı araç kullanma davranışı üzerinde anlamlı etkisi olduğunu görmekteyiz. Bu noktada belirtmekte fayda vardır ki, Afyon 4. dalga verileri içinde kadınlara ait veri olmadığı için cinsiyet verisi analizi yapılmamıştır. Zira, tek cinsiyete ait verinin kullanılması regresyon analizi için gerekli olan varsayımların ihlaline sebebiyet verecektir.

Elde edilen bulgular, çalışma sonrasında üzerine düşülmesi gereken hassas gruplara işaret etmektedir. Erkekler, düşük eğitime ve düşük kilometreye sahip olanlar. Birçok çalışma, genç erkeklerin hızlı araç kullanma davranışına daha eğilimli olduğunu göstermektedir (Roberts ve Indermaur, 2005; Lawton, 1997); ancak bu çalışmadaki 18-24 yaş arası nüfusu, katılımcı profilinin sadece yüzde 13'ünü oluşturduğu için, bu gruba dair anlamlı bir saptama yapılamamış olabilir. Tarko'ya (2009) göre, erkeklerin daha çok hız ihlali yapmalarının nedeni, kaza riskini daha az olarak , kendi sürüş yetilerini daha yüksek olarak algılamaları; ve bunun yanında kendilerini genel olarak diğer sürücülerden daha "iyi" olarak görmeleridir.

Farklı yaş gruplarından kadınların ve erkeklerin, araç kullanma nedenleri ve motivasyonları da farklı olacağı için, hız davranışını düzeltme yönteminin de her bir grup için farklı olarak belirlenmesi büyük önem taşımaktadır. Örneğin, içsel veya dışsal kontrole sahip olan katılımcılarla yapılan çalışmalarda; dışsal kontrole sahip olan insanların (ör. genç erkekler) geleneksel trafik güvenliği eğitimlerinden, ölümlü kaza istatistiklerinden, veya ağır yaralanmış insan görüntülerinden etkilenmedikleri; bilakis bu tarz yöntemlerin onları daha çok hız yapmaya teşvik ettikleri görülmüştür (Alper ve Özkan, 2015).

Bu bağlamda, çok faydalı bir öneri de Forward (2009) tarafından sunulmuştur. Forward'a göre, güvenli hıza dair eğitimlerde ve kampanyalarda, genç erkek ve kadınlara güvenli davranışı anlatan kişinin profili de genç erkeklerden oluşmalıdır. Zira, bu yaş grubunda hem kadınlar, hem de erkekler; kendi yaş grubunda yer alan

erkeklerden aldıkları mesaja daha çok önem atfetmekte ve bu mesajları kabul etmeye meyyal olmaktalardır.

Yıllık kilometre bazında araç kullanımının hıza etkisi konusunda; doğru veya ters orantı olduğu şeklinde çelişkili görüşler bulunmaktadır (Lawton, 1997; Kanellaidis ve ark. , 1995). Ancak, bu çalışma sonucunda, yıllık araç kullanımı kilometre bazında azaldığında, aşırı hız davranışının yükseldiği gözlemlenmiştir; ve bu bulgu Kanellaidis ve arkadaşları'nın (1995) çalışmasını destekler niteliktedir.

Hız seçimine dair katılımcıların verdikleri cevaplar incelendiğinde; bu kararın yüzde 64 oranında trafiğe bağlı olarak verildiği görülmüştür. Bu seçimin iki farklı nedeni olabilir: birincisi, sürücüler trafik yoğun olduğu zaman mecburen yavaş araba kullanmak zorunda kaldıklarını, ve trafik açılınca hızlı araç kullandıklarını; ikincisiyse serbest akan trafikte başka sürücülerin davranışlarına uyum sağladıklarını anlatmak istemiş olabilirler. İlk duruma göre insanlar, trafiğin akış hızına uyum sağlamak zorunda olduklarını düşünürler, ve hızlarını buna göre ayarlarlar Fleiter, Lennon and Watson (2010). İkinci duruma göreyse, hız seçimi diğer sürücülerin seçimleriyle ilintilidir. Haglund ve Aberg (2000), trafikte sürüş davranışının, diğer sürücülerin davranışlarına sıkıca bağımlı olduğunu belirtmektedir. Bu çalışmaya göre, sürücünün hız seçimi, çoğunlukla diğer insanlardan etkilenme yoluyla yapılmaktadır. Eğer trafik akışı genellikle hızlıysa hızlı, yavaşsa yavaş araç kullanma eğilimi baskın olarak görülmektedir. Bu davranışı açıklayan bir neden, sürücülerin hız limitlerine uyma konusunda düşük kontrole sahip olduklarını düşünmeleri olabilir (Letirand ve Delhomme, 2005). Diğer insanları takip etme davranışı aynı zamanda, kişilerin farklı trafik kontrol odağı merkezlerine sahip olmalarıyla açıklanabilir. Yani, dışsal kontrole sahip olan insanlar, trafikteki davranışları üzerinde kendi kontrollerinin düşük olduğuna, içsel kontrole sahip olan insanlarsa kontrolün kendilerinde olduğuna inanırlar (Özkan ve Lajunen, 2005). Bu teoriye göre, dışsal kontrole sahip bir insan trafik kazası geçirdiğinde bunun dış etmenlerden kaynaklandığını; içsel kontrole sahip bir insansa, kazanın kendi hatasından

kaynaklandığını savunacaktır. Bütün bu bilgileri toparladığımızda "diğerlerini takip etme" davranışının dışsal kontrole sahip profile ait olduğunu söyleyebiliriz. Bu açıdan, sürücülere, bilhassa kendi hatalarının kazalara sebebiyet verdiğinin, ve trafik güvenliğini iyileştirmek için önce kendi davranışlarını değiştirmeleri gerektiğinin anlatılması gerekmektedir.

Hız seçiminde ikinci önemli faktörün "trafik işaretleri" olduğu da bu çalışmanın bulgularından biridir; ancak bu bulgu, yasal hız sınırını bilmelerine rağmen çoğunlukla bu hızın üzerinde araç kullanan bir katılımcı profiliyle örtüşmemektedir. Böylelikle, bu sonucun sosyal kabul görme eğiliminden kaynaklandığını düşünmemiz yanlış olmayacaktır.

Hız seçimindeki üçüncü önemli faktörse, acele içinde olup olmamaktır. Araç hızını artırmanın, varılacak yere ulaşma süresini kısaltıyor olması fizik kanunları uyarınca mantıklı olsa da (Kubota, 2013); insanlar genellikle hızı yükseltmek suretiyle kazanacakları zamanı abartma eğilimindedir (Svenson, 2008). Bu açıdan, hızdaki artışın gerçekte ne kadar zaman tasarrufu sağlayacağı insanlara doğru şekilde aktarılmalı, ve gerçek hayatta hızı yükseltmenin aslında zaman tasarrufu sağlamayabileceği gösterilmelidir.

Bu çalışmada elde edilen bulgular, RS 10 projesi kapsamında Doğruyol ve arkadaşları (2015) tarafından Afyon ve Ankara'da ilk üç dalga verinin incelenmesiyle elde edilen bulgularla örtüşmektedir.

Bütün bu saptamalar ışığında; bu çalışma aşağıdaki iyileştirme önerilerini sunmaktadır:

- Trafik kanunu daha sıkı bir şekilde denetlenmelidir. Sürücüler denetimlerin keyfi olarak yapıldığına , ve herhangi bir ihlal yaptıklarında yakalanma ihtimallerinin düşük olduğuna inandıklarında, ihlal davranışının kemikleşmesi kaçınılmazdır.

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- Hız denetimlerine ve hız cezalarına dair olumsuz algı; bu şekilde toplanan bütçenin yol güvenliğini iyileştirmeye dair projelerde kullanılması, ve sürücülerin bu yönde bilgilendirilmesi yoluyla iyileştirilebilir. Bir başka öneri de, Trafik Denetim Birimi'nin ceza geliri bütçesinin şeffaflaştırılması olacaktır.

- Sürücüler hız limitlerinin güvenilirliğine inanmadıkları sürece, hız limitlerine uymayacaklardır; bu minvalde, yol, araç ve insan faktörleri gözönünde bulunarak "gerçek" güvenli hız limitleri belirlenmeli; ve bu limitler, belirlenme yöntemleriyle beraber sürücülerle paylaşılmalıdır. Bu kapsamda, farklı hava ve yol koşulları için alternatif hız limitleri kullanılması da iyi bir seçenek olarak görülebilir.

- Sürücü eğitimleri, güvenli araç kullanma konusunu da içerecek şekilde iyileştirilmelidir.

Özetle, bu çalışma iki ilde 2336 katılımcıdan toplanan veriyle yapılmış; detaylı ve anlamlı bir çalışma olup, sonucunda aşırı hız davranışına dair kapsamlı bir öngörü edinmemizi sağlamıştır. Elde edilen sonuçların dalgalar ve şehirler arasında tutarlılık göstermesi, çalışmanın gücünü göstermektedir. Genel anlamda Türk sürücülerinin dışsal kontrole sahip olduğu ve hız sınırlarını bilmelerine rağmen, uymakta zorlandıkları gözlemlenmiş; ve bu noktada trafik denetimlerinin sıkılaştırılması ve trafik güvenliği kültürünün iyileştirilmesi gerekliliği vurgulanmıştır.

Katılımcı sayısının yüksek olmasının ve sonuçların tutarlı olmasının yanında, bu çalışmanın bir kısıtı; sadece anket sonuçlarına dayanarak yapılmış olmasıdır.

İleride yapılacak çalışmalarda, bu bulgular RS 10 projesi kapsamında elde edilen gözlem verileriyle desteklenirse ortaya çok daha güvenilir bir çalışma çıkabileceği düşünülmektedir.

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	☐
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	☐
Enformatik Enstitüsü	☐
Deniz Bilimleri Enstitüsü	☐

YAZARIN

Soyadı : Gür Erdost
Adı   : Begüm
Bölümü : Psikoloji

TEZİN ADI (İngilizce) : Deciding on speed: Do knowledge of speed limits, and other factors influence our way of driving?

TEZİN TÜRÜ : Yüksek Lisans X   Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. X

2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐

3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ☐

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: