

**INFLUENCES OF REGULATORY FOCUS, CORE SELF EVALUATIONS AND AGE
ON BIASES IN PERCEPTION AND CHOICE**

by

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STATEMENT OF AUTHORSHIP

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ABSTRACT

This study attempts to understand how individual differences in personality and age impact the influence of biases in driver's perceptions and choices. Biases in perception (unrealistic optimism, illusion of control) as well as in choice (framing) create variations in behaviors and exposure to risks. An individual differences perspective is investigated where individuals are more prone to be biased depending on their core self-evaluations (e.g., self-esteem, locus of control) and regulatory foci (prevention vs. promotion orientation). For example, with respect to framing bias, only drivers' with a chronic prevention orientation (i.e., focus on avoiding negative outcomes and on maintaining stability and security) are expected to manifest a regular framing effect, taking risks when a loss frame is presented and choosing the sure alternative when a gain frame is presented. On the other hand, a reversed framing effect is expected in the case of promotion oriented drivers (i.e., focus on achieving positive outcomes and on opportunities for self-enhancement). Furthermore, from a developmental perspective, it is hypothesized that among people with promotion focus, older adults will be more likely to show reversed framing bias compared to younger adults due to increasing use of heuristic processing (as opposed to analytic processing) and that among people with prevention focus, older adults will be more likely to show framing bias. Data collected from 150 taxi drivers revealed that although most of the taxi drivers demonstrated illusion of control, participants with negative core self evaluations show more learned helplessness and less illusion of control compared to drivers with positive core self evaluations; and drivers with prevention regulatory focus were more prone to manifest risky choice framing bias. Results are discussed in terms of their implications for bias literature and risk taking in traffic.

Keywords: Regulatory focus, core self evaluations, illusion of control, unrealistic optimism, framing effect

ÖZET

Bu çalışma kişisel farklılıkların yazında bütün insanlarda yaygın olduğu varsayılan bilişsel yanılgıları nasıl ve ne ölçüde etkilediklerini araştırmayı amaçlamıştır. Algıdaki yanılgılar (gerçekçi olmayan iyimserlik, kontrol yanılsaması) ve seçimlerdeki yanılgılar (çerçeve etkisi) davranışları ve dolayısıyla riske maruz kalmayı etkilemektedir. Bu çalışmada, kişilerin öz benlik değerlendirmelerine (e.g. kendine güven, kontrol odağı) ve süregelen yönetim odaklarına (i.e. kaçınmacı odak ve yaklaşımçı odak) göre bilişsel yanılgıda bulunmaya daha eğilimli olacağı öngörülmüştür. Örneğin, kaçınmacı odaklı sürücülerin (i.e. olumsuz sonuçlardan kaçınmaya çalışan, istikrar ve güvenliğini korumaya odaklanmış) çerçeve etkisi gösterecekleri, yani değişik trafik durumları kazanç çerçevesinde sunulduğunda kesin kazanç getiren seçeneği seçecekleri, kayıp çerçevede sunulduğunda ise riskli seçeneği seçecekleri öngörülmüştür. Diğer yandan, yaklaşım odaklı sürücülerin (i.e. olumlu sonuçlara ulaşmaya çalışan, kendini geliştirmeye yönelik fırsatlara odaklı) ters çerçeve etkisinde bulunacakları, yani durumlar kazanç çerçevesinde sunulduğunda risk alacakları ama kayıp çerçevesinde sunulduğunda kesin seçeneği seçecekleri öngörülmüştür. Ayrıca, yaşlandıkça bilişsel olarak daha ekonomik davranma eğiliminden ötürü, yaklaşımçı odaklı kişiler arasında daha yaşlı olan yetişkinlerin genç yetişkinlere kıyasla ters çerçeve etkisinde bulunmaya daha eğilimli olacakları; ve kaçınmacı odaklı kişiler arasında daha yaşlı olan yetişkinlerin genç yetişkinlere kıyasla çerçeve etkisinde bulunmaya daha eğilimli olacakları öngörülmüştür. Veriler İstanbul'un Avrupa yakasında farklı bölgelerde çalışan 150 taksi sürücüsünden toplanmıştır. Sonuçlar, olumsuz öz benlik değerlendirmesine sahip kişilerin olumlu öz benlik değerlendirmesine sahip kişilere oranla daha az kontrol yanılsaması gösterdiklerini ve kaçınmacı odaklı kişilerin daha fazla riskli seçim çerçeve etkisinde bulunduğunu göstermektedir. Sonuçlar bilişsel yanılgı yazını ve trafikte risk alma davranışı açısından tartışılmıştır.

Anahtar Sözcükler: Süregelen yönetim odağı, öz benlik değerlendirmesi, kontrol yanılsaması, gerçekçi olmayan iyimserlik, çerçeve etkisi

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Chapter 1

INTRODUCTION

This study is proposed to attempt to understand how individual differences impact the influence of biases in drivers' perception and choices. Biases are considered a primary reason for risky behavior which is one of the primary causes of traffic accidents and fatalities. Aside from motor coordination skills and driving experience, the level of risk in driver's behaviors suggest such judgments and ensuing choices may be easily biased. Biases in perception (e.g. unrealistic optimism, illusion of control) as well as in choice (e.g. framing) create variations in behaviors and exposure to risks. This study is expected to contribute to psychology literature by incorporating the role of individual differences in bias manifestation with a developmental perspective. The study contributes to the applied area by identifying the underlying mechanism of risky driving behavior which is one of the main catastrophes in our day. Many drivers continue to take risk even though there may be possible fatal consequences for themselves and others. Researchers today study factors influencing risk taking behavior on the roads. However, studies about decision making in traffic are very limited. And furthermore, research on traffic psychology mainly focuses on the role of motor-coordination skills in risky behaviors. However, other factors influencing decision making while driving such as cognitive biases and

personality characteristics have great importance on risk taking behavior. This study aims to contribute to the judgment under uncertainty in traffic literature by investigating the role of the cognitive biases and personality. Furthermore, age related changes on bias manifestation is investigated and the possible causal system behind it is discussed.

According to behavioral decision theory, individuals regularly manifest biases in their perceptions, judgments and decisions (Kahneman, Slovic, & Tversky, 1982). A bias is an inaccurate response deviating from normative standards (Evans & Over, 1996). Biases lead individuals to deviate from having accurate judgments and perceptions and making rational decisions. According to Oreg and Bayazit's (2005) typology derived using an individual differences perspective, biases can be categorized into three groups: verification biases, regulation biases, and simplification biases. According to authors the manifestation of each type of bias may not be universal and may depend on the characteristics of individuals (Appendix A). This study examines the relationship between two individual differences --core self-evaluations and regulatory focus—and two bias types – verification and regulation biases.

Verification biases are biases people commit in order to verify their thoughts and perceptions about themselves and their environments around them (Oreg & Bayazit, 2005). Biases such as illusion of control, unrealistic optimism, self-serving bias, and overconfidence are examples of verification biases. For example, an individual having a positive view about him/herself and the world around him/her would be exhibiting

unrealistic optimism in order to verify this positive view. On the other hand, an individual having a negative view about him/herself and the world (e.g. a depressive individual) would be trying to verify this negative view and would be exhibiting unrealistic pessimism. In this study the relationship between core self evaluations—an individual difference variable involving a person's self-esteem, self-efficacy, locus of control, and neuroticism (Judge & Bono, 2003)—and manifestation of verification biases is examined.

Regulation biases are biases that lead people to deviate from rational decision making. Framing bias (Kahneman & Tversky, 1986) is an example of regulation bias (Oreg & Bayazit, 2005). In framing bias, people respond differently to loss and gain situations. According to prospect theory people are focused on avoiding losses (Kahneman & Tversky, 1979). Therefore, they prefer uncertain great losses over certain smaller losses and become risk seekers when they confront a situation defined in terms of losses. On the other hand, they prefer certain small gains over uncertain larger gains and become risk averse when they confront a situation defined in terms of gains.

Oreg and Bayazit (2005) argued that regulation biases may be influenced by chronic regulatory focus, an individual difference variable involving preferences for promotion vs. prevention strategies in self-regulation (Higgins, 1997). According to Higgins (1997), individuals with chronic prevention focus emphasize avoiding potential losses; however individuals with chronic promotion focus emphasize reaching potential gains. Therefore, it is suggested that because prevention focused individuals attend

avoiding losses; they would be manifesting framing bias (i.e. valuing potential losses and being risk seeker in loss situations). However, promotion focused individuals would be manifesting reverse framing bias (i.e. valuing potential gains and being risk seeker in gain situations) because they are focused on maximizing potential gains. For example, a driver with prevention regulatory focus would best persuaded not to speed when the potential losses s/he may face (e.g. do not having enough time for a sudden stopping, losing the insurance discount) if s/he speeds. On the other hand, a driver with promotion regulatory focus would be best persuaded not to speed when the potential gains s/he may face (e.g. having enough time for a sudden stopping, having an insurance discount) if s/he does not speed. This study examines the role of chronic regulatory focus on regulation bias manifestation.

According to Oreg and Bayazit (2005), verification biases influence the creation of regulation biases so that the links between individual differences and types of biases create a process of bias manifestation. Individuals who exhibit verification biases have a biased interpretation of reality about themselves and the world around them. And these perceptual distortions influence the way people regulate their behaviors. Consequently, the way people regulate their behavior influence the manifestation of regulation biases. For example, a driver with positive core self evaluations will try to verify this positive view of the self and will believe that s/he would not be involved in traffic accidents even in the situations where s/he has no control (i.e., illusion of control). Due to this perceptual distortion, s/he will see risky behaviors (e.g. speeding) as an opportunity (i.e. promotion

orientation). Consequently, s/he will choose to engage in risky behaviors when the situation is described in terms of potential gains (i.e reverse framing bias).

Furthermore, this study examines the influence of age on bias manifestation with a developmental perspective. Older drivers are expected to be more likely to manifest biases in their decisions. It is suggested that as individuals get older, they tend to think cognitively economical. Therefore, in line with the hypothesis predicting the relationship between regulatory focus and framing bias, it is predicted that an interaction of age and regulatory focus will influence the framing bias manifestation. Findings are discussed with regard to the cognitive style and experience of drivers.

Chapter 2

LITERATURE REVIEW

In mainstream cognitive psychology biases are suggested to be universal tendencies (Kahneman et al., 1982). Any individual differences are treated as unsystematic error variance. However, recent empirical studies show that some people exhibit some biases more than others and suggest that it may be possible to explain these systematic between subject variation using individual differences (Klayman et al., 1999; Levin et al., 2002). Oreg and Bayazit (2005) proposed a typology of biases based on five categories of individual differences and three motives. According to these authors, biases can be classified into three types: regulation biases, simplification biases and verification biases—and each type can be explained by an individual motive. Regulation biases (e.g. framing, regret avoidance, endowment effect, and escalation of commitment) are exhibited while individuals try to approach pleasure and avoid pain. Simplification biases (e.g. insensitivity to base rates, regression to the mean, the conjunction fallacy and insensitivity to sample size) are exhibited when individuals try to simplify the reality. Finally, verification biases (e.g. self-serving bias, illusion of control, unrealistic self-view, unrealistic optimism) are biases which are exhibited while people try to achieve a coherent self-image. Based on their typology, Oreg and Bayazit proposed a number of

links between individual differences and these bias types. The present study is an attempt to test some of these propositions with a specific sample, taxi drivers. Next, a brief description of verification biases will be given followed by information on two specific biases, unrealistic optimism and illusion of control. Subsequently, the individual difference variable, core self-evaluation will be described and its relationship with these verification biases will be hypothesized.

2.1 Verification Biases

Verification biases are distortions in one's perceptions of self and reality in order to verify his/her beliefs (Oreg & Bayazit, 2005). According to the literature, biases such as illusion of control and unrealistic optimism are generally exhibited due to a motivation of individuals to self-enhance. According to this perspective all people are motivated to self-enhance but it is those who are low in self-esteem that needs a boost in their self-views, so they will be motivated even more than people with moderate to high self-esteem. On the other hand, plenty of evidence accumulated over the years suggesting that depressive individuals as well as people with low self-esteem do not regularly manifest these biases (Taylor and Brown, 1988). Others in fact found that people with low self-esteem can sometimes be prone to opposite biases such as perceived helplessness (e.g., Orbach & Hadas, 1982) or unrealistic pessimism (Boney McCoy et al., 1999). Therefore, a self-enhancement hypothesis, although favored in the literature by many, is not fully congruent with existing research. Oreg and Bayazit (2005) argued that biases in one's

perceptions of self and reality may be manifested in order to ensure coherence in one's beliefs rather than enhancement. They used Swann's self verification theory (Swann & Read, 1981; Swann, Rentfrow & Guinn, 2003) to account for the research evidence and proposed differences in the type of biases that high and low self esteem people would manifest.

2.1.1 Unrealistic Optimism / Unrealistic Pessimism

While optimism is the expectancy for positive events, it may be unrealistic if majority of individuals perceive their chances to experience positive outcomes as higher than the average person in a certain population. Similarly, individuals may perceive their risk of experiencing bad outcomes lower if they are unrealistically optimistic. An individual may judge his/her probability to experience negative events smaller than others because his/her risk of experiencing this event may really be low. However when a large number of people state the same, it is a tendency of optimistic bias, because everyone's probability of not experiencing the bad outcomes can not be smaller than the average person (Higgins et al., 1997). Many studies (more than 300) show that most of the people show optimistic bias by giving low probabilities of experiencing negative events (Weinstein, 1998, unpublished bibliography; cited in Radcliffe & Klein, 2002). Studies show that people are generally unrealistically optimistic about their risk of having cancer, AIDS, getting involved in a car accident, and other similarly negative events (Clarke et al., 2000; McKenna, 1993; Taylor et al., 1992).

On the other hand, pessimism is the expectation of bad things will happen. Similarly an individual may be unrealistically pessimistic if s/he anticipates the likelihood of a negative event happening to him/her is more than the average person. Unrealistically pessimistic individuals may perceive their risk higher due to their focus on possible negative outcomes and may be too much preventive in their actions to avoid these negative outcomes (Blanton et al., 2001).

According to self verification theory (Swann et al., 2003), people seek for a sense of coherence because stable self-views provide them feelings of “existential security” and smoother social interactions. According to Swann and his colleagues people does not always tend to self enhance, they rather try to verify their self-views even though they may be negative due to their need of coherence in their self-views. This feeling of coherence eliminates the discomfort. People may achieve coherence by either building social environments that fit their self-views or by having biased cognitive processing (Swann et al., 2003). Through biased processing people create more compatible perceptions of themselves.

Unrealistic optimism may be functional in terms of psychological well-being and it is closely related to the self-esteem (Carver & Scheier, 1992). People with unrealistic optimism may avoid depressive symptoms and deal with difficult life situations. However, it may be detrimental in terms of survival in the environment (Peeters et al., 1997). Individuals may perceive the risks lower and may perceive themselves

invulnerable so that they may be careless on the prevention of risky situations (Perloff & Fetzner, 1986). On the other hand, findings of research conducted by Chapin (2001) show that pessimistic bias towards reaching life goals leads to a decrease in risky behavior engagement such as speeding, alcohol abuse and unprotected sexual activity. Chapin claims that pessimism may have a self-protective function in people's lives.

2.1.2 Illusion of Control / Perceived Helplessness

The perceived control of a person may lead to the illusionary control even though events happen due to external forces or purely by chance. According to Langer (1975, cited in Thompson, 1999), people have illusion of control because they confuse the chance situations by skills oriented situations. Alternatively, people perceive themselves helpless if they think that they lack control over the outcome of events (Overmier & Seligman, 1967, cited in Cramer & Nickels, 1997). People experiencing uncontrollable events can begin thinking that future events are also uncontrollable and may feel powerless in their actions.

The perception of control over events may be adaptive or maladaptive. Although perception of illusory control may seem to be unhealthy, it may help people to quickly adjust to the environment around them. Perceived illusory control is found to endorse happiness, creativeness and care for others (Taylor & Brown, 1988). On the other hand, individuals who overestimate their control and skills may have lower perception of risk and engage in risky behaviors and be less careful. For example, a driver who overrates

his/her skills of driving may be in greater risk of accident due to lower self protective behavior (McKenna, 1993).

The literature on biases mainly focuses on cognitive explanations for various verification biases and ignores the role of individual differences (Miller & Norman, 1979). This study will focus on the individual differences that lead to biases and will link the core self evaluations to verification biases.

2.2 Core Self Evaluations

Core self evaluations are how people see and evaluate themselves. According to Judge et al. (1997), self esteem, generalized self-efficacy, neuroticism and locus of control are the main indicators of the core evaluations of the self. Because these traits are highly related authors argue that these characteristics may be the sub dimensions of another construct which is the core self evaluation. Judge et al. (1997) developed the concept from eight areas which are philosophy, clinical psychology research, clinical psychology practice, stress, child development, personality, social psychology and job satisfaction. They argue that although the concept is somewhat similar to ‘cognitive schema’ about one’s self, the core evaluations are different in the way they may not be always cognitive and they are “fundamental traits” (Judge et al., 1998). Authors argue that the core evaluations may not be necessarily cognitive because they are generally

personal appraisals and they are fundamental traits because they are the more general evaluations of the self.

Self-esteem is the positive or negative feelings and thoughts toward the overall self in global terms (Rosenberg et al., 1995). While self-efficacy is defined as how much a person believes in his/her abilities and capacity about a particular task by Bandura (1997), Judge et al. (1997) use the term generalized self-efficacy in order to address a broader concept referring to an individual's belief in his/her abilities and capacity in general. Generalized self efficacy is related to self esteem because it arises from the self evaluations of individuals (Judge et al., 1997). Self-efficacy can even be considered as a factor of self-esteem (Judge et al., 1998). Neuroticism is one of the dimensions of the five factor personality model and it refers to the level of emotional stability of a person (Digman, 1990). Because people who have low self esteem are likely to report more anxiety and depressive symptoms, neuroticism is considered to be negatively related to self-esteem (Judge et al., 2003). And locus of control refers to an individual's beliefs about his/her control over what happens to him/herself. If the individual believes that s/he has control over what happens to him/herself, then s/he has an internal locus of control; whereas if the individual believes that events are controlled by an outside force, then s/he has an external locus of control (Gore & Rotter, 1963). Locus of control is similar to the generalized self efficacy because it also relies on belief in one's capabilities (Judge et al., 1998).

2.2.1 The Impact of Core Self Evaluations on Verification Biases

People have some stable evaluations, beliefs about themselves and they generally try to confirm these views even though they may be negative in nature. Because we are so inclined about our self concepts in our minds, we are prone to prevent any disconfirming information coming from outside. The core evaluations of people about themselves may determine their way of achieving consistency in their beliefs. People constantly seek confirmation of their evaluations about themselves by means of verification biases such as self-serving bias in order to prevent a cognitive dissonance. However, which kind of biases they will exhibit may be moderated by their core self evaluations.

For example, the study of Dewberry et al. (2001) investigating the relationship between anxiety and unrealistic optimism shows that people who were anxious toward a negative event were less likely to show optimistic bias toward this event. Although anxiety as a variable in this study is not dispositional but situation based, it gives support to the relationship between anxiety and optimistic bias. Similarly, Bosson et al.'s study on self enhancement and self esteem finds a positive correlation between unrealistic optimism and explicit self-esteem of participants. People with higher self esteem show higher levels of optimistic bias. Another study investigating the effect of intraindividual differences and situational and individual factors on unrealistic optimism shows that people high in neuroticism manifest lower levels of unrealistic optimism (Klonowicz, 2002).

According to literature it is found that perceived control, and optimism bias lead to risky driving behaviors (Dalziel & Job, 1997; DeJoy, 1989; Horswill & McKenna, 1999; Matthews & Moran, 1986). In a research done with college-age drivers, it is found that participants who have greater optimism bias related to possible traffic accidents regarded themselves as safer, more skillful and less likely to have an accident (DeJoy, 1989). Moreover, it is also found that taxi drivers have an optimism bias toward driving safely when very tired and at high speeds (Dalziel & Job, 1997). Another study done with British motorcyclists showed that the significant majority of the group manifests unrealistic optimism regarding their risk of an accident needing hospital treatment afterwards (Rutter et al., 1998). A study investigating the role of perceived control on risk taking showed that subjects prefer risky behaviors such as speeding when they imagine themselves as drivers not the passengers (Horswill & McKenna, 1999).

Most drivers tend to overestimate their driving skills which lead to risky driving behavior because of inadequate risk perception (Job, 1990). Research shows that majority of drivers see themselves as more skillful and less risky than the average driver (Svenson, 1981). According to Matsuura (1999), drivers' overestimation of their skills comes from self-enhancement bias which is an exaggeration of the sense of control and insufficient estimation of their own and others' driving abilities. This suggestion is in line with the hypothesis 1 that states that individuals with high core self evaluations will be more prone to exhibit illusion of control.

It is predicted that drivers with positive core self evaluations are likely to manifest verification biases such as illusion of control and unrealistic optimism. On the other hand, it is predicted that drivers with negative core self evaluations are likely to manifest verification biases such as perceived helplessness, and unrealistic pessimism. Drivers with mid-range core self evaluations will be least likely to exhibit verification biases (see, Figure 1).

Hypothesis 1a: Drivers with positive core self evaluations will manifest illusion of control and unrealistic optimism verification biases.

Hypothesis 1b: Drivers with negative core self evaluations will manifest perceived helplessness and unrealistic pessimism verification biases.

Hypothesis 1c: Drivers with mid-range core self evaluation will be least likely to manifest verification biases.

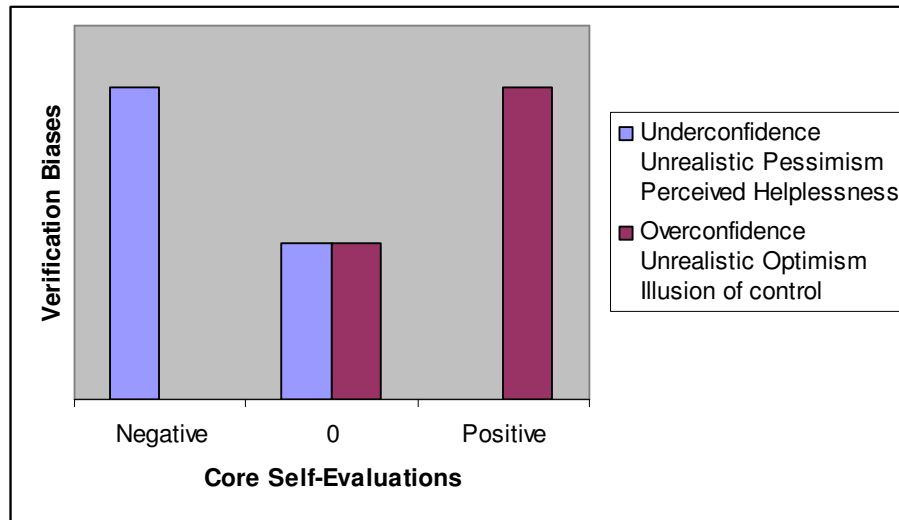


Figure 1. Relationship between core self-evaluations and verification biases

2.3 Regulation Biases

Regulation biases are biases people manifest in the course of a decision or choice. These biases involve deviations from normative decision making to approach pleasure and avoid pain. Framing, regret avoidance, endowment effect and escalation of commitment are examples of regulation biases.

2.3.1 Framing as a Regulation Bias

According to prospect theory, individuals value certain gain more than a probable gain, and probable losses more than certain ones (Kahneman & Tversky, 1979).

Furthermore, the displeasure arising from a potential loss is valued more than the pleasure

arising from a potential gain. Prospect theory suggests that the framing of the same situation in terms of gains or losses reverses the preferences of individuals. When a situation is framed in terms of possible losses, individuals are found to be more risk seeking by choosing uncertain great losses over certain smaller losses. However, when the same situation is framed in terms of possible gains, individuals are found to be risk averse by choosing the definite small gain over uncertain larger gains (i.e., framing effect). A potential outcome can be perceived negatively or positively framed in terms of its subjective reference point. A reference point is the condition a person is in before starting to make a choice. A variety of things can play the role of a reference point at any choice situation: One's aspirations, existing level of finances, others' gains etc. For instance, you expect to earn \$3000 in stock exchange (your reference point) but earn \$1000, you may see it as a loss.

One of the highly cited examples of framing effect manipulation is the Asian Disease Problem, where decision makers are faced with a disease that is expected to kill 600 people (Tversky & Kahneman, 1981):

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

Decision makers faced with this problem are presented with two alternative programs to combat the disease. One-half of the decision makers are presented with gain-framed programs:

Program A: 200 people will be saved.

Program B: 1/3 probability 600 people will be saved, 2/3 probability that nobody will be saved.

The second group of decision makers is presented with loss-framed programs:

Program A: 400 people will die.

Program B: 1/3 probability that nobody will die, 2/3 probability that 600 people will die.

The results typically reveal a framing effect, with choices involving gains revealing more risk aversion (i.e., subjects choosing Program A) than choices involving losses.

Framing effect is frequently mixed up with reflection effect although they are different (Fagley, 1993). In framing effect, the problem situation does not change, the alternative descriptions are objectively equivalent. They are just phrased differently. However, in reflection effect, the alternative scenarios are not the same. The gain frame condition consists of a gain situation (e.g. a certain gain of \$100 versus one-third chance of gaining \$300), and the loss frame condition consists of a loss situation (e.g. a certain loss of \$100, one-third chance of loosing \$300). So, in reflection the gain and loss scenarios are not the rephrasing of the same situation but different situations of loss or gain (Fagley, 1993).

According to Levin et al.'s (1998) typology, framing manipulations may be differentiated in three categories. The first one is 'risky choice framing' which is exemplified by the Asian Disease problem of Tversky and Kahneman (1981) in which the choices are risky or riskless. As mentioned above when the choices are framed in terms of gain, subjects choose the certain outcome. However, when the choices are framed negatively, subjects choose the risky option. The second type of framing effect is 'attribute framing' in which the characteristic of an object is framed either negatively or positively (e.g. 80% lean vs. 20% fat). When the same attribute of an object is framed positively, the subjects are found to make more favorable evaluations. The final type of framing effect is 'goal framing' in which the goal of an action is framed. In goal framing, subjects are offered two choices in which they are entitled to prevent or avoid a potential loss or to provide a potential benefit or gain. For instance, it is found that people are better persuaded to act (e.g. doing breast cancer examination) when the message is framed in terms of potential loss (Meyerowitz & Chaiken, 1987).

It is argued that framing effect is a regulation bias because it involves divergence from normative decision rules (Oreg & Bayazit, 2005). Other regulation biases are regret avoidance, endowment effect and escalation of commitment.

2.3.2 The Impact of Chronic Regulatory Focus on Framing Bias

Manifestation

One of the basic motivations of people is to approach pleasure and avoid pain (Higgins, 1997). Individuals' chronic regulatory focus determines their preferred way of self regulation in achieving desired end states, as approaching a gain or avoiding a loss (Higgins, 1997). According to author, a person who has a self regulation style involving promotion focus is concerned with positive outcomes whereas a person with preventive focus is concerned with the negative outcomes. Individuals with promotion regulatory focus attend to the existence or absence of positive outcomes such as rewards. Because their main aspiration is to approach anticipated pleasure, they focus on advancement, accomplishment and avoiding errors of omission (i.e., missing out a potential gain). The promotion regulatory focus emphasizes eagerness. People with promotion focus are excited about being successful. On the other hand, individuals with prevention regulatory focus attend to the existence of possible outcomes. Their regulatory focus emphasizes protecting security and stability. They choose to use vigilance-related means (Higgins et al., 2001; Higgins & Spiegel, 2004). Their main aim is to avoid potential losses, so that they focus on safety, safeguard and errors of commission (i.e., being unsuccessful in avoiding a potential loss).

Individuals with a chronic promotion regulatory focus seek self enhancement and development due to their emphasis on progression and change with a long-term perspective whereas individuals with a chronic prevention regulatory focus seek stability

and security due their emphasis on conforming to the social rules and responsibilities with a short-term perspective (Higgins et al., 2001).

According to regulatory focus theory (Higgins, 1997), individuals with preventive regulatory focus are focused on preventing losses. This tendency falls in line with the framing effect in which individuals are more risk seeking when confronting with loss situations because they give more weight to avoiding losses. On the other hand, individuals with promotion regulatory focus emphasize approaching gains. Therefore, because individuals with this kind of tendency focus on maximizing gains, they will be risk seeking under a gain frame and risk averse under a loss frame (i.e. reverse framing effect).

For instance, in Joseph et al.'s (1992) study, subjects with high self protection tendency (similar to the preventive focus) are found to be risk seeking under a loss frame. Furthermore, in another study, participants exhibited framing bias with a scenario evoking prevention focus and they exhibited reverse framing bias with a scenario evoking promotion focus (Kluger et al., 2001). Additionally, individuals who have high scores on neuroticism (who are prone to be prevention focused due to their anxiety level) are found to be risk seeking in the loss condition (i.e. framing effect) (Lauriola & Levin, 2001; Lauriola et al., 2005). And individuals who have high scores on openness to experience (who are more prone to be promotion focuses due to their growth orientation) are found

to be risk seeking in the gain frame condition (i.e. reverse framing effect) (Lieberman et al., 1999).

Among three types of framing it is the risky choice framing that has attracted the most attention of researchers, probably because it is the original one. In this study, all of the three types of framing are investigated. In attribute framing effect, individuals are expected to be more likely to use the product in the future when its attribute is framed in positive terms than those whose identical performance is framed in negative terms. On the other hand, reverse of attribute framing effect is not a likely outcome regardless of one's regulatory focus: being more likely to use the product when the attribute is framed in negative terms rather than in positive terms. Therefore, it is not hypothesized that people will manifest attribute framing or reverse attribute framing effect according to their regulatory focus. Attribute framing has the largest effect size among framing types and it is suggested to be a strong common bias (Levin et al., 1998; Levin et al., 2002). The present study will explore the relationship between regulatory focus and attribute framing effect.

With respect to goal framing, on the other hand, reversal of framing effect due to regulatory focus is expected. That is prevention oriented individuals are expected to be persuaded not to engage in a negative behavior (e.g., speeding) when presented with the negative consequences of doing it rather than the benefits of not doing it. Promotion oriented individuals are persuaded to engage in not doing something when presented with

the positive consequences of not doing it rather than the potential losses of doing it. For instance, in regular goal framing effect, if you are trying to persuade a driver on not speeding on residential roads, he would be best persuaded if you tell him/her the negative consequences (i.e. not having enough time for a sudden stopping, losing the insurance discount, possibility of dying) he can face if s/he speeds. It is expected that prevention focused drivers will be best persuaded by the description of potential losses of speeding, because they are focused on avoiding possible losses. However, promotion oriented drivers are expected to manifest reverse framing effect and be best persuaded by the description of potential gains of not speeding (i.e. having enough time for a sudden stopping, having the insurance discount, possibility of living for a long time) because they are oriented on approaching and maximizing the possible gains.

An important possible factor influencing drivers' risk taking behavior is the framing of messages that they confront. For instance, drivers' risky route choice, use of seat belt, speed in traffic etc. may be biased by the framing of message they encounter. For instance, according to Millar and Millar's (2000) study drivers who are high on issue involvement intend to perform safe driving behaviors when the messages they receive are gain framed. However, individual differences which influence the manifestation of this kind of risk related biases are not much studied.

In this study, it is predicted that drivers who are high in their chronic prevention regulatory focus are more likely to exhibit framing bias (risky choice and goal framing),

whereas drivers who are high on their chronic promotion regulatory focus are more likely to exhibit reverse framing bias (see, Figure 2). The chronic regulatory focus will have a curvilinear relationship, because drivers who are either high or low on both regulatory foci will be least likely to exhibit bias.

Hypothesis 2a: Drivers who are high in their chronic prevention regulatory focus will manifest framing bias (risky choice and goal framing) in traffic related circumstances.

Hypothesis 2b: Drivers who are high in their chronic promotion regulatory focus will manifest reversed framing bias (risky choice and goal framing) in traffic related circumstances.

Hypothesis 2c: Drivers who are either high or low on both regulatory foci will manifest neither framing nor reversed framing biases in traffic related circumstances.

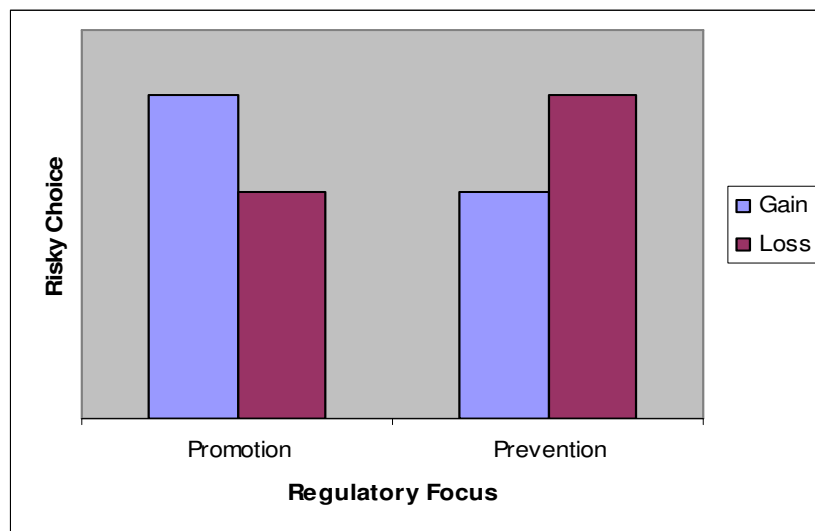


Figure 2. The Impact of Chronic Regulatory Focus on Framing Bias Manifestation

2.4 A Developmental Perspective

2.4.1 The Role of Cognitive Functioning on Bias Manifestation

Recently, many theorists made a distinction between two systems of reasoning. According to dual process theories of reasoning, there are two systems of reasoning: one which is analytic and the other which is heuristic. The three main dual reasoning theories are Evans and Over's dual-process theory; Sloman's two-systems theory; and Stanovich and West's two-systems theory (Osman, 2004).

According to Evans's (1984; Evans & Over, 1996) heuristic-analytic theory, heuristic processes preconsciously select representations related to a specific problem and analytic processes consciously work on these representations to make judgments. On the other hand, Sloman's dual-system theory, there are two types of system which differs in terms of forms of computation (Sloman, 1996). The *associative system* is an intuitive processor that encodes and processes statistical regularities, frequencies and correlations in the environment and the *rule-based system* is a conscious rule interpreter by which symbolic and unbounded representations are combined to form larger and more complex sets of propositions. The rule-based system abstract information and express knowledge as production rules (Sloman, 1996; Osman, 2004). According to Stanovich and West's (2000) two-systems theory, system 1 is automatic, unconscious and context dependent which leads to bias manifestation; system 2 is analytical and context independent. In system 1 people use heuristics because they automatically rely on cues provided by the

context and it leads to *fundamental computational bias* as called by Stanovich and West (1999, cited in Osman, 2004).

Although, there is few research on differences in reasoning biases across the adult life-span, there is evidence that as adults get older, they will rely more on heuristical reasoning (i.e. system 1) rather than analytic system of reasoning (i.e. system 2) (Klaczynski and Robinson, 2000). There are several different explanations in the literature about the influence of this possible change in cognitive functioning on bias manifestation. According to Klaczynski and Robinson (2000), older adults are more likely to rely on heuristics because they may be more cognitively conservative (i.e. relying on experiences readily available in the individual's mind) than younger adults. Another explanation is that metacognitive failures to monitor one's own reasoning increases with age (Klaczynski & Narasimham, 1998). According to Reyna (1995, cited in Klaczynski and Robinson, 2000) age differences in bias manifestation may be due to the age related declines in the ability to suppress memory interference. Another possible explanation given by Klaczynski and Robinson is that older adults may be biased because they have their long-held beliefs. Because older adults have their suppositions for a long time compared to younger people, they are more resistant to change their beliefs.

Related to the suggestion of Klaczynski and Robinson (2000) about adults' reasoning becoming more cognitively economical as they get older, the change in cognitive style and its relation to heuristic and analytic processing are limitedly studied in

the past (Kokis et al., 2002; Stanovich & West, 1997, 1998a, 1998b). In their research with elementary school children, Kokis et al. (2002) hypothesized that analytic processing will override heuristic processing by time due to the changes in cognitive ability and differences in cognitive style. They found significant increases in analytic responding in older children with the increase in cognitive ability. Furthermore, cognitive style measures such as actively open minded thinking and need for cognition are found to be related to analytic responding even after cognitive ability is controlled.

Klaczynski and Robinson's (2000) study with adults ranging from 19 to 81 years old found that biased reasoning was more common in older adults compared to young adults. In Kokis et al.'s study the contrary finding may have resulted from the fact that their subjects are children, not adults. As the age of children increase their cognitive ability increases and they are more prone to process more analytically. However, when the adult development is considered, Klaczynski and Robinson's (2000) finding about the age differences in reasoning is more applicable. Older adults may be more prone to bias because they may be more willing to spend less cognitive energy and use heuristics. However, in their study Klaczynski and Robinson find that older adults report they want to spend more cognitive energy as indicated by their higher need for cognition scores. Authors explain this finding by saying that older adults may be motivated toward cognitive economy unconsciously. However their self reports can not reflect this unconscious tendency. Judgments may not be consciously generated (Sloman, 1996). Therefore, it is predicted that older adults will be more prone to bias manifestation, but

there will not be a difference in cognitive style of older adults versus younger adults as measured by the appropriate scales.

2.4.2 The Role of Experience on Heuristic Processing

It is suggested that as people get older, they will be more prone to bias manifestation due to the change in their thinking and reasoning styles. As they get older they will be thinking more cognitively economical. However, as stated to assess this change may not be conscious and may not be possible by self report of the subjects. For instance, older subjects tend to report that their need for cognition is still high (Klaczynski and Robinson, 2000). It is argued that experience may predict the change in processing of older adults since it may be operating preconsciously in older adults' judgments. For instance, individuals' need for cognition may decrease as they get older because of their life experiences. They may feel that they do not have to think and reason deeply because they have already faced similar situations. Their experiences may lead them to reason and decide heuristically.

In order to see if experience may be one of the reasons of developmental difference in bias manifestation, the driving experience of the subjects is asked. In the analyses if experience has a mediating role on the influence of age on bias manifestation is examined. The superiority of this study in terms of the 'experience' as a variable is that

driving experience of the professional drivers is assessed accurately and is directly related to the dependent variable - framing bias - which is also driving related.

In line with the hypothesis 2 predicting that prevention focused drivers will be prone to manifest framing bias, and promotion focused drivers will be prone to manifest reverse framing bias, it is expected that among people with promotion focus, older drivers will be more likely to show reversed framing bias compared to younger drivers and among people with prevention focus, older drivers will be more likely to show framing bias compared to younger drivers.

Hypothesis 3a: Among people with promotion focus, older drivers will be more likely to show reversed framing bias compared to younger drivers.

Hypothesis 3b: Among people with prevention focus, older drivers will be more likely to show framing bias compared to younger drivers (see, Figure 3).

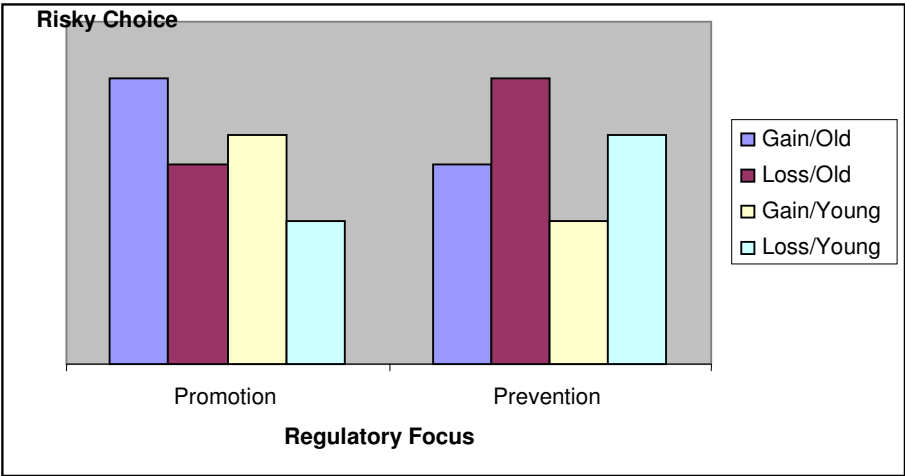


Figure 3. Expected Interaction Effect of Age and Regulatory Focus on Framing and Reversed Framing Biases

Chapter 3

METHOD

3.1 Participants

The sample of the study consists of 150 professional taxi drivers. All participants are male. The participants are recruited from taxi stands in Istanbul. They volunteered to fill the questionnaire and are offered a small gift for their participation in the study. The age range of the participants is between 20 and 65 ($M=36.8$, $sd.=8.9$). 21.2% of the participants are primary school graduates, 30.8% are middle school, 42.5% are high school and 5.5% are university graduates.

3.2 Procedure

Participants are first asked to fill the regulatory focus questionnaire. This was done to each balance the number of participants with promotion and prevention regulatory focus in gain and loss framing conditions. After scoring of their promotion and prevention regulatory focus scores by the researcher, they are given the loss or gain frame scenarios and other questionnaires. Participants are told that the study is about the factors

that may influence driving behavior. After answering to the framing scenarios, participants filled the core self evaluations, illusion of control, unrealistic optimism, cognitive style, driving behavior, and driving safety skills scales (see Appendix B). Participants were able to ask questions to the researcher while they were filling the questionnaires. They are offered a small gift after completing the questionnaires.

3.3 Research Design

The design of this study is quasi experimental because there is no random assignment of subjects into groups. Participants' regulatory focus is assessed and then they are assigned to loss or gain frame conditions according to their scores of promotion and prevention regulatory focus in order to have an equal distribution of participants of different regulatory focuses in both framing (i.e. loss and gain frame) conditions.

3.4 Measures

All measures were translated to Turkish from English and backtranslated to test for semantic equivalence and interpretation differences. Next, all measures were pilot tested on a sample of 40 drivers for face validity.

3.4.1 Individual Differences Measures

3.4.1.1 Core Self Evaluations

The core self evaluations is measured by Judge et al.'s (2003) scale of core self evaluations. This 5 - point Likert scale (5 = completely true; 1= completely false) consisting of 12 items measures four specific core traits which are neuroticism, generalized self-efficacy, self-esteem and locus of control. Items 2, 4, 6, 8, 10 and 12 measure negative evaluations and are reverse coded. The coefficient alpha reliability estimate of the scale is found to be above .80 (Judge et al., 2003). Items 1 and 9 which consist the third factor in the factor analysis are dropped in this study to reach a better reliability score. The items dropped are presented in the Appendix C Table 6.1. The final cronbach's alpha reached is .70.

Core self evaluation scores of the participants are recoded into three as negative, mid-range and positive according to the frequency percentiles for hypothesis testing. The number of participants in positive, mid-range and negative core self evaluations categories are 60, 27 and 63 respectively.

3.4.1.2 Chronic Regulatory Focus

To assess chronic regulatory focus of the participants, a shortened version of the Schwartz's Portrait Questionnaire is used (Schwartz et al., 1999) similar to Kluger et al.'s (2001) study. Authors use the value questionnaire to measure regulatory focus as a result of Higgins' theory of self regulation that links security needs with prevention and self actualization needs with promotion focus (Higgins 1997, 1998). In the original version of the Portraits Questionnaire 40 different people's characteristics are presented. Subjects are asked to determine how much they are like these people on a 6-point scale (1= not like me at all, and 6= very much like me). The questionnaire has 10 subscales including values of stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence and universalism. Items of security (items 2, 8, 11, 17, 19), conformity (items 4, 15, 20) and tradition (items 5, 10, 13, 22) are used to measure prevention focus and items of stimulation (items 3, 9, 16), self-direction (1, 7, 12, 18) and hedonism (6, 14, 21) are used to measure promotion focus of the participants. The scale consists of 22 items. Factor analysis with two extracted factors revealed clear distinction of prevention and promotion focus items (Appendix C Table 6.2). The reliability scores for the promotion and prevention subscales of the measure are .74 and .81 respectively.

It is seen that participants showed response tendencies in their responses. Most of them reported the most values are important to them. In order to correct this tendency, Schwartz (2004) argues that "To retain accuracy of value measurement when comparing individuals or groups, it is critical to correct for individual differences in use of the

response scale. It is the tradeoffs between relevant values that influence behavior and attitudes, so it is the relative importance of the all other values to an individual that should be measured". The author states that failure to correct for scale use yields incorrect results. Therefore, his suggestion of mean centering is done in order to correct the scale use. Each respondent's responses are centered around his/or her mean response to all 22 items before the analyses.

3.4.1.3 Cognitive Style

Need for cognition defined as a person's tendency to engage in cognitively effortful activities is measured by the Turkish adaptation of the Need for Cognition Scale of Cacioppo and Petty (1984) (Gülgöz & Sadowski, 1995). Although the Turkish version of the scale is a 9-point likert scale, It is used as a 5-point likert scale (1= extremely uncharacteristic and 5= extremely characteristic) due to number of study participants with low education levels. The theta coefficient of this original short version of the NFC scale is found to be .90 which shows a high reliability (Cacioppo and Petty, 1984). Cronbach's alpha in the original study of the Turkish version of the scale is found to be .78 (Gülgöz & Sadowski, 1995). Cronbach's alpha of the complete scale found in this study is .63. An exploratory factor analysis with varimax rotation which is done to see the factor loadings revealed six factors. There is not a meaningful, particular trend seen in the emergence of the factors. Items 16, 3 and 1 are dropped after the reliability analyses to increase the reliability of the scale (Appendix C Table 6.3). Item 14 (i.e. the

notion of thinking abstractly is appealing to me) is dropped because a large number of participants told the researcher they did not understand the meaning of the item. The final cronbach's alpha of the scale is .72.

3.4.2 Biases

3.4.2.1 Verification Biases

Illusion of Control: Illusion of control measure is the adapted version of McKenna's (1993) traffic related illusion of control scale. It consists of 8 items which asks the participants the likelihood of their involvement in an accident compared to an average skilled taxi driver. The accidents described in the scale were situations where the drivers have no control over the situation. If subjects' estimate their likelihood of involvement in the accidents as low, they are considered to have illusion of control. On the contrary, if subjects' estimate their involvement as high, they are considered to have perceived helplessness.

Exploratory factor analysis with varimax rotation revealed two factors. The first factor consists of items 1, 2, 3, and 4 and the second factor consists of 5, 6, 7 and 8 (Appendix C Table 6.5). An examination of these two factors revealed that items loading on the second factor implied some level of control of the participant over the situation (e.g. involvement in an accident due to very high speed), whereas in the items of the first

factor imply that the participant has little or no control at all over the possible situation (e.g. involvement in an accident due to an unexpected puncture). The two factors are analyzed separately in this study. Cronbach's alpha for the first factor is .79 and for the second factor is .72.

Both illusion of control variables are recoded into three categories for hypothesis testing. Participants who on average stated that the events' likelihood of happening compared to other taxi drivers with average driving ability is more than 55% are coded as 1 (i.e. having perceived helplessness); participants who on average stated that the events' likelihood of happening is between 45% and 55% are coded as 2 (i.e. having neither perceived helplessness nor illusion of control); and participants who stated that the events' likelihood of happening is lower than 45% are coded as 3 (i.e. having illusion of control). For the illusion of control with no control scenarios variable, the number of participants having perceived helplessness, neither perceived helplessness nor illusion of control, and illusion of control are 31, 24, and 95 respectively. For the illusion of control with low control scenarios variable, the number of participants having perceived helplessness, neither perceived helplessness nor illusion of control, and illusion of control are 17, 33, and 100 respectively. These numbers suggest that a great majority of participants showed illusion of control, regardless of the scale version (some control vs. no control). On the other hand, learned helplessness is found only in a minority of the subjects especially when the subjects perceived some control over the situation.

Unrealistic Optimism: Unrealistic optimism measure is the adapted version of Dejoy's (1989) traffic related optimism bias scale. It consists of 10 items which asks the participants the likelihood of their involvement in an accident compared to other taxi drivers of the same age. Items of the scale differ in terms of outcome severity and controllability. If subjects' estimate for the likelihood of involvement in the accident is low, they are considered to be unrealistically optimistic. On the contrary, if subjects' estimates of involvement are high, they are considered to be unrealistically pessimistic.

Exploratory factor analysis with varimax rotation revealed three factors (Appendix C Table 6.6). In the items of the first factor (items 2, 4, 5, 6, and 9) there is no control of the participant over the situation and the severity is high (e.g. involvement in a serious traffic accident as a passenger). However in the items of the second and third factors, the participant has some control over the situation and the severity of the situation is low (e.g. bumping another vehicle while parking). Items 1 and 8 are loaded to second and items 3, 7 and 10 are loaded to the third factor. Item 10 (i.e. involvement in a serious accident due to the high consumption of alcohol) is eliminated due to the reaction of the participants to the item. A large number of participants stated that they do not consume alcohol because it is against religious rules and gave very low estimates of involvement due to the item's inappropriateness for them. The five items in the first factor is used in this study as the unrealistic optimism scale because they are considered as the most conservative items to measure unrealistic optimism. These items measure the estimates

of the participants about being in negative situations which are not related to their skills of driving. Cronbach's alpha for these items is .79.

Similar to the illusion of control variable, unrealistic optimism variable is also recoded into three categories. Participants who stated that the events' likelihood of happening compared to other taxi drivers of the same age is more than 55% are coded as 1 (i.e. being unrealistically pessimistic); participants who stated that the events' likelihood of happening is between 45% and 55% are coded as 2 (i.e. being neither unrealistically pessimistic nor unrealistically optimistic); and participants who stated that the events' likelihood of happening is lower than 45% are coded as 3 (i.e. being unrealistically optimistic). The number of participants having unrealistic pessimism, neither unrealistic pessimism nor unrealistic optimism, and unrealistic optimism are 26, 21, and 103 respectively. Similar to illusion of control, the majority of participants manifested unrealistic optimism.

3.4.2.2 Framing Bias

Framing bias measure is composed of scenarios based on three different framing manipulations (risky choice framing, attribute framing and goal framing) derived from the typology of Levin et al. (1998). Additionally, a reflection bias scenario is also used in the study.

Attribute Framing: An attribute framing bias scenario is created where the participants read a loss or gain framed description of a specific brand of tire. Participants in the gain frame scenario, read that this specific tire's balance while cornering is 80%. Participants in the loss frame scenario, read that this specific tire's imbalance while cornering is 20%. Then, they are asked about their probability of using this brand of tire in the future. Participants respond to this question by using a 5-point likert scale (1= much less than it was in the past, and 5= much more than it was in the past).

Goal Framing: Traffic related goal framing bias scenario is adapted from Millar and Millar (2000). The message about not exceeding speed limits written in terms of gain or loss is presented to participants. When the participants had completed reading either the gain or the loss message, they are asked if they would speed in the given condition or not. Participants answered the question as 'yes' or 'no'. The gain-framed scenario is:

You should be somewhere on time. But, to get there on time, you should drive at a higher speed than your usual speed.

However if you drive at your usual speed, you will gain time needed for braking in an emergency. You will maintain a good driving record. Also you may have the opportunity for discounted insurance premiums. Moreover, driving at your usual speed can end up giving you extra years of life.

Would you drive at a higher speed than usual in this situation?

The loss-framed scenario is:

You should be somewhere on time. But, to get there on time, you should drive at a higher speed than your usual speed.

However if you drive speeder than your usual speed rate, you will lose time needed for braking in an emergency. You will maintain a bad driving record. Also you may lose the opportunity for discounted insurance premiums. Moreover, driving speeder than your usual speed can end up costing you years of life.

Would you drive at a higher speed than usual in this situation?

Risky Choice Framing and Reflection Bias: Risky choice framing and reflection bias scenarios are adapted from Katsikopoulos et al.'s (2000) study. In risky choice framing, participants in the gain frame scenario are asked to choose one of the two given routes. The first alternative is the choice with a certain travel time which is shorter than their usual travel time to the same destination. The second alternative is the choice with a range of travel time whose mean is shorter than their usual travel time to the same destination. Participants in the loss frame scenario are similarly asked to choose one of the two given routes. The first alternative is the choice with a certain travel time which is longer than their usual travel time to the same destination. The second alternative is the choice with a range of travel time whose mean is longer than their usual travel time to the same destination. The gain-framed scenario is:

Suppose that you drive to your workplace in 100 minutes by using the Road A.

However because the Road A is not available today, you should choose between the alternative roads Road B and Road C.

If you drive to your workplace by using Road B, it will take 80 minutes to get there.

If you drive to your workplace by using Road C, it can take from 50 to 130 minutes.

Which road would you choose? Road B or Road C?

The loss-framed scenario is:

Suppose that you drive to your workplace in 100 minutes by using the Road A.

However because the Road A is not available today, you should choose between the alternative roads Road B and Road C.

If you drive to your workplace by using Road B, it will take 120 minutes to get there.

If you drive to your workplace by using Road C, it can take from 70 to 150 minutes.

Which road would you choose? Road B or Road C?

In the reflection bias scenario, participants in the gain frame scenario are again asked to choose one of the two given routes. If they choose the route A, they will surely

gain a certain amount of time; however, if they choose the route B, they may gain more time than they would in route A or they may lose time. Participants in the loss frame scenario are asked to choose one of the two given routes. If they choose the route A, they will surely lose a certain amount of time; however, if they choose the route B, they may gain time or they may lose more time than they would in route A. The gain-framed scenario is:

Suppose that you are driving to your workplace.

You may gain little or much time or may not gain any time depending on your road choice.

If you choose Road A, you will gain 20 minutes.

If you choose Road B you may gain 40 minutes with a 40% probability, but you may not gain any time with a 60% probability.

Which road would you choose? Road A or Road B?

The loss-framed scenario is:

Suppose that you are driving to your workplace.

You may lose little or much time or you may not lose any time depending on your road choice.

If you choose Road A, you will lose 20 minutes.

If you choose Road B you may lose 40 minutes with a 40% probability, but you may not lose any time with a 60% probability.

Which road would you choose? Road A or Road B?

3.4.3 Driving Behavior

Driving Skills:

Driving skills of the drivers is measured as a control variable by the Driving Skills inventory. The DSI is a 21 item self-reported measure of perceptual motor and safety skills developed by Lajunen and Summala (1995, cited in Sümer et al., under review). This instrument asked drivers to rate how strong they were on driving skills by using 5-point Likert scale (0=very weak and 4=very strong). The Turkish version of the DSI is used in several studies and found to have high reliability for both perceptual-motor skills ($\alpha = .89$) and safety skills ($\alpha = .80$) (Sümer et al., under review). The items 1, 2, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 19, and 21 are perceptual-motor skills items. And items 3, 9, 11, 16, 17, 18 and 20 are safety skills items. After the factor analysis, item 7 of the scale stating “Fluent lane-changing in heavy traffic” is excluded from the scale as it was in the original study due to its possible misunderstanding by the participants. The item’s negative loading to the safety skills factor may indicate that it is understood as a safe behavior by the drivers (Appendix C Table 6.4). Cronbach’s alphas for the perceptual-motor skills and safety skills are .87 and .74 respectively.

Driving violations:

Violation subscale of the Turkish version of the Driver Behaviors Questionnaire (DBQ; Reason, Manstead, Stradling, Baxter, & Campbell, 1990; Sumer, 2003) is used to measure driving violation behaviors (e.g. disregard the speed limits on a residential road). The measure consists of 18 items. Participants were asked to indicate how often they committed each of the behaviors in the previous year on a four-point scale (1= never, 4 = all the time). The original alpha score of the Turkish version of the subscale is .84 (Sumer, 2003). Cronbach's alpha in this study is found to be .81.

Drivers are also asked about for how many years they were taxi drivers, kilometers driven per week and per year, and the number of accidents in the last five years, their overtaking behavior relative to other drivers, and number of complaints about their driving from customers.

Chapter 4

RESULTS

4.1 Descriptive Statistics

Sample characteristics and descriptive statistics and correlations of the variables in the study are provided in Tables 4.1 and 4.2. Being in the gain or loss frame condition (form) is not related to age, education, core self evaluation, unrealistic optimism, illusion of control, regulatory focus, and need for cognition scores. Age and years of driving are strongly correlated ($r = .76$, $p < .01$) as expected. Level of education decreases as the age of the participants increases ($r = -.26$, $p < .01$). Participants' need for cognition scores are positively correlated with their core self evaluation and promotion scores ($r = .33$, $p < .01$ and $r = .22$, $p < .01$).

Table 4.1

Sample Characteristics

	Sample Characteristics
Age	
Mean	36.8
Standard Deviation	8.9
Education (%)	
Primary School	21.2
Middle School	30.8
High School	42.5
University	5.3
Years of Driving	
Mean	16.2
Standard Deviation	7.4
Tenure as a Taxi Driver (years)	
Mean	10.2
Standard Deviation	7.2
Km Driven per week	
Mean	1876.4
Standard Deviation	849.8
Km Driven per year	
Mean	107772.6
Standard Deviation	64154.3
Speeding in Residential Road (%)	
≤50 km/hour	29.5
>50 km/hour	70.5
Overtaking (%) †	
Overtaking < Being Overtaken	45.6
Overtaking = Being Overtaken	36.1
Overtaking > Being Overtaken	18.4
Getting Complaints about his Driving Behaviors by Others in the Last 3 Months (%)	
Never	73.1
A Few Times	20
5 – 10 Times	3.4
Many Times	3.4
Number of Accidents in the Last 5 Years (%)	
None	56.5
One Accident	21.8
Two Accidents	12.2
Three Accidents	6.1
More than Four Accidents	3.4

† Drivers state if their overtaking behavior in traffic is more, less or equal to their being overtaken by other drivers.

Table 4.2

Descriptive Statistics and Correlation Coefficients for Study Variables

	M	SD	N	1	2	3	4	5	6	7	8	9	10
1 Form †	.51	.50	150										
2 Age	36.80	8.87	143	.12									
3 Education	1.32	.87	146	.07	-.26								
4 Years of Driving	16.17	7.41	145	.09	.76	-.21							
5 Need for Cognition	3.22	.65	149	.14	-.07	.13	-.15						
6 Core Self Evaluations	3.50	.57	150	-.01	-.03	-.05	.00	.33					
7 Illusion of Control_no control	3.95	2.22	150	-.10	-.08	-.07	-.11	-.05	-.15				
8 Illusion of Control_low control	3.27	2.10	150	.06	-.11	-.02	-.14	-.07	-.15	.47			
9 Unrealistic Optimism	3.85	2.04	150	.00	-.10	-.08	-.06	.01	.00	.19	.36		
10 Promotion	-.44	.58	150	-.09	-.08	-.09	.05	.22	.03	.07	.16	.01	
11 Prevention	-.06	.60	150	.02	.04	.18	-.09	-.22	-.06	.03	-.02	.02	-.82
12 Choice in Attribute Framing ‡	3.03	1.43	144	.46	-.06	-.05	-.02	.06	.11	-.05	.01	-.03	-.10
13 Choice in Goal Framing §	.34	.48	149	.08	-.20	.21	-.05	.05	.05	-.02	.05	.00	.18
14 Choice in Risky Framing ±	.47	.50	148	-.20	-.07	.08	-.09	.00	.04	.03	.13	.00	.13
15 Choice in Reflection ±	.35	.48	150	-.14	-.03	.15	-.02	-.04	.01	-.03	.05	.02	.13

Note: $|r| \geq .22$ Correlation is significant at the 0.01 level (2-tailed), $.18 \leq |r| < .22$ Correlation is significant at the 0.05 level (2-tailed).

†.Form coding is as follows: loss frame=0 gain frame=1

‡.Coding is as follows: choosing not to use the tire=0 choosing to use the tire=1

§. Coding is as follows: choosing not to speed=0 choosing to speed=1

±.Coding is as follows: choosing the sure alternative=0 choosing the risky alternative=1

Table 4.2

Continued

	11	12	13	14	15
12 Choice in Attribute Framing ‡	.03				
13 Choice in Goal Framing †	-.17	.15			
14 Choice in Risky Framing ±	-.14	-.12	.21		
15 Choice in Reflection ±	-.11	-.21	.06	.26	

Note: $|r| \geq .22$ Correlation is significant at the 0.01 level (2-tailed), $.18 \leq |r| < .22$ Correlation is significant at the 0.05 level (2-tailed).

†.Form coding is as follows: loss frame=0 gain frame=1

‡.Coding is as follows: choosing not to use the tire=0 choosing to use the tire=1

†. Coding is as follows: choosing not to speed=0 choosing to speed=1

±.Coding is as follows: choosing the sure alternative=0 choosing the risky alternative=1

4.2 Hypotheses Testing

Because hypotheses in the study are mainly curvilinear predictions, variables of study are categorized. Both correlation and logistic regression analyses are carried out to test the hypotheses. However, cross tabulation statistics will be used to explain the results because the results of the cross tabulation statistics are the same as logistic regression and it gives a better understanding and explanation of the results.

4.2.1 Relationship between Core Self Evaluation and Verification Biases

In hypothesis 1, it was predicted that a) individuals with positive core self evaluations will be more likely to manifest illusion of control and unrealistic optimism verification biases, b) individuals with negative core self evaluations will be more likely to manifest learned helplessness and unrealistic pessimism and c) individuals with mid range core self evaluations will be least likely to manifest verification biases. Tables below present the results of the cross tabulation analyses for the core self evaluations and illusion of control and unrealistic optimism variables. Because the variables are categorized into ordinal categories, Somers'd symmetric directional measure is used to explain the strength of the relation between the variables core self evaluations and illusion of control and unrealistic optimism.

Table 4.3

Results from Cross Tabulation of Core Self Evaluations with the Verification Bias Illusion of Control Measured with no Control Items

			Core Self Evaluations			Total
			Negative	Mid-range	Positive	
Verification Bias†	Learned helplessness	Count	17	4	10	31
		Expected Count	12.4	5.6	13.0	31.0
		%within cases	28.3%	14.8%	15.9%	20.7%
	None	Count	10	6	8	24
		Expected Count	9.6	4.3	10.1	24.0
		% within cases	16.7%	22.2%	12.7%	16.0%
	Illusion of control	Count	33	17	45	95
		Expected Count	38.0	17.1	39.9	95.0
		% within cases	55.0%	63.0%	71.4%	63.3%
Total		Count	60	27	63	150
		Expected Count	60.0	27.0	63.0	150.0
		% within cases	100.0%	100.0%	100.0%	100.0%

[†] Illusion of control variable measured with no control items

The Somers'd symmetric directional measure¹ for the two ordinal variables core self evaluations and illusion of control measured with no control items is significant (.148, $p < .05$). However the relation is fairly weak. Among drivers with positive core self evaluations 45 out of 63 (71.4%) have illusion of control. And among drivers with negative core self evaluations 17 out of 60 (28.3%) have learned helplessness. These

¹ The Somers'd is an ordinal directional measure that indicates the significance, strength and direction of the relationship between the row and column variables of a crosstabulation. Somers'd is appropriate when both variables are ordinal, categorical variables.

observed counts are significantly more than the expected count for both cells. Therefore, hypotheses 1a and 1b are supported.

Table 4.4

Results from Cross Tabulation of Core Self Evaluations with the Verification Bias

Illusion of Control Measured with Low Control Items

			Core Self Evaluations			Total
			Negative	Mid-range	Positive	
Verification Bias[†]	Learned helplessness	Count	9	2	6	17
		Expected Count	6.8	3.1	7.1	17.0
		% within cases	15.0%	7.4%	9.5%	11.3%
	None	Count	19	5	9	33
		Expected Count	13.2	5.9	13.9	33.0
		% within cases	31.7%	18.5%	14.3%	22.0%
	Illusion of control	Count	32	20	48	100
		Expected Count	40.0	18.0	42.0	100.0
		% within cases	53.3%	74.1%	76.2%	66.7%
Total		Count	60	27	63	150
		Expected Count	60.0	27.0	63.0	150.0
		% within cases	100.0%	100.0%	100.0%	100.0%

[†] Illusion of control variable measured with low control items

The Somers'd symmetric directional measure for the two ordinal variables core self evaluations and illusion of control measured with low control scenarios is significant (.189, $p < .05$). However the relation is fairly weak. Among drivers with positive core self evaluations 48 out of 63 (76.2%) have illusion of control. And among drivers with negative core self evaluations 9 out of 60 (15%) have learned helplessness. These

observed counts are significantly more than the expected count for both cells. Therefore, hypotheses 1a and 1b are supported.

Table 4.5

Results from Cross Tabulation of Core Self Evaluations with the Verification Bias

Unrealistic Optimism

			Core Self Evaluations			Total
			Negative	Mid-range	Positive	
Verification Bias[†]	Unrealistic pessimism	Count	11	3	12	26
		Expected Count	10.4	4.7	10.9	26.0
		% within cases	18.3%	11.1%	19.0%	17.3%
	None	Count	12	2	7	21
		Expected Count	8.4	3.8	8.8	21.0
		% within cases	20.0%	7.4%	11.1%	14.0%
	Unrealistic optimism	Count	37	22	44	103
		Expected Count	41.2	18.5	43.3	103.0
		% within cases	61.7%	81.5%	69.8%	68.7%
Total		Count	60	27	63	150
		Expected Count	60.0	27.0	63.0	150.0
		% within cases	100.0%	100.0%	100.0%	100.0%

[†] Unrealistic optimism variable

The Somers'd symmetric directional measure for the two ordinal variables core self evaluations and unrealistic optimism is not significant (.056, ns.). There is no significant relationship between the two variables. Drivers with unrealistic optimism or

pessimism does not differ in terms of their core self evaluations. Hypothesis 1 is not supported.

4.2.2 The Effect of Regulatory Focus on Framing Bias

Hypothesis 2 states that a) individuals who are high in their chronic prevention regulatory focus will be more likely to manifest framing bias as a regulation bias in traffic related circumstances b) individuals who are high in their chronic promotion regulatory focus will be more likely to manifest reversed framing bias and c) individuals who are either high or low on both regulatory foci will be least likely to manifest framing or reversed framing biases.

To test this hypothesis regulatory focus of the participants are recoded in two ways. In the first recoding of the regulatory focus measure, participant's promotion and prevention scores are recoded separately into three as high, moderate and low. Then, participants whose recoded prevention scores were high and their recoded promotion scores were low are coded as 1 (i.e. prevention oriented); participants whose recoded promotion scores were high and their recoded prevention scores were low are coded as 2 (i.e. promotion oriented); and participants whose recoded prevention and promotion scores are both high, both low or both medium are coded as 3.

In the second recoding of the measure, a median split of the difference between prevention and promotion scores is done similar to the recoding in Higgins et al.'s study (2001). Participants whose prevention scores are higher than their promotion scores are coded as 1 (i.e. prevention focused). And participants whose promotion scores are higher than their prevention scores are coded as 2 (i.e. promotion focused).

Tables 4.6a and 4.6b show the effect of regulatory focus on attribute framing bias. Responses of the participants in the attribute framing scenarios are recoded into three categories. Participants who stated that they are much less likely and less likely to use the object described in terms of gains or losses (i.e. the tire) are coded as 1; participants who stated that they are likely to use the object as before are coded as 2; and participants who stated that they are much more likely and more likely to use the object are coded as 3.

According to framing bias, individuals will state that they are more likely to use the object when its attribute is framed in a positive way; and that they are less likely to use the same object when its attribute is negatively framed. According to hypothesis 2, prevention focused people are expected to exhibit framing bias, and promotion focused people are expected to exhibit reverse framing bias.

According to table 4.6a where regulatory focus variable is coded into three categories, drivers manifest attribute framing bias regardless of their regulatory focus. Majority of the participants with prevention, promotion, or both or neither promotion nor

prevention focus and both prevention and promotion exhibited attribute framing bias. In the loss frame condition, %60.9 of both or neither promotion nor prevention oriented drivers, %66.7 of prevention oriented drivers and %55.2 of promotion oriented drivers state that they are less likely to use the tire. In the gain frame condition, %65.5 of neither promotion nor prevention oriented drivers, %65.4 of prevention oriented drivers and %52.6 of promotion oriented drivers state that they are more likely to use the tire. The nominal symmetric measure contingency coefficient² for the prevention focused drivers is .482 ($p < .01$). Contingency coefficient for the promotion focused drivers and neither promotion nor prevention focused drivers are .383 ($p < .05$) and .481 respectively ($p < .01$).

Similarly in table 4.6b where regulatory focus is coded into two categories, drivers manifest attribute framing bias independent of their regulatory focus. Both promotion and prevention focused people exhibit attribute framing bias. In the loss frame condition, %60 of prevention oriented drivers and %60 of promotion oriented drivers state that they are less likely to use the tire. In the gain frame condition, %62.7 of prevention oriented drivers and %60 of promotion oriented drivers state that they are more likely to use the tire. Contingency coefficient for the prevention focused drivers and promotion focused drivers are .466 ($p < .01$) and .406 ($p < .05$) respectively.

² The nominal symmetric measures indicate both the strength and significance of the relationship between the row and column variables of a crosstabulation. The nominal symmetric measures are appropriate when both variables are nominal, categorical variables.

Table 4.6a *The Relationship between Regulatory Focus (coded into three categories) and Attribute Framing Bias*

Regulatory Focus			Attribute Framing			Total	
			Less likely to use	Same as before	More likely to use		
None	Form	Loss frame	Count	14	4	5	23
			Expected Count	7.5	4.9	10.6	23.0
			% within form	60.9%	17.4%	21.7%	100.0%
		Gain frame	Count	3	7	19	29
			Expected Count	9.5	6.1	13.4	29.0
			% within form	10.3%	24.1%	65.5%	100.0%
		Total	Count	17	11	24	52
			Expected Count	17.0	11.0	24.0	52.0
			% within form	32.7%	21.2%	46.2%	100.0%
Prevention	Form	Loss frame	Count	12	3	3	18
			Expected Count	6.5	3.3	8.2	18.0
			% within form	66.7%	16.7%	16.7%	100.0%
		Gain frame	Count	4	5	17	26
			Expected Count	9.5	4.7	11.8	26.0
			% within form	15.4%	19.2%	65.4%	100.0%
		Total	Count	16	8	20	44
			Expected Count	16.0	8.0	20.0	44.0
			% within form	36.4%	18.2%	45.5%	100.0%
Promotion	Form	Loss frame	Count	16	7	6	29
			Expected Count	11.5	7.9	9.7	29.0
			% within form	55.2%	24.1%	20.7%	100.0%
		Gain frame	Count	3	6	10	19
			Expected Count	7.5	5.1	6.3	19.0
			% within form	15.8%	31.6%	52.6%	100.0%
		Total	Count	19	13	16	48
			Expected Count	19.0	13.0	16.0	48.0
			% within form	39.6%	27.1%	33.3%	100.0%

Table 4.6b *The Relationship between Regulatory Focus (coded into two categories) and Attribute Framing Bias*

Regulatory Focus				Attribute Framing			Total
				Less likely to use	Same as before	More likely to use	
Prevention	Form	Loss frame	Count	30	10	10	50
			Expected Count	17.0	11.5	21.6	50.0
			% within form	60.0%	20.0%	20.0%	100.0%
		Gain frame	Count	7	15	37	59
			Expected Count	20.0	13.5	25.4	59.0
			% within form	11.9%	25.4%	62.7%	100.0%
		Total	Count	37	25	47	109
			Expected Count	37.0	25.0	47.0	109.0
			% within form	33.9%	22.9%	43.1%	100.0%
Promotion	Form	Loss frame	Count	12	4	4	20
			Expected Count	8.6	4.0	7.4	20.0
			% within form	60.0%	20.0%	20.0%	100.0%
		Gain frame	Count	3	3	9	15
			Expected Count	6.4	3.0	5.6	15.0
			% within form	20.0%	20.0%	60.0%	100.0%
		Total	Count	15	7	13	35
			Expected Count	15.0	7.0	13.0	35.0
			% within form	42.9%	20.0%	37.1%	100.0%

Table 4.7a and 4.7b presents the results of the effect of regulatory focus on goal framing bias. According to framing bias, drivers who read the loss framed scenario about speeding will not choose to speed compared to drivers who read the gain framed scenario about speeding. It is expected that prevention focused drivers will exhibit framing bias and will not choose to speed when they read the loss framed scenario; and drivers with promotion regulatory focus will exhibit reverse framing bias and will choose to speed when they read the loss framed scenario about speeding. Analyses show that regulatory focus of the drivers does not influence their manifestation of goal framing bias. In the analyses with the more conservative recoding of regulatory focus measure, contingency coefficients for both or neither prevention nor promotion oriented drivers, prevention oriented drivers, and promotion oriented drivers are .172, .009 and .154 (ns.) respectively. Similarly according to the results of analyses with the median-split recoding of the regulatory focus measure, contingency coefficients for prevention oriented drivers, and promotion oriented drivers are .085 and .137 (ns.) respectively. Therefore hypothesis 2 is not supported. On the other hand, crosstabs results show that although there is no framing bias for prevention focused people, for promotion focused people there is a tendency of exhibiting framing bias since the majority of the promotion focused people states they would not choose to speed when they have read the loss framed scenario.

Table 4.7a

The Relationship between Regulatory Focus (coded into three categories) and Goal

Framing Bias

Regulatory Focus			Goal Framing		Total	
			No	Yes		
None	Form	Loss Frame	Count	18	5	23
			Expected Count	15.9	7.1	23.0
			% within form	78.3%	21.7%	100.0%
		Gain Frame	Count	18	11	29
			Expected Count	20.1	8.9	29.0
			% within form	62.1%	37.9%	100.0%
		Total	Count	36	16	52
			Expected Count	36.0	16.0	52.0
			% within form	69.2%	30.8%	100.0%
Prevention	Form	Loss Frame	Count	16	5	21
			Expected Count	16.1	4.9	21.0
			% within form	76.2%	23.8%	100.0%
		Gain Frame	Count	20	6	26
			Expected Count	19.9	6.1	26.0
			% within form	76.9%	23.1%	100.0%
		Total	Count	36	11	47
			Expected Count	36.0	11.0	47.0
			% within form	76.6%	23.4%	100.0%
Promotion	Form	Loss Frame	Count	17	12	29
			Expected Count	15.1	13.9	29.0
			% within form	58.6%	41.4%	100.0%
		Gain Frame	Count	9	12	21
			Expected Count	10.9	10.1	21.0
			% within form	42.9%	57.1%	100.0%
		Total	Count	26	24	50
			Expected Count	26.0	24.0	50.0
			% within form	52.0%	48.0%	100.0%

Table 4.7b

The Relationship between Regulatory Focus (coded into two categories) and Goal

Framing Bias

Regulatory Focus				Goal Framing		Total
				No	Yes	
Prevention	Form	Loss Frame	Count	40	13	53
			Expected Count	37.9	15.1	53.0
			% within form	75.5%	24.5%	100.0%
		Gain Frame	Count	40	19	59
			Expected Count	42.1	16.9	59.0
			% within form	67.8%	32.2%	100.0%
		Total	Count	80	32	112
			Expected Count	80.0	32.0	112.0
			% within form	71.4%	28.6%	100.0%
Promotion	Form	Loss Frame	Count	11	9	20
			Expected Count	9.7	10.3	20.0
			% within form	55.0%	45.0%	100.0%
		Gain Frame	Count	7	10	17
			Expected Count	8.3	8.7	17.0
			% within form	41.2%	58.8%	100.0%
		Total	Count	18	19	37
			Expected Count	18.0	19.0	37.0
			% within form	48.6%	51.4%	100.0%

Table 4.8a and 4.8b presents the relationship between regulatory focus and risky choice framing bias. It is hypothesized that prevention focused drivers will manifest framing bias. According to framing bias, drivers will choose the road with a varying range of travel time (the risky choice) in the time loosing condition and will choose the road with a sure travel time (the sure choice) in the time gaining condition.

The analyses with the more conservative coding of regulatory focus show that promotion oriented people exhibit framing bias. Contingency coefficients for the neither prevention nor promotion focused drivers, prevention focused drivers and promotion focused drivers are .386 ($p < .05$), .036 (ns.) and .142 (ns.) respectively. Table 4.6a shows that in the loss condition, %69.6 of the neither prevention nor promotion focused drivers choose the risky alternative. Therefore, hypothesis 2 is not supported.

On the contrary, analyses with the median split recoding of the regulatory focus variable reveal that prevention focused drivers exhibit framing bias. Contingency coefficients for the prevention focused drivers and promotion focused drivers are .196 ($p < .05$) and .173 (ns.) respectively. Table 4.6a shows that %32.2 of the prevention focused drivers in the gain condition choose the risky alternative whereas % 51.9 of the prevention focused drivers in the loss condition choose the risky alternative. According to the results of the analysis done with the median-split recoding of regulatory focus variable, hypothesis 2a is supported.

Table 4.8a

The Relationship between Regulatory Focus (coded into three categories) and Risky Choice Framing Bias

Regulatory Focus		Risky Choice Framing			Total	
		Sure Choice	Risky Choice			
None	Form	Loss Frame	Count	7	16	23
			Expected Count	12.4	10.6	23.0
			% within form	30.4%	69.6%	100.0%
		Gain Frame	Count	21	8	29
			Expected Count	15.6	13.4	29.0
			% within form	72.4%	27.6%	100.0%
		Total	Count	28	24	52
			Expected Count	28.0	24.0	52.0
			% within form	53.8%	46.2%	100.0%
Prevention	Form	Loss Frame	Count	13	7	20
			Expected Count	12.6	7.4	20.0
			% within form	65.0%	35.0%	100.0%
		Gain Frame	Count	16	10	26
			Expected Count	16.4	9.6	26.0
			% within form	61.5%	38.5%	100.0%
		Total	Count	29	17	46
			Expected Count	29.0	17.0	46.0
			% within form	63.0%	37.0%	100.0%
Promotion	Form	Loss Frame	Count	11	18	29
			Expected Count	12.8	16.2	29.0
			% within form	37.9%	62.1%	100.0%
		Gain Frame	Count	11	10	21
			Expected Count	9.2	11.8	21.0
			% within form	52.4%	47.6%	100.0%
		Total	Count	22	28	50
			Expected Count	22.0	28.0	50.0
			% within form	44.0%	56.0%	100.0%

Table 4.8b

The Relationship between Regulatory Focus (coded into two categories) and Risky Choice Framing Bias

Regulatory Focus				Risky Choice Framing		Total
				Sure Choice	Risky Choice	
Prevention	Form	Loss Frame	Count	25	27	52
			Expected Count	30.5	21.5	52.0
			% within form	48.1%	51.9%	100.0%
		Gain Frame	Count	40	19	59
			Expected Count	34.5	24.5	59.0
			% within form	67.8%	32.2%	100.0%
		Total	Count	65	46	111
			Expected Count	65.0	46.0	111.0
			% within form	58.6%	41.4%	100.0%
Promotion	Form	Loss Frame	Count	6	14	20
			Expected Count	7.6	12.4	20.0
			% within form	30.0%	70.0%	100.0%
		Gain Frame	Count	8	9	17
			Expected Count	6.4	10.6	17.0
			% within form	47.1%	52.9%	100.0%
		Total	Count	14	23	37
			Expected Count	14.0	23.0	37.0
			% within form	37.8%	62.2%	100.0%

Table 4.9a and 4.9b presents the relationship between regulatory focus and reflection bias. It is expected that drivers with prevention regulatory focus will exhibit reflection bias. According to reflection bias, drivers would choose the risky alternative in the time loosing condition and will choose the sure alternative in time gaining condition. Results show that only drivers with neither prevention nor promotion orientation of regulatory focus manifest reflection bias. In the analyses with conservative recoding of

regulatory focus measure, contingency coefficients for neither prevention nor promotion oriented drivers, prevention oriented drivers, and promotion oriented drivers are .276 ($p < .05$), .038 and .101 (ns.) respectively. According to the results of analyses with the median-split recoding of the regulatory focus measure, contingency coefficients for prevention oriented drivers, and promotion oriented drivers are .124 and .137 (ns.) respectively. Therefore, hypothesis 2 is not supported. On the other hand, crosstabs results show that although there is no framing bias for prevention focused people, for promotion focused people there is a tendency of exhibiting framing bias since the slight majority of the promotion focused people chose the risky alternative in the loss frame condition and chose the sure alternative in the gain frame condition.

Table 4.9a

*The Relationship between Regulatory Focus (coded into three categories) and Reflection**Bias*

Regulatory Focus				Reflection		Total
				Sure Choice	Risky Choice	
None	Form	Loss Frame	Count	12	11	23
			Expected Count	15.5	7.5	23.0
			% within form	52.2%	47.8%	100.0%
		Gain Frame	Count	23	6	29
			Expected Count	19.5	9.5	29.0
			% within form	79.3%	20.7%	100.0%
		Total	Count	35	17	52
			Expected Count	35.0	17.0	52.0
			% within form	67.3%	32.7%	100.0%
Prevention	Form	Loss Frame	Count	16	6	22
			Expected Count	15.6	6.4	22.0
			% within form	72.7%	27.3%	100.0%
		Gain Frame	Count	18	8	26
			Expected Count	18.4	7.6	26.0
			% within form	69.2%	30.8%	100.0%
		Total	Count	34	14	48
			Expected Count	34.0	14.0	48.0
			% within form	70.8%	29.2%	100.0%
Promotion	Form	Loss Frame	Count	15	14	29
			Expected Count	16.2	12.8	29.0
			% within form	51.7%	48.3%	100.0%
		Gain Frame	Count	13	8	21
			Expected Count	11.8	9.2	21.0
			% within form	61.9%	38.1%	100.0%
		Total	Count	28	22	50
			Expected Count	28.0	22.0	50.0
			% within form	56.0%	44.0%	100.0%

Table 4.9b

The Relationship between Regulatory Focus (coded into two categories) and Reflection Bias

Regulatory Focus				Reflection		Total
				Sure Choice	Risky Choice	
Prevention	Form	Loss Frame	Count	34	20	54
			Expected Count	37.3	16.7	54.0
			% within form	63.0%	37.0%	100.0%
		Gain Frame	Count	44	15	59
			Expected Count	40.7	18.3	59.0
			% within form	74.6%	25.4%	100.0%
		Total	Count	78	35	113
			Expected Count	78.0	35.0	113.0
			% within form	69.0%	31.0%	100.0%
Promotion	Form	Loss Frame	Count	9	11	20
			Expected Count	10.3	9.7	20.0
			% within form	45.0%	55.0%	100.0%
		Gain Frame	Count	10	7	17
			Expected Count	8.7	8.3	17.0
			% within form	58.8%	41.2%	100.0%
		Total	Count	19	18	37
			Expected Count	19.0	18.0	37.0
			% within form	51.4%	48.6%	100.0%

4.2.3 The Effect of Age and Regulatory Focus on Framing Bias

Hypothesis 3 states that a) among drivers with promotion focus, older drivers will be more likely to show reversed framing bias compared to younger drivers, b)among

drivers with prevention focus, older drivers will be more likely to show framing bias compared to younger drivers.

It is hypothesized that the reason older drivers will manifest bias is they tend to think more cognitively economical as they get older. However, it is predicted that there will not be a difference in cognitive style of older adults compared to younger adults as will be measured by the cognitive style scales because the change in cognitive style is not conscious. It is suggested that experience may be responsible of the change in processing of older adults since it may be operating preconsciously in older adults judgments.

Results show that there is no significant correlation between need for cognition self reports of the participants and their age ($r = -.07$, ns.) as expected. However, there is a negative relationship between age and education ($r = -.26$, $p < .01$). As the age of the participants increases, their level of education decreases. Due to this correlation, education is controlled in the following analyses. To control the education variable, logistic regression analyses is conducted to test the hypotheses in this section.

Age is recoded similar to Klaczynski and Robinson's (2000) study on adult age differences in reasoning biases. Drivers between the ages of 19 – 31 are coded as young adults ($n=47$); and drivers between the ages of 40 – 55 are coded as middle- aged adults ($n=47$). Because there is a very few number of older adult taxi drivers in taxi stands and

they were not capable of answering the questionnaire, older adult age group (age > 64) is not included to the study.

Table 4.10a presents the effect of age on attribute framing. The interaction of age and regulatory focus is not included in the analyses; because it is not hypothesized that regulatory focus will have an effect on attribute framing bias. Furthermore the results showed that drivers manifested attribute framing bias independent of their regulatory focus. According to results, there is no significant effect of age on attribute framing bias manifestation ($\text{ExpB} = .88$, ns.). Drivers exhibited attribute framing bias independent from their age.

Table 4.10a *The Relationship between the Interaction of Regulatory Focus and Age and Attribute Framing Bias*

Predictors	Models									
	1		2		3		4		5	
	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)
Constant	4.66 **	5.27	2.98*	4.47	5.86 **	82.00	.64	4.88	2.85*	86.08
Form	13.52***	.11	6.53***	.05	7.73***	.03	6.80***	.05	7.92***	.02
Age	.08	1.19	.91	2.76	.16	.57	.72	2.45	.18	.55
Regulatory Focus	.39	.66	.06	.75	.22	1.87	.16	.62	.09	1.49
Education	.58	.73	.34	.78	.54	.72	.53	.73	.72	.69
Regulatory Focus by Form			1.24	4.60	1.13	4.51	1.75	6.58	1.58	6.38
Regulatory Focus by Age			1.70	.17	2.70*	.09	2.21	.12	3.16*	.07
Form by Age			.01	.88	.22	2.00	.02	1.19	.38	2.50
Tenure as a Driver					3.59*	.88			3.31*	.88
Need for Cognition							.00	1.01	.00	.98

Note: Dependent variable: Choice in attribute framing

***. Significant at the .01 level

**. Significant at the .05 level

*. Significant at the .10 level

Table 4.10b presents the effect of interaction of age and regulatory focus on goal framing bias. According to results, there is no significant effect of the interaction of regulatory focus and age on goal framing bias manifestation ($\text{ExpB} = .57$, ns.). Among prevention focused drivers, neither young nor middle-age drivers exhibit bias. And similarly among promotion focused drivers, neither young nor middle-age drivers exhibit bias. Therefore, hypothesis 3 is not supported. On the other hand, there are marginally significant main effects of regulatory focus and age on goal choice. The odds of choosing to speed is doubled when the driver is promotion oriented ($\text{ExpB} = 2.59$, $p < .10$). And, the odds of choosing to speed is doubled when the driver is a young adult ($\text{ExpB} = 2.59$, $p < .10$).

Table 4.10b *The Relationship between the Interaction of Regulatory Focus and Age and Goal Framing Bias*

Predictors	Models											
	1		2		3		4		5		6	
	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)
Constant	7.58***	.20	8.46***	.13	8.13***	.14	4.23 **	.08	3.44*	.06	3.61*	.02
Form	2.74	.44	.24	.62	.29	.53	.27	.54	.24	.56	.22	.57
Age	3.66*	2.59	5.93***	5.55	4.88 **	5.20	4.22 **	7.17	4.92 **	5.27	4.60 **	8.15
Regulatory Focus	3.24*	2.59	1.88	3.65	1.19	3.22	.86	2.77	1.02	2.96	.60	2.37
Education	1.91	1.52	2.61	1.67	2.61	1.67	2.38	1.63	2.31	1.62	2.04	1.58
Regulatory Focus by Form			.14	1.48	.18	2.06	.19	2.11	.16	1.99	.19	2.09
Regulatory Focus by Age			1.03	.33	.33	.42	.27	.46	.62	.30	.56	.32
Form by Age			.82	.38	.28	.47	.28	.48	.30	.46	.29	.46
Regulatory Focus by Form by Age					.06	.57	.08	.53	.01	.82	.02	.75
Tenure as a Driver							.30	1.03	-	-	.52	1.04
Need for Cognition									.41	1.31	.68	1.43

Note: Dependent variable: Choice in goal framing

***. Significant at the .01 level **. Significant at the .05 level *. Significant at the .10 level

Table 4.10c presents the effect of interaction of age and regulatory focus on risky choice framing. According to results, the interaction of age and regulatory focus does not significantly affect the odds of manifesting risky choice framing bias ($\text{ExpB} = 4.81$, ns.). Therefore, hypothesis 3 is not supported. On the other hand, there is a marginally significant effect of age on framing bias manifestation ($\text{ExpB}=.17$, $p<.10$). The odds of choosing the risky alternative in the loss frame condition (i.e. exhibiting framing bias) is cut down by more than half when the driver is a young adult compared to middle-age adults. When driving experience is controlled, this relationship is no more significant. However, when need for cognition of participants is controlled, the relationship is significant. These results point up that the explanation of the effect of age on bias manifestation may be related to experience but not related to cognitive style reports of the participants. Though, when both cognitive style reports of the participants and their driving experience are controlled in the analyses, the effect of age stays marginally significant.

Table 4.10c *The Relationship between the Interaction of Regulatory Focus and Age and Risky Choice Framing Bias*

Predictors	Models											
	1		2		3		4		5		6	
	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)
Constant	.71	.65	3.29*	.33	3.54*	.31	.01	.90	.61	.34	.01	1.24
Form	.33	1.29	3.68**	4.75	3.92**	6.26	3.57*	4.71	4.20**	5.60	4.11**	5.65
Age	.30	.78	.79	1.80	1.15	2.12	.00	1.01	1.02	1.96	.00	1.00
Regulatory Focus	2.30	2.12	3.57	6.32	3.49*	9.83	4.36**	8.73	4.16**	8.46	5.07**	13.05
Education	.50	1.21	1.40	1.42	1.39	1.42	1.41	1.43	1.75	1.50	1.90	1.54
Regulatory Focus by Form			1.74	.24	1.91	.10	1.89	.23	2.74*	.15	3.03*	.13
Regulatory Focus by Age			.64	.42	1.12	.18	.91	.35	.18	.62	.32	.52
Form by Age			3.25*	.17	3.52*	.11	2.63	.20	3.99**	.13	3.37*	.15
Regulatory Focus by Form by Age					.52	4.81	-	-	-	-	-	-
Tenure as a Driver							1.27	.95	-	-	1.59	.94
Need for Cognition									.01	.96	.05	.91

Note: Dependent variable: Choice in risky framing

***. Significant at the .01 level **. Significant at the .05 level *. Significant at the .10 level

Table 4.10d presents the effect of interaction of age and regulatory focus on choice in reflection condition. According to results, the interaction of age and regulatory focus has a marginally significant effect on the odds of manifesting reflection bias ($\text{ExpB} = 42.41, p < .10$). The odds of choosing the risky alternative in the loss frame (i.e. framing effect) when the driver is promotion focused young adult is higher compared to prevention focused middle-age drivers. This marginally significant result is contrary to the hypothesis 3. Therefore, hypothesis 3 is not supported. The marginally significant effect of the interaction between age and regulatory on reflection bias manifestation is no more marginally significant when need for cognition scores of the participants is controlled. Furthermore, there is a marginally significant main effect of regulatory focus on choice. The odds of choosing the risky alternative is doubled when the driver is promotion oriented ($\text{ExpB} = 2.52, p < .10$).

Table 4.10d *The Relationship between the Interaction of Regulatory Focus and Age and Reflection Bias*

Predictors	Models											
	1		2		3		4		5		6	
	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)	Wald	Exp(B)
Constant	4.78 **	.30	4.57* *	.26	5.44**	.21	4.14**	.09	.03	.76	.17	.46
Form	.12	.85	.60	1.82	2.19	3.54	2.38	3.82	2.04	3.44	2.18	3.67
Age	.00	1.03	.08	1.22	.91	2.02	1.51	3.18	.93	2.05	1.24	2.88
Regulatory Focus	3.45*	2.52	.85	2.30	2.84*	5.93	2.30	5.21	3.25*	7.10	2.83*	6.76
Education	.52	1.23	.58	1.26	.58	1.27	.87	1.35	.76	1.32	1.10	1.41
Regulatory Focus by Form			.36	.54	2.98*	.07	3.00*	.07	2.98*	.07	3.01*	.07
Regulatory Focus by Age			.36	1.85	.78	.28	.68	.30	.22	.49	.18	.52
Form by Age			.99	.39	3.50*	.11	4.57**	.07	3.51*	.11	4.58	.07
Regulatory Focus by Form by Age					3.37*	42.41	3.78**	56.36	2.37	25.44	2.75*	34.74
Tenure as a Driver							.67	1.04			.36	1.03
Need for Cognition									1.02	.65	1.25	.61

Note: Dependent variable: Choice in reflection

***. Significant at the .01 level **. Significant at the .05 level *. Significant at the .10 level

Table 4.11
Summary Table for the Hypotheses

#	Hypothesized Relationships	
1	- Drivers with positive core self evaluations will manifest illusion of control and unrealistic optimism verification biases. - Drivers with negative core self evaluations will manifest perceived helplessness and unrealistic pessimism verification biases. - Drivers with mid-range core self evaluation will be least likely to manifest verification biases.	
	Illusion of control verification bias	~S
	Unrealistic optimism verification bias	ns
2	- Drivers who are high in their chronic prevention regulatory focus will manifest framing bias in traffic related circumstances. - Drivers who are high in their chronic promotion regulatory focus will manifest reversed framing bias in traffic related circumstances. - Drivers who are either high or low on both regulatory foci will manifest neither framing nor reversed framing biases in traffic related circumstances.	
	Goal framing bias	ns
	Risky choice framing bias	~S
	Reflection bias	ns
3	- Among people with promotion focus, older drivers will be more likely to show reversed framing bias compared to younger drivers. - Among people with prevention focus, older drivers will be more likely to show framing bias compared to younger drivers.	
	Goal framing bias	ns
	Risky choice framing bias	ns
	Reflection bias	ns

Note: S = Supported, ns = Not supported, ~S= Partially supported

4.3 Post-hoc Analyses

Traffic Related Behaviors

The relationship between driving related behaviors and variables of the study are analyzed. The aim of these analyses was to see whether driving patterns are associated with drivers' individual differences. Table 4.12 presents the correlations between core self evaluations, verification biases (i.e. illusion of control, unrealistic optimism), regulatory focus (i.e. prevention focus, promotion focus) and years of driving, tenure as a taxi driver, kilometers driven per week, speeding rate, safety skills, perceptual motor skills, driving violations, overtaking behavior, being complained by others, number of accidents participants had in the last five year. Results show that there is a significant relationship between regulatory focus and overtaking behavior. Drivers who have higher promotion score display more overtaking behavior than the number of being overtaken in traffic. Furthermore, there is weak significant relation between unrealistic optimism and overtaking behavior. Drivers who have unrealistic pessimism display more overtaking behavior than the number of being overtaken in traffic. There is a significant relationship between prevention focus and safety skills. Drivers who have higher chronic prevention focus have better safety skills. There is no significant relationship found between driving related behaviors and, core self evaluations and illusion of control verification bias

Table 4.12

Correlations Table for the Variables of Study and Driving Related Behaviors

	Core Self Evaluation	Illusion of Control (No Control)	Illusion of Control (Some Control)	Unrealistic Optimism	Promotion	Prevention	Need for Cognition
Years of Driving	.00	-.11	-.14	-.06	.05	-.09	-.15
Tenure as a Taxi Driver	.07	.03	-.01	-.05	.07	-.07	-.10
Km Driven per Week	.01	.01	.04	.04	.21	-.16	-.10
Speeding Rate in Residential Road (km)	.10	.04	-.04	.00	.13	-.07	.05
Safety Skills	.02	-.02	.00	.02	-.14	.21	-.08
Perceptual Motor Skills	.08	-.03	-.08	.10	.00	-.03	.03
Driving Violations	-.08	.07	.10	.01	.10	-.07	.00
Overtaking †	-.12	-.00	.04	.19	.23	-.24	-.06
Number of Complaints ‡	-.11	.03	.03	.13	.07	-.16	.01
Number of Accidents in the Last 5 Years	-.11	.01	.09	.06	-.05	.03	-.04

Note: $|r| \geq .21$ Correlation is significant at the 0.01 level (2-tailed), $.16 \leq |r| < .21$ Correlation is significant at the 0.05 level (2-tailed).

†.Overtaking coding is as follows: Overtaking < Being Overtaken =1, Overtaking = Being Overtaken =2, and Overtaking > Being Overtaken=3

‡ Complaints about His Driving Behaviors by Others in the Last Three Months

Furthermore, the relationship between overtaking behavior and risky-choice framing and reflection bias manifestation of drivers is analyzed. Table 4.13a shows that drivers who display less overtaking behavior than the number of being overtaken in traffic do not manifest the risky choice framing bias, compared to drivers who display equal or more overtaking behavior than the number of being overtaken. Contingency coefficients for the drivers who display less overtaking behavior than the number of being overtaken, drivers whose overtaking behavior is equal to being overtaken, and drivers who display more overtaking behavior than the number of being overtaken are .051 (ns.), .279 ($p < .05$), and .343 ($p < .06$) respectively. The marginal significance level for the drivers who display more overtaking behavior than the number of being overtaken may be arising from the lower sample size of this group of drivers compared to other two groups.

Table 4.13b shows that only drivers who display more overtaking behavior than being overtaken manifest reflection bias. Contingency coefficients for the drivers who display less overtaking behavior than the number of being overtaken, drivers whose overtaking behavior is equal to being overtaken, and drivers who display more overtaking behavior than the number of being overtaken are .011 (ns.), .055 (ns.), and .439 ($p < .05$).

Table 4.13a

*Results from Cross Tabulation of Overtaking Behavior with the Risky Choice**Framing Bias Manifestation*

				Risky Choice Framing		
Overtaking Behavior				Sure Loss	Risky Choice	Total
Overtaking < Being Overtaken	Form	Loss frame	Count	18	16	34
			Expected Count	18.8	15.2	34.0
			% within form	52.9%	47.1%	100.0%
		Gain frame	Count	18	13	31
			Expected Count	17.2	13.8	31.0
			% within form	58.1%	41.9%	100.0%
	Total		Count	36	29	65
			Expected Count	36.0	29.0	65.0
			% within form	55.4%	44.6%	100.0%
Overtaking = Being Overtaken	Form	Loss frame	Count	9	12	21
			Expected Count	12.7	8.3	21.0
			% within form	42.9%	57.1%	100.0%
		Gain frame	Count	23	9	32
			Expected Count	19.3	12.7	32.0
			% within form	71.9%	28.1%	100.0%
	Total		Count	32	21	53
			Expected Count	32.0	21.0	53.0
			% within form	60.4%	39.6%	100.0%
Overtaking > Being Overtaken	Form	Loss frame	Count	4	13	17
			Expected Count	6.3	10.7	17.0
			% within form	23.5%	76.5%	100.0%
		Gain frame	Count	6	4	10
			Expected Count	3.7	6.3	10.0
			% within form	60.0%	40.0%	100.0%
	Total		Count	10	17	27
			Expected Count	10.0	17.0	27.0
			% within form	37.0%	63.0%	100.0%

Table 4.13b

*Results from Cross Tabulation of Overtaking Behavior with the Reflection Bias**Manifestation*

Overtaking Behavior				Reflection Choice		Total
				Sure Loss	Risky Choice	
Overtaking < Being Overtaken	Form	Loss frame	Count	24	12	36
			Expected Count	24.2	11.8	36.0
			% within form	66.7%	33.3%	100.0%
		Gain frame	Count	21	10	31
			Expected Count	20.8	10.2	31.0
			% within form	67.7%	32.3%	100.0%
	Total		Count	45	22	67
			Expected Count	45.0	22.0	67.0
			% within form	67.2%	32.8%	100.0%
Overtaking = Being Overtaken	Form	Loss frame	Count	14	7	21
			Expected Count	14.7	6.3	21.0
			% within form	66.7%	33.3%	100.0%
		Gain frame	Count	23	9	32
			Expected Count	22.3	9.7	32.0
			% within form	71.9%	28.1%	100.0%
	Total		Count	37	16	53
			Expected Count	37.0	16.0	53.0
			% within form	69.8%	30.2%	100.0%
Overtaking > Being Overtaken	Form	Loss frame	Count	5	12	17
			Expected Count	8.2	8.8	17.0
			% within form	29.4%	70.6%	100.0%
		Gain frame	Count	8	2	10
			Expected Count	4.8	5.2	10.0
			% within form	80.0%	20.0%	100.0%
	Total		Count	13	14	27
			Expected Count	13.0	14.0	27.0
			% within form	48.1%	51.9%	100.0%

Cognitive Style and Bias Manifestation

The relationship between need for cognition and risky choice framing and reflection bias manifestation of participants is analyzed. Table 4.14a shows that only drivers with lower need for cognition manifest risky choice framing bias.

Contingency coefficients for the drivers with low, moderate and high need for cognition scores are .456 ($p < .001$), .051 (ns.), and .080 (ns.) respectively.

On the other hand, table 4.14b shows that participants with neither low nor high need for cognition scores display reflection bias. Contingency coefficients for the drivers with low, moderate and high need for cognition scores are .165 (ns.), .123 (ns.), and .100 (ns.) respectively.

Table 4.14a

Results from Cross Tabulation of Need for Cognition with the Risky Choice Framing

Bias Manifestation

Need For Cognition				Risky Choice		
				Sure Loss	Risky Choice	Total
Low	Form	Loss frame	Count	9	21	30
			Expected Count	15.6	14.4	30.0
			% within form	30.0%	70.0%	100.0%
		Gain frame	Count	18	4	22
			Expected Count	11.4	10.6	22.0
			% within form	81.8%	18.2%	100.0%
		Total	Count	27	25	52
			Expected Count	27.0	25.0	52.0
			% within form	51.9%	48.1%	100.0%
Moderate	Form	Loss frame	Count	9	8	17
			Expected Count	8.5	8.5	17.0
			% within form	52.9%	47.1%	100.0%
		Gain frame	Count	11	12	23
			Expected Count	11.5	11.5	23.0
			% within form	47.8%	52.2%	100.0%
		Total	Count	20	20	40
			Expected Count	20.0	20.0	40.0
			% within form	50.0%	50.0%	100.0%
High	Form	Loss frame	Count	13	12	25
			Expected Count	14.1	10.9	25.0
			% within form	52.0%	48.0%	100.0%
		Gain frame	Count	18	12	30
			Expected Count	16.9	13.1	30.0
			% within form	60.0%	40.0%	100.0%
		Total	Count	31	24	55
			Expected Count	31.0	24.0	55.0
			% within form	56.4%	43.6%	100.0%

Table 4.14b

Results from Cross Tabulation of Need for Cognition with the Reflection Bias

Manifestation

Need for Cognition				Reflection Choice		
				Sure Loss	Risky Choice	Total
Low	Form	Loss frame	Count	18	14	32
			Expected Count	20.1	11.9	32.0
			% within form	56.3%	43.8%	100.0%
		Gain frame	Count	16	6	22
			Expected Count	13.9	8.1	22.0
			% within form	72.7%	27.3%	100.0%
	Total		Count	34	20	54
			Expected Count	34.0	20.0	54.0
			% within form	63.0%	37.0%	100.0%
Moderate	Form	Loss frame	Count	9	8	17
			Expected Count	10.2	6.8	17.0
			% within form	52.9%	47.1%	100.0%
		Gain frame	Count	15	8	23
			Expected Count	13.8	9.2	23.0
			% within form	65.2%	34.8%	100.0%
	Total		Count	24	16	40
			Expected Count	24.0	16.0	40.0
			% within form	60.0%	40.0%	100.0%
High	Form	Loss frame	Count	16	9	25
			Expected Count	17.3	7.7	25.0
			% within form	64.0%	36.0%	100.0%
		Gain frame	Count	22	8	30
			Expected Count	20.7	9.3	30.0
			% within form	73.3%	26.7%	100.0%
	Total		Count	38	17	55
			Expected Count	38.0	17.0	55.0
			% within form	69.1%	30.9%	100.0%

Chapter 5

DISCUSSION

This study examines whether some people are more prone to be biased and whether individual differences explain such proneness (Oreg & Bayazit, 2005). More specifically, the goal of this study is to examine the role of individual differences in age, in regulatory focus, in core self-evaluations and in cognitive style in the manifestation of biases in perception and choice.

This study specifically addresses three biases: illusion of control, unrealistic optimism and framing bias. To examine which characteristics are the indicators of committing these biases, perceptions and choices in traffic related situations are investigated. Cross-tabulation and logistic regression analyses are used in order to analyze data collected from 150 professional taxi drivers.

5.1 Summary and Discussion of Findings

It has been suggested that individuals with positive core self evaluations are likely to manifest verification biases such as illusion of control and unrealistic optimism. On the other hand, individuals with negative core self evaluations are likely to manifest verification biases such as perceived helplessness, and unrealistic

pessimism. And individuals with mid-range core self evaluations will be least likely to exhibit verification biases. Analyses did not support the predicted relationship between unrealistic optimism and core self evaluations. On the other hand, results provided partial support for the predicted relationship between core self evaluations and illusion of control verification bias. Although most of the taxi drivers demonstrated illusion of control, participants with negative core self evaluations showed more learned helplessness and less illusion of control compared to drivers with positive core self evaluations. And majority of the participants showing no bias of illusion of control and learned helplessness had mid-range core self evaluations. These results show that individuals with different views of themselves differ in perceptions of their control over mostly uncontrollable traffic accidents.

The lack of support for the hypothesized relationship between core self-evaluations and unrealistic optimism can be explained by the nature of the bias. Unrealistic optimism is not only related to individual perceptions about the self but also related to how people perceive their environment and other people. For example, individuals who rated their likelihood of being in an accident due to a puncture in the tire as lower than an average person may believe that such an event is unlikely in the real world. Such specific beliefs may be a manifestation of the broader belief in a just and benevolent world compared to an unjust and malevolent world. These basic beliefs about the world are suggested to be a part of individual differences in core evaluations of reality (Judge et al., 1997). Individuals with negative evaluations of the reality believe that the world is generally a hostile, unjust and dangerous place. It might very well be it is this group of people, not those with

negative core self-evaluations, who are more likely to perceive negative events such as accidents as waiting to happen.

Hypotheses 2a, 2b and 2c suggested that regulatory focus of individuals will influence framing bias manifestation. Three types of framing manipulation and a reflection manipulation were created using scenarios to measure biases. The types of framing were attribute framing in which participants who are professional drivers had to choose to use or not to use a brand of tire depending on its description of a characteristics; goal framing in which participants had to choose to speed or not to speed given the conditions described in the scenario; and risky choice framing and reflection bias scenarios in which participants had to choose the sure or risky (i.e. in terms of gaining or loosing time) alternative between two routes. It has been predicted that individuals with prevention regulatory focus will manifest goal and risky choice framing biases, whereas individuals with promotion focus will manifest reversed goal and risky choice framing biases; and individuals without a distinct regulatory focus (high or low in both foci) will be less likely to manifest framing or reversed framing biases.

The effect of regulatory focus on attribute framing is examined for exploratory purposes. As expected results revealed no significant relationship between regulatory focus of drivers and their attribute framing, goal framing and reflection bias manifestations. In attribute framing, drivers did not differ in terms of their regulatory focus orientation in bias manifestation; the significant majority of all the participants exhibited attribute framing bias (i.e. chose to use the tire when its

characteristics was described using positive phrasing and did not choose to use the tire when the same characteristic of it was described with negative phrasing). A reason for the insignificant relationship between regulatory focus and attribute framing bias is that attribute framing is a very powerful effect with a very large effect size (Levin et al., 1998; Levin et al., 2002). This finding support that this particular framing bias is an ubiquitous phenomenon not conditional on individual differences.

The predicted relationship between regulatory focus and goal framing effect was not supported by the findings. Meta analysis done by Levin et al. (1998, Levin et al., 2002) shows that goal framing has a low effect size, and inconsistent effects in the literature. Similarly, there was no goal framing effect in this study. This suggests that goal framing effect is probably moderated by a third variable. However, results show that this variable was not regulatory focus. Future research should focus on the personal and contextual factors that might be responsible on irregularities in the goal framing effect.

Regulatory focus was not related to reflection effect. A reason behind this insignificant finding may be that the scenario constructed were too complex for the participant and therefore low in construct validity.. The scenario of reflection manipulation gives information about the probability percentages of gaining vs. loosing time to let the participants choose between the two alternative roads. Probability percentages may not be easily cognitively processed by most taxi drivers due to their limited time to answer the survey and their low level of education.

Results partially supported the predicted relationship with only risky choice framing bias. It is found that prevention focused drivers exhibited risky choice framing bias whereas promotion focused drivers did not exhibit this bias. However, this relationship is supported only by the analyses done with the median split recoding of the regulatory focus variable. The analyses done with the more conservative recoding of the regulatory focus variable do not support the predicted hypothesis. These two poles-apart results with the two different recoding of regulatory focus variable point up that this result is not very stable. The possible reason for this unstable result may be the sample size. The relatively small sample size of promotion focused individuals in the latter more conservative operationalization of regulatory focus decrease the power of the statistical analyses.

Hypotheses 3a and 3b suggested an interaction of age and regulatory focus on framing bias manifestation. It is argued that older drivers will be more prone to manifest this bias because people think more cognitively economical as they get older. Therefore it is suggested that among drivers with promotion focus, older drivers will be more likely to show reversed framing bias compared to younger adults; and among drivers with prevention focus, older drivers will be more likely to show framing bias compared to younger drivers. These predictions are explained by the change in the need for cognition of older drivers. However, it is predicted that there will not be a significant difference in cognitive style reports of older and younger drivers because the change in cognitive style is not conscious. On the other hand, it is argued that experience may be responsible of the change in processing of older adults since it may be operating preconsciously in older adults judgments.

Results show that there is no significant effect of interaction of age and regulatory focus on goal framing, risky choice framing and reflection bias manifestation. A reason for the insignificant relationships may be similar to the reasons of the insignificant findings of the previous hypothesis. Goal framing and reflection bias scenarios may not be well constructed. Another reason may be the sample size which may not provide adequate level of power for the test of the interaction effects. Moreover, another limitation is that young adults were compared to middle-age adults as the older group. Because the participants were taxi drivers, there were few participants from the older group (i.e. over 65 years old). If the comparison were made between the young adults and old adults, expected results could be obtained. On the other hand, it is found a marginally significant effect of age on risky choice framing. According to results, older adults are more likely to manifest risky choice framing bias. This result suggests that older people are more prone to bias manifestation regardless of their regulatory focus. This relationship between age and framing effect ceases to be significant when driving experience of participants is controlled in the equation. However, controlling for participants' level of need for cognition does not change the relationship. Together these results support the predicted causal mechanism of the relationship between age and bias manifestation. Experience explains, whereas need for cognition does not, why middle-aged people are more likely to exhibit framing bias compared to young adults. The post-hoc analysis of the relationship between need for cognition and framing bias manifestation reveals that only drivers with lower need for cognition manifest risky-choice framing bias. This result demonstrates that cognitive style influences heuristical reasoning although it did not explain the age differences on bias

manifestation. The controversial findings stresses the importance of further, especially longitudinal, studies investigating the causal mechanism behind age differences on bias manifestation.

Furthermore, post-hoc analyses show that there are significant relationships between driving related behaviors and the individual differences variables of study. There is an expected positive relationship between driving safety skills and chronic prevention focus of drivers showing that prevention focused individuals have better safety skills in traffic. This finding enlightens a new individual difference variable which relates to the safe driving behavior. Moreover, post-hoc analysis of the overtaking behavior and framing effect shows that only drivers whose overtaking behavior is more than being overtaken manifest risky-choice framing and reflection biases. This finding shows that drivers who are more prone to heuristical decision making in traffic, also manifest overtaking behavior more. Frequent overtaking behavior in traffic may sometimes be the main cause of traffic accidents. This finding demonstrates that this behavior may also be explained by the heuristical processing of drivers.

5.2 Methodological Considerations

5.2.1 Instruments

The present study aimed to take an individual differences perspective to the investigation of the predictors of bias manifestation in traffic related contexts. To

assess framing bias, scenarios related to traffic situations are used. Although the goal framing scenario is adapted from Millar and Millar's (2000) study, the other scenarios are created by the author. The scenario of attribute framing bias is created similar to the Levin and Gaeth's (1988) famous attribute framing scenario example (e.g. a brand of meat being 80% lean vs. 20% fat). When constructing the risky choice and reflection scenarios, the scenarios used by Katsikopoulos et al. (2000) were the source of inspiration. The scenarios used by Katsikopoulos et al. (2000) were additionally used in an experimental design using simulators. The scenarios used in this study are created convenient to the self report method. It might be argued that an assessment of framing bias in traffic related situations with a driving simulator would increase the internal validity of the study. Unfortunately, the present study was carried out with time and budget limitations and therefore relied solely on paper based self reports of drivers. It might be argued that reliance on paper based report of behaviors in traffic situations may decrease the validity of the study since drivers' responses may be biased and an assessment with a simulator may provide more valid data. However, the assessment with a simulator could have its own disadvantages such as behaving unusually due to the feelings of playing a game with a machine.

Another methodological consideration is the use of Schwartz's Portrait Questionnaire (Schwartz et al., 1999) to measure regulatory focus of participants as it is used in Kluger et al.'s (2001) study. Items of security, conformity and tradition are used to measure prevention focus and items of stimulation, self-direction and hedonism are used to measure promotion focus of the participants. However, the

number of participants with promotion focus was very low compared to the prevention oriented participants. The range restriction in these variables probably decreased the power of statistical analyses. The reason behind range restriction in promotion focus variable may be the traditional values prominent in Turkish cultural context, especially within low SES groups such as taxi drivers. Turkish culture tend to emphasize values such as conformity and security more than autonomy and hedonism compared to Western cultures (Schwartz, 1994; Kuşdil & Kağıtçıbaşı, 2000; Markus & Kitayama, 1991). Another concern with this measure is that participants showed response tendencies in their responses to this measure. Most of them reported the most values are important to them. In order to correct this tendency, mean centering method is used as suggested by Schwartz (2004). However, this method might be somewhat conservative and provide an overcorrection to the problem.

5.2.2 Sample Size and Characteristics

An important limitation is the method of sampling used. Convenience sampling is used for data collection which limits the generalization of the results to the general population of taxi drivers. Another consideration is the relatively small sample size of promotion focused drivers which decreased the power of the statistical analyses. Especially, the logistic regression analyses may have revealed stronger effect sizes if conducted with a larger sample size. A third limitation of the sample is that to test the age-related hypotheses, younger adults could only be compared to middle-age adults. Because the participants were taxi drivers, the older group (i.e.

over 65 years old) was very few in numbers and was not able to understand and complete the questionnaire due to their age.

Another limitation of the data arises from the sample characteristic. Because the education level of taxi drivers was low, they experienced difficulties in understanding and completing the survey. Moreover, the time to be spend to complete this long survey was too long (i.e. at least 45 minutes) for their attention range of time.

5.2.3 Limitations of Design

This study presented used a cross-sectional design to test the age differences hypotheses. However, cross-sectional designs do not allow us to understand the causal mechanism behind the age differences on bias manifestation. It does not allow making certain predictions about which factors are the predictors of the relationship between age and bias manifestation.

5.3 Future Directions and Conclusion

This study investigates the role of individual differences on bias manifestation. Biases in traffic related situations are examined to investigate the predicted relationships. Hypotheses should be further studied in other contexts to see the generalizability of the results. Furthermore, the method used to test the age differences on bias manifestation was cross-sectional. However, longitudinal studies

should be carried out in order to understand the causal mechanism behind the change in bias manifestation.

The present study may be replicated in different cultures to see the cross-cultural variability in bias manifestation. Differences in self serving bias manifestation across cultures have been shown by research (Heine et al., 1999). The relationship between core self evaluations and self enhancing biases such as unrealistic optimism needs further examination in other cultures to see if the predicted relationships are valid across cultures. The results showed that differences in personality may affect biases in perception and choice. Some people may be more prone to be biased based on their traits. Although not all the predicted relationships were supported, this study allows us to consider biases as subject to individual differences rather than as a universal phenomenon. Moreover, the marginally significant effect of age on risky choice framing bias points up that there may be a developmental trend on bias manifestation. However, the reason of this possible trend should be more clearly examined in longitudinal studies in the future.

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APPENDICES

Appendix A

Bias categorization by pursued end-state and the corresponding individual difference variable

	Verification Biases - Achieving Coherence	
Core Evaluations	Positive Evaluations	Self-serving bias Unrealistic self-view False consensus Illusions of Control Unrealistic Optimism Overconfidence
	Negative Evaluations	Self-diminishment Perceived Helplessness Unrealistic pessimism Underconfidence
	Simplification Biases – Comprehending Reality	
Cognitive Style and Ability	Insensitivity to base rates Insensitivity to sample size Misconceptions of chance Regression to the mean The conjunction fallacy	
	Regulation Biases – Approaching Pleasure & Avoiding Pain	
Chronic Regulatory Focus	Promotion Focus	Escalation of commitment Inaction regret avoidance Reversed Framing bias Reversed Endowment effect
	Prevention Focus	Escalation of commitment Framing bias Endowment effect Action regret avoidance Category response bias

Appendix B

Turkish Version of the Questionnaire

Merhaba,

Bu anket Koç Üniversitesi Psikoloji Bölümü bitirme tezim için benim tarafımdan hazırlanmıştır. Anket sürücülerin trafikteki davranışlarını etkileyen faktörleri araştırmak amacıyla oluşturulmuştur.

Bu araştırmaya katılımınız gönüllüdür. Anketten elde edilecek kişisel bilgiler, yalnızca bilimsel amaçlarla kullanılacak, kesinlikle hiç bir kişi veya kurumla paylaşılmayacaktır.

Anketin cevaplanmasında süre kısıtlaması yoktur. Hiç bir sorunun doğru ya da yanlış cevabı yoktur. Sizin içtenlikle vereceğiniz cevaplar bizim için en yararlı olanlardır. Lütfen her soruyu dikkatle okuyunuz ve hiç bir soruyu yanıtsız bırakmayınız.

Çalışmama yaptığınız katkı benim için çok değerlidir. Bu anketi doldurmak için zaman ayırdığınız için teşekkür ederim.

Saygılarımla,

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Örnek Soru:

Anketi nasıl doldurmanız gerektiği aşağıdaki örnekte gösterilmektedir.

Genel olarak utangaç bir insanım	4
----------------------------------	---

1	2	3	4	5
Bu cümle tamamen bana aykırı	Bu cümle bana biraz aykırı	Bu cümle bana ne aykırı ne uygun	Bu cümle bana biraz uygun	Bu cümle tamamen beni anlatıyor

Örneğin, eğer cümlenin size biraz uygun olduğunu düşünüyorsanız cevap olarak 4 yazabilirsiniz

Kaç Yaşındasınız: _____

BÖLÜM 1. Aşağıdaki maddelerde bazı insanların kendilerini nasıl tanımladıkları yazılıdır. Lütfen her bir tanımdaki anlatılan kişinin size ne derece benzediğini ya da benzemediğini aşağıdaki ölçeği kullanarak değerlendiriniz.

Bana hiç benzemiyor	Bana benzemiyor	Bana pek benzemiyor	Bana biraz benziyor	Bana benziyor	Bana çok benziyor
1	2	3	4	5	6

1. Yeni fikirler bulmak ve yaratıcı olmak onun için önemlidir. İşleri kendine özgü, orijinal yollarla yapmaktan hoşlanır.	
2. Onun için güvenli bir çevrede yaşamak önemlidir. Güvenliğini tehlikeye sokabilecek her şeyden kaçınır.	
3. Hayatta pek çok farklı şey yapmanın önemli olduğunu düşünür. Her zaman deneyecek yeni şeyler arar.	
4. İnsanların kendilerine söylenenleri yapmaları gerektiğine inanır. İnsanların her zaman, hatta başkaları izlemiyorken bile, kurallara uymaları gerektiğini düşünür.	
5. Sahip olduğundan daha fazlasını istememek önemli diye düşünür. İnsanların sahip olduklarıyla yetinmeleri gerektiğine inanır.	
6. Eğlenmek için her fırsatı kollar. Zevk veren şeyleri yapmak onun için önemlidir.	
7. Yaptığı işler hakkında kendi başına karar vermek onun için önemlidir. Faaliyetlerini seçip planlarken özgür olmaktan hoşlanır.	
8. Ülkesinin güvende olması onun için çok önemlidir. Devletin içeriden ve dışarıdan gelebilecek tehditlere karşı uyanık olması gerektiğini düşünür.	
9. Risk almaktan hoşlanır. Her zaman macera peşinde koşar.	
10. Dini inanç onun için önemlidir. Dinin gereklerini yerine getirmek için çok çaba harcar.	
11. Eşyaların düzenli ve temiz olması onun için önemlidir. Ortalığın dağınık ve kirli olmasından hiç hoşlanmaz.	
12. Her şeyle ilgili olmanın önemli olduğunu düşünür. Herşeyi merak etmekten ve anlamaya çalışmaktan hoşlanır.	
13. İşleri geleneksel yollarla yapmanın en iyisi olduğunu düşünür. Öğrendiği gelenek ve görenekleri devam ettirmek onun için önemlidir.	
14. Hayattan zevk almak onun için önemlidir. Kendisini “şımartmaktan” hoşlanır.	
15. Ana-babasına ve yaşlı insanlara her zaman saygı göstermesi gerektiğine inanır. Onun için itaatkar olmak önemlidir.	
16. Sürprizlerden hoşlanır. Heyecan verici bir yaşamının olması onun için önemlidir.	
17. Hastalanmaktan kaçınmak için çok çaba gösterir. Sağlıklı olmak onun için çok önemlidir.	
18. Bağımsız olmak onun için önemlidir. Kendi ayakları üzerinde durmak ister.	
19. İstikrarlı bir hükümetin olması onun için önemlidir. Sosyal düzenin korunması konusunda endişelenir.	
20. Başkalarına karşı her zaman nazik olmak onun için önemlidir. Başkalarını hiçbir zaman rahatsız veya huzursuz etmemeye çalışır.	
21. Hayattan zevk almayı gerçekten ister. İyi zaman geçirmek onun için çok önemlidir.	
22. Alçakgönüllü ve kibirsiz olmak onun için önemlidir. Dikkatleri üzerine çekmemeye çalışır.	

BÖLÜM 2. Lütfen soruyu dikkatlice okuduktan sonra o maddeyi aşağıda verilen ölçeği kullanarak cevaplayınız.

Yapılan yol tutuş testlerine göre A marka lastiğin virajlarda dengesinin %80 olduğu görülmüştür.

Sizin gelecekte A lastiğini kullanma olasılığınız nedir?

1	2	3	4	5
Geçmişte olduğundan çok daha az	Geçmişte olduğundan daha az	Geçmişte olduğu kadar	Geçmişte olduğundan fazla	Geçmişte olduğundan çok daha fazla

BÖLÜM 3. Lütfen soruyu dikkatlice okuduktan sonra sorulan soruya evet veya hayır olarak cevap veriniz.

Bir yere zamanında varmanız gerekiyor. Fakat bunun için aracı normal hızınızın üzerinde kullanmanız gerekiyor.

Ancak alışık olduğunuz normal hızınızda kullanırsanız acil bir durumda fren yapabilmek için zaman kazanırsınız. İyi bir sürücü kaydınız olur. Ve aracın sigortası için indirim kazanma fırsatı yakalarsınız. Ayrıca normal hızınızın üzerine çıkmamak daha uzun yaşamınıza olanak sağlar.

Böyle bir durumda siz normalde gittiğiniz hızın üzerine çıkar mısınız?

A) Evet

B) Hayır

BÖLÜM 4. Lütfen soruyu dikkatlice okuduktan sonra o maddeyi verilen ölçeği kullanarak cevaplayınız.

Varsayınız ki normalde iş yerinize 100 dakikada A yolundan gidiyorsunuz. Fakat A yolu kapalı olduğu için bugün alternatif 2 yol olan B ya da C yolları arasında tercih yapmanız gerekiyor.

B yolundan giderseniz iş yerinize tam olarak 80 dakikada varacaksınız.

C yolundan giderseniz iş yerinize varma süreniz 50 ile 130 dakika arasında değişebilir.

Hangi yolu kullanırdınız?

B yolunu mu, C yolunu mu? Cevabınız: ____

Eğitim durumunuz nedir? Lütfen bir tanesini işaretleyiniz.

☐ İlkokul mezunu ☐ Ortaokul mezunu ☐ Lise mezunu ☐ Üniversite

Ehliyetinizi kaç yılında aldınız? _____

Kaç yıldır aktif olarak araç kullanıyorsunuz? _____

Kaç senedir taksi şoförlüğü yapıyorsunuz? _____

Haftada yaklaşık olarak kaç kilometre araç kullanıyorsunuz? _____ km

Bir yılda ortalama olarak kaç kilometre yaparsınız? _____ km

BÖLÜM 5. Lütfen her maddeyi dikkatlice okuduktan sonra o maddede yazanın size göre ne derece doğru veya yanlış olduğunu aşağıda verilen ölçeği kullanarak değerlendiriniz.

1	2	3	4	5
Tamamen Yanlış	Yanlış	Ne doğru Ne Yanlış	Doğru	Tamamen Doğru

1. Hayatta hak ettiğim başarıyı yakaladığıma eminim.	
2. Bazen kendimi depresyonda hissedirim.	
3. Uğraştığım zaman genelde başarıyorum.	
4. Bazen başarısız olduğumda kendimi değersiz hissedirim.	
5. İşleri başarıyla tamamlarım.	
6. Bazen kendimi işime hakim hissetmiyorum.	
7. Genel olarak, kendimden memnunum.	
8. Yeteneklerimle ilgili şüphe duyuyorum.	
9. Hayatımda ne olacağını ben belirlerim.	
10. Meslek yaşamımdaki başarımların kontrolünün elimde olmadığını hissediyorum.	
11. Sorunlarımın çoğuyla başa çıkabilirim.	
12. Bazı zamanlar var ki her şey bana karamsar ve ümitsiz gözükür.	

BÖLÜM 6. Lütfen her maddeyi dikkatlice okuduktan sonra o maddede yazanın size ne derece uygun veya aykırı olduğunu aşağıda verilen ölçeği kullanarak değerlendiriniz.

1	2	3	4	5
Bu cümle tamamen bana aykırı	Bu cümle bana biraz aykırı	Bu cümle bana ne aykırı ne uygun	Bu cümle bana biraz uygun	Bu cümle tamamen beni anlatıyor

1. Karmaşık problemleri basit problemlere yeğlerim.	
2. Çok düşünmeyi gerektiren bir işin sorumluluğunu almak hoşuma gider.	
3. Düşünmek benim için bir eğlence biçimi değildir.	
4. Düşünme yeteneğimi zorlayacak bir şey yapmaktansa, az düşünmeyi gerektirecek şeyleri tercih ederim.	
5. Bir mesele hakkında derin düşünmemi gerektirecek durumları önceden sezip, onlardan uzak durmaya çalışırım.	
6. Bir sorunu kafamda uzun süre yoğun bir biçimde tartışmak hoşuma gider.	
7. Sadece durumun gerektirdiği kadar derin düşünürüm.	
8. Uzun süreli işlere kafa yormaktansa, küçük, günlük meseleler hakkında düşünmeyi yeğlerim.	
9. Nasıl yapıldığını öğrendikten sonra fazla düşünmeyi gerektirmeyecek işleri tercih ederim.	
10. İşimde, düşünme yeteneğime güvenerek yükselme fikri bana çekici gelir.	
11. Sorunlara yeni çözümler bulmayı gerektiren işler bana gerçekten zevk verir.	
12. Yeni düşünce biçimleri öğrenmek bana pek heyecan vermez.	
13. Yaşamımın çözmem gereken bulmacalarla dolu olmasını yeğlerim.	
14. Soyut düşünme eylemi bana çekici gelir.	
15. Orta önemde, fazla düşünce gerektirmeyen bir iş yapmaktansa, kafa çalıştırmamı gerektiren, zor ve önemli bir işi tercih ederim.	
16. Çok zihinsel çaba gerektirmiş bir işi tamamlayınca tatminden ziyade rahatlama duygusu hissedirim.	
17. Bence bir nesnenin kendisinden beklenen işi görmesi önemlidir, işi nasıl ve neden gördüğü benim ilgimi çekmez.	
18. Kişisel olarak beni etkilemeleri söz konusu olmasa bile bir çok değişik konuda düşünürüm.	

BÖLÜM 11. Aşağıda verilen davranışları ne sıklıkta gösterirsiniz ? Lütfen her bir madde için verilen davranışa ne sıklıkta başvurduğunuzu belirtiniz. Soruları, nasıl araç kullandığınızı düşünerek cevaplandırınız ve her bir soru için sizi tam olarak yansıtan cevabı yanındaki kutuya yazınız

1	2	3	4
Hiç bir zaman	Bazen	Sık sık	Her zaman

1.	Başka bir sürücüyü uyarmak için korna çalmak	
2.	Kavşağa çok hızlı girip geçiş üstünlüğü olan aracı durmak zorunda bırakmak	
3.	Şehir içi yollarda hız sınırını aşmak	
4.	Sola dönüş sinyali veren bir aracın sinyalini fark etmeyip onu sollamaya çalışmak	
5.	Trafikte sinirlendiğiniz bir sürücüyü takip edip ona haddini bildirmeye çalışmak	
6.	Otoyolda ileride kapanacak bir şeritte son ana kadar ilerlemek	
7.	Solda yavaş giden bir aracın sağından geçmek	
8.	Trafik ışığında en hızlı hareket eden araç olmak için yandaki araçlarla yarışmak	
9.	Acil bir durumda duramayacak kadar, öndeki aracı yakın takip etmek	
10.	Trafik ışıkları sizin yönünüze kırmızıya döndüğü halde kavşaktan geçmek	
11.	Bazı tip sürücülere kızgın olmak (illet olmak) ve bu kızgınlığı bir şekilde onlara göstermek	
12.	Otobanda hız limitlerini dikkate almamak	
13.	Yol kenarına, kısa süreli de olsa yolu kapatacak şekilde park etmek	
14.	Sizi sollamaya çalışan bir araca yol vermemek	
15.	Geçiş üstünlüğü olan araçlara yol vermemek	
16.	Öndeki giden araçları sağa geçmeleri için selektörle uyarmak	
17.	Sarı yanar yanmaz öndeki aracı korna ile uyarmak	
18.	Aşırı süratle sollama yapmak	

BÖLÜM 12.

Araç kullanmada güçlü ve zayıf yönleriniz nelerdir?

Doğal olarak, hepimizin araç kullanmada güçlü ve zayıf yönlerimiz vardır.

Lütfen sizin, bir sürücü olarak güçlü ve zayıf yönlerinizin neler olduğunu her bir madde için aşağıdaki seçeneklerden uygun olanını kullanarak belirtiniz.

1	2	3	4
Zayıf	Biraz Zayıf	Biraz güçlü	Güçlü

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

BÖLÜM 13. Aşağıda sürücülüğünüze ilişkin bazı sorular sorulmaktadır. Lütfen eksiksiz olarak cevap veriniz.

1) Hava ve yol koşulları uygun olduğunda şehir içi yollarda yaklaşık ortalama kaç kilometre hızla gidersiniz? _____ km

2) Normal bir seyahatinizde kendinizi diğer sürücülerle kıyasladığınızda yaptığınız sollamaların sayısı sollandığınıza oranla nedir? Uygun olan seçeneği işaretleyiniz.

Yaptığım sollamaların sayısı sollanmalarımın sayısına oranla:

- ☐ daha azdır
☐ hemen hemen eşittir
☐ daha fazladır

3) Son 3 ayda tanıdıklarınızdan, müşterilerinizden ya da ailenizden araba kullanmanızla ilgili ne kadar şikayet aldınız?

- A) Hiç almadım B) Bir kaç kez aldım C) 5-10 kez aldım D) Çok kez aldım

4) Son 5 yılda kaç kaza yaptınız?

- ☐ Hiç yapmadım ☐ 1 Kaza ☐ 2 Kaza ☐ 3 kaza ☐ 4 ya da daha fazla

5) Aşağıdaki kaza raporu formunu sadece son 5 yıl içinde kaza yapmış olanlar dolduracaktır.

Birden fazla kazanız varsa en ciddi 2 kazanızı dikkate alarak, her bir kaza için formları sırayla doldurunuz. Son 5 yıl içinde kaza yapmadıysanız bu bölümü doldurmayınız.

Birinci Kaza:

Kaza sonucunda araçtaki hasar düzeyi ne idi?

- ☐ Hiç hasar olmadı ☐ Az hasar ☐ Orta derecede hasar ☐ Çok hasar

Kaza sonucunda yaralanma veya can kaybı oldu mu?

- ☐ Olmadı ☐ Hafif yaralanma ☐ Yaralanma ☐ Ağır yaralanma ☐ Can kaybı

Kazanın gerçekleşme nedeni nelerdir? (bir tanesini işaretleyiniz)

- _____ Kazanın gerçekleşmesi tamamen benden kaynaklandı.
 _____ Kazanın gerçekleşmesi kısmen benden kısmen diğer nedenlerden kaynaklandı.
 _____ Kaza tamamen benim dışımdaki nedenlerden kaynaklandı.

İkinci Kaza:

Kaza sonucunda araçtaki hasar düzeyi ne idi?

- ☐ Hiç hasar olmadı ☐ Az hasar ☐ Orta derecede hasar ☐ Çok hasar

Kaza sonucunda yaralanma veya can kaybı oldu mu?

- ☐ Olmadı ☐ Hafif yaralanma ☐ Yaralanma ☐ Ağır yaralanma ☐ Can kaybı

Loss Frame Scenarios

BÖLÜM 2. Lütfen soruyu dikkatlice okuduktan sonra o maddeyi aşağıda verilen ölçeği kullanarak cevaplayınız.

Yapılan yol tutuş testlerine göre A marka lastiğin virajlarda denge kaybının %20 olduğu görülmüştür.

Sizin gelecekte A lastiğini kullanma olasılığınız nedir?

1	2	3	4	5
Geçmişte olduğundan çok daha az	Geçmişte olduğundan daha az	Geçmişte olduğu kadar	Geçmişte olduğundan fazla	Geçmişte olduğundan çok daha fazla

BÖLÜM 3. Lütfen soruyu dikkatlice okuduktan sonra sorulan soruya evet veya hayır olarak cevap veriniz.

Bir yere zamanında varmanız gerekiyor. Fakat bunun için aracı normal hızınızın üzerinde kullanmanız gerekiyor.

Ancak alışık olduğunuz normal hızınızda kullanmazsanız acil bir durumda fren yapabilmek için gereken zamanı kaybedersiniz. Kötü bir sürücü kaydınız olabilir. Ve aracın sigortası için indirim kazanma fırsatını kaybedersiniz. Ayrıca normal hızınızın üzerine çıkmak yaşam sürenizi kısaltabilir.

Böyle bir durumda siz normalde gittiğiniz hızın üzerine çıkar mısınız?

A) Evet

B) Hayır

BÖLÜM 4. Lütfen soruyu dikkatlice okuduktan sonra cevaplayınız.

Varsayınız ki normalde iş yerinize 100 dakikada A yolundan gidiyorsunuz. Fakat A yolu kapalı olduğu için bugün alternatif 2 yol olan B ya da C yolları arasında tercih yapmanız gerekiyor.

B yolundan giderseniz iş yerinize tam olarak 120 dakikada varacaksınız.

C yolundan giderseniz iş yerinize varma süreniz 70 ile 150 dakika arasında değişebilir.

Hangi yolu kullanırdınız?

B yolunu mu, C yolunu mu? **Cevabınız:** ____

BÖLÜM 8. Lütfen soruyu dikkatlice okuduktan sonra o maddeyi verilen ölçeđi kullanarak cevaplayınız.

Varsayınız ki iş yerinize gidiyorsunuz.

Seçtiğiniz yola bađlı olarak az veya çok zaman kaybedebilir ya da hiç zaman kaybetmeyebilirsiniz.

Eđer A yolunu seçerseniz 20 dakika kaybedeceksiniz.

Eđer B yolunu seçerseniz, % 60 olasılık ile 40 dakika kaybedebilir, fakat % 40 olasılıkla hiç zaman kaybetmeyebilirsiniz.

Hangi yolu seçerdiniz?

A yolunu mu, B yolunu mu? **Cevabınız:** ____

APPENDIX C

Table 6.1 Factor Loadings of Core Self Evaluations Measure

Item	Loadings		
	1	2	3
2 Bazen kendimi depresyonda hissederim.*	.530		
4 Bazen başarısız olduğumda kendimi değersiz hissederim.*	.563		
6 Bazen kendimi işime hakim hissetmiyorum.*	.557		
8 Yeteneklerimle ilgili şüphe duyuyorum.*	.549		
10 Meslek yaşamımdaki başarımların kontrolünün elimde olmadığını hissediyorum.*	.611		
12 Bazı zamanlar var ki her şey bana karamsar ve ümitsiz gözükür.*	.696		
3 Uğraştığım zaman genelde başarımlarım.		.752	
5 İşleri başarıyla tamamlarım.		.694	
7 Genel olarak, kendimden memnunum.		.518	
11 Sorunlarımın çoğuyla başa çıkabilirim.		.716	
1 Hayatta hak ettiğim başarıyı yakaladığıma eminim.†			-.614
9 Hayatımda ne olacağını ben belirlerim.†			.567

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

% Explained Variation for Factors 1, 2 and 3 are 19.4, 17.5, 10.7 respectively

* Reverse Coded

† Items are dropped in this study

Table 6.2 Factor Loadings of Regulatory Focus Measure

Item		Loadings	
		1	2
2	Onun için güvenli bir çevrede yaşamak önemlidir. Güvenliğini tehlikeye sokabilecek her şeyden kaçınır.	.437	
8	Ülkesinin güvende olması onun için çok önemlidir. Devletin içeriden ve dışarıdan gelebilecek tehditlere karşı uyanık olması gerektiğini düşünür. †	.556	
11	Eşyaların düzenli ve temiz olması onun için önemlidir. Ortalığın dağınık ve kirli olmasından hiç hoşlanmaz. †	.712	
17	Hastalanmaktan kaçınmak için çok çaba gösterir. Sağlıklı olmak onun için çok önemlidir.	.607	
19	İstikrarlı bir hükümetin olması onun için önemlidir. Sosyal düzenin korunması konusunda endişelenir. †	.518	
4	İnsanların kendilerine söylenenleri yapmaları gerektiğine inanır. İnsanların her zaman, hatta başkaları izlemiyorken bile, kurallara uymaları gerektiğini düşünür.	.711	
15	Ana-babasına ve yaşlı insanlara her zaman saygı göstermesi gerektiğine inanır. Onun için itaatkar olmak önemlidir. †	.655	
20	Başkalarına karşı her zaman nazik olmak onun için önemlidir. Başkalarını hiçbir zaman rahatsız veya huzursuz etmemeye çalışır. †	.469	
5	Sahip olduğundan daha fazlasını istememek önemli diye düşünür. İnsanların sahip olduklarıyla yetinmeleri gerektiğine inanır.	.547	
10	Dini inanç onun için önemlidir. Dinin gereklerini yerine getirmek için çok çaba harcar.	.530	
13	İşleri geleneksel yollarla yapmanın en iyisi olduğunu düşünür. Öğrendiği gelenek ve göreneklere devam ettirmek onun için önemlidir.	.552	
22	Alçakgönüllü ve kibirsiz olmak onun için önemlidir. Dikkatleri üzerine çekmemeye çalışır.	.536	
3	Hayatta pek çok farklı şey yapmanın önemli olduğunu düşünür. Her zaman deneyecek yeni şeyler arar.		.502
9	Risk almaktan hoşlanır. Her zaman macera peşinde koşar.		.529
16	Sürprizlerden hoşlanır. Heyecan verici bir yaşamının olması onun için önemlidir.		.766
6	Eğlenmek için her fırsatı kollar. Zevk veren şeyleri yapmak onun için önemlidir.		.656
14	Hayattan zevk almak onun için önemlidir. Kendisini “şımartmaktan” hoşlanır.		.592
21	Hayattan zevk almayı gerçekten ister. İyi zaman geçirmek onun için çok önemlidir.		.576
1	Yeni fikirler bulmak ve yaratıcı olmak onun için önemlidir. İşleri kendine özgü, orijinal yollarla yapmaktan hoşlanır.		.383
7	Yaptığı işler hakkında kendi başına karar vermek onun için önemlidir. Faaliyetlerini seçip planlarken özgür olmaktan hoşlanır.		.503
12	Her şeyle ilgili olmanın önemli olduğunu düşünür. Herşeyi merak etmekten ve anlamaya çalışmaktan hoşlanır.		.444
18	Bağımsız olmak onun için önemlidir. Kendi ayakları üzerinde durmak ister. †	.515	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

% Explained Variation for the Two Factors are 20.7 and 14.3 respectively

† Item was dropped in this study

Table 6.3 Factor Loadings of Need for Cognition Measure

Item	Loadings					
	1	2	3	4	5	6
4	Düşünme yeteneğimi zorlayacak bir şey yapmaktansa, az düşünmeyi gerektirecek şeyleri tercih ederim.	.840				
5	Bir mesele hakkında derin düşünmemi gerektirecek durumları önceden sezip, onlardan uzak durmaya çalışırım.	.658				
8	Çok zihinsel çaba gerektirmiş bir işi tamamlayınca tatminden ziyade rahatlama duygusu hissedirim.	.765				
9	Nasıl yapıldığını öğrendikten sonra fazla düşünmeyi gerektirmeyecek işleri tercih ederim.	.698				
10	İşimde, düşünme yeteneğime güvenerek yükselme fikri bana çekici gelir.		.699			
11	Sorunlara yeni çözümler bulmayı gerektiren işler bana gerçekten zevk verir.		.631			
16	Uzun süreli işlere kafa yormaktansa, küçük, günlük meseleler hakkında düşünmeyi yeğlerim.†		-.647			
7	Sadece durumun gerektirdiği kadar derin düşünürüm.		-.441	.351		
3	Düşünmek benim için bir eğlence biçimi değildir.†			-.789		
6	Bir sorunu kafamda uzun süre yoğun bir biçimde tartışmak hoşuma gider.			.586		
13	Yaşamımın çözmem gereken bulmacalarla dolu olmasını yeğlerim.			.479		
1	Karmaşık problemleri basit problemlere yeğlerim.†				-.781	
17	Bence bir nesnenin kendisinden beklenen işi görmesi önemlidir, işi nasıl ve neden gördüğü benim ilgimi çekmez.				.712	
14	Soyut düşünme eylemi bana çekici gelir.†					.843
18	Kişisel olarak beni etkilemeleri söz konusu olmasa bile bir çok değişik konuda düşünürüm.				.670	
2	Çok düşünmeyi gerektiren bir işin sorumluluğunu almak hoşuma gider.					.433
12	Yeni düşünce biçimleri öğrenmek bana pek heyecan vermez.					-.676
15	Orta önemde, fazla düşünce gerektirmeyen bir iş yapmaktansa, kafa çalıştırmamı gerektiren, zor ve önemli bir işi tercih ederim.					.590

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

† Items are dropped in this study

Table 6.4 Factor Loadings of the Driving Safety Inventory

Item	Loadings	
	1	2
1 Seri araç kullanma	.673	
2 Trafikte tehlikeleri görme	.549	
4 Kaygan yolda araç kullanma	.637	
5 İlerideki trafik durumlarını önceden kestirme	.666	
6 Belirli trafik ortamlarında nasıl hareket edileceğini bilme	.670	
7 Yoğun trafikte sık sık şerit değiştirme ‡†	.460	-.210
8 Hızlı karar alma	.592	
10 Aracı kontrol etme	.343	.523
12 Koşullara göre hızı ayarlama	.582	
13 Geriye kaçırmadan aracı yokuşta kaldırma	.547	
14 Yokuş hızını ayarlama	.633	
15 Sollama	.616	
19 Diğer sürücülerin hatalarını telafi edebilme	.423	
21 Dar bir yere geri geri park etme	.602	
3 Sabırsızlanmadan yavaş bir aracın arkasından sürme		.418
9 Sinir bozucu durumlarda sakin davranma		.566
11 Yeterli takip mesafesi bırakma		.791
16 Gerekğinde kazadan kaçınmak için yol hakkından vazgeçme		.140
17 Hız sınırlarına uyma		.739
18 Gereksiz risklerden kaçınma		.667
20 Trafik ışıklarına dikkatle uymak		.847

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

% Explained Variation for the Two Factors are 23.1 and 18.9 respectively

Items 1, 2, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 19, and 21 are perceptual-motor skills items, and items 3, 9, 11, 16, 17, 18 and 20 are safety skills items.

‡ Item was dropped in the original version of the scale.

† Item was dropped in this study.

Table 6.5 Factor Loadings of Illusion of Control Measure

Item	<i>Ortalama kabiliyete sahip bir taksi sürücüsüne oranla, kullandığınız aracın</i>	Loadings	
		1	2
1	buzda kaymasından kaynaklanan bir kazaya karışma olasılığınız nedir?	.741	
2	yoldaki yağdan kaynaklanan bir kazaya karışması olasılığınız nedir?	.855	
3	lastiğinin beklenmedik bir şekilde patlamasından kaynaklanan bir kazaya karışma olasılığınız nedir?	.659	
4	beklenmedik bir fren arızasından kaynaklanan bir kazaya karışma olasılığınız nedir?	.749	
5	başka bir aracın arkadan çarpmasından kaynaklanan bir kazaya karışma olasılığınız nedir?		.692
6	başka bir araç tarafından sollanmasından kaynaklanan bir kazaya karışma olasılığınız nedir?		.804
7	keskin bir virajı dönmesinden kaynaklanan bir kazaya karışma olasılığınız nedir?		.712
8	çok hızlı gitmesinden kaynaklanan bir kazaya karışma olasılığınız nedir?		.701

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

% Explained Variation for the Two Factors are 30.4 and 29.6 respectively

Table 6.6 Factor Loadings of Unrealistic Optimism Measure

		Loadings		
		1	2	3
2	Başka birinin sürdüğü araçtayken ciddi bir kazanın başıma gelmesi	.581		
4	Kırmızı ışıktaki beklerken başka bir aracın aracıma arkadan çarpması	.806		
5	Hızlı giden bir sürücü tarafından aracıma çarpılması ve kaçılması	.790		
6	Ehliyeti alınmış bir sürücü yüzünden meydana gelen bir kazada ölmek	.689		
9	Aracımın önünde giden bir kamyonun yola moloz düşmesi	.792		
1	Park yerinden çıkarken başka bir araca çarpmak		.831	
8	Park ederken arkamdaki araca sürtmek		.828	
3	Kavşakta yol vermediğim için meydana gelecek bir kazada ölmek			.824
7	Yüksek hızla giderken arabamın kontrolünü kaybederek bir başka araca çarpmak			.576
10	Alkollü araba kullanırken ciddi bir kazaya sebep olmak			.627

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

% Explained Variation for Factors 1, 2 and 3 are 28.8, 16.6, 15.7 respectively