

THE EFFECTS OF STATE ANXIETY ON ATTENTION AND EXECUTIVE
FUNCTIONS

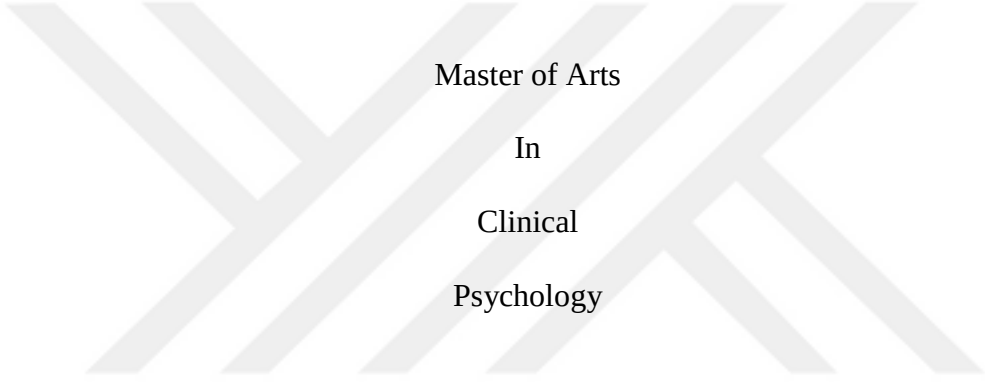


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THE EFFECTS OF STATE ANXIETY ON ATTENTION AND EXECUTIVE
FUNCTIONS

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PLAGIARISM

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

People complain that their forgetfulness and careless behavior increase in the developing world. Research indicates that anxiety undeniably has an effect on cognitive processes. This study aims to investigate how stress and state anxiety are related with attention and executive functions. Individuals with high state anxiety levels are expected to perform weaker in tests evaluating attention and executive functions than those with low state anxiety levels.

An experimental setup was used. First, a pilot study was conducted with a group of 20 people to test whether manipulation to change state anxiety level worked. As manipulation, 2 videos with a length of approximately 5 minutes were used to increase or decrease the state anxiety in the participant. Participants were assigned to the videos by simple random assignment method. After the video was finished, a measure of state anxiety was given. After the observation that the manipulation worked, the main study was started. At this stage, data were collected from 66 participants who are undergraduate and graduate students at Yeditepe University with an average age of 21 years. Participants were randomly assigned to one of the two video conditions. The State-Trait Anxiety Inventory (Öner & LeCompte, 1985) and Perceived Stress Scale (Demirkıran, Dereboy, Eskin & Harlak, 2013) were given to the participants to evaluate anxiety and stress levels. Stroop Test (Karakaş et al., 1999), Forward and Backward Digit Span Tasks (Wechsler, 1987) and Verbal Fluency Test (Tumaç, 1997) were used as the assessment of attention and executive functions.

When participants with high and low state anxiety were compared, it was observed that participants with low anxiety level were more successful in executive

function tests than participants with high anxiety level. The results were discussed in the light of the relevant literature and the recommendations for future studies and clinical applications were presented.

Keywords: state anxiety, stress, attention, cognitive processes, executive functions



ÖZET

İnsanlar gelişen dünyada unutkanlıklarının ve dikkatsiz davranışlarının arttığından şikayet ederler. Alanda yapılan araştırmalar da kaygının dikkat ve bellek gibi bilişsel süreçler üzerinde inkar edilemez bir etkisi olduğunu göstermektedir. Bu çalışma, stres ve durumluk kaygının dikkat ve yürütücü işlevlerle nasıl ilişkili olduğunu incelemeyi amaçlamaktadır. Durumluk kaygı düzeyi yüksek olan bireylerin, dikkat ve yürütücü işlevleri değerlendiren testlerde, düşük durumluk kaygı düzeyine sahip bireylere göre daha zayıf performans göstermeleri beklenmektedir.

Araştırmada deneysel bir düzenek kullanıldı. İlk olarak, durumluk kaygı düzeyini değiştirmeye yönelik manipülasyonun işe yarayıp yaramadığını test etmek için 20 kişilik bir grupla bir pilot çalışma yapıldı. Manipülasyon olarak, katılımcıda durumluk kaygıyı artırmak veya azaltmak amacıyla uzunluğu yaklaşık 5 dakika olan 2 video kullanıldı. Katılımcılar basit rastgele atama yöntemiyle videolara atandı. Video bittikten sonra, bir durumluk kaygı ölçüsü verildi. Manipülasyonun işe yaradığı gözlemlendikten sonra esas çalışma başlatıldı. Bu aşamada Yeditepe Üniversitesi'nde lisans ve yüksek lisans düzeyinde eğitim görmekte olan ve yaş ortalaması 21 olan 66 katılımcıdan veri toplandı. Katılımcılar, iki video koşulundan birine rastgele atandı. Katılımcılara kaygı ve stres düzeylerini değerlendirmek için Durumluk-Sürekli Kaygı Envanteri (Öner ve LeCompte, 1985) ve Algılanan Stres Ölçeği (Demirkıran, Dereboy, Eskin ve Harlak, 2013) verildi. Dikkat ve yürütücü işlevlerin değerlendirilmesi için Stroop Testi (Karakaş ve vd., 1999), İleri ve Geri Sayı Menzili (Wechsler, 1987) ve Sözel Akıcılık Testi (Tumaç, 1997) kullanıldı.

Durumluk kaygı düzeyi yüksek ve düşük olan katılımcılar karşılaştırıldığında, kaygı düzeyi düşük olan katılımcıların, kaygı düzeyi yüksek olan katılımcılara göre yürütücü işlev testlerinde daha başarılı oldukları görülmüştür. Sonuçlar, ilgili literatür

ıřıęında tartıřılımlıř, ileride yapılacak alıřmalar ve klinik uygulamalar iin neriler sunulmuřtur.

Anahtar Kelimeler: durumluk kaygı, stres, dikkat, biliřsel sreler, yrtc iřlevler





To My Family

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1. INTRODUCTION

Stress and anxiety have been two concepts that have affected our lives in every sense. Uncertainties, economic problems and insecurity in society increase the effect of these two concepts. They may be quite uncomfortable for daily life. Anxious people interpret statements, events and comments in a negative way (Bishop, 2007). In the studies on anxiety, the concept of fear was also emphasized. Fear and anxiety are basic emotions. While fear is directed to an external object or situation, anxiety is an internal process (Bourne, 1995) and it has fear at its origin (Beck & Clark, 2011). As a result, anxiety is the state of discomfort in the person affected by fear (Beck, Emery & Greenberg, 2005).

One of the effects of anxiety may be the difficulties we face in executive functions. Executive functions are defined as functions required for purposeful behavior (Burgess, 2003). These include all adaptive capabilities, such as abstract and creative thinking, internal observation, and whole processes such as attention, strategy building, focusing and processing of relevant information in working memory (WM) that allow an individual to analyze what they want, how they can get it, and then how they can implement that plan (Burgess, 2003). Executive functions prevent people from moving away from their goal, reminding the purpose, and following the steps necessary to achieve the objective (Bashir & Singer, 1999).

Many studies have been run to measure the effects of anxiety on cognitive performance. Theorists working on this topic (e.g. Humphreys & Revelle, 1984; Sarason, 1988; Calvo & Eysenck, 1992) argue that anxiety leads to worry, and worry disrupts performance on tasks with high attentional load. Another study states that anxious people concern about a threat to a goal and try to incorporate strategies to

decrease the effects of anxiety to reach the goal (Derakshan & Eysenck, 2009). One of the most important studies on this topic is the Cognitive Interference Theory (CIT). CIT suggested by Sarason (1984). According to Sarason (1984), cognitive intervention is an important factor in reducing the performance of people with high levels of test anxiety. CIT is also related to the effects of anxiety on the working memory system (Baddeley, 1986). This system consists of three components that are hierarchically coordinated. At the top of the hierarchy is the central executive, an attention and domain-free system, which includes planning, strategy selection, and attentional control (Derakshan & Eysenck, 2009). At this point, two theories take our attention. One of them is Attentional Control Theory (ACT) (Calvo, Derakshan, Eysenck & Santos, 2007), and the other is Processing Efficiency Theory (PET) (Calvo & Eysenck, 1992).

Accordingly, it is significant to specify which functions are more or less influenced by anxiety, which is a topic directly related to the PET was handled by making a distinction between process efficiency and performance efficiency. Performance efficiency is defined as the quality of performance (Derakshan & Eysenck, 2009). Process efficiency, on the other hand, is based on the relationship between both performance efficiency and the amount of effort used to achieve this level of performance (Derakshan & Eysenck, 2009).

The second issue with the ACT (Derakshan & Eysenck, 2009). At the center of the ACT, it is estimated that anxiety affects performance by way of its reverse effects on attention control, which is a crucial function of the central executive (Derakshan & Eysenck, 2009). Besides, there is evidence that anxiety is associated with increased amygdala activation and reduced recruitment of prefrontal cortical areas (Bishop, 2007). Therefore, both behavioral and brain imaging studies have

shown that anxiety is related to negative effects on cognitive performance, particularly on tasks that need attentional focus (Derakshan & Eysenck, 2009). Briefly, anxiety affects the executive functions and attention, which is the heart of the executive functions.

According to the cognitive control theory put forward by Braver, Burgess and Gray (2007), decreased cognitive efficiency may occur as a result of changes in the temporal dynamics of dorsolateral prefrontal cortex (DLPFC) recruitment. The study conducted on this topic used a mixed block / event-related fMRI design to monitor transient and sustained activity in the DLPFC, while high and low anxiety participants performed a working memory task (Fales et al., 2008). Videos were used as manipulation. The results support the cognitive control theory: Higher anxiety impaired the ability to optimally recruit working memory regions, reducing cognitive efficiency (Fales et al., 2008).

Similarly, in another study, participants watched 3 video episodes of 2 minutes as manipulation to create high and low anxiety (Giannakakis et al., 2017). Participants' reactions to the videos were recorded. The results indicated that the rate of eye blinking increased, head movements accelerated and enlarged in stress and anxiety situations (Giannakakis et al., 2017). In addition, increased heart rate was observed in situations of stress and anxiety, in which the most significant differences in social exposure stage and mental task (Stroop test) were noted (Giannakakis et al., 2017).

In another study Beckwe and Deroost (2016) investigated the performance of individuals with high and low anxiety on verbal and visual-spatial tasks. Participants first watched movie clips to induce anxiety or neutral feelings. Subsequently, they completed their verbal and visual-spatial tasks. It was observed that the performance

of the individuals in the anxiety group was impaired compared to those in the neutral group (both verbal and visual-spatial tasks). In addition, this effect is also valid for the two groups divided into high and low anxiety in terms of their baseline anxiety scores. In this respect, the authors suggested that the detrimental effect of anxiety cannot be explained by the natural tendencies of individuals to anxiety.

Based on the above information, this thesis aims to investigate how stress and state anxiety are related to prefrontal cortex functions, including attention and executive functions. Although many studies in the literature show that anxiety affects cognitive functions negatively (Eysenck, 1985; Calvo & Eysenck, 1992; Sarason, 1988; Ansari, Derakshan & Richards, 2008; Derakshan & Eysenck, 2009; Johnson & Gronlund, 2009), there is no clear consensus on the nature of the relationship between these two concepts. It is hoped that the study, with its experimental approach, will provide a more in-depth understanding of the effect of anxiety on cognitive functions. The findings are also expected to shed light on possible anxiety intervention and treatment approaches to clinicians working in the field.

1.1.anxiety

Anxiety is derived from the Greek word "angh", which means contraction and tension, (Rachman, 2004). In its German origin, the term "angst" refers to emotions or perpetual fear, highlighting an uncertain dreadful future (Bannister, 1985).

Anxiety is described by The American Psychological Association (APA, 2019) as an emotion defined by worrying thoughts, physical changes, and somatic tension anticipating catastrophe, impending danger, or misfortune. Another description said that anxiety is an intense emotional state that is accompanied by threatening thoughts and physical symptoms resulting from perceptions that a situation or event is dangerous (Leahy, 2017; Riskind, 2007; Beck, Emery &

Greenberg, 2005). Physical symptoms may include physical reactions such as rapid heartbeat, dry mouth, sweating, muscle tension and nausea. Besides, the behavioral level of anxiety may sabotage an individual's mobility, self-expression, or ability to cope with daily life routines. On the other hand, anxiety helps people protect from an extensive diversity of threats. When the person is faced with any threat or danger, the body becomes alert and switch on fight or flight responses (Nesse, 1994). As we can see, anxiety, which has become a part of life, affects people's daily life extensively. Therefore, anxiety plays a major role in psychology research, as well.

Freud (1920) has also made anxiety the center of his studies. He argued that anxiety is the most important problem in emotional and behavioral disorders (May, 1950). According to him, anxiety begins from the moment of birth. He called this situation as “birth anxiety”. A baby's biological helplessness necessarily causes a high tension of pain. This leads to a primary anxiety syndrome in the person (Fenichel & Rangell, 1995). In other words, we have anxiety since we were born. Freud also talks about neurotic anxiety, which results from the conflict between the id and the ego, and moral anxiety, resulting from the conflict between the id and the superego (Endler & Kocovski, 2001).

Karen Horney, another psychoanalyst, was concerned with the concept of “basic anxiety” (Smith, 2007). According to Horney, a child should grow up in an encouraging, loving, sensitive, and consistent family for a healthy development (Paris, 1999). If the family is inconsistent, oppressive, indifferent, threatening, overprotective, then the child develops a basic sense of hostility (Paris, 1999). Horney named the state of intense anxiety and insecurity that this emotion creates in the child as “basic anxiety” (Smith, 2007). Horney was interested in the strategies that the person developed and implemented to cope with the basic anxiety. Freud assumed a

destructive instinct that exists in all of us. On the other hand, Horney postulated that humans are not good or bad by inherently. However, they could be destructive because of negative environmental conditions (Smith, 2007).

According to cognitive perspective, the source of anxiety is often the individual's threatening thoughts. (Riskind, 2007). If the anxiety that is potentially found in every person goes above the normal level, it affects the individual emotionally, behaviorally, physically, and cognitively (Beck & Clark, 2011). When an individual has high anxiety, he/she thinks, feels, and acts differently. In addition, the cognitive perspective emphasizes that the individual's way of thinking in general remains effective in the continuity or severity of anxiety (Beck & Clark, 2011).

In summary, anxiety is seen as a response to uncertain, distant, unidentifiable hazards and has the power to affect the individual completely (Bourne, 1995). On the other hand, according to researchers, anxiety, which is an expression of life protection or escape reaction, acts as a mechanism that ensures the mobility of the organism in case of danger (Beck, 2008).

1.1.1. Types of Anxiety

Most people agree that anxiety affects our lives. This effect may be negative or positive, and varies according to its severity and duration. Especially in learning and thinking processes, intense anxiety affects the person negatively (Horwitz, 2001). If we examine in more detail, anxiety is divided into two as short-term (state anxiety) and long-term (trait anxiety) (Dornyei, 2005).

1.1.1.1. Trait Anxiety

Trait anxiety means long-term anxiety. The person finds reasons to feel constant anxiety, a state that becomes characteristic of the person (Scovel, 1978). Trait anxiety is also called personality-based anxiety and is defined as the probability

of a person to feel worried in any situation (Spielberger, 1983). People with trait anxiety feel constantly anxious or uncomfortable in many situations in their daily lives.

1.1.1.2. State Anxiety

State anxiety (we can also call it as “situational stress”) expresses the experiences of transient tension, nervousness, worry, and activation of the autonomic nervous system in certain situations (Spielberger, 1972). It may be described as an example of a situation in which a clear behavioral model is not initiated is to remove and replace an event, object, that threatens an individual's current goal (Power & Dalglish, 2015). In other words, it is a transient emotional experience with cognitive effects (MacIntyre, 1995), and it is encountered temporarily or for a short time (Horwitz, 2001). For example, students are concerned before taking the exam.

A division between trait anxiety (T-anxiety) and state anxiety (S-anxiety) has become widespread (Spielberger, 1972, 1983). S-anxiety is described as an unpleasant emotional arousal in the face of threatening demands or dangers. To experience this emotion, a cognitive assessment of the threat must be made (Lazarus, 1991). On the other hand, T-anxiety indicates the presence of stable personal distinctions and tends to respond with S-anxiety when a threatening situation is expected. According to Reiss (1997), a person who has high trait anxiety has impairment on ego defense, which is why he suffers from high state anxiety.

Personal and situational factors are both effective in determining the levels of state anxiety (Spielberger, 1972). The direction of trait anxiety and the stressful event must be compatible so that the individual would experience a rise in state anxiety. In this respect, the difference between trait and state anxiety is similar to the distinction between kinetic and potential energy (Endler & Kocovski, 2001).

1.1.1. Biology of Anxiety

Biologically, anxiety has an important biological aspect because cortical and subcortical neural structures play a critical role in emotional experiences (Steimer, 2002).

The brain is divided into three main regions, the hindbrain, midbrain, forebrain, and requires the effective and efficient operation of a range of chemicals (Steimer, 2002). These chemicals contain neurotransmitters and hormones. Hormones are produced by the endocrine system. Neurotransmitters and the work of the endocrine system require a delicate balance, and many factors can disrupt it. Biochemical imbalances, genetic abnormalities, and brain dysfunction are the causes of abnormalities that biological approaches usually focus on, and these three factors can affect each other. This may lead to a psychological disorder (Aldao et al., 2010). Besides, researchers show that the amygdala and medial prefrontal cortex has an important role in anxiety (Davidson, 2002).

Increased amygdala activation has been reported in patients with generalized anxiety disorder (GAD) in response to fear (McClure et al., 2007), and masked angry facial expressions (Monk et al., 2008). Nitschke et al. (2009) also found increased amount of anticipatory activation in the amygdala among patients with GAD. Similar results within a range of different anxiety disorders including, phobia and PTSD were indicated by Shin and Liberzon (2010). Moreover, current models of hippocampal function (HF) highlight its important role in cognitive functions. HF has also been proposed as a neural mediator of emotion (Engin & Treit, 2007). Animal studies have also pointed to the importance of the hippocampus in untrained reactions to anxiety (Engin & Treit, 2007).

When many psychiatric disorders are examined, it can be seen that anxiety can occur as a transitional symptom, an intermediate symptom, or a relatively severe symptom and, neural mechanisms and neurobiological transformations that play a role in the emergence and development of all kinds of anxiety are similar in principle (Dunsmoor & Paz, 2015).

1.1.2. Stress and Anxiety

Stress is a significant word for human health. It has many definitions. The most widely used definition of the stress is the imbalance that occurs between the individual's coping mechanisms and demands from the environment (McGrath, 1970). Besides, Hans Selye, known as the “father of stress”, talked about the concept of homeostasis which is the stability through continuity constancy (Fink, 2010).

It is important for a person to live in harmony and balance with the environment. The coping mechanism of the person adapts to the order. When a person's environment changes as a result of factors such as quitting, divorce and loss, his capacity to cope also changes. These changes (even could be positive life changes such as a mortgage, a promotion, etc.) cause homeostasis to break down and stress occurs (Fink, 2010). When the stress occurs, the body reacts to the event and, this reaction involves mental, emotional and physical responses (Fink, 2010).

Research shows that most people who experience stress also have anxiety (Sarason, 1984). An event may trigger a person's stress level, which in turn makes him feel nervous or discomfort (Sarason, 1984).

Stress and anxiety may cause both physical and emotional symptoms. Physical symptoms may include tension, dizziness, muscle tension, shaking, headache, sweating, change in appetite, change in sleep routines, and fatigue (Greening & Stoppelbein, 2007). On the other hand, emotional or psychological symptoms can

contain panic, difficulty concentrating, lack of attention, irrational anger, and restlessness (Greening & Stoppelbein, 2007). Besides, according to neuroimaging studies of anxiety disorders, comparatively high amygdala activation in reaction to the disorder-relevant stimulant in PTSD, specific phobia and social phobia have been reported (Shin & Liberzon, 2010). Generalized anxiety disorder (GAD), panic disorder, post-traumatic stress disorder (PTSD), social phobia and obsessive-compulsive disorder are examples of disorders that show a strong association between anxiety and stress (Bandelow et al., 2012).

1.1.2.1. The Studies about Stress and State Anxiety

Stress, state anxiety and trait anxiety might have an effect on cognitive performance (Meijer, 2001). Stress is thought of as an external manipulation, state anxiety as a sense of temporary insecurity, and trait anxiety as a relatively stable personality trait (Leuner & Shors, 2013).

The effect of stress on performance in a desktop aided mathematical task among women who have differences in anxiety tendencies were observed. According to this study, it was observed that women with high state anxiety made seriously more mistakes than low state anxiety participants in questions (Yoshie, 2008). In another study based on music performance anxiety, the author also found a strong correlation between stress and state anxiety (Davis, Kenny & Oates, 2004).

Collins, Csemiczky and Landgren (2000) found a tendency towards higher state levels of anxiety among women who failed to conceive after in vitro fertilization (IVF) treatment. Women with stress levels were higher in circulating cortisol and prolactin levels compared to fertile inspection. Findings show that psychological stress can influence the result of IVF treatment because state anxiety is slightly higher among those who fail to conceive than those who become pregnant (Collins et al.,

2000). Findings among diverse studies appear to indicate a strong relationship between stress and state anxiety.

1.2. Frontal Lobe Functions

The brain is one of the organs that are important for our body (Anderson, 2010). It is a large and complex structure and it contains millions of neurons (Jawabri & Sharma, 2019). These neurons are in constant communication with each other through synapses. The brain consists of three main parts: cerebrum, brain stem and cerebellum. The largest part of the brain is the cerebral cortex and the brain has four lobes; temporal lobe, frontal lobe, occipital lobe, and parietal lobe (Jawabri & Sharma, 2019).

The frontal lobe (FL) is the largest lobe, which is located in front of the cerebral hemispheres. Functions of the FL are related with remembering, planning (from a simple daily plan to future lifelong plans), reasoning, speech and language, attention, motor skills, social cognition, emotion regulation, and personality (Jawabri & Sharma, 2019). Personality, plans, cognitive functions, emotional and social behavior are mostly governed by the prefrontal cortex (PFC), which is a part of the frontal lobe (Anderson, 2010). The most important example of the effect of PFC on personality is the case of Phineas Gage, a railway worker who experienced a severe damage to his PFC (Damasio, Frank, Galaburda & Grabowski, 1994). As a result of the damage, he suffered from disturbances in his emotions, social behavior, executive functions, and decision making (Damasio et al., 1994). Dempster (1993) also found that young children, whose PFC have not yet fully developed, have some cognitive, emotional and social problems, affecting areas such as decision-making.

1.3.Executive Functions

According to Denckla (1994), executive functions (EF) refer to a process of mental control required to perform targeted behaviors; involving working memory, shifting, and inhibition. It is a complex process associated with the development of the prefrontal cortex.

Lezak (1995) mentions the capacity of the EF. According to him (1995), this capacity enables the person to successfully perform purposeful, independent, self-serving behaviors. They are a process to improve plans for future events, keeping these plans and set of events in the WM until they are executed, and prohibit irrelevant events (Pennington & Ozonoff, 1996). Stuss (1992) suggested an integrated model of EF, consist of abilities that allow the person to improve goals, monitor performance, keep them in active memory, and control for intervention to achieve these goals. This integrated system is then described under four headings: Attentional control, cognitive flexibility, information processing and goal setting (Lezak, 1995; Anderson et al., 2001).

Attention control includes cognitive abilities such as selective attention, sustained attention, self-regulation, self-monitoring, and response inhibition (Anderson, 2010). Cognitive flexibility contains working memory, self-monitoring, self-regulation,divided attention, attention shift, feedback utilization, and conceptual transfer (Stuss & Knight, 2013). It is also the capability to suitably adjust the individual's behavior in a changing environment (Scott, 1962; Armbruster, et al., 2012). Set shifting tasks and task switching are usually used to measure cognitive flexibility. Information processing refers to a person's functioning as an information processor; just like a computer gets in data and chases a program to produce an output (McLeod, 2008). It evaluates the speed of receiving and processing

information. Finally, goal setting includes initiation, planning, organization, problem solving, reasoning, and strategic behavior, and the impairment of goal-setting skills can cause irregularity and inefficiency of reasonable decisions (Anderson, 2010). As a consequence, executive dysfunction can manifest itself by inefficient planning, difficulty in solving problems, being unable to understand the problem and find the right strategy to be applied, rigid or concrete thought processes, perseveration, difficulty in reasoning, and deficiency in correcting errors or using feedback (Walsh, 1978; Benson & Stuss, 1986).

EF requires that lower-level processes be modulated by higher-level processes (Stuss & Knight, 2013). Modulation allows us to exhibit appropriate behavior in line with our objectives. Consequently, EF enables us to act flexibly instead of being stereotyped and always being a prisoner to our environment when certain external demands occur. This ability allows us to adapt to changing or new events. This process is called “Top-down control”. In other words, top-down control refers to the modulation of cognitive, motor, and perceptual processes based on abstract goals and intentions (Stuss & Knight, 2013). The role of EF in cognition can be said to modulate the continuous interaction between higher and lower-level processes. Higher-level processes are often activated by conflicts between lower levels of inputs or representations in daily life, for example, when something unexpected happens or when there are no ordinary results of and a behavior (Stuss & Knight, 2013).

Most of the information on executive functions comes from lesion studies (Alexander, Floden, Katz, Levine & Stuss, 2001). Lesion studies on humans and animals, as well as functional neuroimaging and other physiological methods (such as electrophysiology), have been used to evaluate EF. Many neuropsychological tools that can be used in human studies to measure EFs. The Hayling Sentence Completion

Test, the Wisconsin Card Sorting Test, the Trail-Making Test, and the Tower of London test are some of these methods (Stuss & Knight, 2013).

1.3.1. Anxiety and Executive Functions

Executive functioning is a crucial part of the human memory system and the effect of anxiety on executive functions (EFs) has been the subject of many research studies.

Recent work has suggested that the effect of anger and anxiety on executive functions was examined. According to the results found that anger did not disturb EF, while anxiety disturbs EF (Moons, Shields, Tewell & Yonelinas, 2016). Anxiety and anger have significant differences when researching the impact of negative effects on main cognitive processes such as memory and EF (Moons et al., 2016). The reason for this relationship is explained as follows that individuals with higher anxiety have less place in their working memory (WM) because they have a lot concerning thoughts, which disturb attention controls (Hunley, 2017). Very anxious people constantly carry extra information in their minds (i.e., concerns or worries). In other words, they are very preoccupied with their worries that they do not have space or scattered memory for new information. As a result, people with a high concern may be more easily affected by new information, and it may be more difficult to switch their focus between resources of instructions (Hunley, 2017). For instance, the inability to focus on the subject due to external noise while studying. Another study was conducted with elderly people with healthy, depressed, and anxious (Begley et al., 2007). According to the results found in the short-term memory of anxious participants showed cognitive impairment. Healthy participants did not experience any disorder, while no significant difference was observed between participants in

depression and anxious participants. Individuals with anxiety and depressive individuals had impaired EF.

A study on episodic memory and EF performance within anxiety disorders found that the anxiety disorder group (composed of participants with agoraphobia, panic disorder, social phobia, and obsessive-compulsive disorder) showed significant impairments in episodic memory and EF (Airaksinen, Forsell & Larsson, 2005). Another study was conducted on elderly people with mild cognitive impairment (Chilovi et al., 2009). EFs were found to be independently associated with anxiety disorders in patients with mild cognitive impairment (Chilovi et al., 2009). As a result, we can observe the effect of anxiety on cognitive disorders. We can also say that as anxiety level increases, deterioration in EFs increases.

Another study was done on recall and recognition. Mitte (2008) studied effects on anxiety on recall and recognition. According to him, anxiety had an influence on the recalling of previous experiences. According to research results, high anxiety people have cognitive deficits on recall and recognition than non-anxious people. One of the theories trying to explain the underlying mechanisms of the association between cognitive performance and anxiety was suggested by Eysenck (1979). According to Eysenck (1979), individuals with a high level of anxiety remain in non-task-related thinking, consuming some of the existing cognitive capacity and causing a decrease in performance. Since anxiety creates worry in the individual, it takes up some of the working memory and decreases the performance in both recognition and remembering and performing a given task (Eysenck, 1979).

1.3.1.1. Theories of Anxiety and Performance

A number of different theories have been proposed to account for the relationship between anxiety and cognitive performance. Sarason (1988) proposed the

Cognitive Interference Theory (CIT). According to this theory, anxiety is related to excessive concern, worry, and self-concern or being engaged in one's deficiencies and inadequacies and all these anxiety factors affect our cognitive performance (Sarason, 1988). With this theory, Sarason partially helped us to understand the effects of anxiety on performance, but it was not enough because Sarason did not take into account specific cognitive mechanisms.

Another important name working on anxiety and performance is Eysenck. Two versions of the original theory of Eysenck (1979) were later proposed. The first is Processing Efficiency Theory (PET) and the second is the Attentional Control Theory (ACT). PET refers to the deficiencies in the performance of high anxious individuals. This theory distinguished between performance effectiveness and processing efficiency. Performance effectiveness is about the quality of performance. It is usually evaluated by dependent variables, such as precision of performance. On the other hand, processing efficiency is a little more complicated. It is defined as the connection between performance efficiency and the quantity of effort or source used to achieve this level of performance. Thoughts that are unrelated with the task such as self-preoccupation and concern are presumed to damage processing efficiency (Derakshan & Eysenck, 2009).

According to estimates made about PET, it is based on state anxiety and the supposition that limited capacity of human's attention system. As stated by the PET, state anxiety occurs from the interaction between environmental threat or demand and trait anxiety (Janelle & Murray, 2003). The cognitive factor of the causing state anxiety is characterized by worry in the form of self-preoccupation, worry over assessment, and performance level. Cognitive anxiety is suggested to occupy a part of

the WM system that is specific to executive functions (Derakshan & Eysenck 2009).

Thus, increases in cognitive anxiety provide less resource for the given task.

Worry is the source of anxiety. Worrying thoughts consume the sources of attention required for task demands, thus reducing the storage and processing performance of the WM, or reducing the efficiency of task processing at the same time. Therefore, individuals may not finish a task that they can finish with high performance and without any problems because of anxiety. In addition, individuals with a high level of anxiety are demanding on the task in WM (Barkovec et al., 1983). As a result, anxious individuals who make high demands experience reduced performance in their tasks. However, there is another important assumption. According to this assumption, non-task processing has no negative impact on performance effectiveness.

The argument is that worrying thoughts increase motivation to minimize the negative effects of anxiety in anxious individuals. In contrast, the anxious individual uses additional processing resources to eliminate anxiety, anxiety damages processing efficiency more than performance effectiveness (Janelle & Murray, 2003). Besides, according to Baddeley (1993), the WM represents an attentional control system and it consists of three components of limited capacity: a modality-free central executive, an articulatory loop, and a visuospatial sketchpad. Studies were carried out on the PET, considering the work of the Baddeley. According to studies, anxiety reduces the existing capacity of the central executive, yet it has minimal effect on phonological cycle and visuo-spatial sketchbook (Derakshan & Eysenck, 2009). This theory has been taken one step further, as there are some limitations to centralized execution.

Attentional Control Theory was developed by Eysenck et al. (2007) as an essential progress to the PET. The central executive performs many functions. In the

theory of processing efficiency, it was not clear which function was concerned with anxiety. Therefore, it is important to carefully state which functions are more or less affected by anxiety in control theory. At the center of ACT, it is estimated that anxiety affects performance by primarily its negative effects on attention control, a key function of the central executive (Derakshan & Eysenck, 2009).

Corbetta and Shulman (2002) talked about the two systems of attention. They are the top-down, goal-driven system and the stimulus-driven (bottom-up) system. According to ACT, the balance of these two systems is impaired by anxiety. The reason for this can be said to be enhanced amygdala activation and reduced input of prefrontal cortical areas (Bishop, 2007). Both neuroimaging and behavioral studies have indicated that anxiety is linked with negative impacts on cognitive performance, especially tasks that need attention (Derakshan & Eysenck, 2009). In another saying, anxiety has power on attention control. Another study was done on separating anger and anxiety. Anger and anxiety were evoked in the participants. Results of the study indicated that while anger does not affect executive functions, anxiety impairs them (Shields et al., 2016).

1.3.1.2. The studies about State Anxiety and Executive Functions

Based on previous findings, we have seen that anxiety has an effect on executive functions (EFs). If we look more specifically at the impact of state anxiety on EFs, we should take a look at the other studies. A longitudinal survey was done with pregnant women. EF of their their children were assessed between the ages of 6 and 9 years old. The results indicated results found a significant relationship between higher maternal stress and lower visuospatial working memory (WM) performance (Buss, Davis, Hobel& Sandman, 2011). Another study by Wetherell et al. (2002) tested participants with no cognitive performance problems three times within an

interval of three years. They recorded changes in their cognitive performance and state anxiety depending on their age. According to the results, state anxiety has an important effect on complex visuospatial abilities and visual learning (Wetherell et al., 2002). Additionally, state anxiety had a more detrimental effect on men with regard to their performances in Card Rotations and Digit Span tasks.

Another research is designed to investigate whether performance on EF tests is impaired by the presence of a third-party observer (Horwitz & McCaffrey, 2008). The study also tried to examine the relationship between anxiety, observer presence, and performance. Findings show that a third observer affects responses to the test. The presence of a third observer increases the state anxiety of the participants and accordingly the performance of the participants decreases in the tests.

Another study is about threat. It has been investigated how the threat has an effect on cognitive performance (Choi, Padmala and Pessoa, 2012). An electrical shock was used in this study. The threat of shock has been observed to increase state anxiety, and lead to increased an increased amount of interference effect. This relationship was found to be partially mediated by the activation pattern of the medial prefrontal cortex (Choi et al., 2012).

We have observed in the above studies that state anxiety has negative effects on cognitive performance. However, some studies mention the benefits of state anxiety. According to Pacheco-Unguetti et al. (2010), state anxiety causes an increase in the focus of the shifting task because of alerting attention. In a study conducted with children between the ages of 9-12 revealed that children with high persistent anxiety showed lower performance EF measures. On the other hand, it was observed that children with low and medium state anxiety were more successful in the Stroop test, while they were not successful in the Hearts and Flowers task (Raver & Ursache,

2014). However, according to a study by Hadwin et al. (2008), children with non-state anxiety were more successful than the children with state anxiety in the backwards digit span task. These findings might indicate that state anxiety might have a differential effect on different cognitive tasks.

1.3.2. Anxiety and Attention

Although attention is a word, we all recognize and use frequently in our daily lives. Within psychology, however, it has been a difficult concept to define (Lund, 2002). Moran (2009) claims that attention is a concentration that requires mental effort on mental or sensory situations. Moran considered attention as a skill. Allport (1993) offered a different suggestion. He believes that attention does not have a uniform function. According to him (1993), attention has at least two different interests: Selective Attention and Divided Attention. Focused (or selective) attention is described as the capability to select (or focus on) some details from a bundle of stimuli (Allport, 1993). For example, there may be hundreds of people talking in a hall where you are invited, but you can only listen to one. Divided attention is described as the capability to perform two or more tasks at the same time. For example, a driver notices obstacles and hazards to avoid an accident and participate in discussion with car radio while driving (Posner, Snyder & Solso, 2004).

The main point is that anxiety affects attention. Attentional control theory (ACT), Eysenck et al. (2007) claimed that the shifting, updating and inhibition have the primary roles on the executive functions. According to this theory, anxiety disrupts attention control. Therefore, its main negative effects are on functions that include attention control. If we look at this study, individuals with high anxiety and low anxiety differ in various ways in their attentional functioning. While individuals

with high anxiety were more unsuccessful in tasks requiring attention, those with low anxiety were more successful on such tasks (Eysenck, 1988).

1.3.2.1. The studies about State Anxiety and Executive Functions

While many neurocognitive anxiety models emphasize the importance of an amygdale-centered hypersensitive threat detection system, recent statements include a role for prefrontal mechanisms in regulating attention to threat. A study examined the link between trait anxiety and dysregulation of attention control (Bishop, 2009).

According to the results, it was observed that prefrontal activity was decreased in individuals with high trait anxiety, and therefore these individuals could not fully use their attention sources. A similar relationship was proposed by state anxiety, as well. These findings show that the negative situations we encounter in daily life can cause us to have difficulty in concentration. It can cause problems with attention and focus (Bishop, 2009).

If we look at other studies, negative thoughts regarding danger and attention focus on envisaged state anxiety (Georgiou, Spada & Wells, 2010). Both attention shifting and attention focusing were observed to be negatively correlated with state anxiety. According to Wells and Matthews (1996), meta-cognitions (“negative beliefs about thoughts concerning uncontrollability, cognitive confidence, and beliefs about the need to control thoughts”, pp. 881) are negatively related with aspects of attention shifting and attention focusing and positively related with state anxiety.

Another issue that has been studied is the effects of state anxiety on attention bias. Research shows that anxiety is not only related to attention bias. Attention and anxiety are proposed to mutually affect each other. State anxiety leads to increased attention bias against threatening stimuli, and the perception of these stimuli increases state anxiety (Broadbent, 1988). Another study claims that anxiety narrows the focus

of visual attention (Beeman, Franconeri & Wegbreit, 2015). The Easterbrook phenomenon also supports this conclusion: The presence of threat and high state anxiety indicates that the scope of attention narrows and added this narrowing could be fight-or-flight response (Amir, Kuckertz & Najmi, 2012).

Anxiety controls the functioning of attention. An undeniable fact that the presence of this relationship is open, even the connection between them is clear. In addition, different types of anxiety can affect attention differently (Acosta, Callejas, Lupiáñez & Pacheco-Unguetti, 2010).

1.4. Goals and Hypotheses of the Study

In this study, it is aimed to look at the effect of experimentally manipulated state anxiety on attention and executive functions. Members of the group that receive the anxiety-provoking manipulation are expected to demonstrate poorer cognitive performance in all attention and executive function tests compared to those who do not. In addition, a significant relationship between stress and cognitive performance is also expected. The findings of the study might provide a more in-depth understanding of the relationship between anxiety and cognitive performance.

2. METHOD

2.1. Subjects

This study was carried out with a sample of 66 undergraduate and graduate university students from Yeditepe University whose ages ranged between 18 and 25 years. Only participants without any neurological or psychiatric disorders were included. In the study, the participants were made up of volunteer students.

2.2. Materials

2.2.1. Demographic Form. Participants were asked to indicate their age, gender, education level and department. The participants were also questioned regarding their use of medications, coffee, or cigarettes and whether they have a sleep problem. Participants were also asked to indicate whether they have a history of neurological or psychiatric disorders, and those with a history of such conditions were excluded from the study (See Appendix B.).

2.2.2. Perceived Stress Scale. Perceived Stress Scale (PSS) was developed by Cohen, Kamarck and Mermelstein (1983). The scale aims to measure the stress level of the situations faced by the person. PSS consists of a total of 14 items, each rated on a 5-point Likert scale (0) not at all (4) very much so. There are items with reverse scores: 4, 5, 6, 7, 9, 10, 13. According to inventory, people with high scores have high stress level. PSS was adapted to Turkish by Demirkıran, Dereboy, Eskin and Harlak (2013). The internal consistency for the Turkish version was 0.84. The test-retest reliability coefficient for the PSS was 0.87 (See Appendix C.).

2.2.3. State-Trait Anxiety Inventory. State-Trait Anxiety Inventory (STAI) was developed by Spielberger, Gorsuch and Lushene (1970). The STAI is composed of two 40-item subscales. Each part contains 20 items, rated on a 4-point Likert scale (1) not at all (4) very much so. The first part measures the intensity of anxiety as an

emotional state (S-Anxiety), and the second part measures personal differences in anxiety tendency as a personality trait (T-Anxiety) (Spielberger, 2010). The answers to the S-Anxiety questions show the current intensity of anxiety of a person on the basis of a 4-point scale. T-Anxiety relates to the general state of anxiety of the person. The given answers to the inventory show the participants' current intensity of concern. There are items with reverse scores: 1,2,5,8,10,11,15,16,19 and 20. Higher scores indicate higher levels of anxiety. The cultural and linguistic equivalence of STAI with 40 questions was provided, and the essential reliability and validity studies were made by Öner and Le Compte (1985). The Cronbach alpha values of this Turkish version were found to range between 0.83 and 0.87 (See Appendix D.).

2.2.4. Executive Function Tests

2.2.4.1. Forward and Backward Digit Span Task. Forward and backward digit span task is the eighth subtest in the Wechsler Memory Scale-Revised (Wechsler, 1987). In the forward digit span task, various number sequences are told to the participant at one-second intervals. The participant is asked to repeat the numbers spoken in the same order. In the backward digit span task, the participant is told various number sequences at one-second intervals. Unlike the forward digit span task, the participant is asked to repeat the spoken numbers from the end to the beginning. The Forward digit span task shows how simple attention and information are held in short-term memory. The backward digit span task is a little more complicated than the forward digit span task. It is associated with executive functions, particularly working memory (Öktem-Tanor, 2011). A validity and a reliability study were conducted in Turkish (Karakaş, 2004). Validity-reliability and norm study of WMS-R in Turkish society Karakaş et al. (1996) was made within the

Scope of the BILNOT Battery with 353 participants between the ages of 20-74 (See Appendix E.).

2.2.4.2. Verbal Fluency Test. The test of verbal fluency, which expresses the word production of an individual within a certain period of time, was first developed by Thurstone in 1938, as the Thurstone Word Fluency Test (Bolter, Long & Wagner, 1983). Benton (1968) continued to work on verbal fluency. He studied FAS task in patients with lesions of the frontal lobe (Baldo et al., 1998).

Verbal fluency test has played an important role to measure executive functions in neuropsychological research. It consists of two parts: letter fluency task and category fluency task (Kozak, Rees & Tombaugh, 1999). The letter fluency task, the task begins with the letters F, A, S. The participant is given one minute for each category. Participants are asked to produce as many words as they can, beginning with a specific letter, within one minute. Proper names, numbers and repeated words are not included in scoring (Tumaç, 1997). The numbers of correct words produced are noted. Although letter fluency task is done using the letters F, A, S in the original English version, Turkish version includes letters K, A, S in Turkey (Tumaç, 1997).

The categorical fluency test consists of categories such as fruits, market products, and animals. One minute is given to the participant for each category. Within one minute, participants are asked to generate words for each semantic category. In addition to the most widely used animal category, fruit and supermarket categories were also included in the current study. For both versions of verbal fluency, the total number of generated words is recorded.

Verbal fluency test is related to frontal and temporal lobe activation (Moscovich, Troyer & Winocur, 1998). However, there are important distinctions between letter and category fluency. Category fluency requires a search through semantic or conceptual memory, whereas letter fluency requires a search through lexical or phonemic memory (Monsch et al., 1994; Baldo et al., 1998). Phonemic fluency is associated with the left frontal lobe, while semantic fluency is associated with the left temporal lobe (Mummery, 1996; Birn, 2010) (See Appendix F.).

2.2.4.3. Stroop Test Çapa Form. Stroop Test was developed in 1935 by John Ridley Stroop, and there are many forms in use today. Stroop Test is a neuropsychological test that assesses prefrontal lobe functions, including information processing speed, selective attention, and ability to resist interference (Stroop, 1935). Although there are different versions of the Stroop test, it basically includes the task of naming colors, reading color names written in different colors, and saying the color written in different colors (Strauss et al., 2006).

In the current study, Stroop Test-Çapa Form was used. This version was developed by Weintraub (2000), and the reliability and validity of its Turkish Version were established by Emek-Savaş et al. (2019). The Stroop Test Çapa Form is composed of 2 stimulus cards, with each card involving 60 items displayed in 6 x 10 setup. There are three subsections of the test: Stroop A, Stroop B, and Stroop C. First, testing begins with the Stroop A section. This section consists of colored small rectangles. The participant is asked to name these colors (red, blue and green) as quickly as possible. The Stroop B section contains color names printed in different colors (for example, the word ‘green’ written in red ink). The participant is asked to read the color names as quickly as possible. In the last part of the (Stroop C) participants to name the color of the color names printed in a different color. Stroop

effect is observed in this section because participants need to suppress automatic reading behavior (Emek-Savas et al., 2019).

For this form, spontaneous correction numbers and errors are recorded, as well as the completion time of each section. In addition, an interference score (Stroop D) is calculated by subtracting the completion time of Stroop B from that of Stroop C (Emek-Savas et al., 2019) (See Appendix G.).

2.2.4.4. Mood Manipulation. Two videos were used to manipulate the state anxiety levels of the participants. One of the videos was used to create a feeling of fear and increase the level of state anxiety in the participant. This video includes two scenes from the movie "The Conjuring I" directed by James Wan (2013)

(https://genvideos.io/watch_the_conjuring_2013_1080p_bluray.html#video=uqhznf_b3d0p1j_hkh2lnhfs-xqct-qm17lpbnedf).

Its length is 4 minutes and 56 seconds. Two parts of the movie are used. Both parts were taken from scenes that took place in children's room. Children trying to sleep are startled by the sudden appearance of something. Both scenes are in color. In the clipped part, there is sound but no speech is present.

The other video is intended to create a feeling of relaxation/peace and decrease the level of state anxiety in the participants. This video contains 4 minutes and 20 seconds of an underwater video shot in the Maldives (<https://www.youtube.com/watch?v=bW19KtfyqWw&t=7s>). The video has been cropped. Only the part where the fish swim in the sea and the relaxing music remain. The video is in color.

2.3.Procedure

Each participant was tested individually. Participants were asked to fill out the Informed Consent form (See Appendix A.). They were informed about the

purpose of the research and asked to fill out the demographic form. The application consists of two stages. At first, a pilot study was carried out to assess whether mood manipulation procedures were successful. Here, 20 participants were assigned to videos through a random assignment. There were two videos in the experiment. The first video was aimed at enhancing an instant emotion state that strengthens feelings of state anxiety. The second video was aimed to calm the participant down. The first video took 4 minutes and 56 seconds and, the second video took 4 minutes 20 seconds. The participant was left alone while watching the video. After watching the videos, S-anxiety inventory was given. The results of the Mann-Whitney test revealed that the state anxiety score was greater for horror video ($Mdn = 59.5$) than for calm video ($Mdn = 32$), $U(N_{horror} = 10, N_{calm} = 10) = .00$, $z = -3.79$, $p < .001$, indicating that the manipulation procedure was successful.

The actual study was conducted with 66 participants after the pilot was completed: Participants were first asked to fill out the Informed Consent form (See Appendix A). After agreeing to participate, each participant was informed about the purpose of the research and asked to fill out the demographic form and Perceived Stress Scale was given to measure stress. After both forms have been completed, participants were randomly assigned to videos. After each participant watched the video, State Anxiety Scale was given to measure the state anxiety levels and the attention and executive functions test to be used were given respectively. The ordering of cognitive tests was as follows: Forward and Backward Digit Span Task, Verbal Fluency Test, and Stroop Test. In addition, all participants were informed verbally about the study at the end of the data collection process.

Both the pilot study and the main study took place in the psychology laboratory of Yeditepe University. Each participant was tested by appointment. A

39.6 cm (15.6 inch) high resolution LED BrightView screen (1366 x 768) HP laptop was used to show the participants the videos. While the main study took approximately 30 minutes, the pilot study took approximately 10 minutes. All experiments were conducted between 10 a.m. and 4 p.m.. The participant was left alone in the room while watching the video. After the video was finished, the experimenter entered the room and carried out the rest of the experimental process. Particular attention was paid to the fact that the laboratory was quiet and that there were no distractions in the room. There were only a computer, a large table, two chairs, forms and pens in the room.

This study was approved by the Social and Human Sciences Ethical Committee of Yeditepe University (See Appendix H.).

2.4.Data Analysis

The data was analyzed with the Statistical Package for Social Sciences (SPSS), version 20.0. All continuous variables were checked for normality via Kolmogorov-Smirnov test. In addition, a box plot was drawn for each of these variables in SPSS to indicate whether there were any outliers (values more than 1.5 times the interquartile range). Chi-square test for goodness of fit was used to compare the experimental groups with respect to gender and education. Intergroup comparisons for state anxiety, stress, and fruit fluency scores were conducted with independent samples t-test. Since the distribution of digit span, Stroop, and the remaining verbal fluency scores either violated normality or included outliers, group differences based on these were analyzed via the Mann-Whitney U test. Bonferroni correction was applied for multiple comparisons.

To test whether state anxiety predicts neuropsychological performance, a series of Spearman correlational analyses were first carried out to test whether state

anxiety score was significantly correlated with digit span, Stroop, KAS fluency and animal fluency test scores. Then, a series of simple regression analyses were carried out to test the extent to which variables that are significantly correlated with state anxiety score are predicted by that score.



3. RESULTS

3.1. Sociodemographic Characteristics of the Sample

In total, 66 participants (54 female and 12 male) had a mean of age of 21.4 years ($SD = 2.2$). There were 33 participants in both horror and calm conditions. The two groups did not significantly differ from each other with regard to the distribution of gender, $\chi^2(1) = .407$, $p = .751$, level of education; $\chi^2(1) = 1.63$, $p = .339$ and age; $t(64) = -1.26$, $p = .212$. Sociodemographic characteristics of the sample are demonstrated in Table 1.

Table 1. Sociodemographic Characteristics of the Sample

Sociodemographic Variables	Groups		
	Horror ($n = 33$)	Calm ($n = 33$)	Total ($N = 66$)
Gender (%)	33 (50)	33 (50)	66 (100)
Female	28 (42.40)	26 (39.40)	54 (81.8)
Male	5 (7.6)	7 (10.6)	12 (18.2)
Education Level (%)			
Undergraduate	29 (43.9)	25 (37.9)	54 (81.8)
Graduate	4 (6.1)	8 (12.1)	12 (18.2)
Mean Age (SD)	21.2 (2)	21.8 (2.3)	21.4 (2.1)

3.2. Comparison of State Anxiety and Stress between Groups

An independent samples t-test revealed a significant difference in the state anxiety scores of horror ($M = 58.12$, $SD = 7.68$) and calm ($M = 29.61$, $SD = 5.754$) groups; $t(64) = 17.07$, $p < .001$, $d = 4.21$, indicating that the experimental manipulation

was successful in terms of modifying the state anxiety level of the participants. The groups, however, did not differ from each other with regard to their total perceived stress scores; $t(64) = .85$, $p = .3994$ (See Table 2).

Table 2. *Intergroup Comparisons with Regard to Total S-Anxiety and PSS Scores*

Variables	Horror		Calm		$t(64)$	p	Cohen's d
	($n = 33$)		($n = 33$)				
	M	SD	M	SD			
S-Anxiety	58.11	7.68	29.60	5.74	17.07	<.001	4.21
PSS	29.15	7.21	27.64	7.30	.85	.399	.21

S-Anxiety: State Anxiety, PSS: Perceives Stress Scale

3.3. Comparison of the Effects Anxiety Manipulation on Executive Function Performances of the two Groups

Means and standard deviations for all executive function tests are provided in Table 3. A Mann-Whitney U test indicated Forward Digit Span Task (FDST) scores of the calm group ($Mdn = 7$) were significantly higher than the scores of the horror group ($Mdn = 5$); $U(N_{horror} = 33, N_{calm} = 33) = 16.50$, $p < .001$, $r = .87$. Backward Digit Span Task (BDST) scores of the calm group ($Mdn = 5$) were also higher than that of the horror group ($Mdn = 4$). $U(N_{horror} = 33, N_{calm} = 33) = 76$, $p < .001$, $r = .78$. Figure 1 demonstrates FDST and BDST performances of the two groups.

Table 3. *Executive Function Test Performances of the Groups*

Groups			
Mean Test Scores	Horror	Calm	
(SD)	(n=33)	(n=33)	<i>p</i>
Digit span test			
Forward	5.33 (.48)	7.15 (.57)	< .001*
Backward	3.94 (.61)	5.36 (.65)	< .001*
Verbal Fluency			
KAS	41.55 (9.15)	53.70 (13.31)	< .001*
Animal	20.45 (3.92)	23.33 (5.24)	.014
Supermarket	21.00 (5.18)	23.70 (6.00)	.063
Fruit	14.67 (3.74)	15.06 (3.14)	.65
Stroop Interference	34.82 (9.42)	26.45 (4.93)	< .001*

* significant results at the Bonferroni-corrected *p* level of .007.

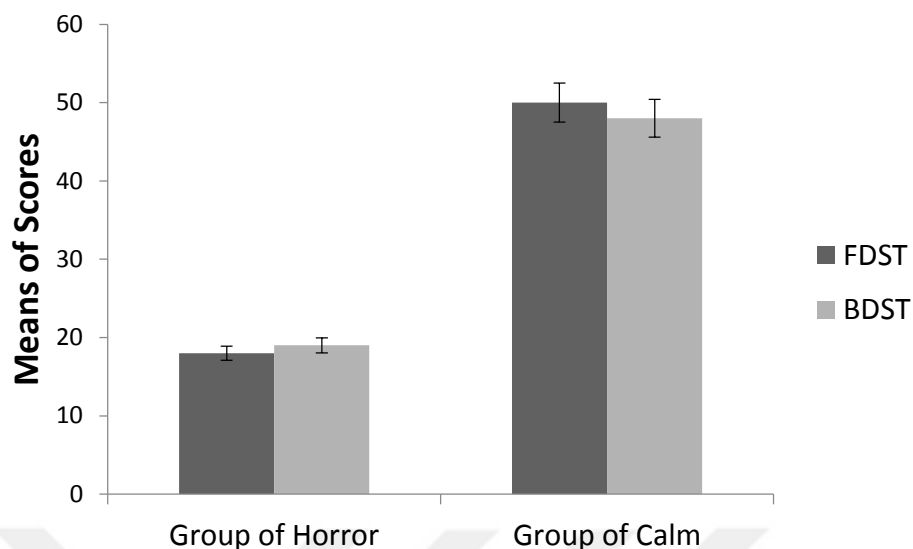


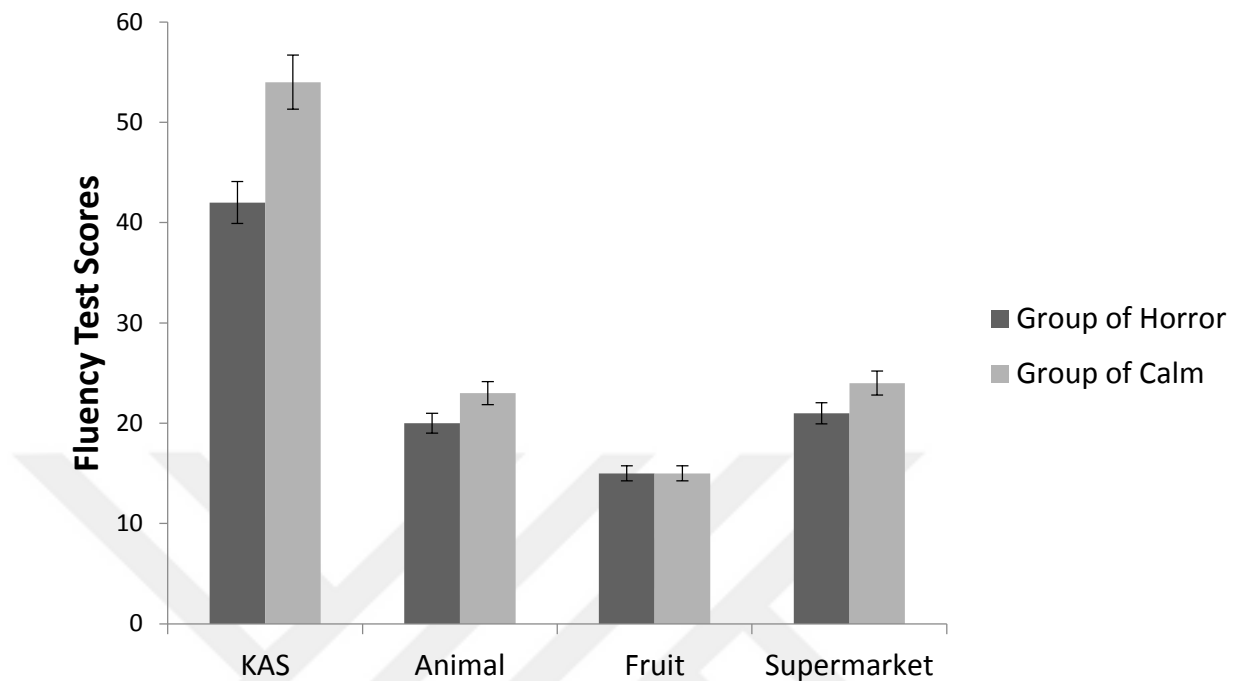
Figure 1. Digit Span Performance of the Experimental Groups

FDST: Forward Digit Span Task, BDST: Backward Digit Span Task.

Note. Means of scores for FDST and BDST are shown for both conditions. The standard error of the mean is indicated by error bars.

In terms of verbal fluency, the calm group ($Mdn = 49$) scored significantly higher than the horror group ($Mdn = 42$) in lexical fluency (KAS) task, $U(N_{horror} = 33, N_{calm} = 33) = 244.50, p < .001, r = .47$. Animal fluency scores of the calm group ($Mdn = 23$) were also significantly higher than the horror group ($Mdn = 20$), $U(N_{horror} = 33, N_{calm} = 33) = 353.50, p = .014, r = .30$, although this difference disappeared after Bonferroni correction. However, the groups did not differ from each other with respect to fruit fluency ($t(64) = -.463, p = .65$), and supermarket fluency ($U(N_{horror} = 33, N_{calm} = 33) = 400, p = .063$) scores. Mean verbal fluency test scores for both groups are demonstrated in Figure 2.

Figure 2 .Verbal Fluency Performances of the Groups



Note. Means of scores for KAS, Animal, Fruit and Supermarket are shown for both conditions. The standard error of the mean is indicated by error bars.

Finally, a Mann-Whitney U test indicated that Stroop interference scores of the calm group ($Mdn = 26$) were higher than the horror group ($Mdn = 33$). Mann-Whitney test indicated that this difference was statistically significant, $U(N_{horror} = 33, N_{calm} = 33) = 233, p < .001, r = .23$.

3.4.Does State Anxiety Predict Executive Function Performance?

The correlation between each test score (i.e., Stroop test, digit span test, KAS fluency test and, animal fluency test) and the state anxiety score was examined for the whole sample ($N = 66$). The results indicated that state anxiety score was significantly correlated with all test scores (See Table 4).

Table 4. *Intercorrelations between State Anxiety and Neuropsychology Test Scores*

Variables	1	2	3	4	5
1. State Anxiety	-				
2. Forward Digit Span Test	-.826**	-			
3. Backward Digit Span Test	-.664**	-.701**	-		
4. KAS Fluency Test	-.471**	.513**	.494**	-	
5. Animal Fluency Test	-.286*	.281*	.391**	.495**	-
6. Stroop Test	.511**	-.382**	-.394**	-.182	-.032

* $p < .05$. ** $p < .01$.

A series of simple linear regression analyses were conducted to test whether state anxiety scores predict performance in these tests. The results indicated that state anxiety was a significant predictor for all of these variables, with increased levels of anxiety being associated with decreased performance. Results of the linear regression analysis for state anxiety score predicting executive functions tests are provided in Table 5.

Table 5. *Results of the Linear Regression Analysis for State Anxiety Score Predicting Executive Functions*

Dependent Variables	B	SE B	B	t	p	Adj. R²
Forward Digit Span	-.056	.004	-.843	-12.541	<.001	.706
Backward Digit Span	-.041	.005	-.684	-7.505	<.001	.460
KAS Fluency Test	-.394	.089	-.486	-4.445	<.001	.224
Animal Fluency Test	-.087	.036	-.286	-2.390	.020	.068
Stroop Test	.283	.058	.523	4.914	<.001	.263

4. DISCUSSION

4.1. Overview of the Study

The present study investigated the effects of state anxiety on attention and executive functions. Half of the participants were assigned in a condition in which they watched a clip that would increase their state anxiety whereas the other half watched a relatively calm, underwater sea video. Then both groups were tested with measures of attention and executive function (EF). Apart from fruit and supermarket fluency tests, anxiety group performed worse than the calm group in all cognitive measures; including digit span, Stroop test, lexical and animal fluency (although the difference is weaker here, as it disappeared lost its statistical significance after Bonferroni correction).

4.2. Effects of State Anxiety on Executive Functions

Forward and backward digit span, verbal fluency test and Stroop test were used as the assessment of executive functions in this study. According to executive functions tests participants performed, significant results were obtained in forward and backward digit span task, and Stroop test. In addition, animal and KAS (lexical) fluency performance also significantly differed between the groups. However, the results of the categories of fruit and supermarket tests were not significant.

4.2.1. The Relationship Between State Anxiety and Forward and Backward Digit Span Task

Backward and forward digit span tasks have been associated with different aspects of Working Memory. It has been indicated that backward digit span is related to Working Memory component while, forward digit span is related to the Short Term Memory component (Alloway, Elliott, Gathercole & Kirkwood, 2009). According to

Lezak (1995), forward digit span should be treated as an attention test and the backward digit span as a memory test.

The results of the current study show that while the performance values of the participants with high anxiety level in both (forward and backward) parts are low, the performance values of the participants with low anxiety level are high in both parts. Another study also supports this result. According to this study, the digit span task from the WAIS used in the study shows us that the success rate of the participants with high state anxiety is low (Horwitz et al., 2008). Again, a similar study on children found that children with high anxiety took longer to complete the backward digit span task than children with low anxiety, and it was observed that high anxiety children increased their mental effort on the forward digit span task (Hadwin et al., 2005). In other words, slower performance related to state anxiety on the backwards digit span task.

4.2.2. Relationship Between State Anxiety and Verbal Fluency Test

Performance on verbal fluency tests is associated with the location of focal cerebral deficits (Caltagirone et al., 1981). Besides, the verbal fluency test shows high validity with clinical tests of executive functions.

In the research, KAS, animal, fruit, and supermarket were used as the verbal fluency test on participants. While it was observed that the KAS and animal performances of the participants with high anxiety levels were low, no significant difference was observed in the supermarket and fruit categories with participants with high or low anxiety levels.

Hendrawan et al. (2012) found a negative relationship between state anxiety and letter fluency score. Increased state anxiety was also positively correlated with negative mood, skin conductivity, and salivary cortisol levels in this study. Similarly,

Buckelew and Hannay (1986) found participants with high state anxiety performed poorly in the block design subtest of WAIS and a simple word fluency test. In addition, the results of a study by Horwitz et al. (2008) indicated that participants who experienced an increase in state anxiety with the presence of a third person could not show sufficient success in the animal fluency test.

In this study, as opposed to animal and letter fluency, there was not a statistically significant difference between horror and calm groups with regard to their fruit and supermarket fluency performances. Horwitz et al. (2008) suggested that “high levels of state anxiety may be associated with poorer performance on difficult but not necessarily easy tests” (p. 409). Therefore, it might be the case that since these two categories are frequently used in daily life, participants found it easier to generate words in these categories even when they were more anxious.

4.2.3. Relationship Between State Anxiety and Stroop Test Performance

Stroop Test, one of the executive function tests, is widely used to evaluate information processing speed, selective attention, response inhibition and cognitive flexibility (Savaş, Tanör, Yener & Yerlikaya, 2019).

According to the results of the study, it was observed that the performance of highly anxious individuals on the Stroop Test-Çapa Form was less compared to the performance of individuals with low anxiety. Accordingly, it can be said that the anxiety increase in the person decreases the efficiency of test performance.

The findings of this study generally suggest that increased state anxiety has a detrimental effect on attention and EF performance. Some theories have been put forward to explain this relationship. When we look at the Processing Efficiency Theory (Calvo, Derakshan, Eysenck & Santos, 2007), it was thought that anxious participants needed more activation of their brain systems that support cognitive

control in order to maintain a performance similar to non-anxious participants. This might lead to extra load on the brain mechanisms, which in turn, might lead to reduced performance.

Another theory is on Attentional Control Theory (Calvo et al., 2007).

According to this theory, anxiety disrupts the efficient processing of the goal-directed attention system. It is supposed that it increases the degree to which it influences the functioning of the stimulus-driven system. In connection with this theory, the results of the work done by Derakshan, Eysenck, and Smyth (2009) show that task switching had a minor effect on low anxiety individuals. However, it significantly slowed the performance of high anxiety participants. Another study conducted to look at the effect of state anxiety on attention: Participants were given arithmetic tasks under conditions that task-switching or non-task-switching. According to the results of the study, individuals with high state anxiety had difficulties in task-switching conditions (Derakshan et al., 2009).

Besides, Cognitive Control Theory (Braver, Burgess & Gray, 2007) suggested that reduced cognitive activity may occur in consequence of changes in the temporal dynamics of dorsolateral prefrontal cortex uptake. In an experiment based on this theory (Barch, Burgess, Braver, Fales, Gray, Mennin, & Schaefer, 2008), it was created with fMRI design and video to influence the participants' mood. According to the results of the experiment, after the neutral video, the high-anxious participants had reduced continued but enhancement temporary activation in working memory compared to with low-anxious participants (Barch et al., 2008).

4.3. Limitations and Future Recommendations

Since the emergence and intensity of anxiety (state anxiety) felt in a given situation is affected by the individual's susceptibility to anxiety (trait anxiety), state

and trait anxiety are highly correlated (Rachman, 2004). Both trait and state anxiety have negative effects on cognitive tasks (see Eysenck, 1992). However, only state anxiety was assessed in this thesis. It would be essential for further studies to include trait anxiety as an additional variable in order to see both its independent effect as well as its interaction with state anxiety in affecting cognitive performance.

Although the data presented in the current study clearly indicates a significant negative relationship between state anxiety and measures of attention and EF, it fails to explain the mechanisms through which this happens. Incorporating neurophysiological measures such brain imaging techniques our measures of skin conductance would therefore enable future researchers to reach a more anatomy-based explanations regarding the mechanisms of this relationship.

There is an unbalanced distribution in the ratio of women and men in the study, although gender distribution between groups were not significantly different from each other. Although studies in general failed to find a gender effect in such procedures (eg., Fales et al., 2008), studies with more balanced gender distribution are warranted to support the results. Another potential limitation might be lack of pretest assessment of both anxiety and cognitive performance. Although random assignment supposedly eliminates individual difference between groups, mixed design studies will provide additional insight in the field.

4.4. Contribution of The Study to Literature

With its experimental design, this study clearly shows that state anxiety leads to a reduction in attention and EF performance. In addition to providing additional data to the existing literature, the findings are also expected to shed light on possible anxiety intervention and treatment approaches for clinicians working on anxiety disorders or anxiety-related cognitive deficits.

5. CONCLUSION

This study was created to examine the effects of stress and state anxiety on attention and executive functions. It was observed that individuals with high state anxiety levels performed worse in tests evaluating attention and executive functions (including digit span, verbal fluency, and the Stroop task) than those with low state anxiety levels. The findings of the study appear to be largely in line with the previous literature on the subject. The experimental nature of the study enables us to reach a causal relationship between state anxiety and cognitive performance; i.e., it appears that increased state anxiety leads to a deteriorated performance in attention and EF. Future studies incorporating neurophysiological measures would enable us to gain a deeper understanding of the mechanisms of this effect.

REFERENCES

- Airaksinen, E., Larsson, M., & Forsell, Y. (2005). Neuropsychological functions in anxiety disorders in population-based samples: Evidence of episodic memory dysfunction. *Journal of Psychiatric Research*, 39(2), 207-214.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30(2), 217-237.
- Alloway, T. P., Gathercole, S. E., Kirkwood, H., & Elliott, J. (2009). The cognitive and behavioral characteristics of children with low working memory. *Child Development*, 80, 606–21. doi:10.1111/j.1467-8624.2009.01282.x
- Allport, A. (1993). Attention and control: Have we been asking the wrong questions? A critical review of twenty-five years. *Attention and performance XIV: Synergies in experimental psychology, artificial intelligence, and cognitive neuroscience*, 14, 183.
- Anderson, P. J. (2010). Towards a developmental model of executive function. *In Executive Functions and The Frontal Lobes* (pp. 37-56). Psychology Press.
- Anderson, V.A., Anderson, P., Northam, E., Jacobs, R., Catroppa, C. (2001). Development of executive functions through late childhood and adolescence in an Australian sample. *Developmental Neuropsychology*, 20(1), 385-406.

- Ansari, T.L., Derakshan, N., & Richards, A. (2008). Effects of anxiety on task switching: Evidence from mixed antisaccade task. *Cognitive, Affective, and Behavioral Neuroscience*, 8, 229-238
- Armbruster, D. J., Ueltzhöffer, K., Basten, U., & Fiebach, C. J. (2012). Prefrontal cortical mechanisms underlying individual differences in cognitive flexibility and stability. *Journal of Cognitive Neuroscience*, 24(12), 2385-2399.
- American Psychological Association. (2019). *Anxiety*. American Psychological Association.
- Baddeley, A. (1986) *Working Memory*. Oxford University Press, Oxford.
- Baldo, J. V., & Shimamura, A. P. (1998). Letter and category fluency in patients with frontal lobe lesions. *Neuropsychology*, 12(2), 259–267. doi:10.1037/0894-4105.12.2.259
- Bandelow, B., Sher, L., Bunevicius, R., Hollander, E., Kasper, S., Zohar, J., & Möller, H. J. (2012). WFSBP task force on anxiety disorders, OCD and PTSD. Guidelines for the pharmacological treatment of anxiety disorders, obsessive-compulsive disorder and posttraumatic stress disorder in primary care. *Int J Psychiatry Clin Pract*, 16(2), 77-84.
- Bannister, D. (1985). The free-floating concept of anxiety. In *Current issues in clinical psychology* (pp. 227-235). Springer, Boston, MA.

- Beck, A. T., & Clark, D. A. (2011). *Cognitive therapy of anxiety disorders: Science and practice*. Guilford Press.
- Beck, A. T., Emery, G., & Greenberg, R. L. (2005). *Anxiety disorders and phobias: A cognitive perspective*. Basic Books.
- Beckwé, M. ve Deroost, N. (2016). Induced worrying impairs updating efficiency. *Journal of Psychology and Psychotherapy*, 6(266), 2161-0487.
- Benton, A. (1968). Differential behavioral effects on frontal lobe disease. *Neuropsychologia*, 6, 53-60.
- Birn, R. M., vd. (2010). Neural systems supporting lexical search guided by letter and semantic category cues: A self-paced overt response fMRI study of verbal fluency. *Neuroimage*, 49, 1099 – 1107.
- Bishop, S. J. (2007). Neurocognitive mechanisms of anxiety: An integrative account. *Trends in Cognitive Sciences*, 11(7), 307-316.
- Bishop, S. J. (2009). Trait anxiety and impoverished prefrontal control of attention. *Nature Neuroscience*, 12(1), 92-98.
- Bolter, J., Long, C., & Wagner, M. (1983). The utility of the Thurstone word fluency test in identifying cortical damage. *Clinical Neuropsychology*, 5, 77-82.
- Broadbent, D., & Broadbent, M. (1988). Anxiety and attentional bias: State and trait. *Cognition & Emotion*, 2(3), 165-183.

Braver, T. S., Gray, J. R., & Burgess, G. C. (2007). Explaining the many varieties of working

memory variation: Dual mechanisms of cognitive control. *Variation in Working Memory*, 75, 106.

Buckelew, S. P., & Hannay, H. J. (1986). Relationships among anxiety, defensiveness, sex,

task difficulty, and performance on various neuropsychological tasks. *Perceptual and Motor Skills*, 63(2), 711-718.

Burgess, P. W. (2003). Assessment of executive function. *Handbook of Clinical Neuropsychology*, 302-321.

Buss, C., Davis, E. P., Hobel, C. J., & Sandman, C. A. (2011). Maternal pregnancy-specific

anxiety is associated with child executive function at 6–9 years age. *Stress*, 14(6), 665-676.

Choi, J. M., Padmala, S., & Pessoa, L. (2012). Impact of state anxiety on the interaction

between threat monitoring and cognition. *Neuroimage*, 59(2), 1912-1923.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396.

Corbetta, M., & Shulman, G. L. (2002). Control of goal-directed and stimulus-driven attention in the brain. *Nature Reviews Neuroscience*, 3(3), 201-215.

Csemiczky, G., Landgren, B. M., & Collins, A. (2000). The influence of stress and state

anxiety on the outcome of IVF treatment: Psychological and endocrinological assessment of Swedish women entering IVF treatment. *Acta Obstetrica et Gynecologica Scandinavica*, 79(2), 113-118.

Dalgleish, T., & Power, M. (2015). *Cognition and emotion: From order to disorder*. New

York/London: Psychology Press.

Damasio, H., Grabowski, T., Frank, R., Galaburda, A. M., & Damasio, A. R. (1994). The

return of Phineas Gage: Clues about the brain from the skull of a famous patient. *Science*, 264(5162), 1102-1105.

Davidson, R. J. (2002). Anxiety and affective style: role of prefrontal cortex and amygdala. *Biological Psychiatry*, 51(1), 68-80.

Demirkıran, F., Dereboy, Ç. Eskin, M., & Harlak, H. (2013, October). Algılanan stres ölçeğinin Türkçeye uyarlanması: güvenirlik ve geçerlik analizi. *In New/Yeni Symposium Journal* (Vol. 51, No. 3, pp. 132-140).

Dempster, F. N. (1993). Resistance to interference: Developmental changes in a basic processing mechanism. In Howe M. L., Pasnak R., (Eds.). *Emerging themes in cognitive development* (Vol. 1., pp. 3–27) Springer; New York: 1993.

Denckla, M.B. (1994) Measurement of executive function. *In Frames of Reference for the*

Assessment of Learning Disabilities (Lyon, G.R., ed.), pp. 117–142, Paul H.

Brooks

Derakshan, N., & Eysenck, M. W. (2009). Anxiety, processing efficiency, and cognitive

- performance: New developments from attentional control theory. *European Psychologist*, 14(2), 168-176.
- Derakshan, N., Smyth, S., & Eysenck, M. W. (2009). Effects of state anxiety on performance using a task-switching paradigm: An investigation of attentional control theory. *Psychonomic Bulletin & Review*, 16(6), 1112-1117.
- Derosa-Grund, T. (Producer), Safran, P. (Producer), Cowan, R. (Producer) ve Wan, J. (Director). (2013). *The conjuring* [Movie]. USA: Warner Bros.
- Dornyei, Z. (2005). *The psychology of the language learner Individual differences in second language acquisition*. Mahwah, NJ: Lawrence Erlbaum Associates
- Dunsmoor, J. E., & Paz, R. (2015). Fear generalization and anxiety: Behavioral and neural mechanisms. *Biological Psychiatry*, 78(5), 336-343.
- Emek-Savaş, D. D., Yerlikaya, D., Yener, G. G., & Tanör, Ö. Ö. (2019). Stroop Testi Çapa Formu'nun Geçerlik-Güvenirlik ve Norm Çalışması.
- Endler, N. S., & Kocovski, N. L. (2001). State and trait anxiety revisited. *Journal of Anxiety Disorders*, 15(3), 231-245.
- Engin, E., & Treit, D. (2007). The role of hippocampus in anxiety: Intracerebral infusion studies. *Behavioural Pharmacology*, 18(5-6), 365-374.
- Erdoğan, E., Karakaş, S., Sak, L., Soysal, A. Ş., Ulusoy, T., Ulusoy, İ. Y., & Alkan, S. (1999).

Stroop Testi TBAG Formu: Türk kültürüne standardizasyon çalışmaları, güvenirlik ve

geçerlik. *Klinik Psikiyatri*, 2(2), 75-88.

Eysenck, M. W. (1979). Anxiety, learning, and memory: A reconceptualization. *Journal of*

Research in Personality, 13(4), 363-385.

Eysenck, M. W. (1985). Anxiety and cognitive-task performance. *Personality and Individual*

Differences, 6(5), 579-586

Eysenck, M. W. (1988). Anxiety and attention. *Anxiety Research*, 1(1), 9-15.

Eysenck, M. W. (1992). *Anxiety: The cognitive perspective*. Hove, UK: Psychology Press.

Eysenck, M. W., & Calvo, M. G. (1992). Anxiety and performance: The processing efficiency

theory. *Cognition & Emotion*, 6(6), 409-434

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive

performance: Attentional control theory. *Emotion*, 7(2), 336.

Eysenck, M., Payne, S., & Derakshan, N. (2005). Trait anxiety, visuospatial processing, and

working memory. *Cognition & Emotion*, 19(8), 1214-1228.

Fales, C. L., Barch, D. M., Burgess, G. C., Schaefer, A., Mennin, D. S., Gray, J. R., & Braver,

T. S. (2008). Anxiety and cognitive efficiency: Differential modulation of transient and sustained neural activity during a working memory task. *Cognitive, Affective, & Behavioral Neuroscience*, 8(3), 239-253.

Fales, C. L., Barch, D. M., Burgess, G. C., Schaefer, A., Mennin, D. S., Gray, J. R., & Braver,

T. S. (2008). Anxiety and cognitive efficiency: Differential modulation of transient and sustained neural activity during a working memory task. *Cognitive, Affective, & Behavioral Neuroscience*, 8(3), 239-253.

Fenichel, O., & Rangell, L. (1995). *The psychoanalytic theory of neurosis*. WW Norton & Company.

Fink, G. (2010). Stress: definition and history. *Stress science: Neuroendocrinology*, 3-9.

Freud, S. (1920). *A general introduction to psychoanalysis*. New York: Boni and Liveright.

Giannakakis, G., Pediaditis, M., Manousos, D., Kazantzaki, E., Chiarugi, F., Simos, P. G., ...

& Tsiknakis, M. (2017). Stress and anxiety detection using facial cues from videos. *Biomedical Signal Processing and Control*, 31, 89-101.

Greening, L., & Stoppelbein, L. (2007). Brief report: Pediatric cancer, parental coping style,

and risk for depressive, posttraumatic stress, and anxiety symptoms. *Journal of Pediatric Psychology*, 32(10), 1272-1277.

Hadwin, J. A., Brogan, J., & Stevenson, J. (2005). State anxiety and working memory in

children: A test of processing efficiency theory. *Educational Psychology, 25*(4), 379-393.

Hendrawan, D., Yamakawa, K., Kimura, M., Murakami, H., & Ohira, H. (2012).

Executive

functioning performance predicts subjective and physiological acute stress reactivity: Preliminary results. *International Journal of Psychophysiology, 84*(3), 277-283.

Horwitz, E. (2001). Language anxiety and achievement. *Annual review of applied linguistics, 21*(1), 112.

Horwitz, J. E., & McCaffrey, R. J. (2008). Effects of a third-party observer and anxiety on

tests of executive function. *Archives of Clinical Neuropsychology, 23*(4), 409-417.

Humphreys, M. S., & Revelle, W. (1984). Personality, motivation, and performance:

A theory

of the relationship between individual differences and information processing. *Psychological Review, 91*(2), 153.

Hunley, S. (2017). *Executive functioning and how it relates to anxiety*. Retrieved from

<https://www.anxiety.org/what-is-executive-functioning-and-how-does-it-relate-to-anxiety>

Jawabri, K. H., & Sharma, S. (2019). Physiology, cerebral cortex functions.

In StatPearls

[Internet]. StatPearls Publishing.

Johnson, D. R., & Gronlund, S. D. (2009). Individuals lower in working memory capacity are

particularly vulnerable to anxiety's disruptive effect on performance. *Anxiety, Stress and Coping*, 22, 201-213.

Karakaş, S., Eski, R., & Başar, E. (1996). Türk kültürü için standardizasyonu yapılmış

nöropsikolojik testler topluluğu: BİLNOT bataryası. *32.Ulusal Nöroloji Kongresi Kitabı*. Türk Nöroloji Dergisi ve Bakırköy Ruh ve Sinir Hastalıkları Hastanesi, İstanbul, Ufuk Matbaası

Karakaş, S. (2004). *BİLNOT bataryası el kitabı: Nöropsikolojik testler için araştırma ve*

geliştirme çalışmaları (1st ed.). Ankara, Dizayn Ofset

Kenny, D. T., Davis, P., & Oates, J. (2004). Music performance anxiety and occupational

stress amongst opera chorus artists and their relationship with state and trait anxiety and perfectionism. *Journal of Anxiety Disorders*, 18(6), 757-777.

Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist*, 46(8), 819.

Leahy, R. L. (2017). *Cognitive therapy techniques: A practitioner's guide*. Guilford Publications.

Leuner, B., & Shors, T. J. (2013). Stress, anxiety, and dendritic spines: What are the connections?. *Neuroscience*, 251, 108-119.

Lezak, M. (1995). *Neuropsychological assessment*. New York: Oxford University Press.

Lund, N. (2002). *Attention and pattern recognition*. Routledge.

Mantella, R. C., Butters, M. A., Dew, M. A., Mulsant, B. H., Begley, A. E., Tracey, B., &

- Lenze, E. J. (2007). Cognitive impairment in late-life generalized anxiety disorder. *The American Journal of Geriatric Psychiatry*, 15(8), 673-679.
- May, R. (1950). *The Meaning of Anxiety*. Norton, New York.
- McClure EB, Monk CS, Nelson EE, Parrish JM, Adler A, Blair RJ, et al. Abnormal attention modulation of fear circuit function in pediatric generalized anxiety disorder. *Arch Gen Psychiatry*. 2007b;64:97–106.
- McGrath, J. E. (1970). *Social and psychological factors in stress*. Illinois Univ at Urbana
Dept of Psychology.
- McLeod, S. A. (2008, Oct 24). *Information processing*. Retrieved from <https://www.simplypsychology.org/information-processing.html>
- Meijer, J. (2001). Stress in the relation between trait and state anxiety. *Psychological Reports*, 88(3_suppl), 947-964.
- Miceli, G., Caltagirone, C., Gainotti, G., Masullo, C., & Silveri, M. C. (1981). Neuropsychological correlates of localized cerebral lesions in non-aphasic brain damaged patients. *Journal of Clinical Neuropsychology*, 3, 53-63.
- Mitte, K. (2008). Memory bias for threatening information in anxiety and anxiety disorders: A meta-analytic review. *Psychological Bulletin*, 134(6), 886.
- Monsch, A., Bondi, M., Butters, N., Paulsen, J., Salmon, D., Bruyer, D., & Swenson, M. (1994). A comparison of category and letter fluency in Alzheimer's and Huntington's disease. *Neuropsychology*, 8, 25-30.

Monk, C. S., Telzer, E. H., Mogg, K., Bradley, B. P., Mai, X., Louro, H. M., ... Pine, D. S.

(2008). Amygdala and ventrolateral prefrontal cortex activation to masked angry faces in children and adolescents with generalized anxiety disorder. *Archives of General Psychiatry*, 65(5), 568-576.

Moran, A. P. (2009). Attention, concentration and thought management. *Handbook of sports medicine and science: Sport Psychology*, 18-29.

Mummary, C. J., vd. (1996). *Proceedings: Biological Sciences*. 263, 989-995.

Murray, N. P., & Janelle, C. M. (2003). Anxiety and performance: A visual search examination of the processing efficiency theory. *Journal of Sport and Exercise Psychology*, 25(2), 171-187.

Najmi, S., Kuckertz, J. M., & Amir, N. (2012). Attentional impairment in anxiety: Inefficiency in expanding the scope of attention. *Depression and Anxiety*, 29(3), 243-249.

Nesse, R. M. (1994). Fear and fitness: An evolutionary analysis of anxiety disorders. *Ethology and Sociobiology*, 15(5-6), 247-261.

Nitschke, J. B., Sarinopoulos, I., Oathes, D. J., Johnstone, T., Whalen, P. J., Davidson, R. J.,

& Kalin, N. H. (2009). Anticipatory activation in the amygdala and anterior cingulate in generalized anxiety disorder and prediction of treatment response. *American Journal of Psychiatry*, 166(3), 302-310.

Owens, M., Stevenson, J., Norgate, R., & Hadwin, J. A. (2008). Processing efficiency theory

- in children: Working memory as a mediator between trait anxiety and academic performance. *Anxiety, Stress, & Coping*, 21(4), 417-430.
- Öktem-Tanor, O. (2011).Öktem sözel bellek süreçleri testi el kitabı. *Türk Psikolog Derneği Yayınları*. Ankara
- Öner, N., & LeCompte, W. A. (1985). Durumluk-sürekli kaygı envanteri el kitabı. *Boğaziçi Üniversitesi Yayınları*.
- Paris, B. J. (1999). Karen Horney's vision of the self. *The American Journal of Psychoanalysis*, 59(2), 157-166.
- Pacheco-Unguetti, A. P., Acosta, A., Callejas, A., & Lupiáñez, J. (2010). Attention and anxiety: Different attentional functioning under state and trait anxiety. *Psychological Science*, 21(2), 298-304.
- Pennington, B. F., Bennetto, L., McAleer, O., & Roberts, R. J.(1996). Executive functions and working memory: Theoreticaland measurement issues. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory, and Executive Function* (pp. 327–348). Baltimore, MD: Paul Brookes.
- Posner, M. I., Snyder, C. R., & Solso, R. (2004). Attention and cognitive control. *Cognitive Psychology: Key Readings*, 205.
- Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy*, 42(11), 1227-1255.
- Reiss, S. (1997). Trait anxiety: It's not what you think it is. *Journal of Anxiety*

Disorders, 11(2), 201-214.

Riskind, J. H. (2007). Genellenmiş anksiyete bozukluğu. T. Özakkaş (Ed.), *Bilişsel terapi*

ve uygulamaları içinde (s. 141-167) (H. Hacak, M. Macit & F. Özpilavcı, Çev.).

İstanbul: Litera Yayıncılık.

Rozzini, L., Chilovi, B. V., Peli, M., Conti, M., Rozzini, R., Trabucchi, M., & Padovani, A.

(2009). Anxiety symptoms in mild cognitive impairment. *International Journal of Geriatric Psychiatry: A journal of the psychiatry of late life and allied sciences*, 24(3), 300-305.

Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reactions to tests. *Journal of Personality and Social Psychology*, 46(4), 929.

Sarason, I. G. (1988). Anxiety, self-preoccupation and attention. *Anxiety Research*, 1(1), 3-7.

Saviola, F., Pappaianni, E., Monti, A., Grecucci, A., Jovicich, J., & De Pisapia, N. (2020).

Trait and state anxiety are mapped differently in the human brain. *Scientific Reports*, 10(1), 1-11.

Scott, W.A. (1962) Cognitive complexity and cognitive flexibility. *Sociometry*, 405–414

Scovel, T. (1978). The effect of affect on foreign language learning. *A Review of the Anxiety*

Research, 28(1), 129-142.

- Shields, G. S., Moons, W. G., Tewell, C. A., & Yonelinas, A. P. (2016). The effect of negative affect on cognition: Anxiety, not anger, impairs executive function. *Emotion*, 16(6), 792.
- Shin, L. M., & Liberzon, I. (2010). The neurocircuitry of fear, stress, and anxiety disorders. *Neuropsychopharmacology: Official publication of the American College of Neuropsychopharmacology*, 35(1), 169–191.
doi:10.1038/npp.2009.83
- Singer, B. D., & Bashir, A. S. (1999). What are executive functions and self-regulation and what do they have to do with language-learning disorders?. *Language, Speech, and Hearing Services in Schools*, 30(3), 265-273.
- Smith, W. B. (2007). Karen Horney and psychotherapy in the 21st century. *Clinical Social Work Journal*, 35(1), 57-66.
- Spada, M. M., Georgiou, G. A., & Wells, A. (2010). The relationship among metacognitions, attentional control, and state anxiety. *Cognitive Behaviour Therapy*, 39(1), 64-71.
- Spielberger, C. D. (1972). *Anxiety: Current trends in theory and research*. I. New York: Academic Press.
- Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C. D. (1972). *Review of Profile of Mood States*.
- Speilberger, C. D. (1983). *Anxiety*. New York: Academic Press

- Spielberger, C. D. (2010). State-Trait anxiety inventory. *The Corsini Encyclopedia of Psychology*, 1-1.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *The State-trait anxiety inventory (Test mud)*. Palo Alto, Ca: Consulting Psychologists Press.
- Steimer, T. (2002). The biology of fear-and anxiety-related behaviors. *Dialogues in Clinical Neuroscience*, 4(3), 231.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18(6), 643.
- Stuss, D. T. (1992). Biological and psychological development of executive functions. *Brain and Cognition*, 20(1), 8-23.
- Stuss, D. T., & Benson, D. F. (1986). *The frontal lobes*. New York: Raven.
- Stuss, D. T., Floden, D., Alexander, M. P., Levine, B., & Katz, D. (2001). Stroop performance in focal lesion patients: dissociation of processes and frontal lobe lesionlocation. *Neuropsychologia*, 39(8), 771-786.
- Stuss, D. T., & Knight, R. T. (Eds.). (2013). *Principles of frontal lobe function*. Oxford University Press.
- Strauss, E., Sherman, E., & Spreen, O. (2006). *A compendium of neuropsychological tests*. New York: Oxford University Press.

Troyer, A. K., Moscovich, M., Winocur, G., Alexander, M. P., & Stuss, D. (1998).

Clustering

and switching on verbal fluency: The effects of focal frontal- and temporal-lobe lesions. *Neuropsychologia*, 36, 449–504

Tombaugh, T. N., Kozak, J., & Rees, L. (1999). Normative data stratified by age and education for two measures of verbal fluency: FAS and animal naming. *Archives of Clinical Neuropsychology*, 14(2), 167-177.

Tumaç, A. (1997). *The effects of age and education on frontal lobe tests in healthy Turkish*

Subjects(Unpublished master's thesis). University of Istanbul, Institute of Social Sciences, Department of Psychology.

Ursache, A., & Raver, C. C. (2014). Trait and state anxiety: Relations to executive functioning in an at-risk sample. *Cognition & Emotion*, 28(5), 845-855.

Walsh, K. W. (1978). *Neuropsychology: A clinical approach*. New York: Churchill Livingstone.

Wechsler D, (1987) WMS-R: Wechsler Memory Scale-Revised (The Psychological Corporation). *New York: Harcourt, Brace, Jovanovich*.

Wegbreit, E., Franconeri, S., & Beeman, M. (2015). Anxious mood narrows attention in

feature space. *Cognition and Emotion*, 29(4), 668-677.

Weintraub, S. (2000). Neuropsychological Assessment. *Principles of Behavioral and Cognitive Neurology*, 121.

Wells, A., & Matthews, G. (1996). Modelling cognition in emotional disorder: The S-REF

model. *Behaviour Research and Therapy*, 34(11-12), 881-888.

Wetherell, J. L., Reynolds, C. A., Gatz, M., & Pedersen, N. L. (2002). Anxiety, cognitive

performance, and cognitive decline in normal aging. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 57(3), P246-P255.

Yoshie, M. M. (2008). Effects of psychological stress on state anxiety, electromyographic

activity, and arpeggio performance in pianists. *Medical Problems of Performing Artists*, 23(3), 120-132.

Appendix A: Informed Consent

Katılımcı Kodu:

Tarih:

BİLGİLENDİRİLMİŞ GÖNÜLLÜ ONAM FORMU

Değerli katılımcı,

Sizi Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü, Klinik Psikoloji Bölümü'nde yüksek lisans öğrencisi Beray Bulak tarafından, Dr. Öğr. Üyesi Ezgi Soncu Büyükişcan danışmanlığında yürütülen yüksek lisans tez çalışmasına davet ediyoruz. Bu çalışmada kişinin stres yaşadığı durumlar, konular ve buna dair deneyimleri incelenecektir.

Araştırma kapsamında size bir video izletilecek ve bazı sorular sorulacaktır. Çalışmanın amacına ulaşması için sizden beklenen, bütün sorulara eksiksiz, kimsenin baskısı veya telkini altında olmadan, size en uygun gelen biçimde açık yüreklilikle yanıt vermenizdir. Çalışmanın hiçbir aşamasında sizden kimlik bilgileriniz istenmeyecek, verileriniz anonim olarak kaydedilecektir. Vereceğiniz bilgiler bu araştırma dışında hiçbir yerde kullanılmayacaktır.

Araştırmaya katılım tamamen gönüllülük esasına bağlıdır. Araştırmaya katıldıktan sonra, araştırmanın herhangi bir anında kendinizi rahatsız hissetmeniz durumunda araştırmadan çekilmekte tamamen özgürsünüz, bu durumun size herhangi bir olumsuz sonucu olmayacaktır. Araştırma sürecinde size stres ya da kaygı uyandırabilecek birtakım görüntüler izletilebilir. Bunların sizin üzerinizde uzun süreli olumsuz etki oluşturması beklenmemektedir. Ancak çalışma süresince ya da sonrasında kendinizi kötü hissetmeniz durumunda araştırmacıyla iletişime geçebilir veya üniversitenin psikolojik danışmanlık birimine (TEL: 0216 578 0000 - Dahili: 3772/3238) başvurabilirsiniz.

Arařtırmacı bana bu alıřmada ne yapacađımı anlattı ve bu alıřmaya gnll olarak katılmayı kabul ediyorum. Bilgilerimin gizli tutulacađının ve istediđim zaman arařtırmadan ayrılabilceđimin farkındayım.

Katılımcının İmzası:

Arařtırmacı: Beray Bulak

Tarih:

Mail:



Appendix B: Demographic Information Form

Katılımcı Kodu:

DEMOGRAFİK BİLGİ FORMU

Tari

h:

Lütfen aşağıda kişisel bilgileriniz ile ilgili soruları cevaplayınız.

Yaş :

Cinsiyet : Kadın ☐ Erkek ☐ Diğer ☐ (Belirtiniz.....)

Eğitim durumu: Lisans 1.Sınıf () 2.Sınıf () 3.Sınıf () 4.Sınıf ()

Yüksek Lisans 1.Sınıf () 2.Sınıf ()

Öğrenim gördüğünüz Fakülte:

Öğrenim gördüğünüz Bölüm:

1. Sürekli kullandığınız herhangi bir ilaç var mı? Varsa belirtiniz.

a) Evet (.....)

b) Hayır

2. Kahve tüketiyor musunuz? Eğer tüketiyorsanız en son ne zaman içtiğinizi belirtiniz.

a) Evet (.....)

b) Hayır

3. Sigara kullanıyor musunuz? Eğer kullanıyorsanız en son ne zaman içtiğinizi belirtiniz.

a) Evet (.....)

b) Hayır

b) Son bir hafta içerisinde uyku problemi yaşadınız mı?

a) Evet

b) Hayır

b) Herhangi bir nörolojik veya psikolojik rahatsızlığınız var mı? Eğer varsa belirtiniz.

a) Evet (.....)

b) Hayır

Appendix C: Perceived Stress Scale

Kod:

Tarih:

Yönerge: Aşağıda geçtiğimiz ay içerisindeki kişisel deneyimleriniz hakkında bir dizi soru yöneltilmektedir. Her soruyu dikkatlice okuyarak size en uygun seçeneğin altındaki kutuya bir çarpı işareti koyarak cevaplayınız. Soruların doğru veya yanlış cevabı yoktur. Önemli olan sizin duygu ve düşüncelerinizi yansıtan yanıtları vermenizdir.

	Hiçbir Zaman	Neredeyse Hiçbir Zaman	Bazen	Oldukça Sık	Çok sık
1. Geçen ay, beklenmedik bir şeylerin olması nedeniyle ne sıklıkta rahatsızlık duydunuz?					
2. Geçen ay, hayatınızdaki önemli şeyleri kontrol edemediğinizi ne sıklıkta hissettiniz?					
3. Geçen ay, kendinizi ne sıklıkta sinirli ve stresli hissettiniz?					
4. Geçen ay, ne sıklıkta gündelik zorlukların üstesinden başarıyla geldiniz?					
5. Geçen ay, hayatınızda ortaya çıkan önemli değişikliklerle etkili bir şekilde başa çıktığınızı ne sıklıkta hissettiniz?					
6. Geçen ay, kişisel sorunlarınızı ele alma yeteneğinize ne sıklıkta güven duydunuz?					
7. Geçen ay, her şeyin yolunda gittiğini ne sıklıkta hissettiniz?					
8. Geçen ay, ne sıklıkta yapmanız gereken şeylerle başa çıkamadığınızı fark ettiniz?					
9. Geçen ay, hayatınızdaki zorlukları ne sıklıkta kontrol edebildiniz?					
10. Geçen ay, ne sıklıkta her şeyin üstesinden geldiğinizi hissettiniz?					
11. Geçen ay, ne sıklıkta kontrolünüz dışında gelişen olaylar yüzünden öfkeleniniz?					
12. Geçen ay, kendinizi ne sıklıkta başarmak zorunda olduğunuz şeyleri düşünürken buldunuz?					
13. Geçen ay, ne sıklıkta zamanınızı nasıl kullanacağınızı kontrol edebildiniz?					
14. Geçen ay, ne sıklıkta problemlerin üstesinden gelemeyeceğiniz kadar biriktiğini hissettiniz?					

Appendix D: State Trait Anxiety Inventory

Kod:**Tarih:**

YÖNERGE: Aşağıda kişilerin kendilerine ait duygularını anlatmada kullandıkları birtakım ifadeler verilmiştir. Her ifadeyi okuyun, sonra da o anda nasıl hissettiğinizi ifadelerin sağ tarafındaki parantezlerden uygun olanını işaretlemek suretiyle belirtin. Doğru ya da yanlış cevap yoktur. Herhangi bir ifadenin üzerinde fazla zaman sarfetmeksizin **anında** nasıl hissettiğinizi gösteren cevabı işaretleyin.

		Hiç	BİRAZ	ÇOK	TAMAMİYLE
1.	Şu anda sakinim	(1)	(2)	(3)	(4)
2.	Kendimi emniyette hissediyorum	(1)	(2)	(3)	(4)
3	Su anda sinirlerim gergin	(1)	(2)	(3)	(4)
4	Pişmanlık duygusu içindeyim	(1)	(2)	(3)	(4)
5.	Şu anda huzur içindeyim	(1)	(2)	(3)	(4)
6	Şu anda hiç keyfim yok	(1)	(2)	(3)	(4)
7	Başıma geleceklerden endişe ediyorum	(1)	(2)	(3)	(4)
8.	Kendimi dinlenmiş hissediyorum	(1)	(2)	(3)	(4)
9	Şu anda kaygılıyım	(1)	(2)	(3)	(4)
10.	Kendimi rahat hissediyorum	(1)	(2)	(3)	(4)
11.	Kendime güvenim var	(1)	(2)	(3)	(4)

12.	Şu anda asabım bozuk	(1)	(2)	(3)	(4)
13.	Çok sinirliyim	(1)	(2)	(3)	(4)
14.	Sinirlerimin çok gergin olduğunu hissediyorum	(1)	(2)	(3)	(4)
15.	Kendimi rahatlamış hissediyorum	(1)	(2)	(3)	(4)
16.	Şu anda halimden memnunum	(1)	(2)	(3)	(4)
17.	Şu anda endişeliyim	(1)	(2)	(3)	(4)
18.	Heyecandan kendimi şaşkına dönmüş hissediyorum	(1)	(2)	(3)	(4)
19.	Şu anda sevinçliyim	(1)	(2)	(3)	(4)
20.	Şu anda keyfim yerinde	(1)	(2)	(3)	(4)

Appendix E: WMS R Forward and Backward Digit Span Task

Kod:

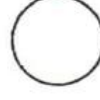
Tarih:

WMS R SAYI MENZİLİ			Ters Sayı Dizisi		
Puan	1. Deneme	2. Deneme	Puan	1. Deneme	2. Deneme
3	629	375	2	51	38
4	5417	8396	3	493	526
5	36925	69471	4	3814	1795
6	918427	635482	5	62973	48527
7	1285346	2814975	6	715286	831964
8	38295174	59182647	7	4739128	8129365

İleri Sayı Menzili



Geri Sayı Menzili



WMS R GÖRSEL MENZİL

Düz Görsel Menzil

Puan	1. Deneme	2. Deneme
2	26	84
3	275	816
4	3284	2615
5	53461	35172
6	172854	736148
7	8253416	4268375
8	75638742	16742853

İleri Görsel Menzil



Ters Görsel Menzil

Puan	1. Deneme	2. Deneme
2	36	74
3	685	318
4	8416	5241
5	46852	81637
6	718362	381754
7	1527438	6743152

Geri Görsel Menzil



WMS III: MENTAL KONTROL

1. 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1:

2. Pazar Cumartesi Cuma Perşembe Çarşamba Salı Pazartesi:

3. Aralık Kasım Ekim Eylül Ağustos Temmuz Haziran Mayıs Nisan Mart Şubat Ocak:

4. 1 4 7 10 13 16 19 22 25 28 31 34 37 40:

5. 100 93 86 79 72 65 58 51 44 37 30 23 16 9 2:

Appendix F: Verbal Fluency Test

Kod:

Tarih:

(a) Harf akıcılık testi:

Deneme Harfi (B)	Tekrar	Özel isim/Yanlış
.....		
.....		
.....		
.....		
.....		
.....		
Toplam:	Toplam:	Toplam:

(a) Harf akıcılık testi:

K Harfi	Tekrar	Özel isim/Yanlış
.....		
.....		
.....		
.....		
.....		
.....		
Toplam:	Toplam:	Toplam:

A Harfi	Tekrar	Özel isim/Yanlış
.....		
.....		
.....		
.....		
.....		
.....		
Toplam:	Toplam:	Toplam:

S Harfi	Tekrar	Özel isim/Yanlış
.....		
.....		
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.....		
.....		
Toplam:	Toplam:	Toplam:

Kod:

Tarih:

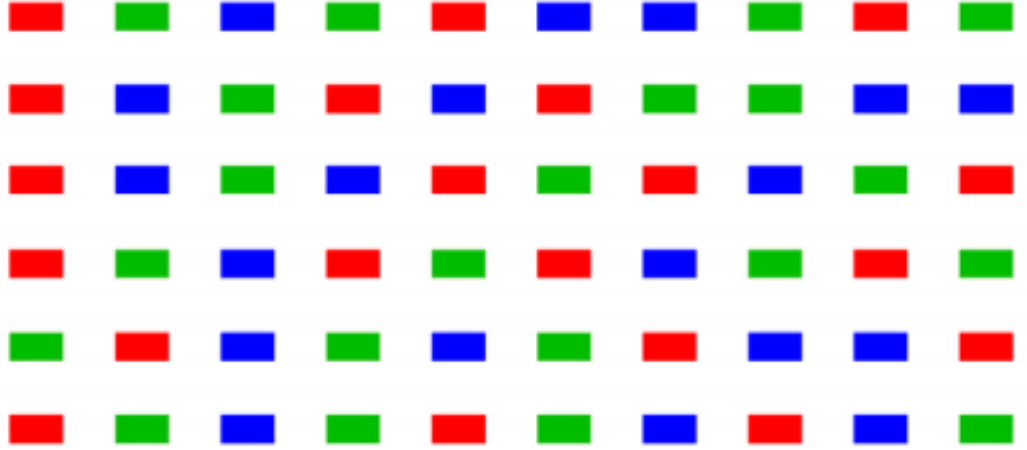
(b) Kategori akıcılık testi

Hayvan	Tekrar
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
Toplam:	Toplam:

Meyve	Tekrar
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
Toplam:	Toplam:

Süpermarket	Tekrar
.....	
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.....	
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.....	
.....	
.....	
Toplam:	Toplam:

Appendix G: Stroop Test Çapa Form

Kod:**Tarih:**

1

KIRMIZI YEŞİL MAVİ YEŞİL KIRMIZI MAVİ MAVİ YEŞİL KIRMIZI YEŞİL
 KIRMIZI MAVİ YEŞİL KIRMIZI MAVİ KIRMIZI YEŞİL YEŞİL MAVİ MAVİ
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 KIRMIZI YEŞİL MAVİ YEŞİL KIRMIZI YEŞİL MAVİ KIRMIZI MAVİ YEŞİL

Appendix H: Social and Human Sciences Ethical Committee of Yeditepe University



Sayı : 21568116-302.14.01-E.618
Konu : Beray Bulak Etik Kurul Hk.

13/10/2020

DAĞITIM YERLERİNE

Üniversitemiz Sosyal Bilimler Enstitüsü Klinik Psikoloji Yüksek Lisans Programı öğrencisi Beray BULAK'a ait "The Effects of State Anxiety on Attention and Executive Functions" başlıklı tez araştırma önerisinin beşeri bilimler etik standartlarına uygunluğuna ilişkin Yeditepe Üniversitesi Beşeri ve Sosyal Araştırmalar Etik Kurulu Onayı ekte sunulmuştur.

Bilgilerinize arz ve rica ederim.

İmza
Prof. Dr. Canan AYKUT BİNGÖL
Rektör

Ek: 13-2020 No'lu Etik Kurul Kararları.pdf

DAĞITIM :
Gereği :
İLGİLİ MAKAMA

Bilgi :
İletişim Fakültesi

NOT : BELGENİN ASLI ELEKTRONİK İMZALIDIR.



Belge Doğrulama Adresi :
<http://belgedogrulama.yeditepe.edu.tr/bg.aspx?id=AD0EA107-636C-4511-A5DA-543CE99AE6E6>
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