



**THE RELATIONSHIPS OF EXECUTIVE FUNCTIONS WITH COGNITIVE  
EMOTION REGULATION STRATEGIES AND PSYCHOLOGICAL  
RESILIENCE**

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## **ABSTRACT**

### **THE RELATIONSHIPS OF EXECUTIVE FUNCTIONS WITH COGNITIVE EMOTION REGULATION STRATEGIES AND PSYCHOLOGICAL RESILIENCE**

**MUNGAN, Özlem**

M.A. in Psychology

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The aim of this study is to examine whether executive functions of working memory, inhibitory control, and cognitive flexibility are related to cognitive emotion regulation strategies and psychological resilience. The study sample consisted of 80 volunteers between ages of 20-45, who did not have any psychiatric or neurological conditions, did not use medication that could affect their cognitive functions, and graduated from at least high school. SCL-90 total score was used to determine exclusion criteria when selecting participants. Cognitive emotion regulation and Connor-Davidson resilience scales were used to determine the emotion regulation strategies and psychological resilience levels of the participants; N-2 back, stop signal, and task switching paradigms were used to evaluate working memory, inhibitory control, and cognitive flexibility performance, respectively. The data obtained were analyzed by correlation, regression, and mediation analysis. In line with the findings obtained, it was observed that inhibitory control had a significant positive correlation with the acceptance emotion regulation strategy, which is one of the adaptive strategies, and cognitive flexibility had a significant positive correlation with both adaptive emotion regulation strategies and also with the refocus on planning and positive refocusing strategies. In addition, according to the findings obtained through mediation analysis, it was found that positive refocusing and refocus on planning

adaptive emotion regulation strategies had full mediating variable roles in the relationship between cognitive flexibility and psychological resilience.

**Keywords:** Executive functions, Working Memory, Inhibitory Control, Cognitive Flexibility, Psychological Resilience, Cognitive Emotion Regulation Strategies.



## ÖZET

### YÜRÜTÜCÜ İŞLEVLERİN BİLİŞSEL DUYGU DÜZENLEME STRATEJİLERİ VE PSİKOLOJİK SAĞLAMLIK İLE İLİŞKİSİ

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Bu çalışmanın amacı, çalışma belleği, engelleyici kontrol ve bilişsel esneklik yürütücü işlevlerinin bilişsel duygu düzenleme stratejileri ve psikolojik sağlamlık ile ilişkisi olup olmadığını incelemektir. Çalışma örneklemini, herhangi bir psikiyatrik veya nörolojik durumu olmayan, bilişsel işlevlerini etkileyebilecek ilaç kullanmayan, en az lise mezunu, 20-45 yaş arası 80 gönüllüden oluşmuştur. Katılımcıları seçerken dışlama kriterleri bağlamında deneklerin uygunluğunu belirlemede SCL-90 toplam puan kullanılmıştır. Katılımcıların kullandıkları duygu düzenleme stratejilerini ve psikolojik sağlamlık düzeylerini belirlemek için bilişsel duygu düzenleme ve Connor-Davidson sağlamlık ölçekleri kullanılırken; çalışma belleği, engelleyici kontrol ve bilişsel esneklik performansını değerlendirmek için sırasıyla N-2 geri, durdurma sinyali ve görev değiştirme paradigmatları kullanılmıştır. Elde edilen veriler korelasyon, regresyon ve aracılık yöntemleri ile analiz edilmiştir. Elde edilen bulgular doğrultusunda, engelleyici kontrolün, uyumlu stratejilerden biri olan kabullenme duygu düzenleme stratejisi ile, bilişsel esnekliğin uyumlu duygu düzenleme stratejileri ve ek olarak plana yeniden odaklanma ve olumlu yeniden odaklanma stratejileri ile anlamlı düzeyde pozitif korelasyona sahip olduğu görülmüştür. Aynı zamanda aracılık analizi ile elde edilen bulgulara göre, bilişsel esneklik ile psikolojik sağlamlık arasındaki

ilişkide olumlu yeniden odaklanma ve plana tekrar odaklanma uyumlu duygu düzenleme stratejilerinin tam aracılık değişken rolü olduğu belirlenmiştir.

**Anahtar Kelimeler:** Yürütücü işlevler, Çalışma Belleği, Engelleyici Kontrol, Bilişsel Esneklik, Psikolojik Sağlamlık, Bilişsel Duygu Düzenleme Stratejileri.

To My Beloved Family....

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## LIST OF SYMBOLS AND ABBREVIATIONS

EFs	: Executive Functions
ER	: Emotion Regulation
CF	: Cognitive Flexibility
SSRT	: Stop Signal Reaction Time
SSD	: Stop Signal Delay
CERS	: Cognitive Emotion Regulation Strategies
LTM	: Longterm Memory
WCST	: Wisconsin Card Sorting Task
ACT	: Attentional Control Theory
PTSD	: Post Traumatic Stress Disorder
PFC	: Prefrontal Cortex
PET	: Positron Emission Tomography
fMRI	: Functional Magnetic Resonance Imaging
ERP	: Event-Related Potentials
DLPFC	: Dorsolateral Prefrontal Cortex
vlPFC	: Left ventrolateral Prefrontal Cortex
SCL	: Symptom Check List
GSI	: General Symptom Index
MBIs	: Mindfulness-Based Interventions
OSP	: Operation Span Task
BEQ	: Berkeley Expressivity Questionnaire

## CHAPTER I

### INTRODUCTION

Executive functions (EFs; also called executive control) are cognitive processes and it provides reorganizing and regulating other brain areas and their functions (Schmeichel and Tang 2014: 133). Executive functions help people to view events from a different perspective, control behaviors, and maintain focus despite distractions (Diamond 2013: 136). Executive functions involve a set of processes such as response inhibition, planning, working memory (updating), cognitive flexibility, reasoning, problem solving (Schmeichel and Tang 2014: 133) but specifically response inhibition, working memory and cognitive flexibility are referred to as the 3 core elements of executive functions (Lehto et al. 2003: 61; Miyake et al. 2000: 50). Working memory is defined as holding the knowledge for short time, retrieving swiftly and protecting the knowledge from distraction (Hofmann et al. 2012: 178). Inhibitory control is the ability to suppress behavior, thought or feeling. More clearly, it includes being able to get control person's attention, behavior, thinking, and/or feeling and changing these with more convenient or required ones (Diamond 2013: 137). Inhibitory control is a skill that a person needs in many areas of her/his life. For example, the ability of a person to pay attention to specific stimuli despite many distracters in the environment is accomplished through inhibitory control. On the other hand, cognitive flexibility (CF) involves changing cognitive perspectives, reasoning, and thinking (Diamond 2013: 147; Miyake et al. 2000: 60). It is the ability to shift attention from learned to specific new stimuli in a given context (Cools et al. 2004: 1132).

According to Herrman et al. (2011) psychological resilience is the ability to overcome adverse conditions and cope with environmental stress. On the other hand, some researchers have defined resilience as a personal trait that includes the ability to overcome and tolerate the negative effects of the situation (Lazarus 1993: 3; Leipold and Greve 2009: 45; Chmitorza et al. 2018: 81). According to the results of an early research

examining the concept of resilience based on the cognitive model, the ability to focus attention, avoid distractions, cognitive flexibility, and suppress negative thoughts are also critical for the concept of "psychological resilience" (Garmezy et al. 1984: 100; Masten and Tellegen 2012: 346).

Emotion regulation (ER) represents the ability to change the intensity, frequency, and length of the emotional response (Vanderlind et al. 2021: 1615). ER is accepted as one of the subdimensions of executive functions and suggested that mostly related to inhibitory control, updating, and cognitive flexibility (Zelazo and Cunningham 2007: 149). According to Tang and Schmeichel (2014: 133), inhibitory control skills are required to control one's attention, behavior, thought, and/or feeling after an emotional experience. Working memory also has a role in emotion regulation strategies along with cognitive flexibility. Such as in reappraisal, we try to look at the positive side of an life event in order to regulate our negative emotions in stressful situations. For that, we need to replace our initial negative assessment of the event with a more positive one. At this point, both working memory and cognitive flexibility skills come into play. Garnefski et al. (2001: 1313) state that emotion regulation is a biological, social, and behavioral skill, as well as conscious and unconscious cognitive process. These researchers also focused on cognitive strategies used in emotion regulation, emphasizing that the cognitive side of emotion regulation cannot be ignored. Garnefski et al. (2001: 1317) proposed two groups of strategies as adaptive and maladaptive. While adaptive strategies break into five as refocusing on planning, acceptance, positive reappraisal, positive refocus and putting into perspective, maladaptive strategies break into four as self blame, other blame, rumination, catastrophizing. In our study, we aimed to explore the relationship between executive functions, and both emotion regulation strategies and psychological resilience.

## **1.1 THE IMPORTANCE OF THE STUDY**

The concept of psychological resilience has not taken much attention in the field of cognitive psychology. It is thought that examining this concept from a cognitive psychology perspective will provide a good basis for understanding the concept of resilience. Moreover, determining the relationship between cognitive

emotion regulation strategies and executive functions in a healthy sample will help us to understand the possible mechanisms that may affect individual's psychological resilience. When the literature studies on this subject are examined, it has been noticed that although there are studies that related with cognitive emotion regulation strategies and executive functions one by one, studies that deal with them as a whole are limited.

## **1.2 THE AIM OF STUDY AND HYPOTHESIS**

The aim of this study is to examine whether working memory, inhibitory control and cognitive flexibility are related to ER strategies and psychological resilience. We also aimed to explore whether emotion regulation strategies mediate between executive functions and psychological resilience. For this purpose, the following hypotheses will be investigated in the study:

H1: It is expected that a positive correlation exists between inhibitory control and psychological resilience

H2: It is expected that a positive correlation exists between working memory and psychological resilience.

H3: It is expected that a positive correlation exists between cognitive flexibility and psychological resilience.

H4: It is expected that a positive correlation exists between cognitive flexibility and the use of adaptive emotion regulation strategies (refocus on planning, acceptance, positive reappraisal, positive refocus and putting into perspective)

H5: It is expected that a negative correlation exists between cognitive flexibility and the use of maladaptive emotion regulation strategies (self blame, other blame, rumination, catastrophizing).

H6: It is expected that a positive correlation exists between inhibitory control and the use of adaptive emotion regulation strategies (refocus on planning, acceptance, positive reappraisal, positive refocus and putting into perspective).

H7: It is expected that a negative correlation exists between inhibitory control and the use of maladaptive emotion regulation strategies (self blame, other blame, rumination, catastrophizing).

H8: It is expected that a positive correlation exists between working memory and the use of adaptive emotion regulation strategies (refocus on planning, acceptance, positive reappraisal, positive refocus and putting into perspective).

H9: It is expected that a negative correlation exists between working memory and the use of maladaptive emotion regulation strategies (self blame, other blame, rumination, catastrophizing).

H10: it is expected that adaptive emotion regulation strategies (refocus on planning, acceptance, positive reappraisal, positive refocus and putting into perspective) would mediate between cognitive flexibility and psychological resilience.

H11: it is expected that maladaptive emotion regulation strategies (self blame, other blame, rumination, catastrophizing) would mediate between cognitive flexibility and psychological resilience.

## CHAPTER II

### LITERATURE REVIEW

#### 2.1. PSYCHOLOGICAL RESILIENCE

Psychological resilience comes from the English word 'resilience', which means that a material is elastic and can easily return to its original form (Greene 2002). According to Herrman et al. (2011) psychological resilience is the ability to overcome unfavourable conditions and salvation from environmental stress. On the other hand, some other researchers defined resilience as a personal trait which includes ability of overcoming and tolerating adverse impact of any negative situation (Lazarus 1993: 5; Leipold and Greve 2009: 47; Chmitorza et al. 2018: 80). Although there is no certain description of psychological resilience in the literature, current definitions generally emphasize accomplishing difficulties, good mental health, coming back to a normal state after encountering a stressor, or adapting to difficulties or using ordinary regulation systems to come over them (McKee 2017: 12). Some previous studies mentioned that, although nearly 40-60 % of adults are subjected to trauma in society, solely a small number of the population experience posttraumatic stress disorder (Kessler et al. 1995: 1050; Yehuda et al. 2015: 10) and according to American Psychiatric Association (2000), among them, 8% of the traumatized individuals develop PTSD. More recently, Cam, Ustuner, & Kuzlu (2022: 1035) conducted a study with 1095 university students investigated the impact of Covid 19 pandemic. It was found that 34.5% of the students had symptoms of post-traumatic stress disorder.

So the main question is that, what are the factors that makes person more resilient than others? In fact, there are many factors that are related to resilience and these are called "resilience factors". These factors consist of individual factors, environmental factors and the relation of environmental and individual factors (Wald et al. 2006: 10).

They represent resources that protect the individual against the adverse effects of the stressful situations they encounter (Chmitorz et al. 2018: 80). While individual factors involve personality traits, self esteem self mastery, intelligence, problem-focused coping strategies, internal locus of control, being goal oriented, higher intellectual functioning and cognitive appraisals; environmental factors mostly focus on social support and positive parenting qualities (Luthar and Cicchetti 2000: 872; Rutter 2006: 7; Vanderbilt-Adriance and Shaw 2008: 42; Kidd and Shahar 2008: 168).

The concept of psychological resilience is generally examined in clinical psychology and described from that viewpoint, therefore cognitive definition has not been emphasized much in the literature.

### **2.1.1 Cognitive Perspective of Psychological Resilience**

According to cognitive perspective of psychological resilience, in addition to the concepts of personal traits and self-efficacy, cognitive characteristics such as being able to focus attention, avoiding distraction, rapidly changing mental state, and reflectively challenging negative thoughts and ideas are critical for the concept of resilience (Garmezy et al. 1984: 104; Masten and Tellegen 2012: 350). Some researchers also support the view that personal characteristics associated with resilience are related to higher cognitive capacity, such as cognitive flexibility, cognitive executive control, and emotional self-regulation (Hauser et al. 2006: 210; Parsons et al. 2016: 306). In this sense, resilience is stated to be an interactive process with more than one path rather than a fixed construct and process (Rutter 2006: 9). Schwager and Rothermund (2013) have emphasized that selective attention and emotional processing skills are important for resilience as they contribute to the motivational change of the person in the face of negative life events and facilitate the expression of the person in case of distress and threat. A significant relationship was stated between automatic negative cognitive biases (in attention, interpretation and memory) and emotional vulnerability (Mathews and MacLeod 2005: 187). That is, the pathologically anxious person tends to pay more attention to negative stimuli than to neutral and positive stimuli and this may affect the degree of their resilience and their reaction towards them (MacLeod and Mathews 1988: 653).

According to Parson and his collegeus (2016), addressing the concept of resilience from a cognitive perspective provide a solid basis for developing the relationship between stress and resilience. In accordance with this purpose, researchers improved a precognitive model of resilience to make cognitive research of resilience easier. The common point of this developed cognitive model with other cognitive models is that they focus on cognitive processes which are unconscious, including executive control and information processing biases.

## **2.2 EXECUTIVE FUNCTIONS**

Executive functions involves a set of processes such as response inhibition, planning, working memory (updating), cognitive flexibility, reasoning, problem solving (Schmeichel and Tang 2014: 133) but specifically response inhibition, working memory and cognitive flexibility are referred to as the 3 cores of executive functions (Lehto et al. 2003: 61; Miyake et al. 2000: 50). Executive functions enable to view events from a different perspective, control involuntary behaviors, and maintain focus despite distractions (Diamond 2013: 137).

Some psychological disorders are associated with executive dysfunction, such as attention deficit hyperactivity disorder (Berlin et al. 2004: 235; Boonstra et al. 2005: 1103), substance use disorders (Baler and Volkow 2006: 564), conduct disorder (Fairchild et al. 2009: 165), obsessive compulsive disorder (Snyder et al. 2015: 328), and schizophrenia (Johnson-Selfridge and Zalewski 2001: 310). At the same time, some studies have indicated that executive dysfunction is associated with negative health consequences such as overeating, obesity, high blood pressure, cardiovascular disease and cancer (Fitzpatrick et al. 2013: 143; Miller et al. 2011: 22).

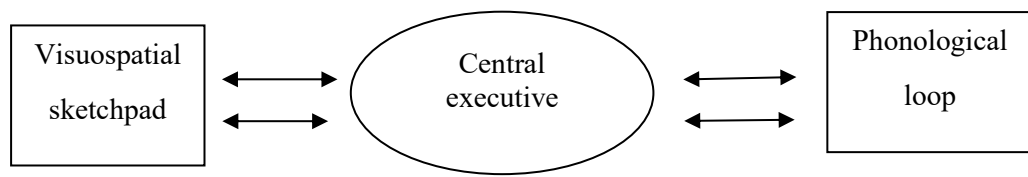
Zelazo et al. (2003: 137) divided executive functions into two as hot (hot) and cool (cool) executive functions. While hot pathway express emotional processes; cold pathway express cognitive processes. Cold executive functions are often involved in abstract and contextual problems, while hot executive functions are necessary for problems involving the regulation of emotion and motivation.

Executive functions are governed by frontal lobe and also reorganize and regulate other brain areas and their functions (Schmeichel and Tang 2014: 138). Previous researches emphasized that keeping and maintaining information in mind or resisting unrelated information need higher prefrontal region activation which provides more successful executive functioning (Knight et al. 1999: 173; Miller and Cohen 2001: 173; Smith and Jonides 1999: 1659). The brain region generally associated with executive functions has long been thought to be the prefrontal cortex (PFC). However, recent studies have shown that not only abnormalities in frontal areas but also other regions can cause executive dysfunction. (Alvarez and Emory 2006: 38; Baddeley 1998: 525; Heyder et al. 2004: 280; Miller and Cohen 2001: 181; Royall et al. 2002: 390; Stuss and Alexander 2000: 296). These results supported that the frontal area is not the only region associated with executive functions (Stuss and Alexander 2000: 297; Stuss and Levine 2002: 421; Koechlin et al. 2000: 7654) on the contrary, it has a very extensive cerebral network, including subcortical structures and thalamic tracts (Lewis et al. 2004: 756; Monchi et al. 2006: 261).

### **2.2.1 Working Memory (Updating)**

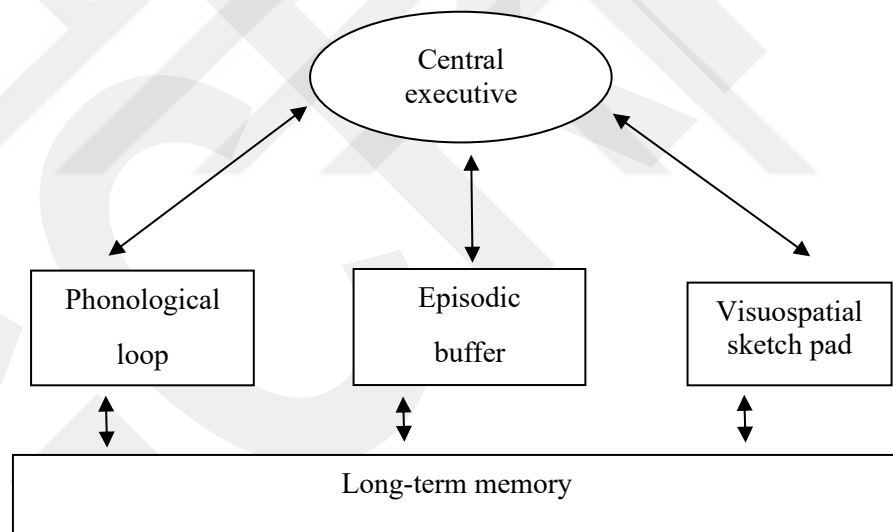
Updating refers holding the knowledge for a short time, retrieving swiftly and protecting the knowledge from distraction (Hofmann et al. 2012: 177). In this respect, working memory differs from short-term memory in two ways: Firstly, short-term memory is basically about storing information for a short time; however, working memory involves manipulation of information that takes place between complex cognitive processes. Secondly, while short-term memory consists of a single component; working memory consists of many components (Baddeley 2000: 75). It is related with a wide range of behaviours (Christophel et al. 2017: 118). For example, when interpreting written or spoken language, solving math problems in your head, rearranging a list, making to-do lists, and acting according to a specific instruction are some of the areas where working memory is necessary (Diamond 2013: 136).

According to the three-component working memory model which is proposed by Baddeley and Hitch (1974: 75), working memory enables manipulation of information with the action of three components which are visuospatial sketchpad, the phonological loop, and the central executive. The goal of this system is to keep the necessary information in mind and to make it easily accessible.



**Figure 1:** The initial three-component model of working memory proposed by Baddeley and Hitch (Baddeley and Hitch 1974: 75).

Baddeley updated “three-component working memory” model in 2000 because it was understood that working memory can hold more information than the phonological loop or visuospatial copying. Due to the updated model information is obtained through the exchange of information between working memory and long-term memory. "Episodic buffer" as an additional component that enables this exchange accepted as one of the components of "multiple components of working memory".” (Baddeley 2000: 80).



**Figure 2:** Baddeley’s revised working memory model (Baddeley 2000: 80).

## **2.2.1.1 Components of Working Memory**

### **2.2.1.1.1 Phonological Loop**

It is expressed as the most advanced component of the working memory model and consists of two subdivisions. Namely *phonological store*, which has limited capacity and keeps the information for a few seconds, and the articulatory rehearsal process, which is responsible for rehearsal to prevent the loss of information in the phonological store. The phonological loop holds verbal and auditory information (Baddeley 2003: 834). For example, the phonological loop is used when trying to remember someone's phone number or address. The function of the phonological loop is to create more permanent representations of the phonological structure of new words (Service 1992: 38).

### **2.2.1.1.2 Visuospatial Sketch Pad**

Visuospatial sketchpad processes two types of information as visual and spatial (Baddeley 2000: 80). This component is responsible for holding visual and spatial information for short periods of time so that it can be used during thinking, remembering and processing tasks (Logie and Macchetti 1991: 110). Function of visual spatial sketch pad; compared to the role of the phonological loop in language acquisition, it plays an important role in spatial orientation, acquiring semantic information about the appearance of objects and how to use them, and understanding complex systems such as machines (Baddeley 2003: 835).

### **2.2.1.1.3 Central Executive**

This structure is accepted as the core of the working memory model and it is seen as a difficult component to study because it has a very complex structure (Repovš and Baddeley 2006: 17). It is the structure that interfaces with long-term memory, allocates resources among the components of working memory, and enables attentional resources to be focused on a specific task, allocated to concurrent tasks, or directed from one task to another (Baddeley and Hitch 1994: 490; Baddeley 2003: 192).

### **2.2.1.1.4 Episodic Buffer**

Episodic buffer is thought to be a transitional part between the phonological loop-the visual-spatial sketchpad and the long-term memory (LTM). It is managed by

the central executive and related to the episodic learning (Baddeley 2003: 193). Function of episodic buffer; It does not store only audio, visual or spatial information, but also information from different sources. Its storage of different types of information separates the episodic buffer from the phonological loop and visual-spatial sketch pad (Baddeley et al. 2010: 230). Another key feature of it is combining information from different sources in the working memory system. For example, an event may contain information such as visual, speech sounds, and motion. It is the duty of the episodic buffer to incorporate this information in a coherent way (Henry 2012).

### **2.2.1.2 The Neurobiology of Working Memory**

To identify brain areas associated with working memory, different methods suggested in the relevant literature. These methods include (a) behavioral studies of healthy participants and patients with brain damage ; (b) neuroimaging (eg, positron emission tomography [PET]); functional magnetic resonance imaging [fMRI]); (c) electrophysiological recordings from humans (eg event-related potentials [ERP]); (d) animal studies (eg lesion, single cell recordings, etc.); and (e) computational modeling of neurophysiological or neuropsychological events (Chai et al. 2018: 11; Collette and Linden 2002: 110; Miyake and Shah 1999).

According to a coordinate-based meta-analysis study combining 189 fMRI studies involving healthy participants brain regions specifically fronto-parietal network are commonly and differentially found to be active during various working memory tasks. Further meta-analysis showed that several other regions were also sensitive to certain task types. While Broca's area appears to be selectively active during verbal tasks, the ventral and dorsal premotor cortex have been associated with object knowledge and location, respectively (Rottschy et al. 2012: 835). In general, many studies have found that the frontoparietal network, which includes the dorsolateral prefrontal cortex (DLPFC), anterior cingulate cortex and parietal cortex, has an important role in working memory (Chein et al. 2011: 553; Wager and Smith 2003: 1657).

Another meta-analysis was focused on studies that used N-back task for working memory under functional neuroimaging. Brain areas namely lateral premotor cortex, dorsal cingulate and medial premotor cortex; dorsolateral and ventrolateral prefrontal cortex, frontal poles, and medial and lateral posterior parietal cortex regions were found to be activated (Owen et al. 2005: 50).

### 2.2.1.3 The Measurement of Working Memory

The first developed task to evaluate the storage and processing dimensions of working memory was reading measurement interval test (Daneman and Carpenter 1980: 452). In this task, participants were asked to read aloud a string of unrelated sentences and remember the last word of each sentence of a string. At the same time, the participants were asked to question the logical accuracy of the sentences when each sentence was presented while trying to remember the words. Other tasks used to measure working memory include tasks such as counting backward interval and working interval. Such working memory interval tasks combine the presentation of target stimuli that need to be remembered, such as numbers or words, with the presentation of a challenging, secondary processing task, such as understanding sentences, verifying equations, or numbering a sequence of figures (Conway et al. 2005: 777).

In the literature, different methods have been used for the measurement of working memory such as digit or spatial span backward tests, n-back memory task, memory and search task, letter-number sequencing test, corsi block test backward and nine box maze tests (Ballesio et al. 2019: 101). The aim of the digit span forward task is to repeat the sequence of digits in the same order. The number sequence is progressively increasing at each trial. In the other version which is called digit span backward, the aim is to repeat the same sequence in the opposite direction (Fortier-Brochu and Morin 2014: 1791; Haimov et al. 2008: 41; Noh et al. 2012: 131). In spatial working memory, the aim is finding the yellow coin among at least 4 colored square boxes by the elimination method and place yellow coins in the empty column on the right. The number of boxes can gradually increase up to a maximum of 12. The color and position of the boxes change at each stage. It is considered an error to touch the box with the coin again. For this reason, the participant should keep in mind the opened boxes and update them at every stage (Haimov et al. 2008: 40; Khassawneh et al. 2018: 4). In the N back memory task aim is the deciding whether current stimulus is the same as the one presented N trials ago or not. The *N* can be 1 trial back, 2 trial back, 3 trial back, etc. (Cellini et al. 2014: 209; Son et al. 2018: 490; Varkevissier et al. 2007: 284).

### 2.2.2 Inhibitory Control

Inhibitory control involves applying conscious control for suppressing behavior. More clearly, it includes being able to get control person's attention, behavior, thinking, and/or feeling and changing these with more convenient or required ones (Diamond 2013: 137). According to other definition of inhibitory control, inhibitory control is a skill that a person uses in many areas of his life. For example, the ability of a person to pay attention to a point despite many stimuli around the person is achieved through inhibitory control, and the person needs to use this in many areas such as education, work, and social life (Cochrane 2014: 23). Inhibitory control skill allows the individual to choose how to react and act adaptive behaviors (Barbas et al. 2018: 2667). Lack of inhibitory control elicits impulsive behaviors and conditioned responses to environmental stimuli (Murphy 2002: 2; Claes et al. 2006: 197). Problem of ability to sustain attention experienced among patients with obsessive-compulsive disorder, Tourette's disorder and attention-deficit/hyperactivity disorder are related to impaired ability of inhibitory control (Garavan et al. 1999: 8302).

Perceptually inhibitory control skill is also an important skill used in daily life. E.g; when we are at a very crowded party, we perceptually ignore all the sounds around and give our full attention to the person that we are talking to. However, there are many stimuli coming from the environment such as sound, image, light. We perceive all these, but by means of inhibitory control skill, we can give our attention to the desired point by inhibiting all other stimuli. This condition is also called external, bottom-up, automatic, stimulus-driven or involuntary attention (Posner and DiGirolamo 1998). In addition to automatically blocking the surrounding stimuli, stimuli can also be blocked consciously. In addition to being called selective or focused attention, this situation is also called attention control or attention inhibition, internal, top-down, active, goal-directed, voluntary or executive attention (Posner and DiGirolamo 1998; Theeuwes 2010: 83). Another type of inhibition is cognitive inhibition, which is used to suppress mental representations of unwanted images and memories (Anderson and Levy 2009: 191).

Self-control skill is also a part of inhibitory control and represents the ability to control one's own behavior and related emotions (Baumeister 2002: 672). It is related to resisting temptation and not behaving impulsively. This is about being able to resist the behavior that should not be tempted, even though it gives pleasure (Duckworth et al. 2016: 40). The resistance of a person who is trying to lose weight to

the sweets, behaving according to social norms are examples of self-control skill (Diamond 2013: 150). Additionally, the behavior of delaying gratification is related to the ability to complete the task started despite different distractors (Hoerger et al. 2011: 728).

### **2.2.2.1 The Neurobiology of Inhibitory Control**

Studies in the literature have indicated that the prefrontal cortex especially the right lower frontal gyrus is responsible from inhibitory control over other brain regions (Tabibnia et al. 2011: 4805). According to the results of the meta-analysis, which included a total of 225 studies, the highest activation was in the right hemispheric regions (inferior frontal gyrus, insula, median cingulate, and paracingulate gyri) and the upper parietal gyrus region, regardless of the task type of inhibition. This meta-analysis study supports the knowledge that response inhibition is a complex cognitive process with multiple neural networks rather than a single neural path (Zhang et al. 2017: 3980).

### **2.2.2.2 The Measurement of Inhibitory Control**

Examples of psychological measures of inhibitory control include the Stroop task (MacLeod 1991: 163), Simon task (Hommel 1993: 270), Flanker task (Eriksen and Eriksen 1974: 143), Antisaccade tasks (Hallett 1978: 1279), delay-of-gratification tasks (Forstmeier et al. 2011: 118), go/no-go task (Gomez et al. 2007: 389), and stop-signal task (Verbruggen and Logan 2008: 418). During stroop task, subjects asked to tell the color names as fast as possible and inhibit the automatic process of reading. This paradigm indicates that naming becomes difficult when the name of the color is incompatible with the color of the ink (Bugg et al. 2008: 1487; Macleod 2005: 181). Similar to stroop task, the Simon task supports the view that people respond faster when the stimulus and response characteristics are in harmony. For example, in terms of location; when the word “left” appears on the right of the screen, it is expected that the person's reaction time will be slower than when it appears on the left (Van der Lubbe and Verleger 2002: 103; Proctor 2011: 184). Flanker task also consists of stimuli that are in the same direction as the target in opposite direction and presented as neutral. Letters and arrows are generally used as stimuli, and at the end of the test, the response times of congruent and incongruent stimuli are compared (Kopp et al. 1996: 287). In antisaccade task, first of all, the participants are asked to focus on a fix-

motionless point like red small dot. Afterwards, they are asked to look to the left when the stimulus comes to the right of that point, and to the right when the stimulus comes to the left of that point. If the person does not comply with these instructions error points are added (Hutton and Ettinger 2006: 306; Derakshan et al. 2009: 50). In the delay of gratifications task, the aim is to measure the ability to inhibit the response towards pleasant stimuli. One's ability to delay gratification is related to skills such as self-regulation, patience, and impulse control (Duckworth et al. 2013: 847). In stop signal and go/nogo tasks, the goal is to stop increased motor response. However, there is a temporal difference between these two tasks. In the stop signal task, it is required to stop the motor response that has already started, while in the go/nogo task, it is required to stop the motor response that has not yet started (Zhang et al. 2017: 3976). Other tasks are those that affect the response by interfering with the relevant stimulus or response. For this reason, some authors have named these tasks as “incongruency tasks” (Cieslik et al. 2015: 26).

### **2.2.3. Cognitive Flexibility**

The term of cognitive flexibility was first proposed by Spiro and Jehng in 1990. Spiro and Jenhg (1990) defined the concept of cognitive flexibility as the ability of a person to reorganize existing knowledge and change it according to the situation. According to Martin and Anderson (1998: 1) cognitive flexibility includes awareness of people's communication process, their ability to adapt to a novel situation, and their self-confidence to be flexible (McKee 2017: 31). Cognitive flexibility is a critical skill when we are thinking about the view of an object from different perspectives looking at an event from another person's viewpoint. The general definition of cognitive flexibility includes changing cognitive perspectives, reasoning, and thinking (Diamond 2013: 150; Miyake et al. 2000: 55). However changing perspective involves blocking previous views and updating old perspectives. In this sense, cognitive flexibility cooperates with inhibitory control and working memory functions (Diamond 2013: 153).

Cognitive flexibility is also called shifting, set-shifting and it represents the ability to switch attention, between tasks (Monsell 2003: 136). Gabrys et al. (2018: 2219) by considering cognitive flexibility and cognitive control together, suggested that they are concepts that include attention, situation assessment and coping strategies in the face of stressful situations. Moreover, they defined cognitive flexibility and

cognitive control as a trait that includes goal-oriented behaviors such as creativity, problem solving, multitasking, and decision making. Hodson et al. (2021: 1) stated that the ability to plan, solve problems, switch between tasks, and inhibiting the unnecessary strategies are processes that associated with cognitive flexibility.

Cognitive development facilitate adaptation to changing situational demands, which is the cornerstone of cognitive flexibility. Considering all these issues, it can be said that formal operational thinking is a very important in the formation of cognitive flexibility (Shaffer and Kipp 2014; Spiro and Jehng 1990). From a neuropsychological point of view, these abilities, which develop in the formal operational stage, are among a few of the subcategories of executive functions (Stevens 2009: 1).

### **2.2.3.1 The Neurobiology of Cognitive Flexibility**

One fMRI study (Leber et al. 2008: 13593) showed that, in task switching paradigm specific brain regions such as prefrontal, anterior cingulate and posterior parietal cortices, and basal ganglia are governed cognitive flexibility process. In another study during task switching paradigm left ventrolateral prefrontal cortex (vlPFC) as well as inferior parietal cortex were acitvated and especially the activation of left vlPFC was thought to resolve the conflict during the change of ask (Badre and Wagner 2006: 7186).

According to the fMRI results with the Wisconsin Card Sorting Test, the active brain regions were found to be frontoparietal and striatal regions. Furthermore, it was reported that set-shifting was associated with cerebellum activation (Lie et al. 2006: 1041).

### **2.2.3.2 The Measurement of Cognitive Flexibility**

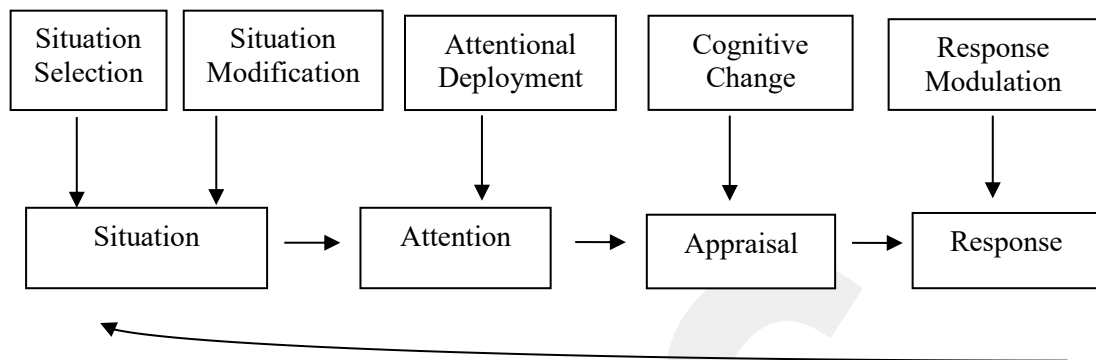
Task-switching or set-shifting paradigm are the most common tasks for measuring cognitive flexibility (Diamond 2013: 150; Monsell 2003: 134). Task switching paradigms usually include two tasks and these tasks can vary in different studies. For example, in one study, Monsel (2003: 136) worked with vowel or consonant / odd or even letters and numbers. Meiran (1996: 1430) also used the stimulus left/right and below/above tasks. At the same time, there are tasks that include the shape and color versions of the stimulus (Allport and Wylie 2000: 220; Rubin and Meiran 2005: 1482; Weissberger et al. 2015: 196).

Wisconsin Card Sorting Task (WCST) is a neuropsychological test that most widely used tool to measure executive function ability (Baddeley 1998: 525; Fisk and Sharp 2004: 880; Kane and Engle 2002: 650; Miyake et al. 2000: 49). WCST consists of two card packs, each with four stimulus cards and 64 response cards. Each card measures 7×7 cm and has various geometric shapes in different colors and numbers. Participants are expected to correctly rank each response card, which has one of the four stimulus cards, based on the feedback (true or false) given to them. The correct matching category is listed as color, shape, amount, color, shape, amount. When the participant makes 10 consecutive correct matches in the same category, the correct category moves on to the next category. The test ends when the participant completes all 6 categories or uses all cards in both decks (Karakas et al. 2013).

### **2.3 EMOTION REGULATION**

Emotion regulation (ER) represents the skill of changing the density, frequency, and length of emotional response (Vanderlind et al. 2021: 1615). This process of change can be conscious or unconscious (Gross 1998: 283). According to Gross's (2015: 6) process model of emotion regulation, there are 5 different emotion regulation strategies that commonly used. Antecedent-focused strategies are used before emotion arises and the aim is to control and regulate the reaction before the emotional response emerges. Situation selection, situation modification, attentional deployment, and cognitive change fall into the four group of antecedent-focused strategies. On the other hand, response -focused strategies are used after emotion arises and it includes only response modulation strategy. The aim is to change the expressive and physiological effect of emotion (Niedenthal and Ric 2017). According to the definitions given by Bosse, Pontier & Treur (2010: 213) the first antecedent-focused strategy, situation selection refers to being in a situation that creates a positive or negative emotion for person. Situation modification includes behavior that changed the emotion of the current situation. Attentional deployment can be described as focusing one's attention on the emotional content or taking it away from that completely. Distraction or shifting attention is one of the attentional deployment techniques. Cognitive change means to regulate the emotion created by changing the perspective of the person towards the situation and reappraisal is one of the most common strategies used to change the meaning of emotional events (Palmer and Alfano 2017: 7). Response modulation

includes the direct modification of the behavioral and physiological reactions of the emotion experienced (Palmer and Alfano 2017: 7).



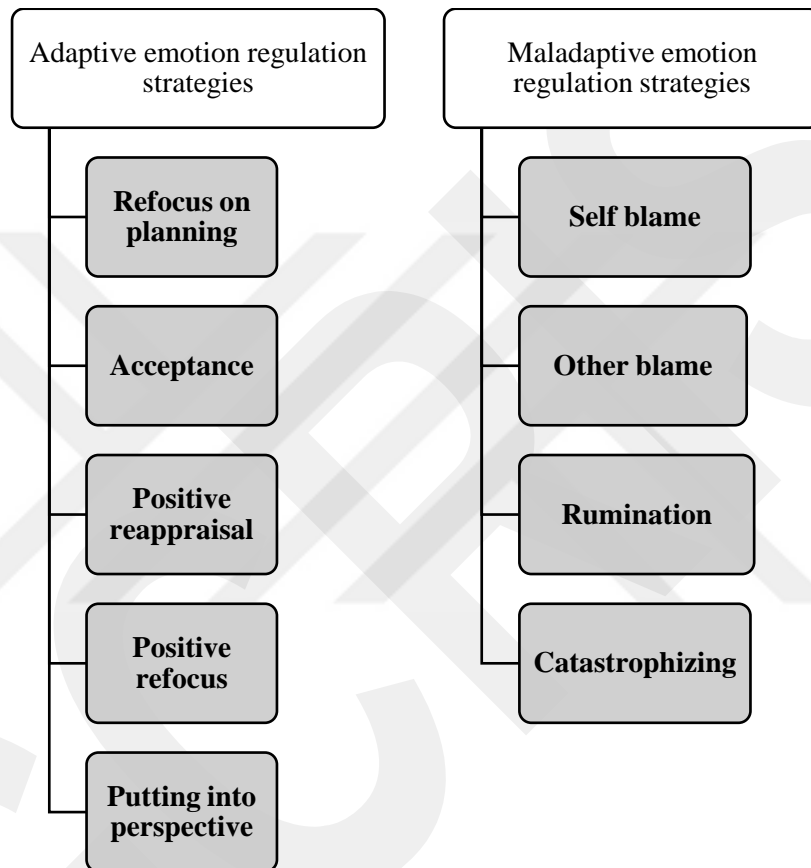
**Figure 3:** Gross's process model of emotion regulation, which highlights five families of emotion regulation that occur different times (Gross 2014: 7).

### 2.3.1. Cognitive Emotion Regulation Strategies

Garnefski, Kraaij, and Spinhoven (2001: 1314) stated cognitions or cognitive processes can help individuals to manage or regulate emotions or feelings effectively. They focused on the cognitive dimension of coping and defined these as thoughts and mental strategies that people use to deliberately regulate their emotions. For this purpose, they developed the Cognitive Emotion Regulation Questionnaire to evaluate the strategies used by people in the face of negative events.

Garnefski et al. (2001: 1314) determined a total of 9 different strategies that are separated between adaptive and maladaptive. Maladaptive strategies consist of self-blame, other blame, rumination, catastrophizing, adaptive strategies consist of refocus on planning, acceptance, positive reappraisal and positive refocusing. Self blaming is blaming oneself for the negative emotions experienced rather than attributing it to the external factors (Anderson et al. 1994: 550). Blaming others means blaming the environment or someone else for current situation (Tennen and Affleck 1990: 209). Rumination which means constantly thinking about feelings and thoughts about the negative event (Nolen-Hoeksema et al. 2008: 400). Catastrophizing represents exaggerating the importance of an adverse event or outcome, often to the point of expecting the worst possible outcome (Sullivan et al. 1995: 525). Refocus on planning means thinking about the next steps to cope with a stressful situation (Garnefski et al. 2001: 1315). Acceptance strategy represents accepting emotional experiences as they are, without trying to suppress or change it (Troy et al. 2018: 58). Positive reappraisal

is the state of an individual to see negative events as an opportunity for development (Nowlan et al. 2015: 475). With positive refocus strategy, the individual thinks about the things that will make them less distressed instead of the stressful consequences (Garnefski et al. 2001: 1315) Last strategy, putting into perspective involves considering the alternative events and by doing so reducing the importance of the event (Garnefski et al. 2005: 1316).



**Figure 4:** Cognitive emotion regulation strategies (Garnefski et al. 2001: 1313).

#### **2.4. THE ASSOCIATION BETWEEN EXECUTIVE FUNCTIONS AND COGNITIVE EMOTION REGULATION STRATEGIES**

According to physiological perspective, emotion regulation processes include interplay of prefrontal cortex which is necessary for controlling subcortical and posterior cortical regions. The increase or decrease in the activation of the prefrontal region are biological indicators of executive functions (Knight et al. 1999; 175; Miller and Cohen 2001: 168). This finding is consistent with that of Gruber and Cassoff (2014: 3) who emphasized that lower connectivity between the prefrontal cortex and amygdala leads to emotional reactivity and impulsivity. This also accords with earlier

studies, which showed that executive functions such as working memory, cognitive flexibility and response inhibition accompany emotion regulation process (Berkman and Lieberman 2009: 481; Gross et al. 2006: 20; MacLeod and Bucks 2011: 62; Ochsner and Gross 2008: 153). These studies support the view that both emotional and cognitive processes of a person should be in constant interaction with each other. That view corroborate the ideas of researchers, who suggested that high working memory performance was associated with successful emotion regulation, including expressive suppression and cognitive reappraisal (McRae et al. 2012: 5; Schmeichel et al. 2008: 1530; Opitz et al. 2014: 609), and the idea of Schmeichel and Tang (2014: 133) who suggested the importance of inhibitory control for emotional responses.

There are also studies that evaluate emotion from a developmental perspective. These studies indicate that individual differences in the process of emotion regulation arise due to the developmental changes in cognitive functions (Luna 2009: 240; Steinberg 2005: 70).

Studies with clinical samples, including anxiety and depression, indicate that these psychological disorders are associated with difficulty in both emotion regulation and cognitive flexibility (Mocan et al. 2014: 511; Whitmer and Banich, 2007: 546). Similarly, According to Attentional Control Theory (ACT; Eysenck et al. 2007: 346) a high level of anxiety affects the attentional control of the person negatively which in turn decrease shifting and inhibition (Derakshan and Eysenck 2009: 50). In a study it was revealed that self-blame, rumination, and catastrophizing strategies were positively and strongly associated with depression in both depression and anxiety groups, while positive reappraisal had a negative relationship with depression (Garnefski et al. 2004: 1316). In another study, it was found that cognitive emotion regulation strategies increased depending on the increase in cognitive capacity from adolescence to adulthood. The use of maladaptive strategies was found most common in the sample of subjects with different psychological diagnosis. Moreover, elderly individuals tended to use acceptance strategy more than the young adult and adolescent groups. Additionally, depression symptoms were strongly positively correlated with cognitive emotion regulation strategies, namely rumination, catastrophizing, and lack of positive reappraisal (Garnefski and Kraaij 2006: 1325).

## **2.5 THE ASSOCIATION BETWEEN PSYCHOLOGICAL RESILIENCE AND EXECUTIVE FUNCTIONS**

Some studies in the literature on executive function and resilience indicate that executive functions have an critical role in resilience for individuals living in stressful conditions. Moreover, they emphasized that higher resilience is associated with better executive function (Shi et al. 2019: 22; Zhang et al. 2019: 446).

In the literature, some researchers suggest that working memory is important for resilience by organizing and assimilating verbal and non-verbal information about negative events, making it easier for the person to plan and apply for appropriate behavior, regulating emotions, and making it easier for the person to cope with difficulties (Evans et al. 2016: 13; Levens et al. 2017: 1247). Furthermore, some studies in the literature have stated that improving working memory contributes to the control of stress management and reduction in anxiety (Hoorelbeke et al. 2015: 4; Owens et al. 2013: 325; Sari et al. 2015: 205). In a meta-analysis study conducted by Motter et al (2016: 187), it was determined that working memory training contributes to the attention control of the person thus creating a protective factor against the "emotional vulnerability". There are two studies in the literature that directly examine the relationship between working memory and resilience (Avci et al. 2013: 165; Wingo et al. 2010: 770). The research result of Avci et al. (2013: 165) showed that, there was positive relation between working memory and resilience. The other study which was conducted by Wingo and his collegeus (2010: 770) supported that high-resilience African-American participants with challenging backgrounds had better nonverbal working memory than those with low-resilience but no difference was found in terms of verbal working memory between resilient and non resilient participants were found.

The results of the research examining the relationship between inhibitory control and psychological resilience indicate that the person should ignore irrelevant information in order to perform goal-directed behavior, and at this point, the inhibitory control skill also contributes to resilience (Schäfer et al. 2015: 133). It has also been found that resilience is functionally related to brain regions involved in cognitive flexibility, inhibitory control, and coping (Spielberg et al. 2015: 10020; Shi et al. 2019: 23).

## **CHAPTER III**

### **METHOD**

#### **3.1.PARTICIPANTS**

The sample consisted of 80 volunteers aged between 20-45, at least high school graduates, who do not have any psychiatric or neurological conditions, and do not use drugs that may affect their cognitive functions. The inclusion criterias were completion of at least high school education; be in the age range of 20-45, no known history of neurological or psychiatric diagnosis. Social media announcements were made to reach the sample. Convenience sampling was applied in recruitment of participants. Before starting the study, general information about the process was given with the informed consent form and it was stated that the participation was voluntary and they could leave the study at any stages of the study

#### **3.2.MEASURES**

##### **3.2.1 Demographic Information Form**

Demographic information form contained questions regarding age, gender, marital status, health status educational status, occupation and socioeconomic level and sleep quality.

##### **3.2.2 Connor-Davidson Resilience Scale**

Connor-Davidson Resilience Scale is a self-report and likert type scale used to measure the resilience level of an individual. The scale was created by Connor and Davidson in 2003 and consists of 25 items in total. Each item of the scale is graded with 5 different (0-4) points, and the total score obtained is interpreted on the level of the individual's resilience. Individuals with higher scores represent higher resilience. The Turkish adaptation of the scale was made by Kararmak (2010: 350), and the Cronbach alpha internal consistency scale was found to be .92. In our study internal consistency was found as .89.

### **3.2.3 Cognitive Emotion Regulation Scale**

The 5-point Likert-type 36-item Cognitive Emotion Regulation Scale developed by Garnefski, Kraaij, and Spinhoven (2001: 1318) was used to evaluate the cognitive coping strategies. The scale includes 9 cognitive coping strategies: positive refocusing, positive reappraisal, refocusing on planning and perspective, self-blame, blaming others, acceptance, rumination, and catastrophizing. The Cronbach alpha internal consistency scale of the scale, which was adapted into Turkish by Onat and Otrar (2010: 123), was found to be .78, test-retest reliability  $r = 1.00$ , and item-total correlation coefficients ranged between .18 - .46. In the current study internal consistency for cognitive emotion regulation scale was found as .87

### **3.2.4 Symptom Check List (SCL-90-R)**

The scale was developed by Derogatis et al. (1977) to detect psychological symptoms. The Likert-type scale consists of 90 items and is a self-report scale. Although the scale provides information about the general symptom level, it has 10 symptom sub-dimensions evaluates. These dimensions are somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid thought, psychoticism and other symptoms. The Turkish validity and reliability study of the scale was carried out by Koğar (2019: 689). In the study, alpha reliability coefficient was found to be between 0.72 and 0.89 and internal consistency coefficient was high, although the sub-dimensions varied.

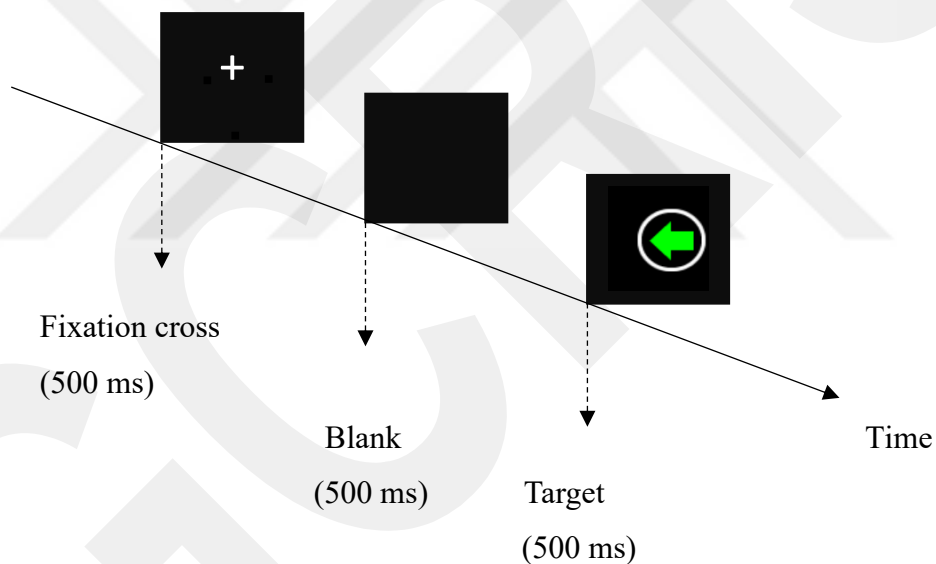
The general symptom index (GSI) score ranges between 0.00 and 4.00 and indicates the severity of psychological symptoms. A GSI score below 1.5 means that the psychological symptoms are not at a psychopathological level, while a GSI score above 1.5 means that the symptoms may be at a psychopathological level (Aydemir and Köroğlu 2000). Based on this information, participants with a GSI score below 1,5 were included in our study The GSI score of our participants varies between .08 and 1.44 and the average GSI score was .82.

### **3.2.5 Stop Signal Paradigm**

The stop-signal paradigm was developed by Lappin and Eriksen (1966: 805) and further revised by Logan (1994: 193) to assess response inhibition. In the paradigm, there were two kind of tasks as go and stop task condition.

In the go condition, participants are required to respond to the arrows pointing to the left or right in accordance with the direction indicated. If the arrow was pointing to the right side participants are asked to press the “N” key. Otherwise, if the arrow was pointing to the left side participants are asked to press the “B” key. Each arrow presented in the center of a black screen and participants have only 500 ms to respond. Participants also received feedback during the task process. When the answer given by the participants was correct, the circle on the screen turned into green. When it was wrong, they received a feedback as "wrong". At the same time, if the participant's response time was more than 150 ms, they received a feedback as "should have pressed" to speed it up. The go task did not end until the participant completed 50 trials or at least 20 consecutive trials without errors.

### Go Trial



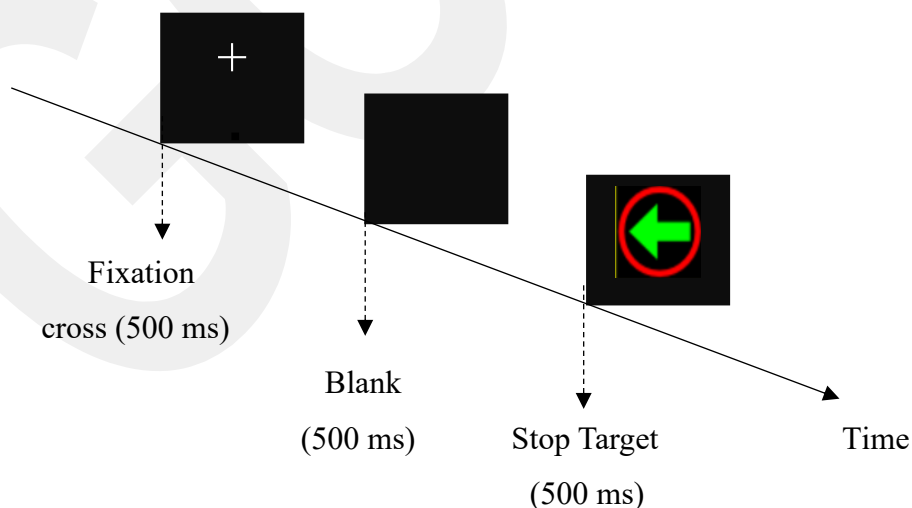
**Figure 5:** Stop Signal Task - Go trial.

The stop condition included 45 go trial and 15 stop trial and they were presented randomly to the participants. In addition to the previous go task, the participant is asked to inhibit their reaction when the stop stimulus appears on the screen. In the stop signal paradigm, the stop signal delay (SSD) can be set in different ways. A study has used a fixed stop signal delay (Logan and Cowan 1984: 277), but this requires large number of trials (Verbruggen and Logan, 2009: 650). Other studies have used multiple stop signal delays (Colonius 1990: 309; De Jong et al. 1990: 170;

Schachar et al. 1995: 415). In the current study, since we did not have large number of trials, multiple stop signal delays were used instead of the fixed delay. There are also studies in the literature stating that the stop signal paradigm has a dynamic structure (Alderson et al. 2008: 991; Logan et al. 1984: 61; Schachar et al. 1995: 415), and according to this dynamic structure, the stop signal delay should vary within the study depending on performance. More precisely, stop signal delay should increase after successful inhibition and decrease after unsuccessful inhibition. However, although 50 ms is generally used for this change, there are also studies in the literature that use different duration (Li et al. 2006: 187; Zhang and Li 2012: 91). In addition, there are studies that use multiple stop signal delays without any dynamic structure (Schachar et al. 1995: 415; Kok et al. 2004: 11). Similarly in our study, the stop signal delay varied randomly without this dynamic structure

The stop stimulus was the red circle that appeared around the arrow and the time appearing of the stop stimuli varied between 100 ms and 300 ms following the onset of the stimulus. Participants also received feedback during the task process. The feedback given in the go trial applied in stop trial as well. Differently, they received feedback that "you shouldn't have pressed" if the participant had reacted at the stop signal.

### Stop Trial



**Figure 6:** Stop Signal Task – Stop trial.

Inhibitory control with stop signal paradigm is evaluated with stop signal reaction time (SSRT). There are several ways to calculating SSRT. If the fixed stop signal delay (SSD) was used, SSRT can be calculated with subtracting SSD from finishing time of stop process. If the multiple stop signal was used as our thesis, SSRT can be calculated with mean method. In mean method SSRT estimated by subtracting observable mean SSD from observable mean go RT (Logan and Cowan 1984: 279; Logan et al. 1997: 61). Some researchers also stated that since the mean method would be less affected by changing go reaction time and SSD, it was more reliable method estimating SSRT (Logan and Cowan 1984: 283; Williams et al. 1999: 207). In the light of these informations, we calculated SSRT as the indicator of inhibitory control with the mean method. Lower SSRT represents lower inhibitory control.

### **3.2.6 Task Switching Paradigm**

Task switching paradigm cued version was used to assess the cognitive flexibility performance (Schneider and Logan 2009: 870; Jamadar et al. 2015: 328). Paradigm included color and shape tasks with clues to tell the participant which tasks to do. The cue for color task was the word "color"; for the shape task cue was the "shape" word with capital red letters (COLOR or SHAPE). Throughout the paradigm after the "shape" cue, participants are asked to press the "N" key on the keyboard if they see a square on the screen; Otherwise, if they see a circle, participants are asked to press the "B" key on the keyboard. Differently, after the "color" cue, participants are asked to focus only on the color instead of the shape, and if the color of the figure on the screen was yellow, participants were expected to press "B" and "N" if it was blue. Task included 20 training block and 50 actual block. For each trial of a few seconds, participants saw a white central fixation cross "+". That fixation sign stayed on the screen for 200 ms. After the fixation, the screen was blank for 500 ms. Then the cue (shape or color) was displayed on the screen for 150 ms. Following the blank screen, the target was presented for 2000 ms and after 2000 ms passed automatically. Furthermore, participants received "too slow" feedback for late answers and "wrong" feedback for incorrect answers.

Cognitive flexibility with task switch paradigm is generally evaluated with value of the switch cost (Rogers and Monsell 1995: 207; Lin et al. 2014: 837). The switch cost was calculated by subtracting the reaction time of the congruent trial from that of the incongruent trial. Whereas the congruent trial represents the same task that

follows each other, the incongruent trial represents the different tasks following each other. According to the paradigm, when a task switches to another task (incongruent trial), the reaction time of performance is expected to be longer than to the same task (congruent trial). For this reasons, switch cost interpreted the questions of “how does the change affect the person and can they adapt quickly to the change? In the light of this information, increasing switch cost represents impaired cognitive flexibility (Allport et al. 1994: 437; Bream and Egner 2018: 470; Rogers and Monsell 1995: 207).

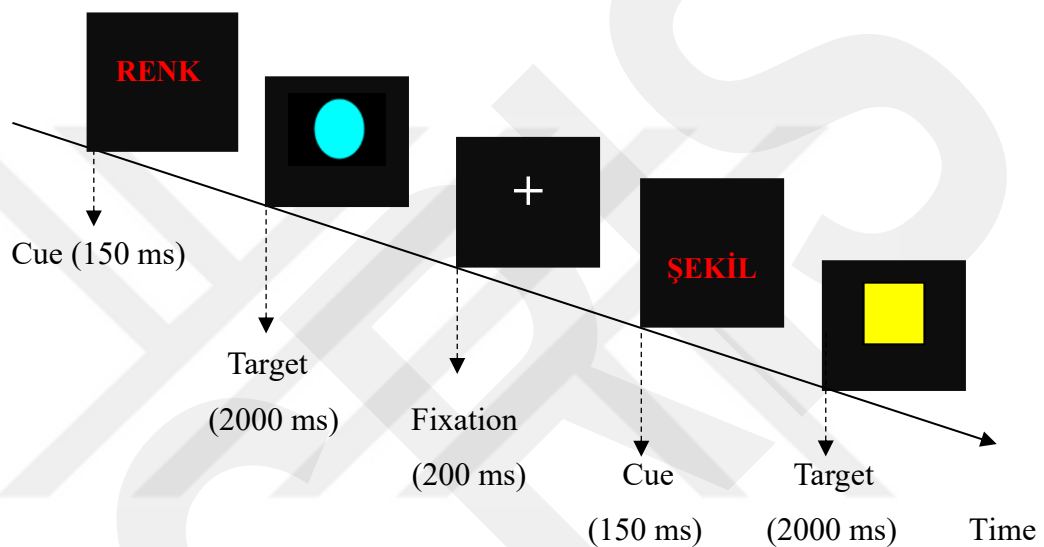


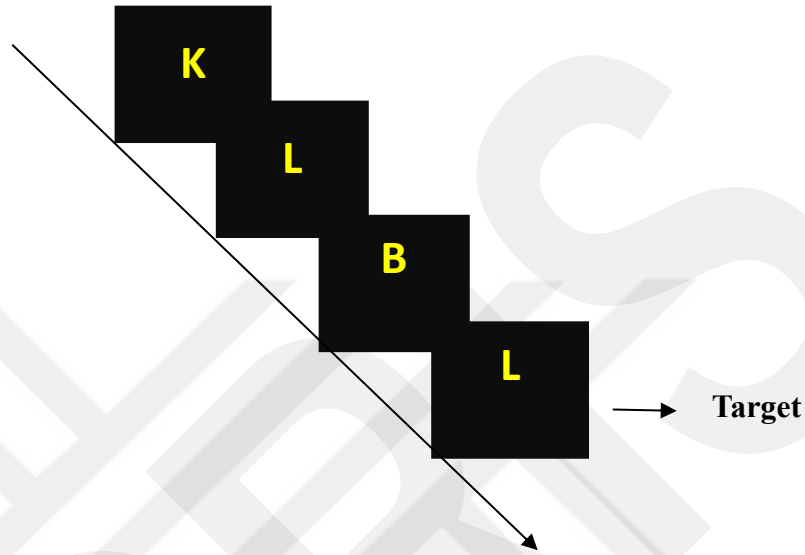
Figure 7: Task switch paradigm – incongruent trial.

### 3.2.7 N-2 Back Paradigm

The N-back task was originally developed in 1958 by Wayne Kirchner (Kirchner 1958: 353) and is generally used to evaluate working memory (Gazzaniga et al. 2009). The paradigm included 3 blocks which are 1 training and 2 real blocks. Whereas training blocks included 30 stimuli, the real blocks included 35 stimuli. A total of 15 letters A, B, C, D, E, H, I, K, L, M, O, P, R, S, and T, were used as stimuli and each one presented for 500 ms randomly. Letter stimulus series were presented the yellow print to the computer screen with the black background one by one. Participants were asked to press the “M” key on the keyboard if the stimulus was the same as the previous 2 trials within 3000 ms. Participants' performance was assessed in the sense of hits score, the number of stimuli that a person correctly remembers.

Empirical studies including N back task in the literature have considered the percentage accuracy and reaction time as dependent variables (Miller et al. 2009: 714;

Schmidt et al. 2009: 3610). Previous researches argued that, percentage accuracy is more reliable than reaction time, they stated that the participants in the working memory task did not aim to be fast, instead they put effort into the accuracy (Hur et al. 2016: 1297). In our thesis also N back percentage hit accuracy was accepted as a working memory variable.



**Figure 8:** N-2 back paradigm.

### **3.3 PROCEDURE**

Firstly Symptom Check List (SCL 90-R) was applied to evaluate participants' psychological symptoms then experiments were executed in quiet, distraction-free rooms. Three different paradigms were used in order to measure cognitive flexibility, inhibitory control and working memory. The experiments run via the psytoolkit free software (Stoet 2010: 1096) and all the instructions were translated into Turkish. While some of the participants first completed the scales and then moved on to the experiment, the other part completed the procedures in the opposite order. Experiments were presented in counterbalancing to eliminate the sequencing effect for each participant while performing the experiments. The task switching paradigm and N-2 back paradigm took 7 minutes, the stop signal task took 6 minutes, and the scales used took 15 minutes. The total data collection process was completed in approximately 35 minutes for one participant.

## CHAPTER IV

### RESULTS

#### 4.1 OVERVIEW

Analyses conducted in the results section were clustered in five sections. Firstly, data screening, data cleaning and normality analyses of the study measures were presented. In the second section descriptive statistics results were presented. In the third, fourth and fifth sections, the results of correlation, linear regression and mediation analyzes are presented, respectively.

#### 4.2. DATA PROCESSING AND DATA CLEANING

The study data were analyzed by using the Statistical Package of Social Sciences (SPSS) for Windows, Version 20 (IBM SPSS Statistics for Windows Version 20, IBM Corp.). Before starting analysis process, with 80 young participants, the data were screened for missing and outliers scores. There were two different scales and a total of 61 items in the study. There were 3 missing data points from the 4860 data points. According to Tabachnick and Fidell (2007), replacement method can be used to handle the missing values if the missing data points ratio over the total data points is smaller than 5%. Therefore, to keep the sample size as large as possible, the mean replacement method was employed.

After the replacing mean values, the skewness and kurtosis values of the research scales were examined and it was seen that values between -1.5 and +1.5, which are considered to be in the normal distribution (Tabahnick and Fidell 2013). For the analysis of extreme values, Mahanalobis distance was examined and there were not any multivariate outliers.

Means, Standard Deviations; Minimum, Maximum, and Skewness and Kurtosis values of study variables were presented in table 1.

**Table 1:** Means, Standard Deviations; Minimum and Maximum, and Skewness and Kurtosis Values of Study Variables

Variable	M	SD	Min	Max.	Skewness	Kurtosis
Estimated SSRT	189.01	31.49	112.70	281.70	0.02	0.03
Task switch cost	32.13	97.49	-252.00	291.00	-0.12	1.10
Nback accuracy	65.34	23.08	12.90	100.00	-0.36	-0.73
Resilience	90.07	12.67	52.00	120.00	-0.03	0.99
Self-blame	11.58	2.99	4.00	20.00	0.12	0.78
Other blame	9,95	3,12	4,00	18,00	0.11	-0.21
Acceptance	13,03	2,59	8,00	19,00	0.06	-0.54
Rumination	14,13	3,27	7,00	20,00	-0.07	-0.67
Positive refocusing	11,60	3,63	4,00	20,00	0.26	-0.34
Positive reappraisal	14,63	3,20	7,00	20,00	-0.24	-0.81
Refocus on planning	15,40	2,73	6,00	20,00	-0.47	0.68
Putting into Perspective	12,21	3,04	4,00	20,00	-0.19	0.12
Catastrophizing	8,71	3,00	4,00	16,00	0.38	-0.63
Maladaptive CERS	11,09	1,99	5,25	15,50	-0.19	0.38
Adaptive CERS	13,37	2,19	6,40	19,80	-0.03	0.99

CERS: Cognitive emotion regulation strategies; SSRT: Stop signal reaction time (ms)

Note: Estimated SSRT represents SSRT which is estimated by subtracting observable mean SSD from observable mean go RT.

**Table 2:** Mean and Standard Deviation of Stop Signal Paradigm

	Mean	Standard Deviation
Go RT (ms)	386,80	23,65
Observable SSRT (ms)	225,83	38,24
Estimated SSRT (ms)	189,01	31,40
SSD (ms)	197,55	19,16
Go correct	36,07	5,36
Go false alarm	.73	1,15
Stop correct	9,89	2,65
Stop false alarm	5,10	2,65

RT: Reaction Time; SSD: Stop Signal Delay; SSRT: Stop Signal Reaction Time

Note: Estimated SSRT represents SSRT which is estimated by subtracting observable mean SSD from observable mean go RT

## 4.3 DESCRIPTIVE STATISTICS

### 4.3.1. Demographic Characteristics of the Participants

According to the demographic findings, 58.8% of the 80 participants were female (N=47) and 41.3% were male (N=33). When the average age of the participants was examined, it was 29.34 years (SD=6.61) for women and 28.78 years (SD=6.32) for men. The frequency of the married participants was 31.3% (N=25) and the rate of those who were single was 68.8% (N=55). The frequency of those with high school

education was 28.7% (N=23), undergraduates was 52.5% (N=42), graduate students was 16.3% (N=13) and doctorate was 2.5% (N=2). There are 35.0% (N=28) participants stating that they have graduated and 65.0% (N=52) stating that they were students. Those with a lower income level were 11.3% (N=9), those with medium level income are 63.7% (N=51) and those with high level of income were 25.0% (N=20). Sleep quality was reported as fair enough 10.0% (N=8), enough 38.8% (N=31), neutral 37.5% (N=30), not fair enough was 12.5% (N=10), and as not enough 1.3% (N=1). The demographic characteristics of the participants were presented in Table 3.

**Table 3:** Demographic Characteristics of Participants

Socio-demographic variables	N (%)	Age (M±SD)
<b>Gender</b>		
Female	47 (58.8)	29.34±6.61
Male	33 (41.3)	28.78±6.32
<b>Marital status</b>		
Married	25 (31.3)	
Single	55 (68.8)	
<b>Education</b>		
High school	23 (28.7)	
Undergraduate	42 (52.5)	
Graduate	13 (16.3)	
Doctorate	2 (2.5)	
<b>Student</b>		
Yes	28 (35.0)	
No	52 (65.0)	
<b>Worker</b>		
Yes	52 (65.0)	
No	28 (35.0)	
<b>Income</b>		
Low	9 (11.3)	
Middle	51 (63.7)	
High	20 (25.0)	
<b>Sleep Quality</b>		
Fair enough	8 (10.0)	
Enough	31 (38.8)	
Neutral	30 (37.5)	
Not fair enough	10 (12.5)	
Not enough	1 (1.3)	
<b>Total</b>	<b>80</b>	

**Table 4:** Independent samples t-test results based on gender

	<i>Female (N=47)</i>		<i>Male (N=33)</i>		<i>t(78)</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
SSRT	189.04	33.22	188.97	29.28	.01	.99
Task switch cost	38.34	111.10	23.30	74.72	.67	.50
N back accuracy	61.23	23.06	71.18	22.15	-1.92	.06
Resilience	89.78	10.43	90.48	15.48	-.24	.81
Self-blame	11.61	3.20	11.54	2.71	.10	.92
Acceptance	13.12	2.69	12.90	2.49	.36	.71
Rumination	14.69	3.09	13.33	3.38	1.85	.07
Positive refocusing	11.76	3.38	11.36	3.99	.48	.63
Refocus on planning	15.31	2.62	15.51	2.92	-.31	.75
Positive reappraisal	14.65	3.05	14.60	3.44	.07	.94
Putting into Perspective	12.08	2.68	12.39	3.52	-.44	.65
Catastrophizing	8.72	3.06	8.69	2.96	.04	.96
Other blame	10.23	3.14	9.54	3.10	.97	.33
Maladaptive CERS	11.31	2.12	10.78	1.78	1.18	.23
Adaptive CERS	13.39	2.10	13.35	2.35	.07	.94

CERS=Cognitive Emotion Regulation Strategies; SSRT = Stop Signal Reaction Time

An independent sample t-test was applied to examine the changes in variables based on the gender. As summarized in the table 4, there was no significant differences between male and female participants ( $p>0.05$ ).

#### 4.4 BIVARIATE PEARSON CORRELATIONS ANALYSIS FINDINGS

Pearson correlation findings for examining the relationship between variables are presented Table 5. No significant correlation was found between stop signal reaction time (SSRT) and psychological resilience and CERS sub-scales except for acceptance and total scores ( $p>.05$ ). SSRT was found as positively and significantly correlated with acceptance ( $r=.24$ ;  $p<.05$ ). No significant correlation was found between back accuracy with psychological resilience, CERS sub-scales and total scores ( $p>.05$ ). Task switch cost was negatively associated with positive refocusing, refocus on planning and total adaptive strategies ( $r=-.22$ ;  $p<.01$ ;  $r=-.28$ ;  $p<.05$ ,  $r=-.24$ ;

$p < .05$  respectively). Psychological resilience and self blaming ( $r = -.29$ ;  $p < .01$ ) were negatively and significantly correlated. Psychological resilience was positively associated with positive refocusing, refocus on planning, positive reappraisal, putting into perspective and total adaptive strategies ( $r = .39$ ;  $p < .01$ ,  $r = .51$ ;  $p < .01$ ,  $r = .47$ ;  $p < .01$ ,  $r = .46$ ;  $p < .01$ ,  $r = .52$ ;  $p < .01$  respectively). Acceptance and self blaming ( $r = .55$ ;  $p < .01$ ) cognitive emotion strategies were positively and significantly correlated. Rumination were found as positively and significantly correlated with acceptance ( $r = .33$ ;  $p < .0$ ) and self blaming ( $r = .48$ ;  $p < .01$ ). Refocus on planning were found positively correlated with positive refocusing ( $r = .37$ ;  $p < .01$ ) and rumination ( $r = .38$ ;  $p < .01$ ). Positive reappraisal were found to be positively correlated with positive refocusing ( $r = .51$ ;  $p < .01$ ) and refocus on planing ( $r = .67$ ;  $p < .01$ ). Putting into perspective was positively associated with psychological resilience, acceptance, positive refocusing, refocus on planning, positive reappraisal, catastrophizing, total adaptive and maladaptive CERS ( $r = .46$ ;  $p < .01$ ,  $r = .34$ ;  $p < .01$ ,  $r = .45$ ;  $p < .01$ ,  $r = .44$ ;  $p < .01$ ,  $r = .23$ ;  $p < .01$ ,  $r = .76$ ;  $p < .01$ ,  $r = .26$ ;  $p < .05$  respectively). Catastrophizing were positively correlated with self blaming ( $r = .32$ ;  $p < .01$ ).

**Table 5 : Bivariate Correlations between Study Variables**

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. SSRT	189.01	31.49	1														
2. Task switch cost	32.13	97.49	.02	1													
3. Nback accuracy	65.34	23.08	.09	.05	1												
4. Resilience	90.07	12.67	-.02	-.21	-.04	1											
5. Self-blaming	11.58	2.99	.11	-.03	.16	-.29**	1										
6. Acceptance	13.03	2.59	.24*	.03	.20	.00	.55**	1									
7. Rumination	14.13	3.27	.09	-.06	.12	.05	.48**	.33**	1								
8. Positive refocusing	11.60	3.63	-.10	-.22*	-.11	.39**	-.00	.11	-.05	1							
9. Refocus on planning	15.40	2.73	.04	-.28*	.08	.51**	.11	.25*	.38**	.37**	1						
10. Positive reappraisal	14.63	3.20	.03	-.15	.10	.47**	-.01	.23*	.16	.51**	.67**	1					

Table 5 Continued

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
11. Putting into perspective	12.21	3.04	.16	-.20	.11	.46**	.12	.34**	.13	.45**	.49**	.44**	1				
12. Catastrophizing	8.71	3.00	.01	-.16	-.11	-.11	.32**	.27*	.12	.19	.05	-.06	.23*	1			
13. Other blame	9.95	3.12	-.02	-.05	.07	.14	.03	.19	.06	.15	.02	-.07	.20	.28*	1		
14. Maladaptive CERS	11.09	1.99	.07	-.12	.09	-.07	.71**	.52**	.66**	.11	.22*	.00	.26*	.66**	.53**	1	
15. Adaptive CERS	13.37	2.19	.08	-.23*	.09	.52**	.18	.50**	.24*	.72**	.77**	.81**	.76**	.19	.14	.29**	1

\* $p < 0.05$  \*\* $p < 0.01$ ; Note: CERS: Cognitive emotion regulation strategies SSRT: Stop signal reaction time(ms)

## 4.5 REGRESSION ANALYSIS FINDINGS

### 4.5.1 Regression Analysis for Predictive Relationship Between Inhibitory Control and Acceptance Emotion Regulation Strategy

Based on the finding in Table 6, the model for predicting acceptance emotion strategy was found that inhibitory control positively and significantly predicted acceptance scores ( $\beta=.24, p<0.05$ ). Furthermore, inhibitory control explained the 5% variance of the using acceptance emotion regulation strategy ( $R^2=.05, F(1,77) = 4.70; p < .05$ ).

**Table 6:** Linear Regression Analysis for predictive relationship between inhibitory control and acceptance emotion regulation strategy

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	$R^2$	<i>F</i>
(Constant)	9.38	1.73		5,41	.00	.05	4.70
SSRT	.02	.01	.24	2,16	.03*		

SSRT: Stop signal reaction time

a. Dependent Variable: acceptance emotion regulation strategy

\* $p<.05$

### 4.5.2 Regression Analysis for Predictive Relationship Between Cognitive Flexibility and Adaptive Emotion Regulation Strategies

Based on the finding in Table 7, the model for predicting adaptive emotion regulation strategy was found that task switch cost negatively and significantly predicted acceptance scores ( $\beta=-.23, p<0.05$ ) and cognitive flexibility explained the 5% variance of the using adaptive emotion regulation strategies ( $R^2=.05, F(1,78) = 4.70; p < .05$ ).

**Table 7:** Linear Regression Analysis for predictive relationship between cognitive flexibility and adaptive emotion regulation strategies

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>	<i>F</i>
(Constant)	13.55	.25		53,67	.00	.05	4.69
Task switch cost	-.00	.00	-.23	-2,16	.03*		

Note:high value of task switch cost means low cognitive flexibility

b. Dependent Variable: adaptive emotion regulation strategies

\* $p < .05$

#### 4.5.3 Regression Analysis for Predictive Relationship Between Cognitive Flexibility and Psychological Resilience

Based on the finding in Table 8, the model for predicting psychological resilience was found that task switch cost negatively and marginally predicted psychological resilience scores ( $\beta = -.21$ ,  $p = 0.05$ ). In the model, cognitive flexibility explained the 4% variance of the psychological resilience ( $R^2 = .04$ ,  $F(1,78) = 3.77$ ;  $p = 0.05$ ).

**Table 8:** Linear Regression Analysis for predictive relationship between cognitive flexibility and psychological resilience

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>	<i>F</i>
(Constant)	90.97	1.46		62.00	.00	.04	3.77
Task switch cost	-.02	.01	.21	-1,94	.05		

Note:high value of task switch cost means low cognitive flexibility

c. Dependent Variable: psychological resilience \* $p < .05$

#### 4.5.4 Regression Analysis for Predictive Relationship Between Cognitive Flexibility and Positive Refocusing Emotion Strategy

Based on the finding in Table 9, the model for predicting positive refocusing emotion strategy was found that task switch cost negatively and significantly predicted positive refocusing scores ( $\beta=-.22$ ,  $p<0.05$ ) In the model, cognitive flexibility explained the 5% variance of the positive refocus emotion regulation strategy ( $R^2=.05$ ,  $F(1,78)=4.23$ ;  $p<0.05$ ).

**Table 9:** Linear Regression Analysis for predictive relationship between cognitive flexibility and positive refocusing

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	$R^2$	<i>F</i>
(Constant)	11.87	.41		28.32	.00	.05	4.23
Task switch cost	-.00	.00	-.22	-2,35	.04*		

Note:high value of task switch cost means low cognitive flexibility

d. Dependent Variable: positive refocusing emotion regulation strategy

\* $p<.05$

#### 4.5.5 Regression Analysis for Predictive Relationship Between Cognitive Flexibility and Refocus on Planning Emotion Strategy

Based on the finding in Table 10, the model for predicting refocus on planning emotion strategy was found that task switch cost was negatively and significantly predicted positive refocusing scores ( $\beta=-.28$ ,  $p<0.05$ ) In the model, and cognitive flexibility explained the 8 % variance of the refocus on planning emotion regulation strategy ( $R^2=.05$ ,  $F(1,78)=6.76$ ;  $p<0.05$ ).

**Table 10:** Linear Regression Analysis for predictive relationship between cognitive flexibility and refocus on planning emotion strategy

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>	<i>F</i>
(Constant)	15.65	.31		50.32	.00	.08	6.76
Task switch cost	-.00	.00	-.28	-2,60	.01*		

Note: high value of task switch cost means low cognitive flexibility

e. Dependent Variable: refocus on planning emotion regulation strategy

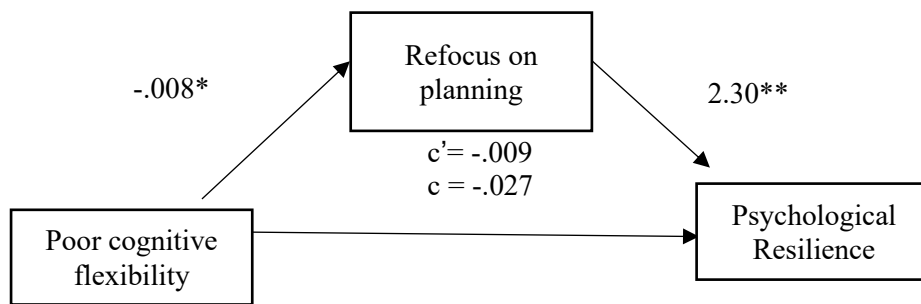
\*p<.05

## 4.6 MEDIATION ANALYSIS FINDINGS

In order to investigate the association between cognitive flexibility and psychological resilience and the mediator roles of emotion regulation strategies mediation analysis was conducted by using simple mediation model 4 PROCESS macro for IBM SPSS developed by Hayes (2018). According to previous analysis two emotion regulation strategies namely refocus on planning and positive refocusing found to be eligible as mediators. We found that cognitive flexibility had a direct relationship on refocus on planning, and then refocus on planning had a direct relationship on psychological resilience. Similarly, cognitive flexibility had a direct relationship on positive refocusing, and then positive refocusing had a direct relationship on psychological resilience. In that sense, 95% bias corrected bootstrap confidence intervals were set based on 5000 bootstrap samples.

### 4.6.1 The Mediator Role of Refocus on Planning on the Relationship Between Cognitive Flexibility And Psychological Resilience

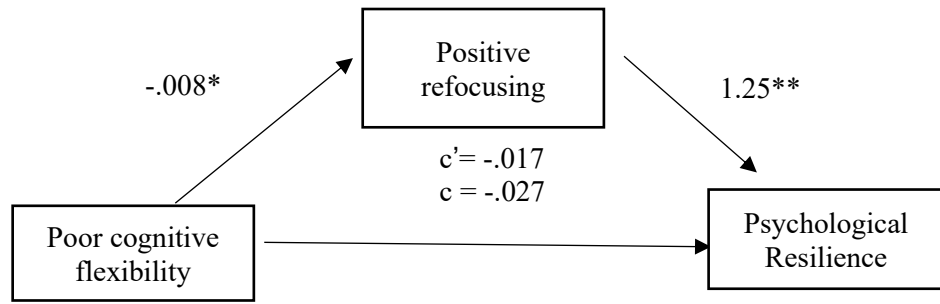
When the relationship between task switch cost and refocus on planning was examined (path a), the predictor of task switch ( $B=-0.008$ ,  $SE=0.003$ ,  $p<.05$ ) on refocus on planning was significant. According to the results, when the direct effect of refocus on planning on psychological resilience was examined (path b), it was found that refocus on planning ( $B= 2.30$ ,  $SE=0.46$ ,  $p<.01$ ) had a significant and positive effect on psychological resilience. In addition, the direct effect of task switch cost on resilience (path c') was not found as statistically significant ( $B=-0.009$ ,  $CI [-0.03, 0.01]$   $SE=0.01$ ;  $p=.46$ ). According to the findings obtained in the analyzes conducted with the bootstrap method, the total effect (path c) of task switch cost on resilience was found as insignificant ( $B=-.027$ ,  $CI [-0.05, 0.00]$   $SE=0.01$ ,  $p =.05$ ). When the mediating role of refocus on planning emotion regulation in the relationship between cognitive flexibility and psychological resilience was examined ( $B=- 0.18$ ,  $SE=0.009$ ,  $95\% CI [-0.03, -0.00]$ ), the mediating role of refocus on planning was statistically significant. Taken together, it was seen that the whole model was significant and explained 27 % of the variance ( $R^2= .27$   $F(2, 78)=14.59$ ,  $p<0.01$ ). The summary of mediation analysis was presented in Figure 9.



**Figure 9.** Mediation analysis with task switch cost, refocus on planning and psychological resilience. Note: high value of task switch cost score means low cognitive flexibility

#### 4.6.2 The Mediator Role of Positive Refocusing on the Relationship Between Cognitive Flexibility and Psychological Resilience

When the relationship between task switch cost and positive refocusing was examined (path a), the predictor of task switch cost ( $B=-0.008$ ,  $SE=0.004$ ,  $p<.05$ ) on positive refocusing was significant. When the direct effect of positive refocus on resilience was examined (path b), it was found that positive refocusing ( $B= 1.25$ ,  $SE=0.37$ ,  $p<.01$ ) had a significant and positive effect on psychological resilience. Furthermore, the direct effect of task switch cost on resilience (path c') was not found as statistically significant ( $B=-0.017$  CI [-0.04, 0.01]  $SE=0.01$ ;  $p=.21$ ). Based on the findings obtained in the analyzes conducted with the bootstrap method, the total effect (path c) on task switch cost on psychological resilience was found as insignificant ( $B=-.027$ ,  $SE=0.01$ , CI [-0.05, 0.00]  $p=.05$ ). When the mediating role of positive refocusing in the relationship between cognitive flexibility and psychological resilience was examined ( $B=-0.01$ ,  $SE=0.006$ , 95% CI [-0.02, -0.00]), the mediating role of positive refocus was statistically significant. Taken together, it was seen that the whole model was significant and explained 16 % of the variance ( $R^2= .16$   $F(2, 78) =7.81$ ,  $p<0.01$ ). Mediation analysis was presented in Figure 10.



**Figure 10.** Mediation analysis with task switch cost, positive refocusing and psychological resilience Note: high value of task switch cost score means low cognitive flexibility

## **CHAPTER V**

### **DISCUSSION**

The current study was aimed to explore how executive functions, emotion regulation strategies and psychological resilience related to each other. Executive functions involves a set of processes such as response inhibition, planning, working memory (updating), cognitive flexibility, reasoning, problem solving (Schmeichel and Tang 2014: 133) but specifically response inhibition, working memory and cognitive flexibility are referred to as the 3 cores of executive functions (Lehto et al. 2003: 61; Miyake et al. 2000: 49). A limited number of studies in the literature that support the view that executive functions such as working memory, cognitive flexibility and response inhibition accompany both emotion regulation process (Berkman and Lieberman 2009: 481; Gross et al. 2006: 20; MacLeod and Bucks 2011: 62; Ochsner and Gross 2008: 154) and psychological resilience (Garmezy et al. 1984: 100; Masten and Tellegen 2012: 346). To explore the associations, we conducted correlation, regression and mediation analysis. In this chapter, in the light of the literature current findings are discussed and presented.

#### **5.1 CORRELATION AND LINEAR REGRESSION ANALYSIS:**

##### **5.1.1 Investigating The Relationship Between Executive Functions and Cognitive Emotion Regulation Strategies**

Regarding to our findings, cognitive flexibility was significantly correlated with adaptive emotion regulation strategies, positive refocusing and refocus on planning. A recent study examining the relationship between emotion regulation strategies and cognitive flexibility also emphasized the same relation (Guler and Aydın 2022: 142). To put it more clearly, the more cognitively flexible the individuals are, they tend to use more adaptive emotion regulation strategies which in turn enable them to cope with negative events more effeciently. Our findings are consistent with the current literature in this regard (Goschke and Bolte 2014: 416). For refocus on planning strategie, Carver and his collegeus (1989) stated that refocus on planning is

a problem-focused strategy (Carver et al. 1989: 271) and a substantial component of problem-solving (Naragon-Gainey et al. 2017: 385). It involves the act of dividing the problem into different perspectives and describing these components in order to deal efficiently (Gick 1986: 110). At that point cognitive flexibility comes into play in the part of dividing the problem into different perspectives.

In positive refocus strategy, the individual thinks about the things that will make them less distressed instead of the stressful consequences. For that, the individual needs to switch between thoughts about two different conditions as negative and positive consequences (Garnefski et al. 2001: 1317). This also accords with our study result, which showed that there is positive relationship between cognitive flexibility and positive refocus emotion strategy.

In contrast to earlier findings, however, no evidence of a correlation between other strategies (acceptance, positive reappraisal, putting into perspective, self blame, other blame, rumination and catastrophizing) and cognitive flexibility was detected. When we look at the literature, there are studies indicating that cognitive flexibility has a significant positive relationship with positive reappraisal (Genet and Siemer 2011: 383; Guler and Aydın 2022: 142) and a negative relationship with maladaptive emotion regulation strategies (Garnefski et al. 2004: 1326). Positive reappraisal defined as the state of an individual to see negative events with positive sides of it (Carver et al. 1989: 267) and mostly, positive reappraisal strategy has been discussed with anxiety and depression symptoms in the literature. Regarding previous studies stated that symptoms of anxiety and depression are negatively correlated with positive reappraisal strategy (Lei et al. 2014: 89; Qi et al. 2020: 199). Similarly in a study it was revealed that self-blame, rumination, and catastrophizing strategies (maladaptive emotion regulation strategies) were positively and strongly associated with depression in both depression and anxiety groups (Garnefski et al. 2004: 1325). In our study, the anxiety and depression scores of the participants were evaluated with the scl-90 symptom screening inventory. Current sample consisted of healthy participants, therefore one of the reasons of not finding any significant association between these variables might be related to the sample characteristics.

Inhibitory control was positively correlated with only acceptance emotion regulation strategy. Inhibitory control refers applying conscious control for suppressing behavior. More clearly, it is a top down process and it includes being able to have control person's attention, behavior, thinking, and/or feeling, and changing these with more convenient or required ones (Diamond 2013: 138). Based on our result, as people can control their impulses and thoughts, their tendency to accept the events and emotions as they are, also increases.

For acceptance emotion regulation strategy, there are conflicting views in the literature. While some studies consider the acceptance strategy as an adaptive emotion regulation strategy (Mazaheri et al. 2016: 196; Garnefski et al. 2001: 1314; Carver et al. 1989: 268), other studies consider it as a maladaptive emotion regulation strategy (Tuna and Bozo 2012: 564; Martin and Dahlen 2005: 1253; Sayinta et al. 2022: 260). Acceptance represents accepting the situation and feelings as they are (Levitt et al. 2004: 748). Some studies in the literature support that acceptance, like positive reappraisal, also reduces symptoms of anxiety and depression (Wang et al. 2021: 1267; McLaughlin et al. 2007: 1740). This result also emphasized that acceptance is an adaptive strategy. On the contrary, another study found a positive relationship between the acceptance strategy and depression symptoms (Lei et al. 2014: 89), and accepted it as a maladaptive strategy. In summary, there are results that show both positive and negative associations with psychological symptomology and acceptance. Based on the sampling and the effect on the person's life, it can be accepted as an adaptive and maladaptive emotion regulation strategy. Our supporting result of the positive relationship between acceptance and inhibitory control are also in line with previous studies (Cadena et al. 2019: 265; Murphy et al. 1999: 1310; Page et al. 2009: 203; Popov and Kustermann 2019: 150). The relationship between acceptance and inhibitory control mostly studied in clinical psychology because of its relation to psycho-therapies. Considering that relation, therapy techniques developed in the clinical field such as Mindfulness-based interventions (MBIs) and/or Acceptance and Commitment Therapy – (ACT) also bring evidence to support this relationship. Content of mindfulness therapy contains basic principles such as awareness of the moment and acceptance (Cardaciotto et al. 2008: 212). Furthermore, previous studies support the view that mindfulness therapy increases inhibitory control skills of individuals (Fabio and Towey 2018: 77; Jaiswal et al. 2018: 627; Teper and Inzlicht 2013: 88).

On the contrary there was no significant relationship between other strategies (positive reappraisal, putting into perspective, positive refocus, refocus on planning self blame, other blame, rumination and catastrophizing) with inhibitory control. That current result can be due to our sample characteristics. Because deficiency of inhibitory control was associated with some clinical groups like obsessive-compulsive disorder, major depression disorder, anxiety disorder and attention-deficit/hyperactivity disorder, substance use disorders (Claes et al. 2006: 199; Garavan et al. 1999: 8302; Murphy 2002: 2), and it was stated that these groups tended to use maladaptive emotion regulation strategies more frequently. However the use of adaptive emotion regulation strategies was mostly related with non clinical groups (Aldao and Nolen-Hoeksema 2010: 978; Aldao et al. 2010: 223). Additionally in the literature, inhibition is divided into two as behavioural and cognitive inhibition. While behavioural inhibition represents getting control of overt behaviour, cognitive inhibition represents the control of thoughts and emotions that occur at the level of consciousness (Harnishfeger 1995: 180). Some researchers argue that it is not reliable to make inferences about cognitive inhibition by evaluating behavioural inhibition (Lipszyc and Schachar 2010: 1067; Logan et al. 1997: 60). Based on this, it is thought that the paradigm used in our study actually was more sensitive to behavioural inhibition, and therefore, no relationship was found between inhibitory control and expected cognitive emotion regulation strategies.

In the current study, there was no significant relationship between working memory and any cognitive emotion regulation strategies. Working memory is responsible for holding the information for short time, retrieving swiftly and protecting the knowledge from distraction (Hofmann et al. 2012: 178). In reviewing the literature, a study investigating the relationship between working memory and emotion regulation strategies emphasized that there is a positive relationship between working memory with cognitive reappraisal and positive reappraisal strategy (Jasielska et al. 2019: 567). Another study reported that there is a positive relationship between working memory with suppression and reappraisal strategy (Schmeichel et al. 2008: 1530). However, in our sample the associations were not significant. The reason for this inconsistency may arise from the method-instruments that applied in different study designs. While we evaluated working memory with the n-back task and emotion regulation with the cognitive emotion regulation scale, Jasielska and colleagues (2019) measured working memory with Operation Span Task (OSP) and

assessed emotion regulation with Emotion Regulation Scale and Cognitive Emotion Regulation Scale. Schmeichel and colleagues (Schmeichel et al. 2008: 1530) also used Operation Span Task (OSP) for evaluating working memory, and they used The Berkeley Expressivity Questionnaire (BEQ) for evaluating participant's expression of negative and positive emotions. In addition, there was a conflict in results examining the relationship between working memory and rumination strategy. Some studies emphasized that there was a negative correlation between them (Altamirano et al. 2010: 1379; Vergara-Lopez et al. 2016: 201), other studies emphasized there was no correlation (Onraedt and Koster 2014: 10; Pe et al. 2013: 10) and that result was compatible with our current result.

### **5.1.2 Investigating The Relationship Between Executive Functions and Psychological Resilience**

According to the results of a research examining the concept of resilience based on the cognitive model, the ability to focus attention, avoid distractions, cognitive flexibility, and suppress negative thoughts are found to be critical functions for the concept of "psychological resilience" (Garmezy et al. 1984: 100; Masten and Tellegen 2012: 346). Our results indicated that there was a marginally significant relationship between cognitive flexibility and psychological resilience. To put it more clearly, as people's cognitive flexibility increases, they recover faster and return to a normal emotional state more easily after a negative event. Current result seems to be consistent with other research which found a positive correlation between cognitive flexibility and psychological resilience (Ram et al. 2019: 362; Soltani et al. 2013: 88). The observed correlation between cognitive flexibility and psychological resilience explained by Ram et al. (2019: 365) was that the bidirectional relationship between cognitive flexibility and resilience stems from its strengthening effect of it on problem-solving and decision-making skills. In other respects, more resilient people can produce new strategies to cope with events, which increases their cognitive flexibility

Current study finding also showed that there was no significant relationship between working memory and psychological resilience. In reviewing the literature, studies that directly investigated the relationship between working memory and psychological resilience were limited. There were only three studies that determined a direct relationship between working memory and psychological resilience (Avci et al. 2013: 165; Bemath et al. 2020: 493; Wingo et al. 2010: 771). A study which was

conducted by Avci et al (2013: 165) supported that there was positive correlation between working memory and resilience. This rather contradictory result may be due to the our sample characteristics. In the current study, our participants were between the ages 20-45, while in the mentioned study, the participants were between the ages of 13-19.

In a second study which was conducted by Wingo and his collegeus (2010: 770), working memory is divided into verbal and nonverbal working memory. While pictures were used in the experimental paradigm evaluating non-verbal working memory, letters and words were used in the verbal working memory paradigm. When the verbal and non-verbal working memory performance of individuals with high and low resilience were compared, it was founded that there was a significant difference in non-verbal working memory performance of the individuals with high resilience but no difference in verbal working memory performance. In this line, our result is compatible with this finding because in our study, N-back paradigm was used to evaluate working memory peformance, and N-back is a paradigm that evaluates verbal working memory. Another study which is conducted by Bemath, Cockcroft & Theron (2020: 497) stated that working memory has an indirect effect on psychological resilience, and sociocultural factors have a major role in this relationship. More clearly, they stated that psychological resilience is greatly affected by sociocultural factors, especially family-related factors such as family social support, and childhood experiences, where these factors also affected working memory.

Previous researchers have stated that inhibitory control is important in psychological resilience in order to manage the emotions and thoughts that will cause stress for an individual (Schäfer et al. 2015: 135). Contrary to expectations, this study did not find a significant difference between inhibitory control and psychological resilience. In reviewing the literature, studies that indicated the relationship between inhibitory control and psychological resilience commonly consisted of different clinical groups such as PTSD and depression (DeGutis et al. 2015: 342; Joorman 2010: 161;Richard-Devantoy et al. 2016: 933). Because, it was stated that the rumination behaviors of these groups increased due to the deficit in inhibitory control, and as a result, psychological resilience decreased and symptoms increased (De Lissnyder et al. 2012: 124). For that reason, we can attribute the current study findings to the sample characteristic. Our sample consisted of young healthy adults with no history of psychological problems, and in this regard, the sample was very homogenous.

## **5.2. MEDIATION ANALYSIS:**

### **5.2.1 Investigating Potential Mediator Role of Refocus on Planning Strategy in the Relationship Between Cognitive Flexibility and Psychological Resilience**

As mentioned above cognitive flexibility and psychological resilience were marginally significant. Meanwhile, there was a positive correlation between refocus on planning and psychological resilience. Refocusing on planning point out how to handle the negative situation and what to do next (Garnefski et al. 2001: 1315). More specifically, when individuals focus on the solution after a negative event, they are able to cope with the negative situation more easily. Comparison of that finding with those of other studies the positive correlation between refocus on planning and psychological resilience was confirmed (Min et al. 2013: 1190). The current study also emphasized that cognitive flexibility significantly and positively correlated with refocus on planning emotion regulation strategy. This finding was also supported by previous findings in the literature (Garnefski et al. 2001: 1315) In line with that correlation, Carver and his colleagues (1989: 268) stated that refocus on planning is a problem-focused strategy and a substantial component of problem-solving (Naragon-Gainey et al. 2017: 385). It involves the act of dividing the problem into different dimensions and describing these components in order to deal efficiently (Gick 1986: 110). At that point, cognitive flexibility comes into play in the part of dividing the problem into different perspectives. The indirect effect of refocus on planning between cognitive flexibility and psychological resilience was significant. Consequently, cognitive flexibility appears to be associated with the more frequent use of refocus on planning, and the more frequent use of the refocus on planning increases psychological resilience.

### **5.2.2 Investigating Potential Mediator Role of Positive Refocus Strategy in the Relationship Between Cognitive Flexibility and Psychological Resilience**

Another finding of the current study which was about the relationship between cognitive flexibility and psychological resilience was showed that cognitive flexibility and psychological resilience was marginally significant. Meanwhile, there was a positive correlation between positive refocus and psychological resilience. The previous findings were consistent with the current study result (Polizzi and Lynn 2021: 1). The current study also emphasized that cognitive flexibility significantly and positively correlated with positive refocus emotion regulation strategy. More clearly,

higher cognitive flexibility increases the use of the positive refocus emotion strategy. This finding was also supported by previous findings in the literature (McRae et al. 2012: 5). The indirect effect of positive refocus between cognitive flexibility and psychological resilience was significant. As a result, cognitive flexibility appears to be associated with positive refocus emotion regulation strategy, and the more frequent use of the positive refocus increases psychological resilience.

### **5.3 CONCLUSION, LIMITATIONS AND FUTURE SUGGESTIONS**

The current study was aimed to explore how executive functions, emotion regulation strategies and psychological resilience related to each other. For that purpose, correlation, regression and mediation analyses were conducted. Overall, findings have revealed that inhibitory control significantly and positively correlated with acceptance emotion regulation strategy which is one of the adaptive strategies. More clearly, based on the result, as people can control their impulses and thoughts, their tendency to accept the events and emotions as they are, also increases. Furthermore, cognitive flexibility was positively correlated with adaptive emotion regulation strategies. To put it more clearly, the more cognitively flexible the individuals are, they tend to use adaptive emotion regulation strategies more frequently which in turn enable them to cope with negative events more efficiently. Cognitive flexibility was also correlated positively with refocus on planning and positive refocus which are among adaptive strategies. Mediation analysis revealed that positive refocusing had a fully mediating role in the relationship between cognitive flexibility and psychological resilience. In addition, refocus on planning also had a fully mediating role in mentioned relation.

As in every study, current study has also some limitations. The first limitation was the number of the sample. The marginal significance of the relationship between cognitive flexibility and resilience showed that accurate results would be obtained if the number of participants was increased. For this reason, it is recommended to work with higher numbers of participants in future studies.

Secondly, in the current thesis, since the study was cross-sectional design the age group of the participants was limited to 20-45 years. Considering the developmental aspects of the executive functions in different age groups, longitudinal studies can provide a broad perspective. In addition, as stated in the discussion section, our sample consists of young healthy adults without a history of psychological

disorder. But in the literature especially, low inhibitory control skills have been associated with clinical groups. In this sense, it is recommended to investigate same topic by clinical groups with healthy participants.

Thirdly, in current study, only the depression and anxiety symptoms of the participants were measured using the SCL 90. However, stressful life events also reported as one of the major factors that affect psychological resilience (Zhang et al. 2019: 446). For this reason, it is recommended that future studies also evaluate participants' stressful life events.

The last limitation was related to the stop signal paradigm used in inhibitory control. It has been suggested in the literature to use the stop signal paradigm with a dynamic structure. Because the inhibitory control skill can be successful or unsuccessful depending on whether the stop process finishes before or after the go process. More clearly, if the stop signal was close to the time the go stimulus appears, the person could inhibit the responses. On the contrary, if the person's go response was close to the time of the stop signal, the person could not be able to inhibit the response that has already started (Verbruggen and Logan 2009: 648). Therefore, it is suggested to use dynamic structure to balance between stop and go signal delay, but in our study, the stop signal delay varied randomly without any dynamic structure that varies depending on the performance of participants. This is one of the limitation of the paradigm we used to assess inhibition control ability.

In the literature, there is a study aiming to increase psychological resilience by improving executive functions developed for adolescents living in high-risk areas (Wenzel and Gunnar 2013). Similarly, in the light of our result, intervention programs that improve cognitive flexibility can be created for children, adolescents and adults separately.

Previous researchers emphasized that there are many protective factors that can affect psychological resilience such as optimism (Ong et al. 2006: 730), self-efficacy (Sapienza and Masten 2011: 270) personality traits (Hassani et al. 2008: 40; Purnamaningsih 2017: 53). For this reason, examining also these factors as mediators in the relationship between executive functions and resilience is also recommended for future studies.

## REFERENCES

- ALDAO Amelia and NOLEN-HOEKSEMA Susan (2010), “Specificity of Cognitive Emotion Regulation Strategies: A Transdiagnostic Examination”, *Behaviour Research and Therapy*, Vol. 48, No. 10, pp. 974-983.
- ALDAO Amelia, NOLEN-HOEKSEMA Susan and SCHWEIZER Susanne (2010), “Emotion-Regulation Strategies Across Psychopathology: A Meta Analytic Review”, *Clinical Psychology Review*, Vol. 30, No. 2, pp. 217-237.
- ALDERSON Matt R., RAPPORT Mark D., SARVER Dustin E. and KOFLER Michael J. (2008), “ADHD and Behavioral Inhibition: A Re-Examination of the Stop-Signal Task”, *Journal of Abnormal Child Psychology*, Vol. 36, No. 7, pp. 989-998.
- ALLPORT David, STYLES Elizabeth A. and HSIEH Shulan L. (1994), Shifting Intentional Set: Exploring the Dynamic Control of Tasks. In C. Umiltà and M. Moscovitch (Eds.), *Attention and performance XV: Conscious and nonconscious information processing* (pp. 421–452), MIT Press, Cambridge, MA.
- ALTAMIRANO Lee. J., MIYAKE Akira and WHITMER Anson J. (2010), “When Mental Inflexibility Facilitates Executive Control Beneficial Side Effects of Ruminative Tendencies on Goal Maintenance”, *Psychological Science*, Vol. 21, No. 10, pp. 1377-1382
- ALVAREZ Julie A. and EMORY Eugene (2006), “Executive Function and the Frontal Lobes: A Metaanalytic Review”, *Neuropsychology Review*, Vol. 16, No. 1, pp. 17-42
- AMERICAN PSYCHIATRIC ASSOCIATION (2000), *Diagnostic and Statistical Manual of Mental Disorders (DSM-4-TR)*, Fourth Edition Revision, American Psychiatric Association, Washington DC.

- ANDERSON Craig A., MILLER Rowland S., RIGER Alice L., DILL Jody C. and SEDIKIDES Constantine (1994), "Behavioral and Characterological Attributional Styles As Predictors of Depression and Loneliness: Review, Refinement, and Test". *Journal of personality and social psychology*, Vol. 66, No. 3, pp. 549-558.
- ANDERSON Michael C. and LEVY Benjamin J. (2009), "Suppressing Unwanted Memories". *Current Directions in Psychological Science*, Vol. 18, No. 4, pp. 189-194.
- AVCI Gunes, HANTEN Gerri R., SCHMIDT Adam T., LI Xiaoqi, ORSTEN Kimberley D., FABER Jessica., POST Marina and NEWSOME Mary R. (2013), "Cognitive Contributors to Resilience in Youth From Underserved Populations: A Brief Report", *Journal of Public Mental Health*, Vol. 12, pp. 165-170.
- AYDEMİR Ömer and KÖROĞLU Ertuğrul (2000), "Psikiyatride Kullanılan Klinik Ölçekler", Hekimler Yayın Birliği, Ankara.
- BADDELEY Alan (1998), "The Central Executive: A Concept and Some Misconceptions", *Journal of the International Neuropsychological Society*, 4, 523–526. Vol. 4, pp. 523-526.
- BADDELEY Alan (2003), "Working Memory and Language: An Overview", *Journal of communication disorders*, Vol. 36, No. 3, pp. 189-208.
- BADDELEY Alan (2003), "Working Memory: Looking Back and Looking Forward", *Nature reviews neuroscience*, Vol. 4, No. 10, pp. 829-839.
- BADDELEY Alan D. and HITCH, G. J. (1994), "Developments in the Concept Of Working Memory", *Neuropsychology*, Vol. 8, No. 4, pp. 485-493.
- BADDELEY Alan, ALLEN Richard J. and HITCH Graham (2010), "Investigating the Episodic Buffer", *Psychologica Belgica*, Vol. 50, No. 3, pp. 223-243.
- BADDELEY Alan.D. (2000), "Short-Term and Working Memory". In E Tulving and F.I.M. Craik (Eds.), *The Oxford Handbook of Memory* (pp. 77-92). Oxford University Press, New York, NY.
- BADDELEY Alan D. and HITCH Graham (1974), "Working Memory". In G. A. Bower (Ed.), *Recent Advances in Learning and Motivation* (pp. 47-89). Academic Press, New York, NY.

- BADRE David and WAGNER Anthony (2006), “Computational and Neurobiological Mechanisms Underlying Cognitive Flexibility”, *Proceedings of the National Academy of Sciences*, Vol. 103, No. 18, pp. 7186-7191.
- BALER Ruben D. and VOLKOW Nora D. (2006), “Drug Addiction: The Neurobiology of Disrupted Self-Control”, *Trends in molecular medicine*, Vol. 12, No. 12, pp. 559-566.
- BALLESIO Andrea, AQUINO Maria R. J. V., KYLE Simon D., FERLAZZO Fabio and LOMBARDO Caterina (2019), “Executive Functions in Insomnia Disorder: A Systematic Review and Exploratory Meta-Analysis”, *Frontiers in psychology*, Vol. 10, pp. 101.
- BARBAS Helen, WANG Jingyi, JOYCE Mary K. P. and GARCIA-CABEZAS Miguel Á. (2018), “Pathway Mechanism for Excitatory and Inhibitory Control in Working Memory”, *Journal of Neurophysiology*, Vol. 120, No. 5, pp. 2659-2678.
- BAUMEISTER Roy (2002), “Yielding to Temptation: Self-Control Failure, Impulsive Purchasing, and Consumer Behavior”, *Journal of consumer Research*, Vol. 28, No. 4, pp. 670-676.
- BEMATH Nabeelah, COCKCROFT Kate and THERON Linda (2020), “Working Memory and Psychological Resilience in South African Emerging Adults”, *South African Journal of Psychology*, Vol. 50, No. 4, pp. 493-506.
- BERKMAN Elliot T. and LIEBERMAN Matthew D. (2009), “Using Neuroscience to Broaden Emotion Regulation: Theoretical and Methodological Considerations”, *Social and personality psychology compass*, Vol. 3, No. 4, pp. 475-493.
- BERLIN Lisa, BOHLIN Gunilla and RYDELL Ann M. (2004), “Relations Between Inhibition, Executive Functioning, and ADHD Symptoms: A Longitudinal Study From Age 5 To 8½ Years”, *Child Neuropsychology*, Vol. 9, No. 4, pp. 225-266.
- BOONSTRA Marije, OOSTERLAAN Jaap, SERGEANT Joseph A. and BUITELAAR Jan K. (2005), “Executive Functioning in Adult ADHD: A Meta-Analytic Review”, *Psychological medicine*, Vol. 35, No. 8, pp. 1097-1108.
- BOSSE Tibor, PONTIER Matthijs and TREUR Jan (2010), “A Computational Model Based on Gross’ Emotion Regulation Theory”, *Cognitive systems research*, Vol. 11, No. 3, pp. 211-230.

- BRAEM Senne and EGNER Tobias (2018), "Getting A Grip on Cognitive Flexibility", *Current directions in psychological science*, Vol. 27, No. 6, pp. 470-476.
- BUGG Julie M., JACOBY Larry L. and TOTH Jeffrey P. (2008), "Multiple Levels of Control in the Stroop Task", *Memory & cognition*, Vol. 36, No. 8, pp. 1484-1494.
- CADENA Elyse J., WHITE David M., KRAGULJAC Nina V., REID Meredith A., JINDAL Ripu, PIXLEY Roland M. and LAHTI Adrienne C. (2019), "Cognitive Control Network Dysconnectivity and Response to Antipsychotic Treatment in Schizophrenia", *Schizophrenia Research*, Vol. 204, pp. 262-270.
- CAI Wen P., PAN Yu, ZHANG Shui M., WEI Cun, DONG Wei and DENG Guang H. (2017), "Relationship Between Cognitive Emotion Regulation, Social Support, Resilience and Acute Stress Responses in Chinese Soldiers: Exploring Multiple Mediation Model", *Psychiatry research*, Vol. 256, pp. 71-78.
- CAM Hasan H., USTUNER TOP Fadime and KUZLU AYYILDIZ Tulay (2022), "Impact Of The COVID-19 Pandemic on Mental Health and Health-Related Quality Of Life Among University Students in Turkey", *Current Psychology*, Vol. 41, No. 2, pp. 1033-1042.
- CARDACIOTTO Leeann, HERBERT James D., FORMAN Evan M., MOITRA Ethan and FARROW Victoria (2008), "The Assessment of Present-Moment Awareness and Acceptance: The Philadelphia Mindfulness Scale", *Assessment*, Vol. 15, No. 2, pp. 204-233.
- CARVER Charles S., SCHEIER Michael F. and WEINTRAUB Jagdish K. (1989), "Assessing Coping Strategies: A Theoretically Based Approach", *Journal of personality and social psychology*, Vol. 56, No. 2, pp. 267-283.
- CELLINI Nicola, DE ZAMBOTTI Massimiliano, COVASSIN Naima, SARLO Michela and STEGAGNO Luciano (2014), "Working Memory Impairment and Cardiovascular Hyperarousal in Young Primary Insomniacs", *Psychophysiology*, Vol. 51, No. 2, pp. 206-214.
- CHAI Wen J., ABD HAMID Aini I. and ABDULLAH Jafri M. (2018), "Working Memory From the Psychological and Neurosciences Perspectives: A Review", *Frontiers in Psychology*, Vol. 9, pp. 1-16.

- CHEIN Jason M., MOORE Adam B. and CONWAY Andrew R. A. (2011), “Domain-General Mechanisms of Complex Working Memory Span”, *NeuroImage*, Vol. 54, No. 1, pp. 550-559.
- CHMITORZA Andrea, KUNZLER Angela, HELMREICH Isabella, TUSCHER Oliver, KALISCH Raffael, KUBIAK Thomas, WESSA Michele and LIEB Klaus (2018), “Intervention Studies to Foster Resilience—A Systematic Review and Proposal for A Resilience Framework in Future Intervention Studies”, *Clinical psychology review*, Vol. 59, , pp. 78-100.
- CHRISTOPHEL Thomas B., KLINK Christiaan P., SPITZER Bernhard, ROELFSEMA Pieter R. and HAYNES John D. (2017), “The Distributed Nature of Working Memory”, *Trends in cognitive sciences*, Vol. 21, No. 2, pp. 111-124.
- CIESLIK Edna C., MUELLER Veronika I., EICKHOFF Claudia R., LANGNER Robert and EICKHOFF Simon B. (2015), “Three Key Regions for Supervisory Attentional Control: Evidence From Neuroimaging Meta-Analyses”, *Neuroscience and biobehavioral reviews*, Vol. 48, pp. 22-34.
- CLAES Laurence, NEDERKOORN Chantal, VANDEREYCKEN Walter, GUERRIERI Ramona and VERTOMMEN Hans (2006), “Impulsiveness and Lack of Inhibitory Control in Eating Disorders”, *Eating behaviors*, Vol. 7, No. 3, pp. 196-203.
- COCHRANE Melanie (2014), *Executive Function Contributions to Emotion Regulation in the Relationship Between Stress and Psychopathology in Emerging Adulthood* (Master’s Thesis). University of Victoria, Canada.
- COLLETTE Fabienne and VAN DER LINDEN Martial (2002), “Brain Imaging of the Central Executive Component of Working Memory”, *Neuroscience and Biobehavioral Reviews*, Vol. 26, No. 2, pp. 105-125.
- COLONIUS Hans (1990), “A Note on the Stop-Signal Paradigm, Or How to Observe the Unobservable”, *Psychological Review*, Vol. 97, No. 2, pp. 309-312.
- CONWAY Andrew A., KANE Michael J., BUNTING Michael F., HAMBRICK Zach D., WILHELM Oliver and ENGLE Randall W. (2005), “Working Memory Span Tasks: A Methodological Review and User’s Guide”, *Psychonomi Bulletin ve Review*, Vol. 12, No. 5, pp. 769-786.

- COOLS Roshan, CLARK Luke and ROBBINS Trevor W. (2004), “Differential Responses in Human Striatum and Prefrontal Cortex to Changes in Object and Rule Relevance”, *Journal of Neuroscience*, Vol. 24, No. 5, pp. 1129-1135.
- COULACOGLOU Carina and SAKLOFSKE Don (2017), “Executive Function, Theory of Mind, and Adaptive Behavior”, *Psychometrics and Psychological Assessment*, pp. 91–130.
- ÇELİKKALELİ Öner (2014), “The Relation Between Cognitive Flexibility and Academic, Social and Emotional Self-Efficacy Beliefs Among Adolescents”, *Ted Eğitim ve Bilim*, Vol. 39, No. 176.
- DANEMAN Meredyth and CARPENTER Patricia A. (1980), “Individual Differences in Working Memory and Reading”, *Journal of Verbal Learning and Verbal Behavior*, Vol. 19, No. 4, pp. 450–466.
- DE JONG Ritske, COLES Michael G. H., LOGAN Gordon D. and GRATTON Gabriele (1990), “In Search of the Point of No Return: The Control of Response Processes”, *Journal of Experimental Psychology: Human Perception and Performance*, 16(1), 164–182. Vol. 16, No. 1, pp. 164-182.
- DE LISSNYDER Evi, KOSTER Ernst H. W., EVERAERT Jonas, SCHACHT, Rik, VAN DEN ABEELE Dirk and DE RAEDT Rudi (2012), “Internal Cognitive Control in Clinical Depression: General But No Emotion-Specific Impairments”, *Psychiatry Research*, Vol. 199, No. 2, pp. 124-130.
- DEGUTIS Joseph, ESTERMAN Michael, MCCULLOCH Bay, ROSENBLATT Andrew, MILBERG William and MCGLINCHEY Regina (2015), “Posttraumatic Psychological Symptoms are Associated with Reduced Inhibitory Control, not General Executive Dysfunction”, *Journal of the International Neuropsychological Society*, Vol. 21, No. 5, pp. 342-352.
- DERAKSHAN Nazanin and EYSENCK Michael W. (2009), “Anxiety, Processing Efficiency, and Cognitive Performance: New Developments From Attentional Control Theory”, *European Psychologist*, Vol. 14, No. 2, pp. 168-176.
- DERAKSHAN Nazanin, ANSARI Tahereh L., HANSARD Miles, SHOKER Leor and EYSENCK Michael W. (2009), “Anxiety, Inhibition, Efficiency, and Effectiveness: An Investigation Using the Antisaccade Task”, *Experimental psychology*, Vol. 56, No. 1, pp. 48-55.

- DEROGATIS Leonard R. (1977), SCL-90-R : Administration, Scoring and Procedures Manual—I for the R(evised) Version. *Clinical psychometric research*, Baltimore, MD.
- DIAMOND Adele (2013), “Executive Functions”, *Annual review of psychology*, Vol. 64, pp. 135-168.
- DUCKWORTH Angela L., GENDLER Tamar S. and GROSS James J. (2016), “Situational Strategies For Self-Control”, *Perspectives on Psychological Science*, Vol. 11, No. 1, pp. 35-55.
- DUCKWORTH Angela L., TSUKAYAMA Eli and KIRBY Teri A. (2013), “Is It Really Self-Control? Examining the Predictive Power of the Delay of Gratification Task”, *Personality and Social Psychology Bulletin*, Vol. 39, No. 7, pp. 843-855.
- ERIKSEN Barbara A. and ERIKSEN Charles W. (1974), “Effects of Noise Letters Upon the Identification of A Target Letter in A Nonsearch Task”, *Perception & psychophysics*, Vol. 16, No. 1, pp. 143-149.
- EVANS Lindsay D., KOUROS Chrystyna D., SAMANEZ-LARKIN Silvia and GARBER Judy (2016), “Concurrent and Short-Term Prospective Relations Among Neurocognitive Functioning, Coping, and Depressive Symptoms in Youth”, *Journal of Clinical Child & Adolescent Psychology*, Vol. 45, No. 1, pp. 6-20.
- EYSENCK Michael W., DERAKSHAN Nazanin, SANTOS Rita and CALVO Manuel G. (2007), “Anxiety and Cognitive Performance: Attentional Control Theory”, *Emotion*, Vol. 7, No. 2, pp. 336-353.
- FABIO Rosa A. and TOWEY Giulia E. (2018), “Long-Term Meditation: The Relationship Between Cognitive Processes, Thinking Styles and Mindfulness”, *Cognitive Processing*, Vol. 19, No. 1, pp. 73-85.
- FAIRCHILD Graeme, VAN GOOZEN Stephanie H., STOLLERY Sarah J., AITKEN Michael R., SAVAGE Justin, MOORE Simon C. and GOODYER IAN M. (2009), “Decision Making and Executive Function in Male Adolescents With Early-Onset or Adolescence-Onset Conduct Disorder and Control Subjects”, *Biological psychiatry*, Vol. 66, No. 2, pp. 162-168.
- FISK John E., SHARP Charles A. (2004), “Age-Related Impairment in Executive Functioning: Updating, Inhibition, Shifting, and Access”, *J Clin Exp Neuropsychol*, Vol. 26, No. 7, pp. 874-890.

- FITZPATRICK Sian, GILBERT Sam and SERPELL Lucy (2013), “Systematic Review: Are Overweight and Obese Individuals Impaired on Behavioural Tasks of Executive Functioning?”, *Neuropsychology review*, Vol. 23, No. 2, pp. 138-156.
- FORSTMEIER Simon, DROBETZ Reinhard and MAERCKER Andreas (2011), “The Delay of Gratification Test For Adults: Validating A Behavioral Measure of Self-Motivation in A Sample of Older People”, *Motivation and Emotion*, Vol. 35, No. 2, pp. 118-134.
- FORTIER-BROCHU Emilie and MORIN Charles M. (2014), “Cognitive Impairment in Individuals with Insomnia: Clinical Significance and Correlates”, *Sleep*, Vol. 37, No. 11, pp. 1787-1798.
- GABRYS Robert L., TABRI Nassim, ANISMAN Hymie and MATHESON Kimberly (2018), “Cognitive Control and Flexibility in the Context of Stress and Depressive Symptoms: The Cognitive Control and Flexibility Questionnaire”, *Frontiers in Psychology*, Vol. 9, 2219.
- GARAVAN Hugh, ROSS Thomas J. and Stein Elliot A. (1999), “Right Hemispheric Dominance of Inhibitory Control: An Event-Related Functional MRI Study”, *Proceedings of the National Academy of Sciences*, Vol. 96, No. 14, pp. 8301-8306.
- GARMEZY Norman, MASTEN Ann S. and TELLEGEN Auke (1984), “The Study Of Stress and Competence in Children: A Building Block For Developmental Psychopathology”, *Child development*, Vol. 55, No. 1, pp. 97-111.
- GARNEFSKI Nadia and KRAAIJ Vivian (2006), “Relationships Between Cognitive Emotion Regulation Strategies and Depressive Symptoms: A Comparative Study of Five Specific Samples”, *Personality and Individual differences*, Vol. 40, No. 8, pp. 1659-1669.
- GARNEFSKI Nadia, KRAAIJ Vivian and SPINHOVEN Philip (2001), “Negative Life Events, Cognitive Emotion Regulation and Emotional Problems”, *Personality and Individual differences*, Vol. 30, No. 8, pp. 1311-1327.
- GARNEFSKI Nadia, KRAAIJ Vivian and VAN ETTEN Marije (2005), “Specificity of Relations Between Adolescents’ Cognitive Emotion Regulation Strategies and Internalizing and Externalizing Psychopathology”, *Journal of adolescence*, Vol. 28, No. 5, pp. 619-631.

- GARNEFSKI Nadia, LEGERSTEE Jeroen, KRAAIJ Vivian, VAN DEN KOMMER Tessa and TEERDS Jan (2002), "Cognitive Coping Strategies and Symptoms Of Depression and Anxiety: A Comparison Between Adolescents and Adults", *Journal of adolescence*, Vol. 25, No. 6, pp. 603-611.
- GARNEFSKI Nadia, TEERDS Jan, KRAAIJ Vivian, LEGERSTEE Jeroen and VAN DEN KOMMER Tessa (2004), "Cognitive Emotion Regulation Strategies and Depressive Symptoms: Differences Between Males and Females", *Personality and individual differences*, Vol. 36, No. 2, pp. 267-276.
- GAZZANIGA Michael, IVRY Richard and MANGUN George (2009), *Cognitive Neuroscience: The Biology of the Mind*, Norton Press, London.
- GENET Jessica J. and SIEMER Matthias (2011), "Flexible Control in Processing Affective and Non-Affective Material Predicts Individual Differences in Trait Resilience", *Cognition & Emotion*, Vol. 25, No. 2, pp. 380-388.
- GICK Mary L. (1986), "Problem-Solving Strategies", *Educational psychologist*, Vol. 21, No. 1-2, pp. 99-120.
- GOMEZ Pablo, RATCLIFF Roger and PEREA Manuel (2007), "A Model of the Go/No-Go Task", *Journal of Experimental Psychology: General*, Vol. 136, No. 3, pp. 389-413
- GOSCHKE Thomas and BOLTE Annette (2014), "Emotional Modulation of Control Dilemmas: The Role Of Positive Affect, Reward, and Dopamine in Cognitive Stability and Flexibility", *Neuropsychologia*, Vol. 62, pp. 403-423.
- GRATZ Kim L. and ROEMER Lizabeth (2004), "Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale", *Journal of Psychopathology and Behavioral Assessment*, Vol. 26, No. 1, pp. 41-54.
- GREENE Roberta (2002), *Human Behavior Theory: A Resilience Orientation. Resiliency. An Integrated Approach to Practice, Policy, and Research*, Nasw press, Washington.
- GROSS James J. (1998), "The Emerging Field of Emotion Regulation: An Integrative Review" *Review of General Psychology*, Vol. 2, No. 3, pp. 271-299.
- GROSS James J. (2014), Emotion Regulation: Conceptual and Empirical Foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–20). The Guilford Press, New york, NY.

- GROSS James J. (2015), "The Extended Process Model of Emotion Regulation: Elaborations, Applications, and Future Directions", *Psychological Inquiry*, Vol. 26, No. 1, pp. 130-137.
- GROSS James J., RICHARDS Jane M. and JOHN Oliver P. (2006), Emotion Regulation in Everyday Life. In D. K. Snyder, J. Simpson and J. N. Hughes (Eds.), *Emotion regulation in couples and families: Pathways to dysfunction and health* (pp. 13–35). American Psychological Association, Washington DC.
- GRUBER Reut and CASSOFF Jamie (2014), "The Interplay Between Sleep and Emotion Regulation: Conceptual Framework Empirical Evidence and Future Directions", *Current psychiatry reports*, Vol. 16, No.11, pp. 1-9.
- GULER Kahraman & Aydin Aylin (2022), "Comparing the Working Memory Capacity with Cognitive Flexibility, Cognitive Emotion Regulation, and Learning Styles of University Students: A Domain General View", *Dementia and Geriatric Cognitive Disorders Extra*, Vol. 12, No.3, pp. 131-149.
- HAIMOV Iris, HANUKA Einat and HOROWITZ Yael (2008), "Chronic Insomnia and Cognitive Functioning Among Older Adults", *Behavioral sleep medicine*, Vol. 6, No.1, pp. 32-54.
- HALLETT Peter E. (1978), "Primary and Secondary Saccades to Goals Defined By Instructions", *Vision research*, Vol. 18, No.10, pp. 1279-1296.
- HARNISHFEGER Katherine K. (1995), The Development of Cognitive Inhibition: Theories, Definitions And Research Evidence. In F. N. Dempster, and C. J. Brainerd (Eds.), *New perspectives on interference and inhibition in cognition* (pp. 176-199). Academic Press, San Diego.
- HASSANI Jafar, AZADFALLAH Parwiz, TABATABAIE Seyed. K. R. and ASHAYERI Hasan (2008), "The Assessment of Cognitive Emotion Regulation Strategies According to Neuroticism and Extraversion Personality Dimensions", *Advances in Cognitive Science*, Vol. 10, No.4, pp. 40-94.
- HAUSER Stuart T., GOLDEN Eve and ALLEN Joseph P. (2006), "Narrative in the Study of Resilience", *The psychoanalytic study of the child*, Vol. 61, No.1, pp. 205-227.
- HAYES Andrew F. (2018), Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach (Methodology in the Social Sciences) (2nd ed.), The Guilford Press, New York, NY.

- HENRY Lucy A. (2012). *The Development of Working Memory in Children*, Sage Publications, London.
- HERRMAN Helen, STEWART Donna E., DIAZ-GRANADOS Natalia, BERGER, Elena L., JACKSON Beth and YUEN Tracy (2011), “What Is Resilience?”, *Canadian journal of psychiatry. Revue canadienne de psychiatrie*, Vol. 56, No.5, pp. 258-265.
- HEYDER Katrin, SUCHAN Boris and DAUM Irene (2004), “Cortico-Subcortical Contributions to Executive Control”, *Acta psychologica*, Vol. 115, No. 2-3, pp. 271-289.
- HODSON Luke, MACCALLUM Fiona, WATSON Derrick G. and BLAGROVE Elisabeth (2021), “Dear Diary: Evaluating A Goal-Oriented Intervention Linked with Increased Hope and Cognitive Flexibility”, *Personality and Individual Differences*. Vol. 168, No.110383.
- HOERGER Michael, QUIRK Stuart W. and WEED Nathan C. (2011), “Development and Validation of the Delaying Gratification Inventory”, *Psychological assessment*, Vol. 23, No.3, pp. 725-738.
- HOFMANN Wilhelm, SCHMEICHEL Brandon J. and BADDELEY Alan D. (2012), “Executive Functions and Self-Regulation”, *Trends in cognitive sciences*, Vol. 16, No.3, pp. 174-180.
- HOMMEL Bernhard (1993), “Inverting the Simon Effect Intention: Determinants of Direction and Extent of Effects of Irrelevant Spatial Information”, *Psychological Research*, Vol. 55, No.4, pp. 270-279.
- HOORELBEKE Kristof, KOSTER Ernst H. W., VANDERHASSELT Marie A., CALLEWAERT Siebren and DEMEYER Ineke (2015), “The Influence of Cognitive Control Training on Stress Reactivity And Rumination in Response to A Lab Stressor and Naturalistic Stress”, *Behaviour Research and Therapy*, Vol. 69, pp. 1–10.
- HUR Juyoen, IORDAN Alexandry D., DOLCOS Florin and BERENBAUM Howard (2016), “Emotional Influences on Perception and Working Memory”, *Cognition and Emotion*, Vol. 31, No.6, pp. 1294-1302.
- HUTTON Samuel B. and ETTINGER Ulrich (2006), “The Antisaccade Task As A Research Tool in Psychopathology: A Critical Review”, *Psychophysiology*, Vol. 43, No.3, pp. 302-313.
- IBM (2011), IBM SPSS Statistics for Windows, Version 20. IBM Corp., Armonk.

- JAISWAL Satish, TSAI Shao.-Yang, JUAN Chi.-Hung, LIANG Wei.-Kuang and MUGGLETON Neil G. (2018), "Better Cognitive Performance Is Associated with the Combination of High Trait Mindfulness and Low Trait Anxiety", *Frontiers in Psychology*, Vol. 9, 627.
- JAMADAR Sharna D., THIENEL Renate and KARAYANIDIS Frini (2015), "Task Switching Processes", *Brain Mapping*, pp. 327–335.
- JASIELSKA Aleksandra, KACZMAREK Lech, BRONSKA Aleksandra, DOMINIAK Maria, NIEMIER Karolina, PATALAS Daria, SOKOŁOWSKI Andrzej and TOMCZAK Martyna (2019), "The Relationship Between Working Memory and Emotion Regulation Strategies", *Roczniki Psychologiczne*, Vol. 18, No. 4, pp. 567-578.
- JOHNSON-SELFIDGE Margaret and ZALEWSKI Christine (2001), "Moderator Variables of Executive Functioning in Schizophrenia: Meta-Analytic Findings", *Schizophrenia bulletin*, Vol. 27, No.2, pp. 305-316.
- JOORMANN Jutta (2010), "Cognitive Inhibition and Emotion Regulation in Depression. Current Directions in Psychological Science", Vol. 19, No.3, pp. 161-166.
- KANE Michael J. and ENGLE Randall W. (2002), "The Role of Prefrontal Cortex in Working-Memory Capacity, Executive Attention, and General Fluid Intelligence: An Individual-Differences Perspective", *Psychonomic bulletin & review*, Vol. 9, No. 4, pp. 637-671.
- KARAIMAK Özlem (2010), "Establishing the Psychometric Qualities of the Connor–Davidson Resilience Scale (CD-RISC) Using Exploratory and Confirmatory Factor Analysis in A Trauma Survivor Sample", *Psychiatry research*, Vol. 179, No. 3, pp. 350-356.
- KARAKAŞ Sirel, ERDOĞAN BAKAR Emel and DOĞUTEPE DINÇER Elvin (2013), "BİLNOT Bataryası El Kitabı: Nöropsikolojik Testlerin Yetişkinler için Araştırma ve Geliştirme Çalışmaları: BİLNOT- Yetişkin (Cilt I). Eğitim Yayınevi, Konya.
- KESSLER Ronald C., SONNEGA Amanda, BROMET Evelyn, HUGHES Michael and NELSON Christopher B. (1995), "Posttraumatic Stress Disorder in the National Comorbidity Survey", *Archives of general psychiatry*, Vol. 52, No. 12, pp. 1048-1060.

- KHASSAWNEH Basheer Y., BATHGATE Christina J., TSAI Sheila C., and EDINGER Jack D. (2018), "Neurocognitive Performance in Insomnia Disorder: The Impact of Hyperarousal and Short Sleep Duration", *Journal of sleep research*, Vol. 27, No. 6, e12747.
- KIDD Sean and SHAHAR Golan (2008), "Resilience in Homeless Youth: The Key Role of Self-Esteem", *American Journal of Orthopsychiatry*, Vol. 78, No. 2, pp. 163-172.
- KIRCHNER Wayne K. (1958), "Age Differences in Short-Term Retention of Rapidly Changing Information", *Journal of Experimental Psychology*, Vol. 55, No. 4, pp. 352-358.
- KNIGHT Robert T., STAINES William R., SWICK Diane and CHAO Linda L. (1999), "Prefrontal Cortex Regulates Inhibition and Excitation in Distributed Neural Networks", *Acta psychologica*, Vol. 101, No. 2-3, pp. 159-178.
- KOECHLIN Etienne, CORRADO Gregory, PIETRINI Pietro and GRAFMAN Jordan (2000), "Dissociating the Role of the Medial and Lateral Anterior Prefrontal Cortex in Human Planning", *Proceedings of the National Academy of Science of the United States of America*, Vol. 97, No. 13, pp. 7651-7656.
- KOĞAR Hakan (2019), "Belirti Tarama Listesinin (SCL-90) Geçerlik ve Güvenirlilik Çalışması: Mokken Ölçekleme Analizleri", *Türk Psikolojik Danışma ve Rehberlik Dergisi*, Vol. 9, No. 54, pp. 689-705.
- KOK Albert, RAMAUTAR Jennifer R., DE RUITER Michiel B., BAND Guido P. and RIDDERINKHOF Richard (2004), "ERP Components Associated With Successful and Unsuccessful Stopping in a Stop-Signal Task", *Psychophysiology*, Vol. 41, No. 1, pp. 9-20.
- KOPP Bruno, RIST Fred and MATTLER Uwe (1996), "N200 in the Flanker Task As A Neurobehavioral Tool For Investigating Executive Control", *Psychophysiology*, Vol. 33, No. 3, pp. 282-294.
- LAPPIN Joseph S. and ERIKSEN Charles W. (1966), "Use of A Delayed Signal to Stop A Visual Reaction-Time Response", *Journal of Experimental Psychology*, Vol. 72, No. 6, pp. 805-811.
- LARSEN Randy J. and PRIZMIC Zvezdana (2004), Affect Regulation. In R. F. Baumeister and K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 40–61), The Guilford Press, New York, NY.

- LAZARUS Richard S. (1993), "From Psychological Stress to the Emotions: A History Of Changing Outlooks", *Annual review of psychology*, Vol. 44, pp. 1–21.
- LEBER Andrew B., TURK-BROWNE Nicholas B. and CHUN Marvin M. (2008), "Neural Predictors of Moment-To-Moment Fluctuations in Cognitive Flexibility", *Proceedings of the National Academy of Sciences*, Vol. 105, No. 36, pp. 13592-13597.
- LEHTO Juhani E., JUUJÄRVI Petri, KOOISTRA Libbe and PULKKINEN Lea (2003), "Dimensions of Executive Functioning: Evidence From Children", *British Journal of Developmental Psychology*, Vol. 21, No. 1, pp. 59-80.
- LEI Hui, ZHANG Xiaocui, CAI Lin, WANG Yuping, BAI Mei and ZHU Xiongzhao (2014), "Cognitive Emotion Regulation Strategies in Outpatients with Major Depressive Disorder", *Psychiatry research*, Vol. 218, No. 1-2, pp. 87-92.
- LEIPOLD Bernhard and GREVE Werner (2009), "Resilience: A Conceptual Bridge Between Coping and Development", *European Psychologist*, Vol. 14, No. 1, pp. 40-50.
- LEVENS Sara M., ARMSTRONG Laura M., OREJUELA-DÁVILA Ana I. and ALVERIO Tabitha (2017), "The Two Sides of Adversity: The Effect of Distant Versus Recent Adversity on Updating Emotional Content in Working Memory", *Cognition and Emotion*, Vol. 31, No. 6, pp. 1243-1251.
- LEVITT Jill T., BROWN Timothy A., ORSILLO Susan M. and BARLOW David H. (2004), "The Effects of Acceptance Versus Suppression of Emotion on Subjective and Psychophysiological Response to Carbon Dioxide Challenge in Patients with Panic Disorder", *Behavior Therapy*, Vol. 35, No. 4, pp. 747-766.
- LEWIS Simon J., DOVE Anja, ROBBINS Trevor W., BARKER Roger A. and OWEN Adrian M. (2004), "Striatal Contributions to Working Memory: A Functional Magnetic Resonance Imaging Study in Humans", *European Journal of Neuroscience*, Vol. 19, No. 3, pp. 755-760.
- LI Chiang S. R., HUANG Cong, CONSTABLE Todd and SINHA Rajita (2006), "Imaging Response Inhibition In A Stop-Signal Task: Neural Correlates Independent of Signal Monitoring and Post-Response Processing", *Journal of Neuroscience*, Vol. 26, No. 1, pp. 186-192.
- LI Chiang S. R., YAN Peisi, SINHA Rajita and LEE Tien W. (2008), "Subcortical Processes of Motor Response Inhibition During A Stop Signal Task", *Neuroimage*, Vol. 41, No. 4, pp. 1352-1363.

- LIE Chuh H., SPECHT Karsten, MARSHALL John C. and FINK Gereon R. (2006), "Using Fmri to Decompose the Neural Processes Underlying the Wisconsin Card Sorting Test", *NeuroImage*, Vol. 30, No. 3, pp. 1038-1049.
- LIN Wei L., TSAI Ping H., LIN Hung Y. and CHEN Hsueh C. (2014), "How Does Emotion Influence Different Creative Performances? The Mediating Role of Cognitive Flexibility", *Cognition & emotion*, Vol. 28, No. 5, pp. 834-844.
- LIPSZYC Jonathan and SCHACHAR Russell (2010), "Inhibitory Control and Psychopathology: A Meta-Analysis of Studies Using the Stop Signal Task", *Journal of the International Neuropsychological Society*, Vol. 16, No. 6, pp. 1064-1076.
- LOGAN Gordon D. (1994), On the Ability to Inhibit Thought and Action: A Users' Guide to the Stop Signal Paradigm. In D. Dagenbach and T. H. Carr (Eds.), *Inhibitory processes in attention, memory, and language* (pp. 189–239). Academic Press.
- LOGAN Gordon D. and COWAN William B. (1984), "On the Ability to Inhibit Thought and Action: A Theory of An Act of Control", *Psychological review*, Vol. 91, No. 3, pp. 295-327.
- LOGAN Gordon D., COWAN William B. and DAVIS Kenneth A. (1984), "On the Ability to Inhibit Simple and Choice Reaction Time Responses: A Model and A Method", *Journal of experimental psychology. Human perception and performance*, Vol. 10, No. 2, pp. 276-291.
- LOGAN Gordon D., SCHACHAR Russell J. and TANNOCK Rosemary (1997), "Impulsivity and Inhibitory Control", *Psychological science*, Vol. 8, No. 1, pp. 60-64.
- LOGIE Robert H. and MARCHETTI Clelia (1991), "Visuo-Spatial Working Memory: Visual, Spatial or Central Executive?", *Advances in psychology*, Vol. 80, pp. 105-115.
- LUNA Beatriz (2009), "Developmental Changes in Cognitive Control through Adolescence", *Advances in Child Development and Behavior*, Vol. 37, pp. 233–278.
- LUTHAR Suniya S. and CICCETTI Dante (2000), "The Construct of Resilience: Implications for 13 Interventions and Social Policies", *Development and Psychopathology*, Vol. 12, No. 4, pp. 857-885.

- MACLEOD Colin and BUCKS Romola S. (2011), "Emotion Regulation and the Cognitive-Experimental Approach to Emotional Dysfunction", *Emotion Review*, Vol. 3, No. 1, pp. 62-73.
- MACLEOD Colin and MATHEWS Andrew (1988), "Anxiety and The Allocation of Attention to Threat", *The Quarterly journal of experimental psychology*, Vol. 40, No. 4, pp. 653-670.
- MACLEOD Colin M. (1991), "Half A Century of Research on the Stroop Effect: An Integrative Review", *Psychological bulletin*, Vol. 109, No. 2, pp. 163-203.
- MACLEOD Colin M. (2005), The Stroop Task in Cognitive Research. In A. Wenzel & D. C. Rubin (Eds.), *Cognitive methods and their application to clinical research* (pp. 17–40), American Psychological Association.
- MARTIN Matthew M. and ANDERSON Carolyn M. (1998), "The Cognitive Flexibility Scale: Three Validity Studies", *Communication Reports*, Vol. 11, No. 1, pp. 1-9.
- MARTIN Ryan C. and DAHLEN Eric R. (2005), "Cognitive Emotion Regulation and The Prediction of Depression, Anxiety, Stress, And Anger", *Personality and Individual Differences*, Vol. 39, No. 7, pp. 1249-1260.
- MASTEN Ann S. (2001), "Ordinary Magic: Resilience Processes in Development", *American psychologist*, Vol. 56, No. 3, pp. 227-238.
- MASTEN Ann S. and TELLEGEN Auke (2012), "Resilience in Developmental Psychopathology: Contributions of the Project Competence Longitudinal Study", *Development and psychopathology*, Vol. 24, No. 2, pp. 345-361.
- MATHEWS Andrew and MACLEOD Colin (2005), "Cognitive Vulnerability to Emotional Disorders", *Annual Review of Clinical Psychology*, Vol. 1, No. 1, pp. 167-195.
- MAZAHERI Mina, AFSHAR Hamid, NIKNESHAN Shekoufeh and ADIBI Peyman (2016), "Cognitive Emotion Regulation Strategies in Patients with Functional Dyspepsia and Healthy Controls - A Comparative Study", *Advanced biomedical research*, Vol. 27, No. 5, 196.
- MCKEE Jackson (2017), *Executive Functions and Resilience in First-Year Undergraduate Students* (Master's Thesis). University of Calgary, Calgary, AB.

- MCLAUGHLIN Katie A., MENNIN Douglas S. and FARACH Frank J. (2007), "The Contributory Role of Worry in Emotion Generation and Dysregulation in Generalized Anxiety Disorder", *Behaviour research and therapy*, Vol. 45, No. 8, pp. 1735-1752.
- MCRAE Kateri, JACOBS Scott E., RAY Rebecca D., JOHN Oliver P. and GROSS James J. (2012), "Individual Differences in Reappraisal Ability: Links to Reappraisal Frequency, Well-Being, and Cognitive Control", *Journal of Research in Personality*, Vol. 46, No. 1, pp. 2-7.
- MEIRAN Nachshon (1996), "Reconfiguration of Processing Mode Prior to Task Performance", *Journal of Experimental Psychology: Learning, memory, and cognition*, Vol. 22 No. 6, pp. 1423-1442.
- MILLER Earl K. and COHEN Jonathan D. (2001), "An Integrative Theory of Prefrontal Cortex Function", *Annual Review of Neuroscience*, Vol. 24 No. 1, pp. 167-202.
- MILLER Holly V., BARNES James C. and Beaver Kevin M. (2011), "Self-Control and Health Outcomes in A Nationally Representative Sample", *American journal of health behavior*, Vol. 35 No. 1, pp. 15-27.
- MILLER Kimberly M., PRICE Catherine C., OKUN Michael S., MONTIJO Harvey and BOWERS Dawn (2009), "Is the N-Back Task A Valid Neuropsychological Measure for Assessing Working Memory?", *Archives of Clinical Neuropsychology*, Vol. 24 No. 7, pp. 711-717.
- MIN Jung A., YU Jeong J., LEE Chang U. and CHAE Jeong H. (2013), "Cognitive Emotion Regulation Strategies Contributing to Resilience in Patients with Depression and/or Anxiety Disorders", *Comprehensive psychiatry*, Vol. 54 No. 8, pp. 1190-1197.
- MIYAKE Akira and SHAH Priti (Eds.). (1999). *Models of Working Memory: Mechanisms of Active Maintenance and Executive Control*. Cambridge University Press.
- MIYAKE Akira, FRIEDMAN Naomi P., EMERSON Michael J., WITZKI Alexander H., HOWERTER Amy and WAGER Tor D. (2000), "The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis", *Cognitive psychology*, Vol. 41 No. 1, pp. 49-100.

- MOCAN Oana, STANCIU Oana and VISU-PETRA L. (2014), “Relating Individual Differences in Internalizing Symptoms to Emotional Attention Set-Shifting In Children”, *Anxiety, Stress, & Coping*, Vol. 27 No. 5, pp. 509-526.
- MONCHI Oury, PETRIDES Michael, STRAFELLA Antonio P., WORSLEY Keith J. and DOYON Julien (2006), “Functional Role of the Basal Ganglia in the Planning and Execution of Actions”, *Annals of Neurology*, Vol. 59 No. 2, pp. 257-264.
- MONSELL Stephen (2003), “Task Switching”, *Trends in cognitive sciences*, Vol. 7 No. 3, pp. 134-140.
- MOTTER Jeffrey N., PIMONTEL Monique A., RINDSKOPF D., DEVANAND Davangere P., DORAISWAMY Murali and SNEED Joel R. (2016), “Computerized Cognitive Training and Functional Recovery in Major Depressive Disorder: A Meta-Analysis”, *Journal of affective disorders*, Vol. 1, No. 189, pp. 184-191.
- MURPHY Fionnuala C., SAHAKIAN Barbara J., RUBINSZTEIN Judy S., MICHAEL Aitken, ROGERS Robert D., ROBBINS Trevor W. and PAYKE Eugene S. (1999), “Emotional Bias and Inhibitory Control Processes in Mania and Depression”, *Psychological medicine*, Vol. 29, No. 6, pp. 1307-1321.
- MURPHY Patricia (2002), “Inhibitory Control in Adults with Attention-Deficit/Hyperactivity Disorder”, *Journal of Attention Disorders*, Vol. 6, No. 1, pp. 1-4.
- NARAGON-GAINEY Kristin, MCMAHON Tierney P. and CHACKO Thomas P. (2017), “The Structure of Common Emotion Regulation Strategies: A Meta-Analytic Examination”, *Psychological Bulletin*, Vol. 143, No. 4, pp. 384–427.
- NIEDENTHAL Paula M. and RIC François (2017), *Psychology of Emotion*. Psychology Press. <https://doi.org/10.4324/9781315276229>
- NOH Hyun J., JOO Eun Y., KIM Sung T., YOON So M., KOO Dae L., KIM Daeyoung, LEE Geun H. and HONG Seung B. (2012), “The Relationship Between Hippocampal Volume and Cognition in Patients with Chronic Primary Insomnia”, *Journal of clinical neurology*, Vol. 8, No. 2, pp. 130-138.
- NOLEN-HOEKSEMA Susan, WISCO Blair E. and LYUBOMIRSKY Sonja (2008), “Rethinking Rumination”, *Perspectives on Psychological Science*, Vol. 3, No.5, pp. 400–424.

- NOWLAN Jamie S., WUTHRICH Viviana M. and RAPEE Ronald M. (2015), “Positive Reappraisal in Older Adults: A Systematic Literature Review”, *Aging Ment Health*, Vol. 19, No. 6, pp. 475-84.
- OCHSNER Kevin N. and GROSS James J. (2008), “Cognitive Emotion Regulation: Insights From Social Cognitive and Affective Neuroscience”, *Current directions in psychological science*, Vol. 17, No. 2, pp. 153-158.
- ONAT Oya and OTRAR Mustafa (2010), “Bilişsel Duygu Düzenleme Ölçeğinin Türkçeye Uyarlanması: Geçerlik ve Güvenirlik Çalışmaları”, *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, Vol. 31, No. 31, pp. 123-143.
- ONG Anthony D., BERGEMAN Cindy S., BISCONTI Toni L. and WALLACE Kimberly A. (2006), “Psychological Resilience, Positive Emotions, and Successful Adaptation to Stress in Later Life”, *Journal of personality and social psychology*, Vol. 91, No. 4, pp. 730-749.
- ONRAEDT Thomas and KOSTER Ernst H. (2014), “Training Working Memory to Reduce Rumination”, Vol. 9, No. 3, e90634.
- OPITZ Philipp C., LEE Ihno A., GROSS James J. and URRY Heather L. (2014), “Fluid Cognitive Ability is A Resource for Successful Emotion Regulation in Older and Younger Adults”, *Frontiers in Psychology*, Vol. 5, 609.
- OWEN Adrian M., MCMILLAN Kathryn M., LAIRD Aangela R. and BULLMORE Ed (2005), “N-Back Working Memory Paradigm: A Meta-Analysis of Normative Functional Neuroimaging Studies”, *Human Brain Mapping*, Vol. 25, No. 1, pp. 46-59.
- OWENS Max and DERAKSHAN Nazanin (2013), “The Effects of Dysphoria and Rumination on Cognitive Flexibility and Task Selection”, *Acta Psychologica*, Vol. 142, No. 3, pp. 323-331.
- PAGE Lisa A., RUBIA Katya, DEELEY Quinton, DALY Eileen, TOAL Fiona, MATAIX-COLS David, GIAMPIETRO Vincent, SCHMITZ Nicole, MURPHY Declan G. (2009), “A Functional Magnetic Resonance Imaging Study of Inhibitory Control in Obsessive-Compulsive Disorder”, *Psychiatry Research: Neuroimaging*, Vol. 174, No. 3, pp. 202-209.
- PALMER Cara and ALFANO Candice (2017), “Sleep and Emotion Regulation: An Organizing, Integrative Review”, *Sleep Medicine Reviews*, Vol.31, pp. 6–16.

- PARSONS Sam, KRUIJT Anne W. and FOX Elaine (2016), “A Cognitive Model of Psychological Resilience”, *Journal of Experimental Psychopathology*, Vol. 7, No. 3, pp. 296-310.
- PE Madeline L., RAES Filip and KUPPENS Peter (2013), “The Cognitive Building Blocks of Emotion Regulation: Ability to Update Working Memory Moderates The Efficacy of Rumination and Reappraisal On Emotion”, *PloS One*, Vol. 8, No. 7, e69071.
- POLIZZI Craig P. and LYNN Steven J. (2021), “Regulating Emotionality to Manage Adversity: A Systematic Review of the Relation Between Emotion Regulation and Psychological Resilience”, *Cognitive Therapy and Research*, Vol. 45, No. 2, pp. 1-21.
- POPOV Tzvetan, KUSTERMAN Thomas, POPOVA Petia, MILLER Gregory A. and ROCKSTROH Brigitte (2019), “Oscillatory Brain Dynamics Supporting Impaired Stroop Task Performance in Schizophreniaspectrum Disorder”, *Schizophrenia Research*, Vol. 204, pp. 146- 154.
- POSNER Michael I. and DIGIROLAMO Gregory J. (1998), Executive Attention: Conflict, Target Detection, and Cognitive Control. In R. Parasuraman (Ed.), *The Attentive Brain*, MIT Press, Cambridge.
- PROCTOR Robert W. (2011), “Playing the Simon Game: Use of the Simon Task for Investigating Human Information Processing”, *Acta Psychologica*, Vol. 136, No. 2, pp. 182-188.
- PURNAMANINGSIH Esti H. (2017), “Personality and Emotion Regulation Strategies”, *International Journal of Psychological Research*, Vol. 10, No. 1, pp. 53-60.
- QI Senging, BASANOVIC Julian, WANG Lunchun, XIANG Shuoqi, HU Weiping and YI Xinfu (2020), “Regulation of Negative Emotions Through Positive Reappraisal and Distancing in High-Trait-Anxious Women”, *Journal of affective disorders*, Vol. 267, pp. 191-202.
- RAM Dushad, CHANDRAN Suhas, SADAR Aarsha and GOWDAPPA Basavana (2019), “Correlation of Cognitive Resilience, Cognitive Flexibility and Impulsivity in Attempted Suicide”, *Indian journal of psychological medicine*, Vol. 41, No. 4, pp. 362-367.

- REPOVŠ Grega and BADDELEY Alan (2006), “The Multi-Component Model of Working Memory: Explorations in Experimental Cognitive Psychology”, *Neuroscience*, Vol. 139, No. 1, pp. 5-21.
- RICE Timothy R. and HOFFMAN Leon (2014), “Defense Mechanisms and Implicit Emotion Regulation”, *Journal of the American Psychoanalytic Association*, Vol. 62, No. 4, pp. 693-708.
- RICHARD-DEVANTOY Stephane, DING Yang, LEPAGE Martin, TURECKI Gustavo and JOLLANT Fabrice (2016), “Cognitive Inhibition in Depression and Suicidal Behavior: A Neuroimaging Study”, *Psychological medicine*, Vol. 46, No. 5, pp. 933–944.
- ROGERS Robert D. and MONSELL Stephen (1995), “Costs of A Predictable Switch Between Simple Cognitive Tasks”, *Journal of Experimental Psychology: General*, Vol. 124, No. 2, pp. 207-231.
- ROTTSCHY Claudia., LANGNER Robert, DOGAN Imis., REETZ Kathrin, LAIRD Angela R., SCHULZ Jörg B., FOX Peter T. and EICKHOFF Simon B. (2012), “Modelling Neural Correlates of Working Memory: A Coordinate-Based Meta Analysis”, *NeuroImage*, Vol. 60, No. 1, pp. 830–846.
- ROYALL Donald R., LAUTERBACH Edward C., CUMMINGS Jeffrey L., REEVE Allison, RUMMANS Teresa A., KAUFER Daniel I., LAFRANCE Curt and COFFEY Edward (2002), “Executive Control Function: A Review of Its Promise and Challenges for Clinical Research. A Report From the Committee on Research of the American Neuropsychiatric Association”, *The Journal of neuropsychiatry and clinical neurosciences*, Vol. 14, No. 4, pp. 377-405.
- RUBIN Orit and MEIRAN Nachshon (2005), “On the Origins of the Task Mixing Cost in the Cuing Task-Switching Paradigm”, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, Vol. 31, No. 6, pp. 1477-1491.
- RUTTER Michael (2006), “Implications of Resilience Concepts for Scientific Understanding”, *Annals of the New York Academy of Sciences*, Vol. 1094, pp. 1-12.
- SAPIENZA Julianna K. and MASTEN Ann S. (2011), “Understanding and Promoting Resilience in Children and Youth”, *Current opinion in psychiatry*, Vol. 24, No. 4, pp. 267-273.

- SARI Berna A., KOSTER Ernst H.W., POURTOIS Gilles, DERAKSHAN Nazanin (2015), "Training Working Memory to Improve Attentional Control in Anxiety: A Proof-Of-Principle Study Using Behavioral and Electrophysiological Measures", *Biological Psychology*, Vol. 121, pp. 203-212.
- SAYINTA Senanur, KOÇAK Hatice N. and KAYNAK Hande (2022), "Direct and Indirect Relationships Between Cognitive Flexibility and COVID-19 Related Psychological Distress: The Mediating Role of Maladaptive Cognitive Emotion Regulation Strategies", *Turkish Journal of Clinical Psychiatry*, Vol. 25, No. 3, pp. 260-269.
- SCHACHAR Russell, TANNOCK Rosemary, MARRIOTT Michael and LOGAN Gordon (1995), "Deficient Inhibitory Control in Attention Deficit Hyperactivity Disorder", *Journal of abnormal child psychology*, Vol. 23, No. 4, pp. 411-437.
- SCHÄFER Judith, WITTCHEM Hans U., HOFLEER Michael, HEINRICH Anke, ZIMMERMANN Peter, SIEGEL Stefan and SCHONFELD Sabine (2015), "Is Trait Resilience Characterized By Specific Patterns of Attentional Bias to Emotional Stimuli and Attentional Control?", *Journal of behavior therapy and experimental psychiatry*, Vol. 48, pp. 133-139.
- SCHMEICHEL Brandon J. and TANG David (2014), The Relationship Between Individual Differences in Executive Functioning and Emotion Regulation: A Comprehensive Review. In J. P. Forgas and E. Harmon-Jones (Eds.), *Motivation and its regulation: The control within* (pp. 133–151). Psychology Press.
- SCHMEICHEL Brandon J., VOLOKHOV Rachael N. and DEMAREE Heath A. (2008), "Working Memory Capacity and the Self-Regulation of Emotional Expression and Experience", *Journal of Personality and Social Psychology*, Vol. 95, No. 6, pp. 1526-1540.
- SCHMIDT Heike, JOGIA Jigar, FAST Kristina, CHRISTODOULOU Tessa, HALDANE Morgan, KUMARI Veena and FRANGOUE Sophia (2009), "No Gender Differences in Brain Activation During The N-Back Task: An Fmri Study in Healthy Individuals", *Hum. Brain Mapp.* Vol. 30, No. 11, pp. 3609-3615.

- SCHNEIDER Darryl W. and LOGAN Gordon D. (2009), "Task Switching", *Encyclopedia of Neuroscience*, Vol. 9, pp. 869–874.
- SCHWAGER Susanne and ROTHERMUND Klaus (2013), "Motivation and Affective Processing Biases in Risky Decision Making: A Counter-Regulation Account", *Journal of Economic Psychology*, Vol. 38, pp. 111-126.
- SERVICE Elisabet (1992), "Phonology, Working Memory, and Foreign-Language Learning" *The Quarterly Journal of Experimental Psychology Section A*, Vol. 45, No. 1, pp. 21-50.
- SHAFFER David R. and KIPP Katherina (2014). *Developmental Psychology: Childhood and Adolescence (9th ed.)*. Cengage learning, Belmont, CA.
- SHI Liang, SUN Jiangzhou, WEI Dongtao and QIU Jiang (2019), "Recover From The Adversity: Functional Connectivity Basis of Psychological Resilience", *Neuropsychologia*, Vol. 122, pp. 20–27.
- SHIELDS Grant S., SAZMA Matthew A., MCCULLOUGH Andrew M. and YONELINAS Andrew P. (2017), "The Effects of Acute Stress on Episodic Memory: A Meta-Analysis and Integrative Review", *Psychological bulletin*, Vol. 143, No. 6, pp. 636-675.
- SMITH Edward E. and JONIDES John (1999), "Storage and Executive Processes in the Frontal Lobes", *Science*, Vol. 283, No. 5408, pp. 1657-1661.
- SNYDER Hannah R., MIYAKE Akira and HANKIN Benjamin L. (2015), "Advancing Understanding of Executive Function Impairments and Psychopathology: Bridging the Gap Between Clinical and Cognitive Approaches", *Frontiers in Psychology*, Vol. 6, 328.
- SOLTANI Esmail, SHAREH Hossein, BAHRAINIAN Seyed A. and FARMANI Azam (2013), "The Mediating Role of Cognitive Flexibility in Correlation of Coping Styles and Resilience with Depression", *Pajoohandeh Journal*, Vol. 18, No. 2, pp. 88-96.
- SON Young D., KANG Jae M., CHO Seong. J., LEE Jung S., HWANG Hee Y. and KANG Seung G. (2018), "fMRI Brain Activation in Patients with Insomnia Disorder During A Working Memory Task", *Sleep & breathing*, Vol. 22, No. 2, pp. 487-493.
- SPIELBERG Jeffrey M., MILLER Gregory A., HELLER Wendy and BANICH Marie T. (2015), "Flexible Brain Network Reconfiguration Supporting Inhibitory

- Control”, *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 112, No. 32, pp. 10020-10025.
- SPIRO Rand J. and JEHNG J. (1990). Cognitive Flexibility and Hypertext: Theory and Technology for the Non-Linear and Multidimensional Traversal of Complex Subject Matter. In D. Nix & R. Spiro (Eds.), *Cognition, education, and multimedia*. Hillsdale, NJ: Erlbaum.
- STEINBERG Laurence (2005), “Cognitive and Affective Development in Adolescence”, *Trends in cognitive sciences*, Vol. 9, No. 2, pp. 69-74.
- STEVENS Arianne D. (2009), *Social Problem-Solving and Cognitive Flexibility: Relations to Social Skills and Problem Behavior of At-Risk Young Children*, (Unpublished Doctoral Dissertation). Seattle Pacific University.
- STOET Gijbert (2010), “Psytoolkit- A Software Package For Programming Psychological Experiments Using Linux”, *Behavior Research Methods*, Vol. 42, No. 4, pp. 1096-1104.
- STUSS Donald T. and ALEXANDER Michael (2000), “Executive Functions and The Frontal Lobes: A Conceptual View”, *Psychological Research*, Vol. 63, No. 3-4, pp. 289-298.
- STUSS Donald T. and LEVINE Brain (2002), “Adult Clinical Neuropsychology: Lessons From Studies of the Frontal Lobes”, *Annual Review of Psychology*, Vol. 53, pp. 401-433.
- SULLIVAN Michael J., BISHOP Scott R. and PIVIK Jayne (1995), “The Pain Catastrophizing Scale: Development and Validation”, *Psychological assessment*, Vol. 7, No. 4, pp. 524-532.
- TABACHNICK Barbara G. and FIDELL Linda S. (2007). *Using Multivariate Statistics* (Vol. 5). Boston, MA: Pearson.
- TABACHNICK Barbara G., FIDELL Linda S. and ULLMAN Jodie B. (2013), “Using Multivariate Statistics”, Boston, MA: pearson, Vol. 6, pp. 497-516.
- TABIBNIA Golnaz, MONTEROSSO John R., BAICY Kate, ARON Adam R., POLDRACK Russell A., CHAKRAPANI Shruthi, LEE Buyean and LONDON Edythe D. (2011), “Different Forms of Self-Control Share A Neurocognitive Substrate”, *The Journal of Neuroscience*, Vol. 31, No. 13, pp. 4805-4810.
- TANG David and SCHMEICHEL Brandon J. (2014), “Stopping Anger and Anxiety: Evidence That Inhibitory Ability Predicts Negative Emotional Responding”, *Cognition & emotion*, 28(1), Vol. 28, No. 1, pp. 132-142.

- TENNEN Howard and AFFLECK Glenn (1990), "Blaming Others for Threatening Events", *Psychological Bulletin*, Vol. 108, No. 2, pp. 209-232.
- TEPER Rimma and INZLICHT Michael (2013), "Meditation, Mindfulness and Executive Control: The Importance of Emotional Acceptance and Brain-Based Performance Monitoring", *Social Cognitive and Affective Neuroscience*, Vol. 8, No. 1, pp. 85-92.
- THEEUWES Jan (2010), "Top-Down and Bottom-Up Control of Visual Selection", *Acta psychologica*, Vol. 135, No. 2, pp. 77-99.
- TROY Allison S., SHALLCROSS Amanda J., BRUNNER Anna, FRIEDMAN Rachel and JONES Markera C. (2018), "Cognitive Reappraisal and Acceptance: Effects on Emotion, Physiology, and Perceived Cognitive Costs", *Emotion*, Vol. 18, No. 1, pp. 58-74.
- TUNA Ezgi and BOZO Özlem (2012), "The Cognitive Emotion Regulation Questionnaire: Factor Structure and Psychometric Properties of the Turkish Version", *J Psychopathol Behav Assess*, Vol. 34, pp. 564-570.
- VAN DER LUBBE Rob H. and VERLEGER Rolf (2002), "Aging and The Simon Task", *Psychophysiology*, Vol. 39, No. 1, pp. 100-110.
- VANDERBILT-ADRIANCE Ella and SHAW Daniel S. (2008), "Conceptualizing and Re-Evaluating Resilience 10 Across Levels Of Risk, Time, and Domains of Competence", *Clinical Child and Family Psychology Review*, Vol. 11, No. 1-2, pp. 30-58.
- VANDERLIND Michael, EVERAERT Jonas and JOORMANN Jutta (2021), "Positive Emotion in Daily Life: Emotion Regulation and Depression", *Emotion*, Vol. 22, No. 7, pp. 1614-1624.
- VARKEVISSER Michael, VAN DONGEN Hans P., VAN AMSTERDAM Jan G. and KERKHOF Gerard A. (2007), "Chronic Insomnia and Daytime Functioning: An Ambulatory Assessment", *Behavioral sleep medicine*, Vol. 5, No. 4, pp. 279-296.
- VERBRUGGEN Frederick and Logan Gordon D. (2008), "Response Inhibition in the Stop-Signal Paradigm", *Trends in cognitive sciences*, Vol. 12, No. 11, pp. 418-424.
- VERBRUGGEN Frederick and LOGAN Gordon D. (2009), "Models of Response Inhibition in the Stop-Signal and Stop-Change Paradigms", *Neuroscience and biobehavioral reviews*, Vol. 33, No. 5, pp. 647-661.

- VERBRUGGEN Frederick, NOTEBAERT Wim, LIEFOOGHE Baptist and VANDIERENDONCK Andre (2006), “Stimulus-and Response-Conflict-Induced Cognitive Control in the Flanker Task”, *Psychonomic Bulletin & Review*, Vol. 13, No. 2, pp. 328-333.
- VERGARA-LOPEZ Chrystal, LOPEZ-VERGARA Hector I. and ROBERTS John E. (2016), “Testing A “Content Meets Process” Model of Depression Vulnerability and Rumination: Exploring the Moderating Role of Set-Shifting Deficits”, *Journal of Behavior Therapy and Experimental Psychiatry*, Vol. 50, pp. 201-208.
- WAGER Tor D. and SMITH Edward E. (2003), “Neuroimaging Studies of Working Memory: A Meta-Analysis”, *Cognitive, Affective and Behavioral Neuroscience*, Vol. 3, No. 4, pp. 255-274.
- WALD Jaye, TAYLOR Steven, ASMUNDSON Gordon J., JANG Kerry L. and STAPLETON Jennifer (2006), “Literature Review of Concepts: Psychological Resiliency.
- WALLER Margaret A. (2001), “Resilience in Ecosystemic Context: Evolution of the Concept”, *American Journal of Orthopsychiatry*, Vol. 71, No. 3, pp. 290-297.
- WANG Qing Q., FANG Yuan Y., HUANG Hao. L., LV Wen J., WANG Xiao X., YANG Tian T., YUAN Jing M., GAO Ying, QIAN Rui L. and ZHANG Yan H. (2021), “Anxiety, Depression and Cognitive Emotion Regulation Strategies in Chinese Nurses During the COVID-19 Outbreak”, *Journal of nursing management*, Vol. 29, No. 5, pp. 1263-1274.
- WEISSBERGER Gali H., GOLLAN Tamar H., BONDI Mark W., CLARK Lindsay R. and WIERENGA Christina E. (2015), “Language and Task Switching in the Bilingual Brain: Bilinguals Are Staying, Not Switching, Experts”, *Neuropsychologia*, Vol. 66, pp. 193-203.
- WENZEL Amanda J. and GUNNAR Megan R. (2013). Protective Role of Executive Function Skills in High-Risk Environments. In J. B. Morton (Ed.), *Encyclopedia on Early Childhood Development: Executive Functions*. Centre of Excellence for Early Childhood Development. USA. <http://www.child-encyclopedia.com/sites/default/files/dossiers-complets/en/executive-functions.pdf>. Accessed 25 November 2014.

- WHITMER Anson J. and BANICH Marie T. (2007), “Inhibition Versus Switching Deficits in Different Forms of Rumination”, *Psychological science*, Vol. 18, No. 6, pp. 546-553.
- WILLIAMS Benjamin R., PONESSE Jonathan S., SCHACHAR Russell J., Logan Gordon D. and TANNOCK Rose (1999), “Development of Inhibitory Control Across The Life Span”, *Developmental psychology*, Vol. 35, No. 1, pp. 205-213.
- WINGO Aliza P., FANI Negar, BRADLEY Bekh and RESSLER Kerry J. (2010), “Psychological Resilience and Neurocognitive Performance in A Traumatized Community Sample”, *Depression and Anxiety*, Vol. 27, No. 8, pp. 768-774.
- WYLIE Glenn and ALLPORT Alan (2000), “Task Switching and The Measurement of “Switch Costs” ”, *Psychological research*, Vol. 63, No. 3, pp. 212-233.
- YEHUDA Rachel, HOGE Charles W., MCFARLANE Alexander C., VERMETTEN Eric, LANIUS Ruth A., NIEVERGELT Caroline M., HOBFOLL Steven E., KOENEN Karestan C., NEYLAN Thomas C. and HYMAN Steven E. (2015), “Post-Traumatic Stress Disorder”, *Nature Reviews Disease Primers*, Vol. 1, No. 1, pp. 1-22.
- ZELAZO Philip D. and CUNNINGHAM William A. (2007), Executive Function: Mechanisms Underlying Emotion Regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 135–158). The Guilford Press, New York, NY.
- ZELAZO Philip D., MULLER Ulrich, FRYE Douglas, MARCOVITCH Stuart, ARGITIS Gina, BOSEOVSKI Janet, CHIANG Jackie K., HONGWANISHKUL Donaya, SCHUSTER Barbara V. and SUTHERLAND Alexandra (2003), “The Development of Executive Function in Early Childhood” , *Monographs of the Society for Research in Child Development*, Vol. 68, No. 3, pp. vii-137.
- ZHANG Ruibin, GENG Xiujuan and LEE Tatia M. C. (2017), “Large-Scale Functional Neural Network Correlates of Response Inhibition: An Fmri Meta-Analysis”, *Brain Structure and Function*, Vol. 222, No. 9, pp. 3973-3990.
- ZHANG Sheng and LI Chiang S. R. (2012), “Functional Networks For Cognitive Control in A Stop Signal Task: Independent Component Analysis”, *Human brain mapping*, Vol. 33, No. 1, pp. 89-104.

ZHANG Yuqing, ZHANG Xing, ZHANG Liwei and GUO Cheng (2019), “Executive Function and Resilience as Mediators of Adolescents’ Perceived Stressful Life Events and School Adjustment”, *Frontiers in psychology*, Vol. 10, 446.



## APPENDIX B: THE INFORMED CONSENT FORM

Çankaya Üniversitesi Sosyal Bilimler Enstitüsü Psikoloji Anabilim Dalı Bilişsel Psikoloji Yüksek Lisans programında yürütülen bu araştırma, Dr. Öğretim Üyesi Nakşidil Yazıhan danışmanlığında, Bilişsel Psikoloji Yüksek Lisans öğrencisi Özlem Mungan'ın tez çalışmasının bir gereği olarak yapılmaktadır. Bu çalışmasının amacı; Yürütücü İşlevlerin Bilişsel Duygu Düzenleme Stratejileri ve Psikolojik Sağlık ile olan ilişkisini incelemektir. Bu amaç doğrultusunda sizden 15 dakika sürecek ölçekleri doldurmanız ve bilgisayar ekranında sunulup 20 dakika sürecek deneyleri tamamlamanız istenmektedir.

Bu çalışmaya katılmak tamamen **gönüllülük** esasına dayanmaktadır. Çalışmanın amacına ulaşması için sizden beklenen, ölçekleri ve bilgisayarda sunulan deneyleri eksiksiz tamamlamanızdır. Ancak çalışmaya katıldıktan sonra çalışmanın herhangi bir aşamasında çalışmayı bırakma hakkına da sahipsiniz. Bu çalışmadan elde edilecek bilgiler tamamen araştırma amacı ile kullanılacak olup kişisel bilgileriniz **gizli tutulacaktır**; ancak verileriniz yayın amacı ile kullanılabilir. Çalışma hakkında daha fazla bilgi almak için Psk. Özlem Mungan (munganozlem@gmail.com) ya da Dr. Öğr. Üyesi Nakşidil Yazıhan (nyazihan@cankaya.edu.tr) ile iletişim kurabilirsiniz

Yukarıda yer alan ve araştırmadan önce katılımcıya verilmesi gereken bilgileri okudum ve katılmam istenen çalışmanın kapsamını ve amacını, gönüllü olarak üzerime düşen sorumlulukları anladım. Bu koşullarda söz konusu araştırmaya kendi isteğimle, hiçbir baskı ve telkin olmaksızın katılmayı kabul ediyorum.

kabul ediyorum

kabul etmiyorum

Katılımcı No:

Tarih:

İmza:

## APPENDIX C: DEMOGRAPHIC INFORMATION FORM

Tarih:

### DEMOGRAFİK BİLGİ FORMU

1. Katılımcı No:

2. Cinsiyet: Kadın ( ) Erkek ( )

3. Yaş:

4. Medeni durum: Evli ( ) Bekar ( )

5. En son mezun olunan okul: ortaokul ( ) Lise ( ) Üniversite ( ) Yüksek lisans ( ) Doktora ( )

6. Tam zamanlı veya yarı zamanlı bir öğrenci misiniz? Evet ( ) Hayır ( )

Evetse: Tam zamanlı / Yarı zamanlı

7. Çalışıyor musunuz? Evet / Hayır

Evetse: Tam zamanlı / Yarı zamanlı / Vardiyalı

8. Kendinizi hangi gelir düzeyinde tanımlarsınız?

Düşük ( ) Orta ( ) Yüksek ( ) Çok Yüksek ( )

9. Daha önce hiç tedavi gerektiren bir psikolojik rahatsızlık geçirdiniz mi?

Evet ( ) Hayır ( )

Evetse, belirtiniz.....

10. Şu anda herhangi bir psikolojik rahatsızlık sebebiyle ilaç tedavisi alıyor musunuz?

Evet ( ) Hayır ( )

Evetse, belirtiniz.....

11. Kronik bir rahatsızlığınız var mı? Evet ( ) Hayır ( )

Varsa belirtiniz.....

12. Düzenli olarak kullandığınız ilaç / ilaçlar var mıdır? Evet ( ) Hayır ( )

Varsa belirtiniz.....

13. Uyku düzeniniz ne kadar doyurucu ya da tatmin edici?

Oldukça yeterli ( ) Yeterli ( ) Nötr ( ) Yetersiz ( ) Çok yetersiz ( )

## APPENDIX D: SYMPTOM CHECK LIST (SCL-90)

### SCL-90-R

KATILIMCI NO:

AÇIKLAMA: Aşağıda zaman zaman herkeste olabilecek yakınmaların ve sorunların bir listesi vardır. Lütfen her birini dikkatle okuyunuz. Sonra bu durumun bugün de dahil olmak üzere son üç ay içerisinde sizi ne ölçüde huzursuz ve tedirgin ettiğini gösterilen şekilde numaralandırarak işaretleyiniz.

Hiç : 0 Örnek:1. ( 2 ) Baş ağrısı  
Çok az : 1  
Orta derecede : 2  
Oldukça fazla : 3  
İleri derecede :4

1. ( ) Baş ağrısı
2. ( ) Sinirlilik ya da içinin titremesi
3. ( ) Zihinden atamadığınız tekrarlayan, hoş gitmeyen düşünceler
4. ( ) Baygınlık ya da baş dönmesi
5. ( ) Cinsel arzu ve ilginin kaybı
6. ( ) Başkaları tarafından eleştirilme duygusu
7. ( ) Herhangi bir kimsenin düşüncelerinizi kontrol edebileceği fikri
8. ( ) Sorunlarınızdan pek çoğu için başkalarının suçlanması gerektiği duygusu
9. ( ) Olayları anımsamada güçlük
10. ( ) Dikkatsizlik ya da sakarlıkla ilgili düşünceler
11. ( ) Kolayca gücenme, rahatsız olma hissi
12. ( ) Göğüs ya da kalp bölgesinde ağrılar
13. ( ) Caddelerde veya açık alanlarda korku hissi
14. ( ) Enerjinizde azalma veya yavaşlama hali
15. ( ) Yaşamınızın sonlanması düşünceleri
16. ( ) Başka kişilerin duymadıkları sesleri duyma
17. ( ) Titreme
18. ( ) Çoğu kişiye güvenilmemesi gerektiği hissi
19. ( ) İştah azalması
20. ( ) Kolayca ağlama

21. ( ) Karşı cinsten kişilerle utangaçlık ve rahatsızlık hissi
22. ( ) Tuzağa düşürülmüş veya yakalanmış olma hissi
23. ( ) Bir neden olmaksızın aniden korkuya kapılma
24. ( ) Kontrol edilemeyen öfke patlamaları
25. ( ) Evden dışarı yalnız çıkma korkusu
26. ( ) Olanlar için kendisini suçlama
27. ( ) Belin alt kısmında ağrılar
28. ( ) İşlerin yapılmasında erteleme duygusu
29. ( ) Yalnızlık hissi
30. ( ) Karamsarlık hissi
31. ( ) Her şey için çok fazla endişe duyma
32. ( ) Her şeye karşı ilgisizlik hali
33. ( ) Korku hissi
34. ( ) Duyularınızın kolayca incitilebilmesi hali
35. ( ) Diğer insanların sizin özel düşüncelerinizi bilmesi
36. ( ) Başkalarının sizi anlamadığı veya hissedemeyeceği duygusu
37. ( ) Başkalarının sizi sevmediği ya da dostça olmayan davranışlar gösterdiği hissi
38. ( ) İşlerin doğru yapıldığından emin olmak için çok yavaş yapmak
39. ( ) Kalbin çok hızlı çarpması
40. ( ) Bulantı ve midede rahatsızlık hissi
41. ( ) Kendini başkalarından aşağı görme
42. ( ) Adale (kas) ağrıları
43. ( ) Başkalarının sizi gözlediği veya hakkınızda konuştuğu hissi
44. ( ) Uykuya dalmada güçlük
45. ( ) Yaptığınız işleri bir ya da birkaç kez kontrol etme
46. ( ) Karar vermede güçlük
47. ( ) Otobüs, tren, metro gibi araçlarla yolculuk etme korkusu
48. ( ) Nefes almada güçlük
49. ( ) Soğuk veya sıcak basması
50. ( ) Sizi korkutan belirli uğraş, yer veya nesnelere kaçınma durumu
51. ( ) Hiç bir şey düşünmeme hali
52. ( ) Bedeninizin bazı kısımlarında uyuşma, karıncalanma olması
53. ( ) Boğazınıza bir yumru takınmış hissi
54. ( ) Gelecek konusunda ümitsizlik

55. ( ) Düşüncelerinizi bir konuya yoğunlaştırmada güçlük
56. ( ) Bedeninizin çeşitli kısımlarında zayıflık hissi
57. ( ) Gerginlik veya coşku hissi
58. ( ) Kol ve bacaklarda ağırlık hissi
59. ( ) Ölüm ya da ölme düşünceleri
60. ( ) Aşırı yemek yeme
61. ( ) İnsanlar size baktığı veya hakkınızda konuştuğu zaman rahatsızlık duyma
62. ( ) Size ait olmayan düşüncelere sahip olma
63. ( ) Bir başkasına vurmak, zarar vermek, yaralamak dürtülerinin olması
64. ( ) Sabahın erken saatlerinde uyanma
65. ( ) Yıkanma, sayma, dokunma, gibi bazı hareketleri yineleme hali
66. ( ) Uykuda huzursuzluk, rahat uyuyamama
67. ( ) Bazı şeyleri kırıp dökme hissi
68. ( ) Başkalarının paylaşıp kabul etmediği inanç ve düşüncelerin olması
69. ( ) Başkalarının yanında kendini çok sıkılğan hissetme
70. ( ) Çarşı, sinema gibi kalabalık yerlerde rahatsızlık hissi
71. ( ) Her şeyin bir yük gibi görünmesi
72. ( ) Dehşet ve panik nöbetleri
73. ( ) Toplum içinde yer, içerken huzursuzluk hissi
74. ( ) Sık sık tartışmaya girme
75. ( ) Yalnız bırakıldığınızda sinirlilik hali
76. ( ) Başkalarının sizi başarılarınız için yeterince takdir etmediği duygusu
77. ( ) Başkalarıyla birlikte olunan durumlarda bile yalnızlık hissetme
78. ( ) Yerinizde duramayacak ölçüde rahatsızlık hissetme
79. ( ) Değersizlik duygusu
80. ( ) Size kötü bir şey olacakmış hissi
81. ( ) Bağırma ya da eşyaları fırlatma
82. ( ) Topluluk içinde bayılacağınız korkusu
83. ( ) Eğer izin verirsiniz insanların sizi sömüreceği duygusu
84. ( ) Cinsiyet konusunda sizi çok rahatsız eden düşüncelerin olması
85. ( ) Günahlarınızdan dolayı cezalandırılmanız gerektiği düşüncesi
86. ( ) Korkutucu türden düşünce ve hayaller
87. ( ) Bedeninizde ciddi bir rahatsızlık olduğu düşüncesi
88. ( ) Başka bir kişiye karşı asla yakınlık duymama

89. ( ) Suçluluk duygusu

90 ( ) Aklınızda bir bozukluğun olduđu düşüncesi

XXXXXS  
GCP

## APPENDIX E: COGNITIVE EMOTION REGULATION QUESTIONNAIRE

**Katılımcı No:**

**Tarih:**

<b>OLAYLARLA NASIL BAŞA ÇIKARSINIZ?</b>	<b>Hiçbir Zaman</b>	<b>Nadiren</b>	<b>Bazen</b>	<b>Sık Sık</b>	<b>Her Zaman</b>
Herkes zaman zaman tatlı acı olaylarla karşılaşmakta ve kendine özgü tepkiler vermektedir. Aşağıdaki sorular, olumsuz durumlarla karşılaştığınızda genelde neler düşündüğünüzü belirlemeyi amaçlamaktadır.					
1. Genelde kendimi suçlu hissedirim.	1	2	3	4	5
2. Olanları kabul etmek zorunda olduğumu düşünürüm.	1	2	3	4	5
3. Yaşadıklarım hakkında neler hissettiğimi sık sık düşünürüm.	1	2	3	4	5
4. Yaşadıklarımı düşünmekten ziyade daha iyi şeyler düşünmeyi tercih ederim.	1	2	3	4	5
5. Elimden gelenin en iyisinin ne olduğunu düşünürüm.	1	2	3	4	5
6. İçinde bulunduğum durumdan bir şeyler öğrenebileceğimi düşünürüm.	1	2	3	4	5
7. Herşey daha da kötü olabilirdi diye düşünürüm.	1	2	3	4	5
8. Yaşadıklarımın, diğerlerinin yaşadıklarından çok daha kötü olduğunu düşünürüm.	1	2	3	4	5
9. Olaylarda diğerlerinin suçlu olduğunu düşünürüm.	1	2	3	4	5
10. Olaylardan sorumlu olan kişinin ben olduğumu düşünürüm.	1	2	3	4	5
11. Durumu (olanları) kabullenmek zorunda olduğumu düşünürüm.	1	2	3	4	5
12. Yaşadıklarım hakkında ne düşündüğüme ve ne hissettiğime takılırım.	1	2	3	4	5
13. Yaşadığım olumlu olaylarla ilgili yapacak bir şeyimin olmadığını düşünürüm.	1	2	3	4	5
14. Durumla en iyi şekilde nasıl başa çıkabileceğimi düşünürüm.	1	2	3	4	5
15. Olaylardan sonra daha güçlü bir kişi haline geldiğimi düşünürüm.	1	2	3	4	5

16. Diğerlerinin daha kötü olaylarla karşılaştıklarını düşünürüm.	1	2	3	4	5
17. Sürekli olarak, yaşadıklarımın ne denli kötü şeyler olduğunu düşünürüm.	1	2	3	4	5
18. Olanlardan diğerlerinin sorumlu olduğunu hissedirim.	1	2	3	4	5
19. Bu olayda yaptığım hataları düşünürüm.	1	2	3	4	5
20. Olayla ilgili olarak birşeyleri değiştiremeyeceğimi düşünürüm.	1	2	3	4	5
21. Yaşadıklarımın dolaylı hissettiklerimin sebebini anlamaya çalışırım.	1	2	3	4	5
22. Olanlardan ziyade iyi şeyler düşünmeyi yeğlerim.	1	2	3	4	5
23. Durumu nasıl değiştirebileceğimi düşünürüm.	1	2	3	4	5
24. Kötü olayların iyi yönlerinin de olduğunu düşünürüm.	1	2	3	4	5
25. Son yaşadığımın, diğer yaşadıklarım kadar kötü olmadığını düşünürüm.	1	2	3	4	5
26. Başıma gelenlerin, bir kişinin başına gelebilecek en kötü şeyler olduğunu düşünürüm.	1	2	3	4	5
27. Bu sorunda, diğerlerinin yaptıkları hataları düşünürüm.	1	2	3	4	5
28. Asıl sorunun benden kaynaklandığını düşünürüm.	1	2	3	4	5
29. Olumsuz durumlarla yaşamayı öğrenmek zorunda olduğumu düşünürüm.	1	2	3	4	5
30. Olayın bende uyandırdığı hisleri derinlemesine irdelerim.	1	2	3	4	5
31. Yaşadığım güzel olayları düşünürüm.	1	2	3	4	5
32. Yapabileceğim en iyi planın ne olduğunu düşünürüm.	1	2	3	4	5
33. Sorunun olumlu yanlarını bulmaya çalışırım.	1	2	3	4	5
34. Hayatta daha kötü şeylerin de olduğunu düşünürüm.	1	2	3	4	5
35. Devamlı olarak, sorunun ne denli kötü olduğunu düşünürüm.	1	2	3	4	5
36. Sebebin, temelde diğerlerinden kaynaklandığını düşünürüm.	1	2	3	4	5

**APPENDIX F: CANNOR-DAVIDSON RESILIENCE SCALE**  
**CONNOR-DAVIDSON PSİKOLOJİK SAĞLAMLIK ÖLÇEĞİ (CDPSÖ)**

**Katılımcı numarası:**

Lütfen aşağıdaki ifadelerin size ne kadar uyduğunu belirtiniz ve yanıtız madde bırakmayınız.	Hiç doğru değil	Nadiren doğru	Bazen doğru	Sıklıkla doğru	Her zaman doğru
1. Değişiklikler karşısında uyum sağlayabilirim.	1	2	3	4	5
2. Stres olduğunda beni rahatlatcak en az bir tane yakın ve güvенеbileceğim ilişkim vardır.	1	2	3	4	5
3. Sorunlarıma açık bir çözüm bulunmadığında, bazen Yaradan ya da kader bana yardımcı olabilir.	1	2	3	4	5
4. Önüme çıkan her şeyle başa çıkabilirim.	1	2	3	4	5
5. Geçmiş başarılarım yeni zorluklarla mücadele etmemde bana güven veriyor.	1	2	3	4	5
6. Sorunlarla karşılaştığım zaman, olayların komik yönlerini görmeye çalışırım.	1	2	3	4	5
7. Stresle mücadele etmek durumunda kalmak, beni daha da güçlendirebilir.	1	2	3	4	5
8. Hastalık, yaralanma ya da benzeri güçlüklerden sonra çabuk normale dönerim.	1	2	3	4	5
9. İyi ya da kötü, her şeyin olmasında belli bir sebep olduğunu düşünürüm.	1	2	3	4	5
10. Sonuç ne olacaksa olsun, elimden gelenin en iyisini yaparım.	1	2	3	4	5
11. Engeller olsa da, hedeflerime ulaşacağıma inanırım.	1	2	3	4	5
12. Umutsuz durumlarda bile vazgeçmem.	1	2	3	4	5
13. Kriz ya da stres durumlarında yardım için nereye gideceğimi bilirim.	1	2	3	4	5
14. Stres altında dikkatim dağılmaz ve açık bir şekilde düşünebilirim.	1	2	3	4	5

	Hiç doğru değil	Nadiren doğru	Bazen doğru	Sıklıkla doğru	Her zaman doğru
15. Başarısızlıklar karşında kolay pes etmem.	1	2	3	4	5
16. Sorunları çözerken bütün kararları başkasının almasına izin vermektense, kendim için başına geçmeyi tercih ederim.	1	2	3	4	5
17. Yaşamdaki zorluklarla uğraşmada kendimi güçlü bir insan olarak görürüm.	1	2	3	4	5
18. Gerektiğinde başkalarını etkileyecek zor ya da kimsenin vermek istemediği kararları alabilirim.	1	2	3	4	5
19. Üzüntü, korku ve öfke gibi hoş olmayan ve acı verici duygularla baş edebilirim.	1	2	3	4	5
20. Yaşamdaki sorunlarla baş ederken, bazen olayların nedenini bilmeden, varsayımlar üzerine hareket etmek gerekir.	1	2	3	4	5
21. Yaşamadaki amacıma dair güçlü bir duyguya sahibim.	1	2	3	4	5
22. Hayatımın kontrolüne sahip olduğumu hissediyorum.	1	2	3	4	5
23. Zoru severim.	1	2	3	4	5
24. Önüme ne engel çıkarsa çıksın, hedeflerime ulaşmaya çalışırım.	1	2	3	4	5
25. Başarılarımla gurur duyarım.	1	2	3	4	5