THE EFFECTS OF ATTENTIONAL BIAS AND EXECUTIVE DYSFUNCTION ON SLEEP CHARACTERISTICS OF HEALTHY ADULTS DURING COVID-19 PANDEMIC

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ABSTRACT

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The current study was aimed to fill the gap arising from the absence of a study in the literature exploring the relationship between sleep quality, executive functions, and attentional bias during COVID-19 pandemic in healthy adult subjects. Moreover, the mediating effects of disinhibition and COVID-19 anxiety in the relationship between attentional bias and poor sleep quality were tested by mediation analysis. 102 healthy adults between the ages of 18-40 participated in the study voluntarily. Participants in the study were evaluated by Brief Symptom Inventory (BSI- 53), Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Depression, Anxiety and Stress Scale (DASS-42), COVID-19 Anxiety Scale (CAS), Visual Dot-Probe Task, Task Switching Paradigm and Go/No go Task. The findings indicated that the association of attentional bias with sleep quality was mediated by Covid-19 anxiety and disinhibition. While it was found that the sleep characteristics scores of the participants differed according to their depression, anxiety, and stress scores, it was concluded that cognitive flexibility was not associated with sleep characteristics and psychological distress scores. Additionally, COVID-19 anxiety has been associated with attentional bias. Finally, the findings obtained from the current study were evaluated in the light of the previous literature and suggestions were made for future studies.

Keywords: Sleep quality, psychological distress, COVID-19 anxiety, executive functions, attentional bias.

ÖZET

COVID-19 PANDEMİSİ SIRASINDA DİKKAT YANLILIĞI VE YÖNETİCİ İŞLEV BOZUKLUĞUNUN SAĞLIKLI YETİŞKİNLERİN UYKU ÖZELLİKLERİ ÜZERİNDEKİ ETKİSİ

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Bu çalışma, sağlıklı yetişkin deneklerde Covid-19 pandemisi sırasında uyku kalitesi, yürütücü işlevler ve dikkat yanlılığı arasındaki ilişkiyi araştıran literatürde bir çalışmanın bulunmamasından kaynaklanan boşluğu doldurmayı amaçlanmıştır. Ayrıca dikkat yanlılığı ile düşük uyku kalitesi arasındaki ilişkide disinhibisyon ve COVID-19 kaygısının aracılık etkileri test edilmiştir. Araştırmaya 18-40 yaş arası 102 sağlıklı yetişkin gönüllü katılmıştır. Çalışmaya katılanlar Kısa Semptom Envanteri (KSE-53), Pittsburgh Uyku Kalitesi İndeksi (PSQI), Epworth Uykululuk Ölçeği (ESS), Depresyon, Anksiyete ve Stres Ölçeği (DASS-42), COVID-19 Anksiyete Ölçeği (CAS) ile değerlendirilmiştir. Visual Dot- Probe Görevi, Görev Değiştirme Paradigması ve Yap/Yapma Görevi Deneysel paradigmaları yürütücü işlevleri ölçmede kullanılmıştır. Bulgular, dikkat yanlılığının uyku kalitesi ile ilişkisine Covid-19 kaygısı ve disinhibisyonun aracılık ettiğini göstermiştir. Katılımcıların uyku özellikleri puanlarının depresyon, anksiyete ve stres puanlarına göre farklılaştığı bulunurken; bilişsel esnekliğin uyku özellikleri ve psikolojik sıkıntı puanları ile ilişkili olmadığı sonucuna varılmıştır. Ek olarak, COVID-19 kaygısı dikkat yanlılığı ile anlamlı düzeyde ilişkili bulunmuştur. Son olarak mevcut çalışmadan elde edilen bulgular önceki literatür ışığında değerlendirilmiş ve gelecek çalışmalar için önerilerde bulunulmuştur.

Anahtar Kelimeler: Uyku kalitesi, psikolojik sıkıntı, COVID-19 kaygısı, yürütücü işlevler, dikkat yanlılığı.

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LIST OF ABBREVIATIONS

COVID-19	: Coronavirus Pandemic
EF	: Executive Functions
RAS	: Reticular Activating System
LC	: Locus Ceruleus
VLPO	: Ventrolateral Preoptic Region
REM	: Rapid Eye Movement
NREM	: Non-repeat Eye Movement
EEG	: Electroencephalogram
PSQI	: Pittsburgh Sleep Quality Index
ESS	: Epworth Sleepiness Scale
HA	: Health Anxiety

CHAPTER I

INTRODUCTION

Coronavirus pandemic (COVID-19) has negative impact on many people's life and people have faced with many challenges, such as economic problems, isolation, life threatening stress, depression, sleep problems (O'Connor et al. 2021: 330). Both the contagious epidemics themselves and the measures taken to contain the epidemic are associated with significant symptoms, including severe psychological distress and poor sleep quality (Jahrami et al. 2021: 504; Wu and Wei 2020: 6). Sleep deprivation has been linked to deficits of higher cognitive functioning particularly reduced inhibition and task switching (Killgore 2010: 122; Kronholm et al. 2009: 437; Venus 2019: 45). Executive functions (EF) are high-level cognitive processes that facilitate new behavioral patterns and optimize one's approach to unfamiliar situations (Gilbert and Burgess 2008: 111). During the covid-19 pandemic not only sleep paterns were changed but also executive functioning has been affected (Benham 2021: 506). According to the research, people reported that they had later bedtime and wake-up times and lower sleep quality compared to pre- coronavirus pandemic, despite they had longer sleep duration (Ali et al. 2020: 1; Benham 2021: 513; Marelli et al. 2021: 14). According to the current evidence, sleep deprivation result with problems such as difficulties in controlling emotions or impulses, deficit in attention and concentration, inability to perform complex tasks or multi-procedures, difficulty in solving problems and learning or processing new information (Rabinovici et al. 2015: 646). Attentional bias is defined as facilitating rapid and early detection of potential hazards and information and responding appropriately (Bar-Haim et al. 2007: 1; Luijten et al. 2012: 2777; O'Keeffe et al. 2014: 580). Based on the reviewed literature the purpose of the study is to fill the gap arising from the absence of a study in the literature exploring the relationship between sleep quality, executive functions, and attentional bias during Covid-19 pandemic in healthy adult subjects.

1.1. WHAT IS SLEEP?

Sleep is an important physiological activity for maintaining one's mental and physical health (İnönü 2021: 389; Otsuka et al. 2017: 39). When the history of sleep research was examined, it was among the priority areas of neuroscience in the 1940s-1950s, while these views were reevaluated in the 1990s (Chokroverty 2017: 25; Dement 1998: 6). From ancient times to the present, numerous cultures have been interested in sleep (Chokroverty 2017: 25). Ancient Romans, Egyptians, and Greeks all had varied methods of describing sleep, including identifying the gods that give sleepers dreams (Oppenheim 1956: 182). In the following years, Aristotle observed that sleep is an awareness station in the heart, which is considered the center of sensation and sensitivity (Gallop 1988: 261).

As sleep studies with brain imaging techniques have increased, it was possible to study the sleeping and waking brain cycles, sleep stages and sleep states in depth (Chokroverty 1994: 8). However, despite progress in this area, it is not possible to give a definite answer to the questions of what sleep is and why we sleep. Sleep is also the outcome of a combination of afferent impulses being passively withdrawn from the brain and functional activation of certain neurons in specific brain areas (Carskadon and Dement 2005: 21; Chokroverty 2017: 6).

The Reticular Activating System (RAS) in the brainstem, spinal cord, and cerebral cortex, as well as the Bulbar Synchronizing Region (BSR) in the medulla, coordinate sleep and wakefulness (Vandekerckhove et al. 2011: 1740). A large network of subcortical structures and pathways supports the cortical activation required to sustain wakefulness (Carley and Farabi 2016: 6). The primary neurochemicals of this arousal system are excitatory norepinephrine, which releases from the locus ceruleus (LC), laterodorsal tegmentum of the pons and orexin which comes from the perifornical area, histamine which comes from the tuberomammillary nucleus, serotonin which comes from the midline raphe nuclei, acetylcholine which comes from the pedunculopontine tegmentum and dopamine which comes from the ventral periaccuductal gray matter (Carley and Farabi, 2016: 6).

Suppression of activity in the arousal systems is necessary for the initiation and maintenance of sleep. The inhibitory neurons of the ventrolateral preoptic region (VLPO), which are active during sleep, are responsible for this process (Saper et al. 2005: 93). In the basal forebrain, adenosine builds up when you're awake and drops as you sleep longer. VLPO is a likely candidate for the "sleep switch" since adenosine stimulates VLPO neurons in vivo and adenosine receptors are present in VLPO (Carley and Farabi 2016: 8; Chamberlin et al. 2003: 917). Touch, pain, sound, and vision are all transmitted through RAS. While awake, the component of the RAS in the brainstem transfers incoming inputs to the cortex. (Şahin and Aşçıoğlu 2013: 97). The 5 cortices receive very few stimuli throughout the sleep process. Serotonin, dopamine, histamine, norepinephrine, and acetylcholine are neurotransmitters that play a role in sleep as mentioned above (Siegel 2004: 6).

1.1.1. Four Stages of Sleep

Sleep cannot be considered as a homogeneous process (Walker 2008: 30). Rapid eye movement (REM) sleep, which is linked to active dreaming, and non-rapid eye movement (NREM) sleep are the two main stages of sleep (McNamara et al. 2010: 84). It appears that reciprocal inhibition between monoaminergic neurons and a specific group of cholinergic neurons in the brainstem regulates the transitions between NREM and REM sleep (Lu et al. 2006: 592). These cholinergic neurons that are "REM-on" have connections that are mutually inhibiting with noradrenergic and serotonergic (raphe) neurons (Lu et al. 2006: 593; Saper et al. 2010: 1040). These behaviors might be classified as wakefulness, NREM and REM sleep (Chokroverty 2017: 25; Stevner et al. 2019: 12). Noradrenergic and serotonergic neurons become almost completely silent when REM sleep is induced, but REM-on cholinergic neurons become maximally active. A typical cycle between NREM and REM is produced by the light and dark information as a result of these neurons' alternation between activity and inhibition (Carley and Farabi 2016: 8).

The characteristics of cells in different brain regions during NREM sleep and their contribution to the sleep process are also different. While most neurons in the cerebral cortex and other forebrain regions diminish or stop firing, most neurons in the brainstem directly above the spinal cord only slightly do so. Cortical neurons fire synchronously in a very low-frequency rhythm during NREM sleep. As a result, NREM sleep is characterized by relatively steady heart and breathing rates, and exceedingly seldom vivid dreams (Siegel 2003: 92).

The medulla and basal forebrain govern NREM sleep generators, whereas the pons and basal forebrain govern REM sleep generators. Neurons in the brainstem reticular formation dorsally and the posterior hypothalamus and basal forebrain ventrally facilitate the nonspecific thalamocortical projection pathway, which provides alertness (Carskadon and Dement 2005: 21). The Suprachiasmatic Nucleus (SKN) is a photosensitive circadian pacemaker that receives inputs from the retina both directly and indirectly. The average human circadian rhythm is 25 hours (24.7 to 25.2 hours on average) (Czeisler et al. 1999: 2180). The signals from the rostral pons and caudal midbrain area reach the diencephalon's paramedian midbrain reticular formation, where they are separated into two and terminate in the thalamus and hypothalamus, which are responsible for wakefulness (Pal and Mallick 2007: 722). The thalamocortical, basalocortical, and hypothalamocortical pathways must next excite the thalamus. The thalamocortical, basalocortical, and hypothalamocortical circuits must then activate the brain (Pal and Mallick, 2007: 722). These excitations are caused by the ascending reticular activating system, and glutamate is the principal neurotransmitter involved. Cholinergic transmissions are sent by the pontomesencephalic tegmental neurons, noradrenergic transmissions are sent by the LC, serotonergic transmissions are sent by the raphe nucleus, and hypocretinergic transmissions are sent by the posterolateral hypothalamus (Pal and Mallick 2007: 723). Glutamate, an excitatory neurotransmitter, is the major neurotransmitter of the ascending reticular activating system and plays an active role in the waking brain (Kalat 2015: 19).

Throughout the night, REM and NREM phases of sleep alternate. When one's impact fades, the other grows stronger and takes oversleep (Carskadon and Dement 2005: 22). After the initial awakening period, the first (N1), second (N2), and third (N3) stages of NREM sleep occur. NREM sleep is categorized into stages N1, N2, N3, with each stage denoting a deeper degree of sleep (Patel et al. 2021). According to studies, over 75% of sleep time is spent in NREM stages, with N2 phase accounting for most of this duration (Malik et al. 2018). N1, N2, N3, and REM make up the first four to five sleep cycles of an average night's sleep (Feinberg and Floyd 1979: 284). An entire sleep cycle lasts between 90 and 110 minutes (Carskadon and Dement 2005: 21). The first REM stage is shorter than the other stages, and as the night progress on, longer REM stages and a corresponding decline in deep sleep (NREM) take place (Patel et al. 2021).

The N1 stage which also called light sleep lasts about one to five minutes and accounts for 5% of total sleep time. The onset of this stage of the lightest sleep occurs when more than half of the alpha waves are replaced by low amplitude mixed frequency (LAMF) activity. Skeletal muscles have tone and breathing usually happens at a normal rate (Patel et al. 2021).

Another stage is N2 also called deeper sleep. As the individual's heart rate and body temperature decrease, this phase of sleep signifies deeper sleep (Gulia et al. 2018: 163). It is distinguished by the presence of K-complexes, sleep spindles, or both. The superior temporal gyri, anterior cingulate, insular cortices, and thalamus all experience sleep spindles, which are brief, intense bursts of neuronal activity that cause calcium influx into cortical pyramidal cells (Nir et al. 2013: 133). It is thought that this mechanism is essential for synaptic plasticity (Dang-Vu et al. 2010: 1590). Numerous studies indicate that sleep spindles are crucial for the consolidation of memory, particularly procedural and declarative memory (Antony et al. 2019:2 ; Stickgold 2013: 850; Wilhelm et al. 2012: 1718). It has been demonstrated that K-complexes have a role in preserving memory consolidation and sleep (Amzica and Steriade 2002: 139). Stage 2 sleep begins with a cycle that lasts around 25 minutes and gets longer each cycle after that, making up finally about 45-50 percent of total sleep.

The next stage is the N3 stage, also called slow-wave sleep (SWS). The signals in this stage, which is regarded as the deepest stage of sleep, are known as delta waves and have a significantly higher amplitude and lower frequency (Patel et al. 2021). The hardest stage to awaken from is this one; some people may not even be awakened by loud noises (over 100 decibels). As people get older, they often spend more time in the N2-stage of sleep rather than the slow, delta-wave slumber.

The last stage is called rapid eye movement sleep or paradoxical sleep. In REM sleep, most brain cells in both the forebrain and brainstem regions are highly active and signal to other nerve cells at rates close to or higher than those seen in the waking state. The overall energy consumption of the brain during REM sleep is just as high as when awake (Siegel 2003: 92; Mignot 2008: 106). During this stage, the brightest vivid dreams take place. Two complementary physiological processes involving neurotransmitters, which are substances that physically transfer impulses from one neuron to another at the synapse, prevent majority of muscle movements during REM sleep. In order to actively deactivate these motor neurons, the brain stops releasing particular neurotransmitters that would otherwise stimulate them. Instead, alternative neurotransmitters are released. Rapid eye movements are possible because this process has no effect on the motor neurons that manage the muscles that move the eyes (Siegel 2003: 92; Williams 2012: 280).

REM sleep alternates with NREM sleep at intervals of 60 minutes in infants and approximately 90 minutes in adults. During REM sleep, the EEG pattern is similar to stage-I sleep, but sawtooth waves called rhythmic theta/delta bursts are occasionally seen in REM sleep (Armitage 1995: 340). In EEG, low-voltage, mixed-frequency activity is associated with very low muscle tone. Rapid eye movements are the only characteristic of this stage of sleep.

1.1.2. Neurobiological Mechanisms of Sleep

A circadian drive (Process C) and a homeostatic mechanism (Process S) that builds up during waking and diminishes during sleep are both included in the model for sleep regulation put out by Borbely and his colleagues (Borbely and Tobler 1985: 43; Achermann and Borbély 2003: 683). Homeostatic process mediates the increase in "sleep pressure" during waking hours and the decrease in "sleep pressure" when a person is sleeping. Along with this, it may also be addressed in the ultradian process, which is sleep-related process that is characterized by the alternating of the two primary sleep phases, non-REM sleep and REM sleep (Borbély and Achermann 1992: 64). The multimodal sleep/wake patterns, internal desynchrony, and progression of daytime drowsiness may all be explained by the interaction of Process S with Process C. There are clear connections between certain brain systems and the processes proposed by diverse theories (Borbély and Achermann 1992: 64).

Evaluation method of the sleep called as polysomnogram, that includes electroencephalogram (EEG), electromyogram, electrooculogram, electrocardiogram, pulse oximetry, airflow, and respiratory effort (Åkerstedt et al. 1994: 157; Patel et al. 2021; Zokaeinikoo 2016: 773). These techniques are often carried out overnight and necessitate at least 6 hours of observation. An EEG specifically uses tiny electrodes applied to the scalp to record brain wave patterns. The standard evaluation for assessing sleep-related respiratory abnormalities such as central sleep apnea, obstructive sleep apnea, and sleep-related hypoventilation/hypoxia or other disorders like narcolepsy, periodic limb movement disorder and nocturnal seizures are all determined by the polysomnogram (Rundo and Downey III 2019: 381; Marino et al. 2013: 1751). To conclude, the first REM cycle starts about 90 minutes after falling asleep. The time between the onset of sleep and the end of the first REM sleep is called a sleep cycle (Pagel and Barnes 2001: 119).

Additionally, there is a structure to individual sleep quality that may be assessed using self-report questionnaires (Talero-Gutiérrez et al. 2008: 54). This kind of evaluation is largely subjective and involves both quantitative factors like sleep length, the frequency of awakenings, and latency as well as qualitative factors like resting mood or imaginative content (Talero-Gutiérrez et al. 2008: 55). The most commonly used scale for measuring sleep quality is the Pittsburgh Sleep Quality Index (PSQI), which consists of 19 items and is grouped into seven components: quality, delay, duration, efficiency and sleep changes, sleeping pill use, and daytime dysfunction (Mendonça et al. 2019: 24528). A proper night's sleep should not be the only focus of a sleep research; daytime performance should also be examined (Anders and Eiben 1997). The Epworth Sleepiness Scale (ESS) has been proposed specifically for that purpose, as a simple method for measuring the general level of daytime sleepiness or sleep propensity in adults (Johns 1992: 376).

As a result, sleep is a key process that allows your body and mind to recover so that you can wake up feeling refreshed and vigilant (Walker 2008: 30). The body can stay healthy and stave off sickness with the aid of adequate sleep (Eugene and Masiak 2015: 35). The body's resilience is boosted by hormones that are released that combat free radicals, such as melatonin. During sleep, most cells, particularly immune system cells, replenish and repair themselves (Carrillo-Vico et al. 2013: 8652). Moreover, the brain cannot function effectively without enough sleep (Eugene and Masiak 2015: 35). People’s capacity to focus, think clearly, and process memories might be hampered by insufficient sleep which can have serious consequences (Horne 1988: 528; Stickgold 2005: 1273; Pilcher and Huffcutt 1996: 318; Yetkin and Aydın 2014: 2). In the light of the current knowledge, getting a good night's sleep is considered as essential to living a healthy life.

In this section, the studies carried out to conceptualize sleep characteristics are included and the processes of the related concept are tried to be conveyed. To conclude, sleep is characterized by different stages with associated autonomous nervous system operations as mentioned above. Sleep is a component of the circadian cycle, and it is an intricate physiological process that is unique to every person and typically lasts for around one-third of the lifespan (Schulz and Salzarulo 2012: 95). In the next section, function of sleep, sleep quality and results of sleep deprivation, which occurs with the decrease of sleep quality, will be given.

1.1.3. Function of Sleep

There have been a lot of theories on how sleep works since the late 20th century (Assefa et al. 2015: 169). Berger and Philips claimed that energy conservation is sleep's principal purpose in the middle of the 1990s (Berger and Philips 1993: 277; Berger and Phillips 1995: 67). The occurrence of REM sleep, which is characterized by heightened brain activity, metabolism, and energy expenditure, presents a challenge to this view. Energy conservation is unlikely to be the primary cause of sleep since the overall quantity of bodily energy conserved during sleep is relatively less compared to alertness (Assefa et al, 2015: 169). Furthermore, Reimund (1994: 232) proposed that sleep serves as a restorative activity by scavenging free radicals that build up in the brain during waking. This does not, however, explain the advantages of REM sleep or the advantages of sleep for other organs. According to Krueger and Obál (1993: 63) and Kavanau (1996: 290), sleep stabilizes usage-related synapses and preserves underused synapses, respectively. According to Jouvet's (1975: 524) theory, sensory and motor circuits mature in a way that is dependent on activity during REM sleep, which favors neuronal activation. This theory, however, primarily addresses REM sleep and ignores the purposes of non-REM sleep. REM sleep was examined by Crick and Mitchison (1983: 111) as a memory eraser that eliminates or diminishes memories of undesirable acts. Moreover, thermoregulatory theory, is supported by data on enhanced sleep following wake-up heat loads, wake-up hypothermia following sleep deprivation, and the intimate relationship between sleep circadian cycles and body temperature (McGinty and Szymusiak 1990: 481). It was discovered more than ten years ago that complete sleep deprivation in rats results in death. Despite significantly more food consumption, these animals are losing weight, which indicates excessive heat loss. For unknown causes, animals passed away within 10 to 20 days rather than if they were given no food at all but were allowed to sleep normally (Siegel 2003: 92). It's unclear if a lack of sleep alone is lethal or if additional symptoms of brain damage are responsible. Human sleep deprivation studies have demonstrated that even little reductions in nightly sleep time led to an increase in tiredness. Being drowsy while operating a vehicle or performing other jobs that needs for continual attention is just as risky as drinking alcohol before performing them (Siegel 2003: 92).

In summary, the above-mentioned theories of sleep function have addressed different aspects of sleep. Although there is no common view on the basic function of sleep, it has been proven that all living things must spend a certain amount of time in sleep and that inadequate has negative effects on general health (Assefa et al. 2015: 170).

1.1.4. Sleep Quality

Sleep is crucial for memory consolidation, physical growth, learning, mood control, and overall quality of life. The feeling of being healthy, vigilant, and ready for a new day is referred as sleep quality (Capellini et al. 2009: 4609). As a result, when discussing variances in the actual sleep experience, the term "sleep quality" is utilized (Carskadon et al. 1976: 1383; Krystal and Edinger 2008: 16). Sleep quality encompasses quantitative measures such as sleep latency, time to fall asleep, sleep duration, and number of times a person wakes up during the night (Krystal and Edinger 2008: 16). Sleep latency is defined as the time between going to bed to sleep and onset of sleep (Littner et al. 2005: 113). Sleep latency and total sleep duration are of central importance in the diagnosis and treatment of insomnia and related sleep disorders (Vanable et al. 2000: 7). According to several research, those who use mobile devices late at night may have worse quality sleep due to the blue light they generate. Since majority of mobile devices emit blue light in the 400–495 nm and 460–480 nm ranges, which might impair melatonin synthesis and induce a phase shift in the human circadian clock (Rask et al. 2001: 1418; Rüger et al. 2013; Rafique et al. 2020: 357). Long sleep latency and sleep problems have both been linked to decreased melatonin levels (Chang et al. 2015: 1233).

Another factor affecting sleep quality is implementation of sleep hygiene. The term "sleep hygiene" refers to a set of behavioral habits that are both beneficial for improving sleep quality. These include having regular bedtimes and wake-up times, limiting alcohol and caffeine intake, engaging in regular exercise, eating healthy, and taking advantage of environmental elements that promote good sleep (Lichstein and Morin 2000: 46; Knufinke et al. 2018: 79).

Adults who have continuous sleep deprivation have poor sleep quality, which may raise their risk for health issues and impair their ability to think clearly and perform well in school and at work (Liu et al. 2013: 1421; Doi et al. 2003: 467). To determine whether indicators of health, happiness, and fatigue were more strongly associated with the quantity or quality of sleep, a seven-day sleep diary and other questionnaires about health, happiness, and drowsiness were given to participants (Pilcher et al. 1997: 586).The findings indicate that, compared to people with normal sleep quality, participants who slept an average of 7 hours per day had superior associations with health, affect balance, life satisfaction, emotions, melancholy, anger, weariness, and uncertainty.

Consequently, lack of sleep has been linked to a deterioration in cognitive performance, immune system, attention problems, deterioration in basic human functions and high blood pressure. Moreover, numerous experimental research has demonstrated that decreased cognitive performance is a result of sleep deprivation (Howell et al. 2004: 525; Harrison and Horne 2000: 236).

1.2. EXECUTIVE FUNCTIONS

Executive functions (EF) are high-level cognitive processes that facilitate new behavioral patterns and optimize one's approach to unfamiliar situations (Gilbert and Burgess 2008: 113). The prefrontal cortex, which is responsible for controlling and supervising the functioning by observing the activations in other cortical and subcortical structures and sending command signals known as top-down signaling to ensure the regular operation of multiple neural systems, is a crucial structure for executive functions (Funahashi and Andreau 2013: 475). EFs enable us to manage our relationships, plan future goal comprehends difficult or abstract concepts, and solve previously unsolved problems (Cristofori et al. 2019: 199). How we organize our lives, how we plan and then implement these plans is largely driven by EFs (Lezak 1982: 195). There is consensus that there are three basic EFs (Diamond 2013; Lehto et al. 2003; Lezak 1982; Miyake et al. 2000) namely, inhibition, working memory and cognitive flexibility.

Diamond (2013: 137) defines inhibition as the capacity to control one's automatic reactions to overcome significant internal or external pull, working memory as the capacity to retain knowledge in order to enable task completion and cognitive flexibility is the capacity to think about several sources and types of information at once and to transition between them when performing a task. Since EFs are largely independent activities, not all are impacted equally; genetics (Thibeau et al. 2016: 6) or lifestyle choices may have an impact on age-related EF reduction (Miyake et al. 2000: 52).

EFs have diverse aging and developmental patterns, with early adulthood seeing prolonged growth (Luna et al. 2010: 112). As people become older seeing a drop brought on by structural and functional alterations in the prefrontal cortex (Paus 2005: 61; Luna et al. 2010: 112). Ferguson and his colleagues (2021: 2) noted a steady increase in working memory ability from youth to early adulthood, which was followed by reductions in both inhibitory control and working memory beginning around the age of 30 to 40 and lasting until later. Moreover, with aging changes in sleep patterns are specifically connected to total sleep duration, sleep continuity, and slow-wave sleep (Ohayon et al. 2004: 1256). A shift in the sleep-wake cycle appears to be a side effect of aging. Changes in prefrontal regions and their connections might help to explain some of the difficulties in performing executive tasks (Morterá and Herculano-Houzel 2012: 6). As mentioned above, findings indicate that the age factor is important in the functioning of executive functions. On the basis of previous literature, while investigating the effectiveness of executive functions, it seems extremely important to include only young adult individuals in the study in order to eliminate cognitive impairments that develop due to aging.

The prefrontal regions are vulnerable to inadequate sleep which is harmful for the brain regions' that has a role in EFs (Thomas et al. 2000: 350). It is understood from literature findings that sleep has an important impact in EFs. Moreover, not only aging and sleep but also stress has negative effect on executive functions (Shields et al. 2016: 792). Stress is assumed to be one of the causes of impairment in executive functions (Diamond 2013: 153; Shansky and Lipps 2013: 123). Shields, Sazma, and Yonelinas (2016: 792) concluded from their meta-analysis research that stress impairs WM, inhibition, and cognitive flexibility. Additionally, they highlighted that stress enhances response inhibition (Schwabe et al. 2013: 2319) which means that it leads to a cognitive state of automatic and reactive processing. Lower level of stress also improves executive motor function, which should make it simpler to connect with or withdraw from the current stressor (Shields et al. 2016: 652). To elaborate, attention is influenced by both the top-down process—the immediate motivation of the observer—and the bottom-up process, the salience of the stimuli and no matter where the information comes from. Research has shown that people tend to focus on whatever is evoking the most emotion at the time (Katsuki and Constantinidis 2014: 516). For instance, according to Mogg et al. (2000: 382), when exposed to highly frightening stimuli relative to less threatening stimuli, Subject display a bias towards threating stimulus.

In the line with the theoretical background, it has been noted that there is a strong relationship between executive functions, psychological distress, and sleep. In order to identify and analyze any impairment, the neuropsychological examination should cover a variety of executive function domains. To conclude, sleep and stress seem to have an important role on executive functions, which will be discussed in more detail in the following sections.

1.2.1. Inhibitory Control

Inhibition control can be defined as the ability to resist the strongest response bias (Dowsett and Livesey 2000: 162). In other words, it provides an extraordinary flexibility and freedom to choose and control our actions (Diamond 1990: 637). There are two different inhibition processes, interference control and response inhibition (Diamond 2013: 141). Inhibition of thoughts and memories in interference control is called cognitive inhibition, while inhibition at the attention level is called selective and focused attention. Response inhibition refers to the ability to suppress inappropriate, irrelevant, or inadequate actions (Zeigler-Hill and Shackelford 2020).

Inhibition is considered essential for EF, and most inhibition tasks do not involve purely inhibition measures and do not benefit from a single inhibition process (Simpson and Riggs 2005: 483). Goals need to be kept in mind to know what is relevant or appropriate and what to inhibit. By focusing particularly intensively on information held in mind, the possibility of this information to guide behavior is increased, thus reducing the possibility of an inhibitory error, and working memory is required for all these processes (Carlson et al. 2002: 79). As mentioned above, inhibition is identified by many researchers as a key executive function. However, Barkley (1997, as cited in Cheung et al. 2004: 395) suggested that behavioral inhibition should be studied separately from executive functions. According to him, executive functions are divided into four as nonverbal working memory, verbal working memory, self-regulation of affect, and reconstitution emphasizing that any change in behavioral inhibition impairs executive functions. Furthermore, inhibition of an initial dominating reaction, stopping a continuing response, and maintaining a latency without being disrupted by competing events and responses are the three processes that make up behavioral inhibition, according to Barkley. There are different methods to measure inhibition control such as Stroop test, Flanker test, stop-signal task and go/ no-go task are among the main tests used to measure inhibition control (Karakaş 2013).

1.2.2. Working Memory

Working memory refers to the cognitive processes involved in temporarily storing information while a person is simultaneously processing incoming information or retrieving information from long-term storage (Karakaş and Karakaş 2000: 216). Processes such as mentally rearranging elements, translating instructions into action plans, incorporating new information into thought or action plans, evaluating alternatives, and deriving a general principle, or mentally relating information to see relationship between items or ideas all require working memory (Diamond 2013: 143). In addition, our ability to see connections between seemingly unrelated things and to separate different elements from the whole is critical for considering our past experiences and future hopes that we remember when making plans or decisions (Simms et al. 2018: 174).

Inhibitory control and working memory might be considered as two mechanisms that complement one another. To recognize what is suitable and what is unimportant, one must keep their aims in mind (Diamond 2013: 147). This knowledge directs the person's actions and helps him/her lower his/her mistake rate (Diamond 2013: 147). For example, in the go/nogo task, which is one of the most basic tasks used to measure inhibition, there are two situations as act and no act. However, it is necessary to keep in mind in which case which process will be processed (Rubia et al. 2001). Additionally, Bull and Scerif (2001: 289) used the Wisconsin Card sorting task to assess EF working memory and the findings demonstrate a link between poor task performance and deficits in working memory and inhibition. Since maintaining knowledge properly and rapidly in potentially distracting situations is crucial, it appears that there is a connection between inhibition and working memory (Fernandes

2017). In the current study, no direct assessment of working memory was taken, but it is considered that working memory will be a complementary mechanism for the Go/No-go and Task Switching tasks to be used in inhibition and cognitive flexibility measurements.

1.2.3. Cognitive Flexibility

Cognitive flexibility can be defined as a person's awareness of the availability of options and alternatives in any situation, willingness to be flexible and adapt to the situation, and self-efficacy to be flexible (Martin and Rubin 1995: 625). It occurs as a property of EF and is typically a structure measured in the laboratory using shifting or task switching behavior paradigms (Dajani and Uddin 2015: 573).

Another feature of cognitive flexibility is that it allows the perspectives to be changed spatially or cognitively. For the person to change his perspective, he must block (inhibit) his previous perspective and load a different perspective into the working memory or activate the existing one (Braem and Egner 2018: 472). It is believed that for a mental state to change, to alter the present perspective inhibition and to actively comprehend the new perspective working memory are required (Diamond 2013: 143). Additionally, since the other two EF sub-skills are dependent on cognitive flexibility, the evaluation of cognitive flexibility alone can be difficult since the decline of one sub-skill impacts the other (Nweze and Nwani 2020: 124). Therefore, task-switching and set-shifting tasks are generally used to measure cognitive flexibility (Dennis and Vander Wal 2010: 243).

Shifting between different conditions are frequently studied using the task switching paradigm (Miyake et al. 2000: 56). The task change condition is one of them; in this condition, participants are required to transition between the two situations quickly. A trial block of one of the two tasks and a block of the other task are repeated under the repetitive condition. The task switch cost is calculated by comparing task switching to task repetition, and this provides details about a person's cognitive abilities and capacity for situational adaptation (Genet and Siemer 2011: 396). Additionally, it has been suggested that there is a connection between executive function deficits and emotional dysregulation, and impairment in cognitive flexibility are linked to both depression and rumination, which are maladaptive thought patterns that draw attention to one's unpleasant emotional state (Whitmer and Banich 2007: 548).

1.2.4. Attentional Bias

For the adaptation process of humans, selective attention to appetitive and aversive stimuli is important (Cisler and Koster 2010: 204; Koster et al. 2006: 635; Zvielli et al 2015: 773). According to the theories, it is suggested that selective attention will be allocated to emotionally evocative information, so fast and early processing of motivational information is functionally very important. (Hester and Luijten 2014: 231; Schäfer et al. 2016: 638; Zvielli et al. 2015: 774). Attentional bias can be associated to a group of information processing biases that underlie a variety of addictions (Luijten et al. 2012: 2772) and anxiety (MacLeod and Grafton 2016: 69). For instance, fear facilitates individuals' perception of danger from the environment and helps organisms respond effectively to threatening situations (Bar-Haim et al. 2007: 1). Researchers revealed that those with high anxiety sensitivity were more likely to engage in threatening information compared to those with low anxiety by using different assessment tasks (Cisler and Koster 2010: 212; Mathews and MacLeod 2005: 167). For example, in a study of children with asthma and anxiety disorders, it was investigated whether these children display attention biases towards threatening stimuli. In addition to self-report and parent-report questionnaires for measuring child asthma and anxiety variables, a visual dot-probe task was used to measure attentional bias. The results show that children with anxiety disorders exhibit poorer attentional control and there is a significant association between reduced asthma symptoms and an attentive bias towards asthma stimuli (Dudeney et al. 2017: 1644).

Two complementary cognitive approaches can be mentioned for pathological anxiety (McNally 2001: 518). The first of these is the traditional approach, which argues that pathological anxiety is the basis of one's false beliefs (Beck et al. 2005). The other approach uses cognitive science to reveal the underlying causes of anxiety disorders based on theories of experimental psychology (Harvey et al. 2004: 46). However, there are some controversial opinions regarding these two approaches due to the fact that reaction time and observational self-report measures are not sufficient to measure attentional bias for threat (McNally 2001: 518; McNally 2019: 7). Despite all these controversial views, the experimental approach consists of two different research paradigms regarding content-related cognitive biases and deficiencies in content-independent biases (McNally 2019: 7).

Early studies on this field focused on paradigms that assess attention, interpretation, and memory to explain the biases that support the processing of threat-related information. However, because anxiety disorder patients may perceive uncertainty as threatening and selectively recall threatening experiences, there may be a possibility of experiencing recurrent episodes of distress. Therefore, it is very important to identify the difference between the procedure and the process itself to measure a latent cognitive process (MacLeod and Clarke 2015: 59; McNally 2019: 11; Cisler and Koster 2010: 212). Another research approach argues that emotional disorders may occur due to cognitive deficits, ignoring the emotional value that the information processed by the person (Eysenck and Derakshan 2011: 957). Moreover, difficulties in executive control over attention might lead to difficulties that inhibit attention to threat, which is an indication that the two research approaches are interrelated (McNally 2019: 11).

1.3. RELATIONSHIP BETWEEN SLEEP AND EXECUTIVE FUNCTION

Lack of sleep can impair a person's emotional and cognitive functioning, which will impact their social and professional performance (Leger et al. 2014: 143; Fabbri et al. 2021: 1082). A concept put out by Beebe and Gozal (2002: 14) connected frontal brain dysfunction, hypoxia, and sleep disruption. According to the model, sleep disruption, nocturnal hypoxemia, and hypercarbia lessen the efficiency of sleep-related restorative processes. This results in a range of biochemical and cellular stressors, disrupts functional homeostasis, and changes the survival of neurons and glia in certain brain areas. According to the hypothesis, these biochemical and cellular processes are principally responsible for the malfunctioning of the cerebral cortex's anterior areas. It's crucial to understand that injuries to brain areas other than the frontal cortex can also cause executive dysfunction. For example, among the daytime symptoms of apnea in people with obstructive sleep apnea syndrome (OSAS), the most striking ones are cognitive disorders such as forgetfulness, memory deficits, attention deficit and concentration disorder (Torun Yazıhan et al. 2007: 85). This executive dysfunction typically occurs in higher-risk situations, including social interactions, traffic, and work-related tasks (Beebe and Gozal 2002: 14). Therefore, as part of a neuropsychological assessment, executive skills should always be assessed.

Rana and her colleagues (2018: 67) conducted a study with 1220 middle-aged male twins to examine the relationship of sleep quality between memory and executive functions of middle-aged adults. In this study, while the sleep quality of the participants was examined with the Pittsburgh Sleep Quality Index, executive function performances were evaluated with tasks such as inhibitory and interference control, set changing and episodic memory. In conclusion, visuospatial episodic memory accuracy was substantially correlated with sleep quality but not verbal episodic memory accuracy. In addition, when executive functions were correlated with memory processes, sleep quality was related to three of the four executive functions. These include working memory updates, working memory demands, and adjust shifting in a task with episodic memory tampering resistance.

In a study conducted by Benitez and Gunstad (2012: 220) with 67 healthy young adults using PSQI, the relationship between sleep quality, personality and executive functions was examined. The findings demonstrated a correlation between low levels of sleep quality (i.e., general sleep quality, length, and drug usage) and greater levels of sadness and anxiety, as well as poor performance on attention and executive function. Another study was conducted with 23 healthy participants to examine the effects of sleep deprivation on executive functions (Tucker et al. 2010: 48). A battery of tasks including a modified Sternberg task, a questioned recall task, and a phonemic verbal fluency task were used to assess executive functions. In the study, it was shown that sleep deprivation reduced the performance of dissociated non-executive components of cognition in executive function tasks, such as control task performance. Additionally, sleep deprivation had no discernible effects on the executive functions of working memory scanning activity or resistance to proactive intervention.

According to a study conducted by Walker and colleagues (2002: 205), the amount of NREM sleep the night before and cognitive function measures were significantly positively correlated. A total of 62 participants were instructed to practice on the motor skill task in this research. Participants who trained at 10:00 in the morning did not performed better when evaluated again 12 hours later. However, they significantly improved by 18.9% at 10:00 the following morning. Similar to this, after just 12 hours of training, those who trained at 10 p.m. shown a substantial improvement of 20.5%. Additionally, they claimed that only one night of sleep was necessary for a motor skill task to observe improvement. This development was especially noticeable in the 2nd NREM phases occured in the last third of the night.

Based on some studies, lack of sleep has been associated with not only executive functions but also attention regulation difficulties, impaired cognition, delayed reactions (Wilckens et al. 2014: 658) and mood abnormalities (Selvi et al. 2007: 244). The medical literature also states that characteristics including gender (Orzech et al. 2011: 617), academic achievement (Cates et al. 2015: 9), general health, socioeconomic situation, and amount of stress (Saygılı et al. 2011) might have an impact on a person's ability to sleep.

1.4. COVID-19 INTRODUCTION

In December 2019, a disease like pneumonia cases began to occur in Wuhan City, Hubei Province, China (Atalan 2020: 38; Saglietto et al. 2020: 1110). Research has revealed that the emerging cases are a new type of coronavirus that was previously unknown, and this virus in the new form has been named Coronavirus 2019 or COVID-19 because it appeared in 2019 (Atalan 2020: 41). The origin of the virus is thought to be the Huanan seafood market in Wuhan city and although, it was thought to be transmitted only from animal to human at first, it was understood that the virus could be transmitted from human to human with the fact that the virus started to be seen in people who did not visit the seafood market (Shereen et al. 2020: 96). It is known that the pathway of transmission of COVID-19 from person to person is similar to the scattering of droplets, which is the principle of transmission of respiratory diseases. In such cases, it is known that a sick person may be very likely to infect the people around them by coughing or sneezing, so environmental factors play an important role in the transmission of the virus (Cássaro and Pires 2020: 138834; Saadat et al. 2020: 138870; Vardoulakis et al. 2020: 1). The COVID-19 outbreak is spreading very rapidly, and according to the data of the World Health Organization (2022), more than 600 million people have been reported to infected by the coronavirus so far. In many parts of the world, restrictions affecting most of life were in place to prevent or reduce the spread of the coronavirus, and people are expected to comply with hygiene rules (Nakada and Urban 2020: 139087). Some of these restrictions were working from home, school vacations, quarantine, and lockdown in areas with a high number of cases (Hensher et al. 2021: 65; Pietrobelli et al. 2020: 1382). When all these restrictions were taken into consideration, it is inevitable that disruptions affected functioning of daily routines and accordingly changes in cognitive functioning (Ingram et al. 2021: 935).

1.4.1. Effects of COVID-19 on Sleep Characteristics

The duration of the restriction due to COVID-19 varied according to the course of the epidemic and the countries, and some countries have had to extend the lockdown by days, which caused the population to be intensely affected (Atalan 2020: 40). It is expected that radical changes in daily life and fear of contamination create stress on individuals and seriously affect mental health and sleep (Voitsidis et al. 2020: 113076). For example, a total of 2,427 people participated in a study conducted with Greek population. They were asked to participate in various online questionnaires such as contact with COVID-19 and COVID-19-related negative attitudes, Athens Insomnia Scale (AIS), the Intolerance to Uncertainty scale (IUS), and the Patient Health Questionnaire-2 (PHQ-2) Depression Scale. The results showed that 37.6% of the participants suffered from sleep problems, and if people live in urban areas, they were more vulnerable to sleep problems. Furthermore, participants who were not sure that they or their relatives have contracted the virus showed higher insomnia scores compared to other participants (Voitsidis et al. 2020: 113076).

In another study conducted with 2291 Italian participants, the effects of the COVID-19 outbreak on sleep quality, general anxiety and psychological distress were investigated (Casagrande et al. 2020: 12). The results show that 57.1% of the participants experienced poor sleep quality, 32.1% experienced high anxiety and 41.8% experienced high distress. Additionally, women, younger participants, and participants who had worries about being infected with COVID-19 were found to be more likely to develop sleep disturbances, high anxiety, and distress.

A study conducted by Beck and his colleagues (2021: 117), researchers investigated the prevalence of sleep problems in the general population of France during the COVID-19 period. In the study, the participants were asked to evaluate their sleep covering the previous 8 days, 49% reported that they had sleep problems, and 74% of the participants who re-evaluated after 2 weeks of lockdown reported that they had sleep problems. Female participants reported more sleep problems compared to male participants. Additionally, younger participants reported more sleep problems than older participants.

Another study showed that during COVID-19 lockdown, people started woke up later and spent more time in bed as their sleep habits changing but their quality of sleep was worse. In addition, it was found that the relationship with the increase in sleep difficulties was stronger in people with high levels of depression, anxiety, and stress (Cellini et al. 2020: 13074). In another study, data were collected from 2272 participants (1622 Italians and 650 Belgians), using an online questionnaire. The aim of the study was to figure out how the duration of lockdown affects reported sleep characteristics in Italians and Belgians, specifically in terms of sleep duration and subjective quality (Cellini et al. 2021: 112). Participants were asked to report their perceived sleep quality and sleep patterns retrospectively throughout the quarantine. According to the results of the study, both Italian and Belgian participants had delayed sleep times and increased time spent in bed, moreover their sleep quality was significantly impaired. Furthermore, women, individuals in a more negative mood, and those who perceive the pandemic situation as highly stressful were found to be the most vulnerable.

Nationally representative sleep patterns from previous years and during the pandemic were examined in a study investigating pre- and post-COVID-19 sleep features in the United States. The average sleep length did not vary between 2018 and 2020, but shorter sleep duration and a higher number of days of difficulty falling asleep, remaining asleep, and feeling tired were shown to be more common in 2020. In addition, Adults' sleep health in the United States was poorer in 2020 than it was in 2018, particularly among those under the age of 60 (Hisler and Twenge 2021: 113849).

Flexibility in schedules due to social constraint resulted in changes in wake and bedtime (Targa et al. 2021: 1055). Recent studies have shown that people awaken and sleep later under quarantine, potentially had a risk of using digital devices just before bed (Gupta et al. 2020: 374). In addition, less exposure to sunshine, reduced daytime activity, and altered mealtimes may disrupt circadian rhythms, which in turn influence sleep (Silva et al. 2020: 612; van de Langenberg et al. 2019: 17). Additionally, mood fluctuates were considerably during this period, which was directly connected to sleep quality (Lian et al. 2019: 2265; Liu et al. 2020: 112921).

1.4.2. COVID- 19 and Executive Functions

Empirical evidence show that Covid-19 may affect certain people's cognitive ability to think rationally (Houben and Bonnechère 2022: 7748). In research conducted by Alemanno and his colleagues (2021), the Mini Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA), the Hamilton Depression Rating Scale, and the Functional Independence Scale were used to assess cognitive abilities of 87 patients with COVID-19 (FIM). According to the results 80% of the 87 patients were found to have cognitive deficits, and 43 percent of those who improved after a month did so because of signs of post-traumatic stress disorder. Additionally, distraction, which has been observed to increase during the COVID-19 pandemic, caused by anxiety and stress, which limit a person's cognitive resources (Boals and Banks 2020: 255).

Based on the correlation between the COVID-19 period and psychological conditions, a study including 90 Italian volunteers examined alterations in executive function in patients with post-traumatic stress symptoms (PTSS). According to the findings of the study, participants with high PTSS demonstrated deficits in inhibiting dominant responses measured with the Stroop task and the Go/No-Go task (Favieri et al. 2021: 170).

According to a study by Cannito and his colleagues (2020: 1), higher health anxiety (HA) was predicted by an attentional bias paradigm by using a visual dot probe tests included virus related stimuli. This study based on the fact that the rapid spread and contagion of COVID-19 increases health anxiety (HA) in humans. Results indicated that HA level predicted a preference and bias for things connected to viruses. Another study with 286 individuals sought to add to the body of research supporting the COVID-19 anxiety syndrome concept (Albery et al. 2021: 1367). In order to predict the levels of generalized anxiety and depression, they compared the COVID-19 anxiety syndrome with personality, health anxiety, and COVID-19 anxiety measures. They also found a correlation between higher COVID-19 psychological distress scores and health anxiety scores by means of attentional bias towards COVID-19-related stimuli.

1.5. PSYCHOLOGICAL DISTRESS

Today, anyone might face the psychological conditions such as depression, anxiety, and stress (Bilgel and Bayram 2014: 1153; Mirowsky and Ross 2017). Distress might be analyzed under two basic categories as depression and anxiety and is characterized as an uncomfortable subjective state (Mirowsky and Ross 2017). Depression is the inability to move on from feelings of sadness, depression, loneliness, hopelessness, or worthlessness (APA 2022; Seel et al. 2003: 181). It is also characterized by death wishes, difficulty sleeping, sobbing, and a sense that everything is an effort (Kessler et al. 2014). Depression has an impact on a person's thoughts, feelings, and ability to manage everyday tasks like sleeping, studying, eating, or working (Kessler et al. 2014). Anxiety is characterized by tension, restlessness, worry, irritability, and fear (Szabó 2011: 102). People with high anxiety levels may struggle to focus, have stomach issues, sleep issues, appetite issues, and have a challenging time managing their anxiety (Trill 2013: 216). Anxiety and stress are two very related concepts (Spielberger 1966: 4). Stress might be defined as an internal condition of the body known as stress encompasses psychological, physiological, and cellular responses (Mason 1975: 24). Stress also might be defined as the body's general response to demands or challenges of any kind, whether they be psychological or physical (Selye 1956: 525). While anxiety is driven by feelings of anxiety and conditions that we see as threatening, accompanied by external factors such as academic achievement and relationships; It is a situation in which feelings of stress, anxiety, disappointment, and impatience prevail and are accompanied by cognitive distortions (Amstadter 2008: 213).

1.5.1. Depression

From childhood through maturity, negative life experiences have a significant impact on how depression develops (Lin et al. 2013; Yetkin and Özgen 2007: 4). The cognitive triad model, which Beck uses to explain depression, contends that a person's perceptions of himself, the outside world, and the future become negatively distorted (Beckham et al. 1986: 566). The negative self-perceptions that a person has, such as believing they are insufficient, deficient, ill, or imperfect, make up the first aspect of the cognitive triangle (Anderson and Skidmore 1995: 603). These people frequently believe they are worthless than others and feel completely unworthy. The second factor is the individual's propensity to adversely perceive their events. For the individual, the world is seen as a place filled with challenges, that is unable to handle (Beck 1970). Finally, the last factor includes the person's pessimistic outlook on the future. It is the unfavorable conviction that one's problems will never end. External variables including upbringing, social situation, cultural issues, poor education level, and life stress may also be significant contributors to depression in addition to cognitive theories (Saveanu and Nemeroff 2012: 51). Depression might happen spontaneously, without a cause, as a side effect of another illness, drug, or alcohol use, postpartum, or as a response to a traumatic experience (Hasler 2010: 157). It may cause decreased appetite, sleep disturbances, decreased libido (Davidson and Turnbull 1986: 445) psychomotor changes (Buyukdura et al. 2011: 398) and deterioration in cognitive functions (Steffens and Potter 2008: 169).

1.5.2. Anxiety

Anxiety might be defined as a sensation of unpleasant suspense brought on by the tight, disturbing expectation of a potentially dangerous yet ambiguous occurrence (Rachman 2004). Anxiety might manifest itself in many different forms, impacting a person's emotions, provoking unfavorable thoughts, and producing unpleasant bodily sensations (Blanchard et al. 2008: 3). In terms of time, it has a tough beginning and an unclear finish (Rachman 2004). State anxiety, which is experienced in response to a perceived threat in a specific situation, and trait anxiety, which depends on how an individual perceives the world and responds to it, are the two categories of anxiety (Leal et al. 2017: 154). These two types of anxiety are highly correlated with one another depending on how they develop and how intense they are.

People who struggle to regulate their anxiety may have trouble focusing, Gasyroimstestinal problems, sleep problems, and may feel tight, weak, and irritated (Emmelkamp and Ehring 2014: 11). Furthermore, studies demonstrate that anxiety of any kind has a detrimental impact on cognitive tasks (Eysenck 1985: 580). Whatever the anxiety-inducing circumstance is the person may respond differently in different conditions. It is crucial to comprehend the anxiety-provoking circumstance because mental processes like thinking, emotion, and memory are employed to consciously cope with the anxiety-provoking event by assisting the person in acting consciously (Emmelkamp and Ehring 2014: 6). However, defense mechanisms against anxiety might unconsciously employed (Waqas et al. 2015: 1). These defensive systems come in a variety of configurations depending on the level, type, and length of the anxiety as well as the growth and traits of the layers that make up the personality (Blaya et al. 2006: 186). Some of them are adaptive and effective defensive mechanisms that contribute significantly to personality development and the preservation of mental health (Emmelkamp and Ehring 2014: 11). Recent studies have shown that individuals who are typically distressed selectively pay attention to danger cues (Barnard and Chapman 2016: 105; MacLeod et al. 2019: 549). Pre attentive processing can exacerbate the danger and contribute to the beginning of anxiety (MacLeod et al. 1986: 15), making it a possible treatment target for the person (Lau and Waters 2017: 391).

1.5.3. Stress

According to Mason (1975: 23), stress is an internal condition of the body characterized by cellular, physiological, and emotional responses. Since stress is a personalized phenomenon that may vary across individuals, depending on the person's fragility and resilience, its meaning varies for people under different conditions such as different age, gender, education level, income level. (Fink 2016: 4). Unpleasant emotional experiences, which are frequently represented by certain stress-related emotions, such as anxiety, anger, sorrow, envy, fear, guilt, and humiliation, are the source of stress (Lazarus 1991: 148).

When under danger, a person automatically responds with a "fight or flight" response to defend themselves or acts swiftly in response to stress; as a result, hazardous situations are either overcome or the individual is protected by avoiding them (Goldstein 2010: 1433). Which coping strategy an individual exhibits depends on how he assesses the input. Anxiety and depression may both arise if the stimulus is perceived as a danger that threatens to upset the biopsychosocial balance of the person (Selye 1976: 123). In addition to depression and anxiety, stress might cause sleep problems, heart diseases, eating disorders and a more sensitive immune system (Salleh 2008: 9). Stress may have a detrimental impact on how well the brain functions (McEwen and Sapolsky 1995: 206).

1.5.4. Effects of Psychological Distress on Sleep

Increases in psychological distress have frequently been linked to unpleasent, unexpected, and stressful life events (Thoits 1983: 33). Life events are characterized as objective occurrences that seriously reorganize a person's behavior and disturb or threaten to disturb their usual sequence of activity (Simons et al. 1993: 584). It is suggested that the anxiety experienced during the COVID-19 is accompanied by increased concern about resolving its long-term personal and societal effects (Peteet 2020: 2203). These unfavorable feelings impact sleep as well (Shen et al. 2018: 2584).

In a study conducted in January 2020 with the participation of 170 participants, it was aimed to investigate the effects of social capital, which refers to networks that facilitate cooperation and coordination between individuals and groups., on sleep quality during the COVID-19 pandemic. Personal Social Capital Scale 16 (PSCI-16), anxiety using the Self-Rating Anxiety Scale (SAS), stress using the Stanford Acute Stress Reaction (SASR) scale, and sleep quality of the participants using the Pittsburgh Sleep Quality Index (PSQI). The results show that anxiety is associated with stress and decreased sleep quality, and that the combination of anxiety and stress reduces the positive effects of social capital on sleep quality (Li et al. 2020: 2032). It is believed that one of sleep's primary purposes is to restore health and refresh people while also repairing tiny everyday harm (Adam and Oswald 1977). According to studies, poor sleep quality increases the risk of several mental health problems, particularly depression and anxiety (Woods and Scott 2016: 44; Okun et al. 2018: 703; Hyun et al. 2021: 54). Additionally, because sleep irregularities are risk factor for suicidal ideation and suicide attempts, sleep problems are linked to both depression and suicide at different ages (Porras-Segovia et al. 2019: 39).

1.5.5. Effects of Psychological Distress on Executive Functions

There is research that suggests that psychological distress might impair executive functions because it changes the brain's capacity for concentration, clear thinking, and decision-making (Shields et al. 2016: 665). As well as numerous research have established the detrimental impact of stress and anxiety on cognitive abilities (Visu-Petra et al. 2013: 649; Snyder et al. 2014: 897; Banks and Boals 2017: 1023; McHugh Power et al. 2020: 1071). Anxiety interacts cognitive processing's key dimensions, including awareness, attention, perception, judgment, and memory

(Rachman 2004). Studies have typically shown that mental performance can be hampered by excessive levels of anxiety (Ashcraft and Kirk 2001: 224).

A lexical decision-making task with distracting neutral and threat terms was employed in a study by Calvo, Gutiérrez, and Fernandez-Martin (2012: 66) to examine the impact of anxiety. An unrelated study word was delivered either 300 ms or 1000 ms following the distractor in either supervised (foveal) or unsupervised (parafoveal) settings. The findings demonstrated that group differences were only apparent when the distractor was a threat phrase delivered at a fixation point that had been observed. The high-anxiety group had greater distractor intervention than the low-anxiety group when the poll word was offered at 1000ms, but at 300ms, there was no difference between the groups. In essence, it demonstrates how anxiety impacts the way the inhibitory function works while distractions are being watched. Additionally, it was suggested that high anxiety required a longer distraction intervention than low anxiety.

Daily stresses might have a detrimental effect on cognitive performance (Miguel 2012). The prefrontal cortex region, which has a high concentration of stress hormone receptors, and other sections of the temporal lobe that are crucial for cognition, like the hippocampus and amygdala, are all significantly impacted by stress (Arnsten 2009; Yaribeygi et al. 2017). In a study conducted with 30 volunteer female participants, 15 of the participants were included in the control group and 15 in the stress group. The results suggested that negative and repetitive thoughts increase when stress occurs (Horowitz and Becker 1971). The control group watched the comedy "The Runner," in which a runner travels by his house and recalls it without any upsetting incidents. On the other side, the stress group saw the more upsetting film "Subincision," which had depictions of bodily harm, nudity, harassment, and blood. After then, both groups reported their own sensations and ideas. Comparing the participants' intrusive, unfavorable thoughts after viewing the stressful movie to those of the control group who saw the less stressful movie, the findings revealed an increase. The ability to repress unwelcome thoughts, which is a sign of cognitive impairment, is found to decline as intrusive thoughts increases (Diamond 2013: 149). It is important to note that depending on the intensity and persistence of the psychological distress, these effects may differ from person to person.

1.5.6. Psychological Distress During COVID-19

As mentioned above, due to the mandatory restrictions made during the COVID-19 period, people had to create a new routine by disrupting their usual order. During this time, a lot of people experienced loneliness, uncertainty, fear of getting sick, spiritual distress, and sadness (Peteet 2020: 2203). Additionally, numerous areas of everyday life have been affected by the epidemic and the methods used to stop its spread, such as lockdown and social isolation, which have left many people feeling stressed and anxious (Choi et al. 2020). During the COVID-19 period, those who contracted the virus or lost loved ones due to the virus had to experience grief and suffering, those who were lonely or lost their jobs, felt financially alone and vulnerable. In addition, the unknown nature of the disease is thought to cause stress and anxiety (Bertuccio and Runion 2020). Furthermore, it is thought that long-term impacts of stress include the expediting the cognitive deterioration in a number of domains, including the capacity to focus and pay attention (Scott et al. 2015). For this reason, it seems important to detect the psychological problems experienced by people during the COVID-19 period and to investigate their effects on cognitive functions that may develop accordingly.

1.6. CURRENT STUDY AND HYPOTHESIS

Epidemic has had a negative impact on people's mental health, which may result in psychiatric crises (Hall, Hall and Chapman 2008). Studies demonstrate that deterioration in anxiety, depression and stress levels have negative impacts on the executive functions of the person (Shields et al. 2016: 651). The COVID-19 pandemic has caused significant stress and disruption for many people, leading to increased rates of psychological distress and sleep problems (Fiorenzato et al. 2021). In the light of previous findings, in the current study, the Brief Symptom Inventory (BSI-53), which is a self-report scale, was used to measure general psychlogical symptoms of the participants (Derogatis and Melisaratos 1983), Depression, Anxiety and Stress Scale (DASS-42) was used to measure the symptoms of depression, anxiety and stress (Lovibond and Lovibond 1995), and the Coronavirus Anxiety Scale (CAS) was used to evaluate the dysfunctional anxiety due to coronavirus (Lee 2020).

Age seems to be an important factor in studies measuring the functioning of executive functions. Studies show that executive function performance declines with increasing age. In particular, while an increase in memory skills was observed in the period until adolescence and early adulthood, a decrease was observed in both memory and inhibition functions in the period that started at the age of 40 and continued thereafter (Ferguson et al. 2021: 15). It has been noted that sleep disturbances are more common due to aging and pathological aging is associated with a rise in sleep disturbances (Gadie et al. 2017).

Additionally, poor sleep quality due to aging leads to excessive daytime sleepiness (Fortier-Brochu et al. 2012), and cognitive impairments (Martella et al. 2011). Based on these studies, the current study's sample consisted of healthy adults aged 18-40 years. In the light of studies emphasizing changes in sleep characteristics and its adverse effect on cognitive functioning including executive functions, we used PSQI for sleep quality (Buysse et al. 1989); ESS for daytime sleepiness (Johns 1992: 379) in current study.

According to research, the central executive's inhibiting and shifting processes are independent of one another and operate in synchrony (Miguel 2012). However, task switching was connected to the suppression of the distracting information, according to Friedman and Miyake's (2004: 101) research. Therefore, in the present study, Task Switching and Go/No-go tasks, which measure executive functions as cognitive flexibility and inhibition were used. In line with the reviewed literature and findings of research it is generally agreed that neurocognitive dysfunctions, attention deficiencies, reduced cognitive function, depression, anxiety, stress, and impulsivity are all linked to sleep disturbances (Mollayeva et al. 2016: 59). The present study it is hypothesized that people with poor executive functions will be more biased towards images related to COVID-19, that these individuals will have higher levels of depression, anxiety and stress, and as a result, their sleep quality will be worse. Since the current study is not an experimental study, the relationships between the factors were examined.

As a result, the following hypotheses will be tested:

Hypothesis 1. It is expected that there will be a positive relationship between poor sleep characteristics and indicators of psychological distress as depression, anxiety, stress, and COVID-19 anxiety.

Hypothesis 1a: It is expected that there will be a positive relationship between poor sleep quality and depression, anxiety, stress, and COVID-19 anxiety.

Hypothesis 1b: It is expected that there will be a positive relationship between daytime sleepiness and depression, anxiety, stress, and COVID-19 anxiety.

Hypothesis 1c: It is expected that sleep quality differs according to depression, anxiety, and stress levels.

Hypothesis 2. It is expected that there will be a positive relationship between sleep characteristics and executive functions.

Hypothesis 2a: It is expected that poor sleep quality positively associated with decreased inhibitory control.

Hypothesis 2b: It is expected that greater sleep quality is positively associated with cognitive flexibility.

Hypothesis 2c: It is expected that sleep quality is negatively associated with attentional bias towards COVID-19 related stimuli.

Hypothesis 2d: It is expected that daytime sleepiness negatively associated with inhibitory control.

Hypothesis 2e: It is expected that daytime sleepiness is negatively associated with cognitive flexibility.

Hypothesis 2f: It is expected that daytime sleepiness is positively associated with attentional bias towards COVID-19 related stimuli.

Hypothesis 2g: It is expected that the attentional bias scores will differ between those with high and low sleep quality.

Hypothesis 3. It is expected that there will be a positive relationship between psychological distress and executive functions.

Hypothesis 3a: It is expected that depression, anxiety, and stress are negatively associated with inhibitory control.

Hypothesis 3b: It is expected that depression, anxiety and stress are negatively associated with cognitive flexibility.

Hypothesis 3c: It is expected that Coronavirus anxiety is positively associated with attentional bias towards COVID-19 related stimuli.

Hypothesis 4. It is expected that sleep quality and attentional bias scores will differ between those with and without history of COVID-19.

Hypothesis 4a: Participants who had history of COVID-19 were expected to report lower sleep quality than participants who did not.

Hypothesis 4b: Participants who had history of COVID-19 were expected to have higher attentional bias scores than participants who did not.
Hypothesis 5. It is expected that inhibition, cognitive flexibility, and coronavirus anxiety have a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.
Hypothesis 5a: It is expected that inhibition has a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.
Hypothesis 5b: It is expected that cognitive flexibility has a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.
Hypothesis 5c: It is expected that coronavirus anxiety has a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.

CHAPTER II

METHOD

2.1. PARTICIPANTS AND RECRUITMENT

Participants consisted of (N = 102) healthy adults with age range of 18- 40. The final set of data had 98 individuals and was used in the primary analysis following the data screening procedure and the removal of outliers. Recruitment was carried out by an invitation to participate in the study. The current study was cross-sectional study and convenience sampling was applied. Inclusion criteria for participation in the study required was as follows; Being between the ages of 18-40, not having an internal medical or neurological disease, not having a visual impairment that affects daily life, being actively using a computer, being at least a high school graduate. Gender distributions of participants were heterogeneous.

2.2. PROCEDURE

The study took place in two stages as questionnaires and computer tasks. A written informed consent form was obtained from all participants by following ethical standards of Çankaya University Ethical Committe. In the first phase of the study, 5 different questionnaire was used. These questionnaires provide information about the individual's sleep quality and general well-being. Questionnaires consisted of Demographic Form, written version of Brief Symptom Inventory (BSI- 53), Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Depression, Anxiety and Stress Scale (DASS-42) and COVID-19 Anxiety Scale (CAS). The second phase of the study included computer experimentation. Before participating in the experiments, subjects were instructed not to consume caffeinated beverages in the last hour. All experiments were conducted in a quiet, neutral environment that is free from distractions. Participants were invited to study verbally and through social media announcements. After the participants completed the written forms, they completed the computer tasks.

Participants were asked to sit in front of a laptop screen while maintaining a distance of approximately 60 cm from the screen throughout the entire task. First, the Go/No go task was presented to evaluate the inhibitory control, then the Task Switching task to evaluate the cognitive flexibility, and finally the Dot Probe task was presented to evaluate their attentional bias against virus-related visuals.

2.3. DATA COLLECTION TOOLS

2.3.1. Demographic Form

In the demographic information form, there were questions to collect information about age, gender, weight, size, marital status, education level, income level, work status, computer usage information, visual impairment information, general health, whether the participant has had COVID-19, if s/he had symptom severity and COVID-19 related brief information, general sleep evaluation, caffeine consumption and telephone or e-mail information to be able to contact them if they request further information about study.

2.3.2. The Coronavirus Anxiety Scale (CAS)

The CAS was developed by Lee in 2020 to measure coronavirus-related dysfunctional anxiety as open access. The scale might be considered as a self-reported mental health screening tool and the Cronbach alpha value of the scale was found to be 0.93 (Lee 2020: 393). The Cronbach Alpha reliability coefficient of the study, for which Turkish validity and reliability analyzes were performed, was calculated as 0.832. The factor loads of the scale, which consists of a single factor and 5 items, vary between 0.625 and 0.784 (Biçer et al. 2020: 217). In the planned study using a 5-point scale, participants will be requested to respond to a series of questions regarding to assess anxiety associated with the COVID-19 pandemic. The scale consists of 5 questions and one dimension. Scoring of the scale is “0” for “never”, “1” for “Rarely, less than one or two days”, “2” for “A few days”, “3” for “more than 7 days” and “4” for “almost daily in the last two weeks”. A participant's total score of 9 or above indicates coronavirus-related dysfunctional anxiety, and a high total scale score may be indicative of the participant's problematic symptoms that may require further evaluation and/or treatment (Şayık et al. 2020: 18).

2.3.3. Pittsburgh Sleep Quality Index (PSQI)

The PSQI was developed by Buysse and his collegues in 1989 and it is a self-report scale used to evaluate sleep quality and sleep disturbance in the last month (Buysse et al. 1989). The validity and reliability of the index for Turkey was determined by Ağargün, Kara, and Anlar (1996) and it was concluded that it was suitable for Turkish society. Turkish PSQI was found to be a scale with a very high degree of reliability (Cronbach's Alpha = 0.80). There are 7 components of PSQI; subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping pills, and daytime dysfunction (Buysse et al. 1989). While some components are specified with a single item, some are obtained by grouping several items. Each item is scored between 0-3 according to frequency, and the range of scores that can be obtained from this scale is 0-21. A total score above 5 indicates poor sleep quality.

2.3.4. Brief Symptom Inventory (BSI)

Brief Symptom Inventory developed by Derogotis (1994) which is a short but valid and reliable scale that makes a general psychopathology assessment. It might be defined as short version of Symptom Checklist’s (SCL-90-R). It was developed as a result of studies with the SCL-90-R. The SCL-90-R consists of 90 items distributed over 9 factors. As a result of the evaluations, a short symptom inventory was created by selecting a total of 53 items with the highest load in each factor. 53 items consist of five sub-dimensions as anxiety, depression, negative self, somatization, and anger. Like the SCL-90-R in BSI, it is a Likert-type scale that requires self-evaluation. It was developed with the aim of catching some psychological symptoms that may occur in both healthy samples and various medical and psychiatric patients. BSI was originally consisted of three global indexes and nine sub-dimensions as "Somatization", "Obsessive-Compulsive Disorder", "Interpersonal Sensitivity", "Depression", "Anxiety Disorder", "Hostility", "Phobic Anxiety", "Paranoid Thoughts", and "Psychoticism". The Turkish adaptation of the study was made by Şahin and Durak (1994) and it was found that it consisted of five factors: "Anxiety", "Depression", "Negative Self", "Somatization" and "Hostility". The three scales of Global Discomfort Detector are “Global Severity Index”, “Positive Symptom Total”, which have different scoring methods and depending on the scoring type, and “Positive

Symptom Distress Index". The items were assessed on a scale of 0 to 4, with 0 indicating "not at all" and 4 indicating "too much." A score is obtained for each subscale by dividing the total determined for each subscale by the number of items in that subscale. A rise in each subtest score and the overall symptom score indicates a high level of psychological symptoms. The "Global Severity Index" measures how stressful something is. This number ranges from 0 to 4. It is calculated by multiplying the sum of the subscales by 53. The total score derived by accepting all positive values as one, except for the elements marked as 0, is known as the "Positive Symptom Total." The range for this score is 0 to 53. By dividing the sum of the subscales by the amount of symptoms, the "Positive Symptom Distress Index" is calculated (Savaşir 1997). The Cronbach Alpha internal consistency coefficients derived from the total internal consistency score were .96 and .95, respectively, according to three separate studies by Sahin and Durak (1994); the coefficients obtained for the subscales varied between.55 and.86. According to studies on criterion-related validity, the BSI's correlation with the "Social Comparison Scale" was between –.14 and –.34, the "Submissiveness Scale" was between.16 and.42, the "Susceptibility to Stress Scale" was between.24 and.36, and the "Beck Depression Inventory" was between.34 and.70. In the construct validity study, the sample was divided into end groups as "prone to stress" and "not prone to stress" based on the scores obtained from the "Stress-Susceptibility Scale," and only three items (4, 8, 26) of the 53 items were statistically significant in determining the item validity of the scale. It was discovered that the significance level could not be attained. The overall score of the scale was analyzed, and it was discovered that the scale could discriminate these two extreme groups at a substantial level.

2.3.5. Epworth Sleepiness Scale

Epworth Sleepiness Scale (ESS) is a subjective scale developed by Johns (1992: 379) that assesses sleepiness. A four-point Likert scale is used in ESS. It is graded on a scale of 0 to 3, with a high score indicating tiredness. The 0–5 point range is considered normal, the 6–10 point range is considered normal but with increased daytime sleepiness, the 11-12 point range is considered increased but with moderate daytime sleepiness, the 13-15 point range is considered increased, and moderate daytime sleepiness is 16-24 points. The interval is also lengthened, resulting in significant daytime sleepiness. The ESS is a valid and reliable scale for assessing general sleepiness, as well as a valid and reliable test that may be used in studies on sleep and sleep disorders in Turkey (Cronbach's alpha = 0.86), according to the researchers (İzci et al. 2008: 165).

2.3.6. Depression Anxiety Stress Scale (DASS)

The Depression, Anxiety Stress Scale (DASS) was created by Lovibond and Lovibond (1995: 335) and measures 14 for depression (for example, I can't think of anything positive), 14 for anxiety (for example, my lips are dry), and 14 for stress (for example, my surroundings). There are 42 entries in the category "events that make me nervous". The scale is a four-point Likert scale: 0 is "absolutely inappropriate for me", 1 is "slightly acceptable for me", 2 is "generally appropriate for me", and 3 is "completely appropriate for me". High scores on the depression, anxiety, and stress aspects suggest that the person is dealing with a mental health issue. A range of 0-9 for depression, 0-7 for anxiety and 0-14 for stress is considered normal. Scores above these ranges (above cut- off level) indicate the degree of clinical emotional states ranging from mild to extreme severe (Lovibond and Lovibond, 1995: 335). For each sub-dimension, the total scores of the scale without reversed items vary from 0 to 42 (Deniz and Sümer, 2010). Bilgel and Bayram, (2010: 118) developed the Turkish version of the scale. The corrected item-total correlations for DASS were found to range between .51 and .75. The DASS internal consistency coefficients were found to be.89 for the entire scale and .90, .92, and .92 for the depression, anxiety, and stress sub-dimensions, respectively. The scale's test-retest reliability results revealed that the correlation coefficients between the two applications were .98 (p.001) for all three sub-dimensions and .99 for the entire scale. The Spierman-Brown split-half reliability scores for the total scale were .96, and for depression, anxiety, and stress components, they were .95, .98, and .95, respectively (Deniz and Sümer, 2010).

2.3.7. Visual Dot-Probe Task

The dot probe task was developed by Macleod and his colleagues (1986: 15) to measure attentional bias towards threatening stimuli. This task was carried out based on the dot-probe procedure presented by Cannito and his colleagues (2020: 1). Permission was obtained from the researcher of the study to use the attentional bias paradigm and a standardized set of 60 images. Later, a study was carried out to adapt 60 images to the Turkish population. The following section contains more detailed information about stimuli selection.

In Visual Dot-Probe task, for a typical laptop screen size, images were presented in a 6x7cm box to both the left and right of the fixation cross with a distance of 10cm between the two. 10 pairs of virus-related/neutral objects were presented 4 times based on four possible object/probe combinations, resulting in a total of 40 test trials. In order to reduce possible habituation to stimuli that may occur when virus-related images are found in all trials, 40 complete trials, each presented four times, were included in the attentional bias task consisting of 10 pairs of neutral images. These filler trials were presented randomly mixed with test trials. The task was presented to the participant in two blocks as 10 practice trials and 80 task trials. Firstly, after the fixation cross (+) is shown in the middle of the screen (500ms), two side-by-side objects were presented for 1000ms. The position of the images was chosen randomly, either to the left or right of the fixation cross. Then, both objects were disappeared, and a probe (X) was appeared at the location of one of the two objects (1000 ms), prompting participants to press a key (E) if the poll is on the left, and another key (I) if the poll is on the right. Attentional bias was determined by the difference in reaction times between congruent trials (when the probe replaces threatening stimuli) and incongruent trials (when the probe replaces neutral stimuli). Participants who focus their attention on the threatening stimulus were expected to have faster response times (i.e., shorter) in trials in which the probe replaces threatening virus-related objects than in trials in which neutral objects are replaced.

2.3.8. Stimuli Selection

To measure attentional bias towards COVID-19, a visual dot probe paradigm was used (Cannito et al. 2020: 3). Since the original study was conducted in Italy, images were familiar to the Italian people in the original study. An online Google Survey was created in order to adapt the study into Turkish and to identify the images that Turkish participants associate with the idea of COVID-19. In the online survey, in which 103 people participated, a total of 60 standardized object images for size and brightness from the web were presented to the participants. In this survey, participants were asked to rate how much the objects they saw were associated with COVID-19, from 0 (not at all) to 100 (extremely). As a result of the scores of the participants, 10 objects strongly associated with the virus (rating score between 95.1 and 64.9) were evaluated in the category of virus-related stimuli, while 30 objects weakly associated with the virus (evaluation score between 14.5 and 6.8) were neutral stimuli evaluated in the neutral stimulus category.

Table 1. Mean score and standard deviation (SD) to the question: "How much from 0 (not at all) to 100 (very much), is this picture associated with the idea of COVID- 19"

Image Type	Trial	Description	Mean score	S.D.
Virus-related 1	Test	HES Code	95.1	18
Virus-related 2	Test	Blue Mask	92.8	13.6
Virus-related 3	Test	N95 Mask	91	18.4
Virus-related 4	Test	Hand Sanitizer	85.9	26.4
Virus-related 5	Test	Portable Hand Sanitizer	85	23.8
Virus-related 6	Test	Face Shield	84.5	29.3
Virus-related 7	Test	Thermometer	83.9	24.7
Virus-related 8	Test	Lemon Cologne	82.9	23.4
Virus-related 9	Test	Blue Gloves	62.4	32.6
Virus-related 10	Test	Syringe	64.9	35.1
Neutral 1	Test	Air Freshener	14.5	21.6
Neutral 2	Test	Tire Repair Kit	2.1	5.7
Neutral 3	Test	Radiator Cleaner	6.2	18
Neutral 4	Test	Shaving Foam	5.4	16.8
Neutral 5	Test	Shaving Cologne	6.4	18.8
Neutral 6	Test	Fertilizer	6.2	15.3
Neutral 7	Test	Hand Lotion	14.2	27
Neutral 8	Test	Foot Deodorant	2.9	10
Neutral 9	Test	Sunscreen	2.4	5.9
Neutral 10	Test	Hair Foam	3	11.2
Filler 1	Filler	Coffee Pot	7.5	18.9
Filler 2	Filler	Iron	6.8	16.1
Filler 3	Filler	Remote Control	16	26.3
Filler 4	Filler	Saltshaker	3.3	11.7
Filler 5	Filler	Hair Dryer	3.1	10.4
Filler 6	Filler	Hair Removal Device	7.1	18
Filler 7	Filler	Water Carafe	5.9	15.3
Filler 8	Filler	Toothbrush	14.4	28.1
Filler 9	Filler	Jar	2.3	6.7
Filler 10	Filler	Flower Watering Can	4	13
Filler 11	Filler	Teapot	10.2	23
Filler 12	Filler	Saucepan	5.5	16.3
Filler 13	Filler	Storage Container	2.8	9.1
Filler 14	Filler	Storage Box	9.4	21.6
Filler 15	Filler	Food Processor	3.3	10.4
Filler 16	Filler	Stapler	2.1	6.8
Filler 17	Filler	Flowerpot	5.8	19.5
Filler 18	Filler	Kitchen Scale	8.8	20.1
Filler 19	Filler	Pan	4.8	16.6
Filler 20	Filler	Blender	5.4	15.4

2.3.9. Go/ No/Go Task

The Go/No go task was used to measure behavioral inhibition. This paradigm reflects processes related to the management of motor behaviors, such as associating applied or inhibited voluntary motor movements with stimuli (Smith and Abel 1999). Participants was presented with two types of stimuli, one is asked to respond to a stimulus, and another is asked to suppress their response. Thus, two different cognitive efforts as pressing and not pressing were displayed (Şansal et al. 2014). The current study, adopted from Favieri and his colleagues' study (2021: 170). Two oval stimuli of various colors were placed in the center of the screen with a black background (red: No-Go stimuli; green: Go Stimuli). The target stimulus (Go) and non-target stimulus (No-Go) were displayed on the screen at random for 2000 milliseconds, followed by 500 milliseconds of blank screen. During the experiment, the participant was asked to keep their attention fixed on the center of the screen. When the green oval appeared in the center of the screen, participants were expected to press the spacebar as rapidly as possible. The participant had to wait for the stimulus to vanish after the red oval appeared. After each incorrect response, feedback was given as "you shouldn't have pressed but you did" or "you should have pressed but you didn't". One hundred twenty trials were conducted (96 Go trials, 24 No-Go trials), with correctness comments provided. To test the inhibition motor component, the percentage of improper reactions to "No-Go" stimuli (False Alarms) was used.

The Go/No-go task is frequently used to evaluate behavioral inhibition with the presumption that people who respond to no-go cues more frequently, or who have a greater false alarm rate, will find it more difficult to suppress a dominant response (Young et al. 2018)

2.3.10. Task Switching Task

Task Switching Paradigm first developed by Rogers and Monsell (1995) and it was used to measure cognitive flexibility. The participants were shown letter-number matching in a square divided into four. Participants were asked to respond by pressing the "B" key for consonants or the "N" key for vowels when the match was shown in one of the top two quadrants. When the match was shown in the sub-dials, they were asked to answer by pressing "B" for odd numbers and "N" for even numbers. The first block of trials consists of 25 trials, and participants are shown only the stimuli from the upper two quadrants. In this section, they are expected to respond only to letters. The second block consists of 25 trials and participants were shown only the stimulus from the lower two quadrants. In this section, they are expected to respond to numbers only. The third and fourth blocks consist of a total of 300 trials. In this section, they were expected to respond to both letters and numbers. Matches were presented clockwise on consecutive dials, with two attempts for letters followed by two attempts for numbers; a task change occurs every two attempts. Switching between tasks is often reflected in this task as a slowing down immediately after a task transition (Podlesek et al. 2021: 149).

CHAPTER III

RESULTS

3.1. OVERVIEW

In this section, data cleaning and data scanning processes, data analysis, descriptive statistics, correlation analysis, group comparisons and mediation analysis are presented before testing hypotheses. First of all, information about the process of examining the data was presented. Then, descriptive statistics and binary correlations of the study data were explained. Finally, the results of testing the main hypothesis of the study were presented. Both descriptive statistics and correlations were analyzed by using the IBM SPSS Statistics (Version 25). The study's moderation analyses were carried out using PROCESS Macro 3.3 for SPSS (Hayes 2017).

3.2 DATA SCREENING AND DATA CLEANING

To determine the outliers, the initially measured values were standardized. Then, it was checked whether each z score was in the range of -3.29 and 3.29 (Tabachnick and Fidell 2013). The 3 participants outside this range were determined as outliers and were not included in the analysis. In addition, it was aimed to determine multivariate outliers using Mahalanobis distance analysis, but as a result of the analysis, there was no multivariate outlier. Moreover, one of the participants excluded from the study because she did not meet the age criteria. Consequently, final set of data included 98 participants.

Table 2: Means, Standard Deviations, Skewness and Kurtosis Values

Variables	Mean	SD	Skewness	Kurtosis
Attentional Bias	.11	.22	.74	1.94
Inhibition	4.32	3.66	.98	.56
Cognitive Flexibility	456.87	248.69	.52	-.47
Sleep Quality	6.20	3.14	.57	-.30
Daytime Sleepiness	8.21	3.98	.11	-.24
DASS				
Depression	10.48	10	1.21	.87
Anxiety	9.84	7.61	.61	-.78
Stress	16.21	10.05	.45	-.77
COVID-19 Anxiety	2.28	2.86	1.10	.12
Valid N (listwise)				98

The means, standard deviations, skewness and kurtosis values of the study variables are presented in Table 2. The distributions of the study variables were examined considering skewness and kurtosis values. In this study, when testing whether the data showed a normal distribution, skewness, and kurtosis values in the range of -2 to 2 (George and Mallery 2019) were accepted as criteria. The skewness and kurtosis values of the study variables were presented in Table 2. This assumption seems to be valid for the variables of attentional bias, inhibition, cognitive flexibility, sleep quality, daytime sleepiness, depression, anxiety, stress, and COVID-19 anxiety. These arguments led to the conclusion that suitable parametric tests might be utilized for data analysis.

3.3. DESCRIPTIVE STATISTICS AND BIVARIATE CORRELATIONS AMONG STUDY VARIABLES

In this section, descriptive statistics to get a sense of the basic characteristics of the collected data of the current study and bivariate correlation measurements are presented, which allow to evaluate the strength and direction of the relationship between the variables.

3.3.1. Descriptive Statistics

Demographic findings of the participants (N = 98) were shown in Table 3. According to the findings of the participants consisting of 98 people were examined, 74.5% of the individuals were female and 25.5% were male. The participants were between ages of 20 and 40. According to the level of education, 19.4% of the participants were high school graduates, 69.4% were university students or university graduates, and 11.2% were masters/doctoral students or graduates. On the other hand, the socioeconomic status (SES) of the participants was examined, the conclusion was that 19.4% of them were low income, 65.3% were middle class income, 15.3% were upper middle income. Moreover, 45.9% of respondents reported having COVID-19 and 54.1% not. Participants who had experienced COVID-19 reported the severity of the disease as 3.1% mild, 35.7% moderate, and 7.1% severe.

Table 3. Demographic Characteristics of the Participants

Variables	***n***	**%**
Gender		
Female	73	74.5
Male	25	25.5
Occupation		
Officeholder	6	6.1
Private Sector Employee	44	44.9
Student	40	40.8
Unemployed	8	8.2
Marital Status		
Married	28	28.6
Single	70	71.4
Educational Status		
High School	19	19.4
University	68	69.4
Master' Degree/ PhD	11	11.2
Socioeconomic Status (SES)		
Low Income	19	19.4
Middle Class Income	64	65.3
Upper Middle Income	15	15.3
COVID-19 Status		
Yes	45	45.9
No	53	54.1
COVID-19 Symptom Severity		
Mild	3	3.1
Moderate	35	35.7
Severe	7	7.1

3.3.2. Correlation Findings Regarding Sleep Characteristics, Psychological Distress Sub-dimensions, Executive Functions, and Attentional Bias Tasks

A Pearson correlation analysis was conducted for the sleep quality, daytime sleepiness, depression, anxiety, stress, COVID-19 anxiety, attentional bias, inhibition, and cognitive flexibility scores of the participants to examine the relationship between sleep characteristics, psychological distress, attentional biases, and executive functions. Table 4. presents the bivariate correlations among the study's variables. Results show that there was a positive and significant relationship between sleep quality and daytime sleepiness (r = .401, $p < .01$), depression (r = .469, $p < .01$), anxiety (r = .428, $p < .01$), stress (r = .427, $p < .01$), Coronavirus anxiety (r = .293, $p < .01$) and Inhibition (r = .258, $p < .05$). In other words, sleep quality was associated with daytime sleepiness, depression, anxiety, stress, coronavirus anxiety and inhibition. On the other hand, there was insufficient data to draw a conclusion on the relationship between sleep quality and attentional bias. In other words, this relationship was positive but not significant (r = .039, $p > .05$). Moreover, the relationship between sleep quality and cognitive flexibility was negative and not significant (r = -.102, $p > .05$).

Daytime sleepiness had positive and significant relationship with depression (r = .392, $p < .01$), anxiety (r = .380, $p < .01$) and stress (r = .359, $p < .01$). Moreover, results show that there was a positive relationship between daytime sleepiness and coronavirus anxiety (r = .184, $p > .05$), attentional bias (r = .047, $p > .05$) and inhibition (r = .156, $p > .05$), however these relationships were not significant. In addition, the relationship between daytime sleepiness and cognitive flexibility was negative and insignificant (r = -.087, $p > .05$).

Table 4. Bivariate Correlations between Study Variables

	1	2	3	4	5	6	7	8	9
1.Depression	1								
2.Anxiety	.772**	1							
3.Stress	.776**	.860**	1						
4.Sleep Quality	.469**	.428**	.427**	1					
5.Attentional Bias	.023	.254*	.231*	.039	1				
6.Inhibitory Control	-.007	.106	.064	.258*	.452**	1			
7.Cognitive Flexibility	-.168	-.079	-.149	-.102	.024	-.066	1		
8.Daytime Sleepiness	.392**	.380**	.359**	.401**	.047	.156	-.087	1	
9.Covid-19 Anxiety	.225	.346**	.335**	.293**	.372**	.172	-.128	.184	1

Note. *$p < .05$, **$p < .01$.

Depression had positive and significant association with anxiety (r = .772, $p < .01$), stress (r = .776, $p < .01$) and COVID-19 anxiety (r = .225, $p < .05$). Additionally, results show that there was a positive but not significant relationship between depression and attentional bias (r = .023, $p > .05$). Furthermore, the relationship between depression and inhibition (r = -.007, $p > .05$) and cognitive flexibility was insignificant (r = -.168, $p > .05$).

Anxiety was positively and significantly correlated with stress (r = .860, $p < .01$), coronavirus anxiety (r = .346, $p < .01$) and attentional bias (r = .254, $p < .05$). There was positive but not significant correlation between anxiety and inhibition (r = .106, $p > .05$). On the other hand, there was no significant correlation between anxiety and cognitive flexibility (r = -.079, $p > .05$).

There was positive and significant correlation between stress and COVID-19 anxiety (r = .335, $p < .01$) and attentional bias (r = .231, $p < .05$). Moreover, there was not significant correlation between stress and inhibition (r = .064, $p > .05$). There was no significant correlation between stress and cognitive flexibility (r = -.149, $p > .05$).

COVID-19 anxiety was positively and significantly correlated with attentional bias (r = .372, $p < .01$). Inhibition (r = .172, $p < .05$) was also positively correlated with coronavirus anxiety. On the contrary, there was no significant correlation between coronavirus anxiety and cognitive flexibility (r = -.128, $p > .05$).

Similarly, attentional bias was positively and significantly correlated with inhibition (r = .452, $p < .01$). There was no significant correlation between attentional bias and cognitive flexibility (r = .024, $p < .05$). Moreover, there was negative and not significant correlation between inhibition and cognitive flexibility (r = -.066, $p > .05$).

3.4. FINDINGS REGARDING MEAN COMPARISONS BETWEEN GROUPS

Independent sample t-test was conducted to find out whether the attentional bias, inhibition and cognitive flexibility scores of participants differ according to their sleep quality and depression, anxiety, and stress levels. Bonferroni correction was made by dividing the critical P value (α) by the number of comparisons made (Napierala 2012).

3.4.1. Results of T- test for Sleep Quality Groups

As presented in Table 5, results indicated that inhibitory control differed significantly according to participants' sleep quality scores which a total score above 5 indicated poor sleep quality and 5 and below indicated high sleep quality. Compared to participants with poor sleep quality (M = 5.22, SD = 3.78), participants with high sleep quality (M = 3.20, SD = 3.20), showed greater inhibitory control (t(95.837) = -2.86, p = .005). Additionally, there was no significant effect for attentional bias (t(90.588) = -2.29, p = .025). Moreover, participants with poor sleep quality (M = .154, SD = .251) showed higher attentional bias scores than high sleep quality (M = .59, SD = .158). Furthermore, although those with high sleep quality (M = 469.75, SD = 236.83) scored higher inhibition than those with poor sleep quality (M = 446.38, SD = 259.69), there was no significant effect for cognitive flexibility (t(96) = .461 p = .646).

Table 5. Differences Between Participants with High and Low Sleep Quality

	Sleep Quality	N	x̄	SD	t Test		
					t	**df**	**P**
Attentional Bias	High	44	.059	.158	-2.285	90.588	.025
	Low	54	.154	.251			
Inhibition	High	44	3.20	3.203	-2.860	95.837	.005**
	Low	54	5.22	3.780			
Cognitive Flexibility	High	44	469.754	236.830	.461	96	.646
	Low	54	446.380	259.691			
COVID-19 Anxiety	High	44	1.55	2.654	-2.332	96	.022
	Low	54	2.87	2.908			

Note. *p<.01, **p<.00

COVID-19 anxiety scores were not differed significantly according to participants' sleep quality. Compared to participants with high sleep quality (*M* = 1.09, *SD* = 2.13), participants with poor sleep quality (*M* = 2.85, *SD* = 3.00), showed greater COVID-19 anxiety ($t(96) = -3.33$, $p = .001$). The results of the comparison of the COVID-19 anxiety scores of the participants with high and low sleep quality are shown in Table 6.

3.4.2. Results of Independent Samples T- Test for Depression, Anxiety and Stress Groups

Additionally, an independent-samples t-test was conducted to compare sleep quality for depression in normal and clinical emotional states (above cut-off level). A range of 0-9 for depression, 0-7 for anxiety and 0-14 for stress is considered normal. Scores above these ranges indicate the clinical emotional states (Lovibond and Lovibond 1995: 335). There was a significant difference on sleep quality in the normal depression scores (*M* = 5.37, *SD* = 2.91) and clinical emotional state depression scores (*M* = 7.46, *SD* = 3.08); (*t*(96) = -3.39 *p* = .01). Also there was significant difference for daytime sleepiness (*t*(96) = -2.48 *p* = .015). In other words, participants with clinical emotional state scores (*M* = 9.41, *SD* = 4.18) show higher daytime sleepiness scores than normal depression scores (*M* = 7.42, *SD* = 3.66).

There was no significant effect for attentional bias (*t*(96) = -1.68 *p* = .29). Although, participants with clinical emotional state depression score (*M* = .141, *SD* = .286) show greater bias than normal depression scores (*M* = .092, *SD* = .160). Clinical emotional state depression levels (*M* = 4.51, *SD* = 3.74) and normal depression levels (*M* = 4.19, *SD* = 3.63) participants' inhibitory control scores did not differed significantly (*t*(96) = -.431 *p* = .67). Additionally, cognitive flexibility was also not differed significantly (*t*(96) = .963 *p* = .34). Participants with clinical emotional state depression scores (*M* = 427.09, *SD* = 257.57) show greater cognitive flexibility than normal depression scores (*M* = 476.55, *SD* = 242.86)

Table 6. Differences between Depression Score Levels

	Depression level	N	x̄	S	t Test		
					t	df	P
Sleep Quality	Normal	59	5.37	2.918	-3.394	96	.001*
	Clinical Emotional States	39	7.46	3.077			
Daytime Sleepiness	Normal	59	7.42	3.663	-2.484	96	.015
	Clinical Emotional States	39	9.41	4.178			
Attentional Bias	Normal	59	.092	.159	-.958	53.790	.342
	Clinical Emotional States	39	.140	.285			
Inhibition	Normal	59	4.19	3.627	-.431	96	.668
	Clinical Emotional States	39	4.51	3.741			
Cognitive Flexibility	Normal	59	476.554	242.859	.963	96	.338
	Clinical Emotional States	39	427.092	257.570			

Note. *p<.01, **p<.00

Findings indicated that there was significant difference for sleep quality ($t(96) = -4.38$, $p < .00$) between participants with clinical emotional state anxiety levels ($M = 7.53$, $SD = 3.20$) and normal anxiety level ($M = 4.98$, $SD = 2.56$). However, there was insignificant difference for daytime sleepiness $t(96) = -3.73$ $p < .00$ between participants with clinical emotional state anxiety levels ($M = 9.68$, $SD = 3.91$) and normal anxiety level ($M = 6.86$, $SD = 3.57$). Although, participants with clinical emotional state anxiety levels ($M = .157$, $SD = .273$) showed greater attentional bias than participants with normal anxiety level ($M = .070$, $SD = .143$). There was no significant difference for attentional bias ($t(96) = -1.96$, $p = .054$). Moreover, there was no significant difference for inhibitory control ($t(96) = -.39$, $p = .70$) between participants with clinical emotional state anxiety levels ($M = 4.47$, $SD = 3.03$) and normal anxiety level ($M = 4.18$, $SD = 4.180$). Finally, there was no significant difference for cognitive flexibility ($t(96) = .350$, $p = .727$) between participants with clinical emotional state anxiety levels ($M = 447.66$, $SD = 252.85$) and normal anxiety level ($M = 465.36$, $SD = 247.01$).

Table 7. Differences Between Anxiety Score Levels

	Anxiety level	N	x̄	SD	t Test		
					t	df	P
Sleep Quality	Normal	51	4.98	2.557	-4.341	88.092	.000**
	Clinical Emotional States	47	7.53	3.195			
Sleepiness	Normal	51	6.86	3.567	-3.730	96	.000**
	Clinical Emotional States	47	9.68	3.913			
Attentional Bias	Normal	51	.069	.142	-1.963	68.125	.054
	Clinical Emotional States	47	.157	.272			
Inhibition	Normal	51	4.18	4.180	-.393	96	.695
	Clinical Emotional States	47	4.47	3.028			
Cognitive Flexibility	Normal	51	480.917	465.355	.350	96	.727
	Clinical Emotional States	47	445.211	447.664			

Note. *p<.01, **p<.00

Results indicated that there was significant difference for sleep quality (*t*(96) = -3.92, $p < .00$) between participants with higher stress levels (*M* = 7.34, *SD* = 3.13) and normal stress level (*M* = 5.02, *SD* = 2.71). There was insignificant difference for daytime sleepiness (*t*(96) = -2.30, $p = .02$) between participants with higher stress levels (*M* = 9.10, *SD* = 4.13) and normal stress level (*M* = 7.29, *SD* = 3.63). Similarly, there was insignificant difference for attentional bias (*t*(96) = -2.38, $p = .020$) between participants with higher stress levels (*M* = .161, *SD* = .274) and normal stress level (*M* = .060, *SD* = .121). Moreover, there was no significant difference for inhibitory control (*t*(96) = -.18, $p = .86$) between participants with higher stress levels (*M* = 4.38, *SD* = 3.42) and normal stress level (*M* = 4.25, *SD* = 3.93). Finally there was no there was no significant difference for cognitive flexibility (*t*(96) = .621, $p = .536$) between participants with higher stress levels (*M* = 441.53, *SD* = 258.22) and normal stress level (*M* = 472.53, *SD* = 240.04).

Table 8. Differences Between Stress Score Levels

	Stress Level	N	x̄	SD	t Test		
					t	df	P
Sleep Quality	Normal	48	5.02	2.709	-3.917	96	.000**
	Clinical Emotional States	50	7.34	3.127			
Sleepiness	Normal	48	7.29	3.632	-2.299	96	.024
	Clinical Emotional States	50	9.10	4.127			
Attentional Bias	Normal	48	.060	.121	-2.377	68.030	.020
	Clinical Emotional States	50	.161	.274			
Inhibitory Control	Normal	48	4.25	3.928	-.175	96	.861
	Clinical Emotional States	50	4.38	3.416			
Cognitive Flexibility	Normal	48	472.847	240.035	.621	96	.536
	Clinical Emotional States	50	441.532	258.224			

Note. *p<.01, **p<.00

3.4.2. Results of T test for COVID-19 Status Groups

Table 10 represents that t test results of participants according to their COVID-19 status. indicated that there was significant difference for sleep quality ($t(96) = -2.65, p < .05$) between participants who had COVID-19 ($M = 7.09, SD = 3.21$) and who had not COVID-19 ($M = 5.02, SD = 2.90$). However, there was no significant difference for attentional bias ($t(96) = -1.68, p = .097$) between participants who had COVID-19 ($M = .15, SD = .20$) and who had not COVID-19 ($M = .08, SD = .23$).

Table 9. Differences of COVID-19 Status

	COVID-19 Status	N	x̄	S	t Test		
					t	df	P
Sleep Quality	Yes	45	7.09	3.211	-2.650	96	.009*
	No	53	5.45	2.899			
Attentional Bias	Yes	45	.15	.201	-1.677	96	.097
	No	53	.08	.229			

Note. *p<.01, **p<.00

3.5. HYPOTHESIS TESTING

3.5.1. Results of Linear Regression Analyses of Variables

In line with the hypotheses of the research, firstly, a bivariate correlation analysis was performed to determine whether depression, anxiety, stress, COVID-19 anxiety, attentional bias, and executive functions are associated with poor sleep characteristics. It was not necessary to test for the presence of multicollinearity as the independent variables were not significantly correlated. Therefore, simple linear regression analysis was performed to examine the relationships between the variables that were found to be related as a result of the correlation analysis.

Table 10. Predicting the Role of Attentional Bias on Inhibition

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	3.47	.37		9.316	.000	.21	24.716***
AttentionalBias	7.57	1.52	.45	4.972	.000		

Note. ***p < .001, Dependent variable: Inhibition

A simple linear regression analysis was performed to determine how much attentional bias affected inhibition. Pearson correlation analysis results showed that there is a high level of positive and significant relationship between variables $\beta = .45$, $t(96) = 9.32$, $p < .001$. According to the results of the regression analysis, the model was found significant $F(1, 96) = 24.716$, $p < .001$, with an R^2 of . 205. In other words, 21% of inhibition can be explained by attentional bias. Results of the regression analysis was presented in Table 8.

Table 11. Predicting the Role of Inhibition on Poor Sleep Quality

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	5.25	.48		10.981	.000	.06	6.865***
Inhibition	.22	.09	.26	2.620	.010		

Note. ***p < .001, Dependent variable: Poor Sleep Quality

Furthermore, another simple linear regression was calculated to predict sleep quality based on inhibition, $\beta = .26$, $t(96) = 10.98$, $p < .001$. A significant regression equation was found $F(1,96) = 6.865$, $p < .05$, with an R^2 of .067. Table 9 presents the regression analysis's findings.

Table 12. Predicting the Role of Attentional Bias on Coronavirus Anxiety

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	1.73	.30		5.708	.000	.14	15.450***
AttentionalBias	4.88	1024.	.37	3.931	.000		

Note. ***p < .001, Dependent variable: COVID-19 Anxiety

Table 10 indicates a simple linear regression analysis which used to test if the attentional bias significantly predicted participants' ratings of COVID-19 anxiety. The results of the regression analysis represents the attentional bias explained 13.9% of the variance (R^2 = .139, F(1, 96) = 9.038, p < .05). It was found that attentional bias significantly predicted coronavirus anxiety (β = .37 t(96) = 5.71, p < .001).

Table 13. Predicting the Role of COVID-19 Anxiety on Poor Sleep Quality

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	5.47	.39		14.023	.000	.09	9.038***
COVID-19 Anxiety	.32	.11	.29	3.006	.003		

Note. ***p < .001, Dependent variable: Poor Sleep Quality

As presented in Table 13 coronavirus anxiety depending on sleep quality was predicted using a simple linear regression analysis, β = .29, t(96) = 14.02, p < .001. A significant regression equation was found F(1,96) = 9.038, p < .05, with an R^2 of .086.

3.5.2. Result of Mediation Analysis

Hayes's PROCESS Model 4 (2018) was used in order to examine mediating role of disinhibition on the relationship between attentional bias and sleep quality. 95% confidence interval and 5000 bootstrapping was taken into consideration. Confidence intervals were expected to not include zero for paths to be considered significant. The results showed that attentional bias was significantly associated with disinhibition (B= 7.57, %95 CI [4.55, 10.60], *SE* = 1.52, *p* = .00). Disinhibition was significantly associated with sleep quality (B= .26, %95 CI [.07, .45], *SE*= .10, *p* =.00). The total effect of attentional bias on sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70), and the direct effect of attentional bias on sleep quality was also insignificant (B= -1.40, %95 CI [-4.56, 1.75], *SE*= 1.59, *p* = .38). The indirect effect of inhibition on the relationship between attentional bias and sleep quality was significant (indirect effect= 1.97, *SE*= .94, %95 CI [.56, 4.17]).

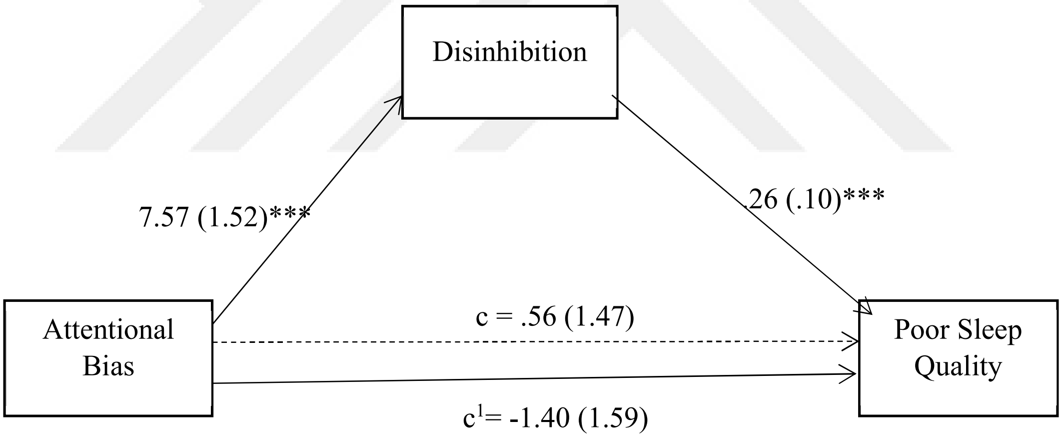

Figure 1. Simple Mediation Model for Disinhibition.

The findings indicated that attentional bias was not significantly associated with cognitive flexibility (B= 27.21, %95 CI [-203.35, 257.77], *SE* = 116.15, *p* = .82). Cognitive flexibility was not significantly associated with poor sleep quality (B= -00. %95 CI [-.004, .001], *SE*= .00, *p* =.56). The total effect of attentional bias on sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70) and the direct effect of attentional bias of attentional bias on sleep quality was not significant (B= .60, %95 CI [-2.31, 3.51], *SE*= 1.47, *p* = .68). The indirect effect of inhibition on the relationship between attentional bias and sleep quality was also not significant (indirect effect= -.04, *SE*= .25, %95 CI [-.47, .57]).

The results showed that attentional bias was significantly associated with COVID-19 Anxiety (B= 4.87, %95 CI [2.41, 7.34], *SE* = 1.24, *p* = .00). COVID-19 Anxiety was significantly associated with poor sleep quality (B= .36, %95 CI [.13, .58], *SE*= .12, *p* =.00). The total effect of attentional bias on poor sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70), and the direct effect of attentional bias on poor sleep quality was also insignificant (B= -1.17, %95 CI [-4.17, 1.84], *SE*= 1.51, *p* = .44). The indirect effect of COVID-19 Anxiety on the relationship between attentional bias and sleep quality was significant (indirect effect= 1.73, *SE*= .76, %95 CI [.50, 3.49]).

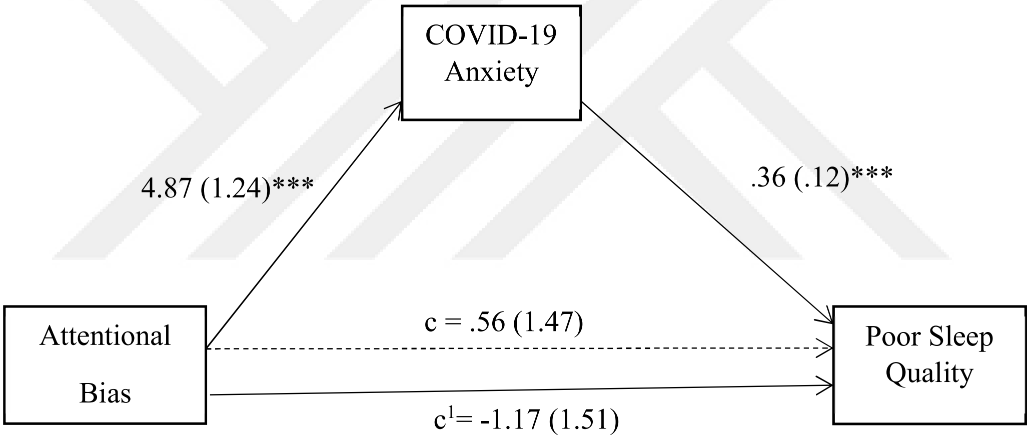

Figure 2. Simple Mediation Model for COVID-19 Anxiety.

The results showed that attentional bias was significantly associated with both disinhibition (B= 7.57, %95 CI [4.55, 10.60], *SE* = 1.52, *p* = .00) and COVID-19 Anxiety (B= 4.87, %95 CI [2.41, 7.34], *SE* = 1.24, *p* = .00). Disinhibition (B= .26, %95 CI [.08, .44], *SE*= .09, *p* =.00) was significantly associated with poor sleep quality, COVID-19 Anxiety was also significantly associated with poor sleep quality (B= .35, %95 CI [.13, .58], *SE*= .11, *p*= .00). The total effect of attentional bias on poor sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70), and the direct effect of attentional bias on poor sleep quality was also insignificant (B= -3.12, %95 CI [-6.32, .08], *SE*= 1.61, *p* = .06). The indirect effect of disinhibition on the association between attentional bias and poor sleep quality was significant (indirect effect= 1.96, *SE*= .89, %95 CI [.64, 4.09]). Also, the indirect effect of COVID-19 anxiety on the association between attentional bias and poor sleep quality was significant (indirect effect= 1.72, %95 CI [.56, 3.27], *SE*= .69). Hence, the total indirect effect was also significant (indirect effect= 3.68, %95 CI [1.72, 6.18], *SE*= 1.15).

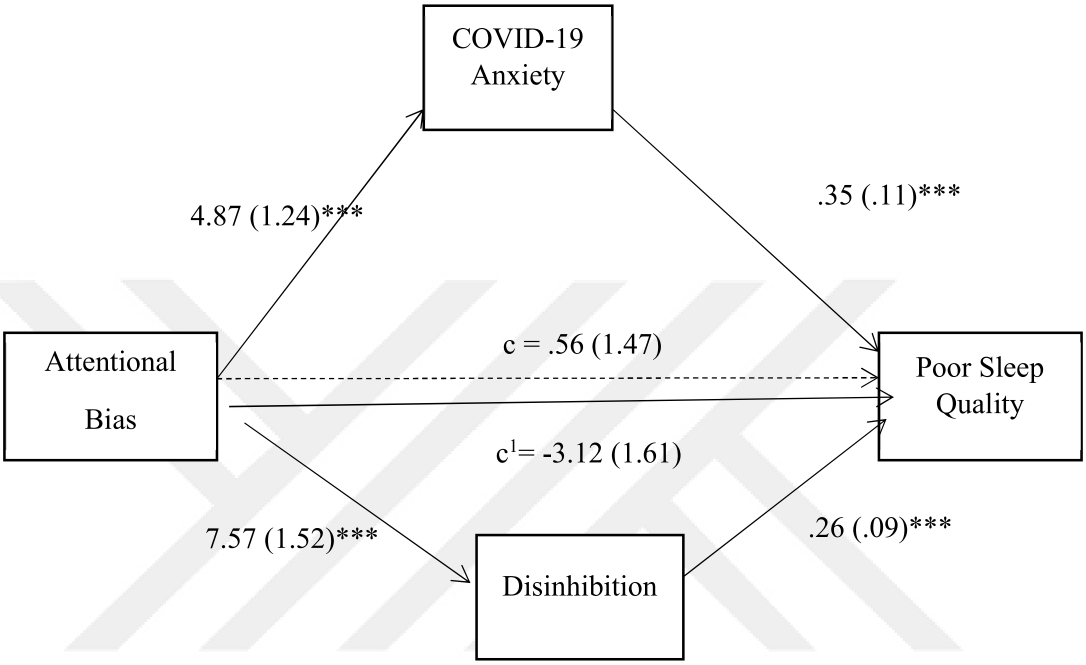

Figure 3. Results of Multiple Mediator Model.

CHAPTER IV

DISCUSSION

4.1. INTRODUCTION

In this section, the findings related to the proposed models and hypotheses will be examined within the framework of the current literature. In other words, findings on the relationship between attentional bias and sleep characteristics, and the effect of executive functions and psychological distress on this process will be presented. Then, the limitations of the study and suggestions for future studies will be presented. Finally, the contributions and implications of the research will be shared.

In the study, the effects of changes in executive functions and attentional bias on sleep characteristics due to the psychological distress experienced by healthy adults in the COVID-19 period were examined. In addition, the relationships between executive functions, sleep characteristics, and psychological distress scores were investigated.

The findings obtained from the research were handled and evaluated in four stages. First, the correlation findings on sleep characteristics, psychological distress sub-dimensions, executive functions and attentional bias tasks were evaluated in the context of the relevant literature. Secondly, the findings of the t-test analysis were evaluated according to the sleep quality, depression, anxiety, and stress levels of the participants. Thirdly, the result of the linear regression analyzes of the variables are discussed in the light of the relevant literature. Finally, the mediation analysis result is discussed and discussed.

4.2. EVALUATION OF THE CORRELATION FINDINGS IN THE CONTEXT OF THE RELEVANT LITERATURE

Although not hypothesized in the current study, it was assumed that poor sleep characteristics would be reported at a higher rate than in the pre-COVID-19 period. Overall, this research reveals that majority of a sample of healthy Turkish people had poor sleep quality during the COVID-19 period (Demir et al. 2015: 306). The data obtained from 7,236 volunteer participants in the study conducted by Huang and Zhao (2020: 5) during the COVID-19 period shows that 35.1% of the participants reported generalized anxiety disorder and 20.1% reported depressive symptoms. When compared with the previous literature, these rates were higher than the pre-COVID-19 pandemic period (Kocalevent et al. 2013: 552; Hinz et al. 2017: 340). When the previous studies evaluating sleep characteristics in our country were examined, it was seen that there were differences in sleep characteristics between pre-COVID-19 and COVID-19 period. For instance, in the study conducted before COVID-19 pandemic, with a sample of 5521 subjects representing the adult population of Turkey, 15.3% of the participants reported insomnia and 5.4% reported excessive daytime sleepiness (Demir et al. 2015: 306). However, in a study conducted in Istanbul in which 352 people participated during the COVID-19 pandemic period, depression, anxiety, and sleep quality of the participants were evaluated. Beck Depression index (BDI) and Beck Anxiety index (BAI) and Pittsburgh Sleep Quality index (PSQI) were used as assessment tools. Results showed that 69.5% of the participants had report poor sleep quality, 18.5% struggled with depression and 24.6% with anxiety (Kabeloğlu and Gül 2021: 99). The results obtained in the current study show that poor sleep characteristics is reported at a higher rate than in the pre-COVID-19 period as assumed. This finding seems to be consistent with previous literature findings that when contagious infectious illnesses expand over the globe, the prevalence of mental problems including depression, anxiety, and sleep problems rises (Kabeloğlu and Gül 2021: 101).

Supporting findings have been obtained for Hypothesis 1, which suggests that there will be a positive relationship between poor sleep characteristics and indicators of psychological distress such as depression, anxiety, stress, and COVID-19 anxiety. First, consistent with Hypothesis 1a, the association between poor sleep quality and depression, anxiety, stress, and COVID-19 anxiety appear to be positive and significant. In other words, participants with poor sleep quality were found to have higher levels of depression, anxiety, stress, and COVID-19 anxiety. The relevant literature reveals that there is a deep-rooted link between sleep problems and psychological distress (Woods and Scott 2016: 45; Hyun et al. 2021: 54; Goldstein and Walker 2014: 679). Stress, anxiety, and depression may all be brought on by not getting enough sleep, and they might all worsen as well (Goldstein and Walker 2014: 679). On the other hand, these mental health issues might also cause sleep disturbances (Kahn et al. 2013: 221). In a study of 2291 participants, 57.1% of participants reported poor sleep quality, 32.1% high anxiety, 41.8% high distress, and 7.6% PTSD symptomatology associated with COVID-19 (Casagrande et al. 2020: 12). Consistent with Hypothesis 1b, the current study shows that the association between daytime sleepiness and depression, anxiety, stress, and COVID-19 anxiety is positive and significant. In a study of 64 healthy young adults, participants who reported higher levels of daytime sleepiness reported higher levels of depressive symptoms (Campos-Morales et al. 2005: 10).

Complex results have been obtained regarding Hypothesis 2, which suggests a positive relationship between sleep characteristics and executive functions. Reviewed literature indicted that the nervous systems of the prefrontal cortex (PFC), which is engaged in executive processes, are particularly sensitive to sleep deprivation (Couyoumdjian et al. 2010: 66). Moreover, it is known that poor sleep quality has been linked to disinhibition, a cognitive process that involves the capacity to regulate or repress thoughts, behaviors, or reactions (Zeigler-Hill and Shackelford 2020). Schapkin and colleagues (2006: 696) proposed that the inhibitory control-related go/no go task would be more impacted because executive tasks are more susceptible to sleep disruptions than non-executive tasks. Despite the fact that research had no discernible impact on performance, it was found that the inhibitory function had decreased over the day. In the line with reviewed literature Hypothesis 2a was supported by current study results. However, Hypothesis 2d, which suggested that daytime sleepiness would be negatively correlated with inhibitory control, was not supported. Although, previous studies have reported that increased levels of daytime sleepiness are associated with lower performance on measures of executive functioning (Anderson et al. 2009: 701). However, similar with our findings, Fueggle (2018: 1) did not find a direct relationship between measures of daytime sleepiness and inhibition in his study.

He suggests that increased levels of daytime sleepiness are not directly related to cognitive control difficulties.

The evidence suggest that sleep deprivation has a detrimental impact on people's capacity to change their behavior rapidly and adaptably in response to shifting environmental demands. Couyoumdjian and colleagues' study (2010: 68), which included 118 university students, participants were randomly assigned to sleep and sleep deprivation groups to test task switching paradigm. The results demonstrated that insufficient sleep reduced task switching accuracy as well as speed. Additionally, participants with sleep deprivation were observed to exhibit greater rates of error and higher task switch costs when compared to sleep group. In our study, we predicted that sleep quality would be positively associated with cognitive flexibility in Hypothesis 2b, and daytime sleepiness negatively associated with cognitive flexibility in Hypothesis 2e. However, our results did not support this hypothesis. Specifically, we found no significant relationship between both sleep quality and daytime sleepiness and cognitive flexibility. Harrison and Horne's (2000: 236) study revealed that sleep deprived participants have normal reaction times in dull tasks such as reaction time, and even after sleep deprivation, they make compensatory efforts to overcome sleepiness. Similarly, another study shows that participants maintained their performance better on more complex tasks after sleep deprivation (Chee and Choo 2004: 4560).

The functioning of the executive functions of the brain, which include mental processes like attention, working memory, problem-solving, and decision-making, is linked to depression, anxiety, and stress (Shields et al. 2016: 651). According to research, people with depression and anxiety frequently struggle with attention and working memory, which can make it challenging for them to complete daily activities and reach conclusions (Keller et al. 2019: 9). In the line with reviewed literature, it is known that rumination and trouble in controlling unpleasant thoughts are symptoms of depression (DeGutis et al. 2015: 345), stress can pose a challenge to control impulsivity and aggressive attitude, while anxiety can make it difficult to prevent fear and anxiety (Edwards et al. 2017: 674). However, other studies indicate that the association between depression, anxiety, and stress and inhibitory control might be bidirectional, indicating that the absence of inhibitory control can also play a role in the onset and persistence of these disorders (Hasher and Zacks 1979: 356).

Additionally, as these circumstances may result in alterations to the function and structure of the brain that might worsen the inhibitory control (DeGutis et al. 2015: 345), it is hypothesized depression, anxiety and stress are negatively associated with inhibitory control and cognitive flexibility in Hypothesis 3a. However, this hypothesis not supported in current study. In a study conducted during the COVID-19 pandemic, participants reported higher-than-anticipated psychological distress (O'Connor et al. 2022: 683). Similar with our results, no significant relationship was found between executive functions, including working memory and inhibitory control, and psychological distress. Mirowsky and Ross (2017) stated that cognitive problems are distinctly separate from emotional issues like anxiety and depression according to psychiatric diagnostic models.

Reduced cognitive flexibility, which means the capacity to adapt to changing circumstances, think creatively, and generate novel ideas, has been linked to depression, anxiety, and stress. According to studies, people who struggle with anxiety and depression find it harder to move between activities and are less able to filter out extraneous information. Additionally, it has been discovered that stress has a detrimental impact on cognitive flexibility, with high stress levels resulting in a reduced capacity to move between activities and a heightened difficulty in filtering out unnecessary information. It is crucial to remember that these relationships are complicated and that various circumstances may have varied effects on cognitive flexibility. Cognitive flexibility may also influence mood and stress levels. In a study of 477 university students, measures of anxiety, depression, impulsivity, and cognitive flexibility were taken. The results show that higher anxiety and depression scores are associated with lower cognitive flexibility scores and higher levels of impulsivity (Yu et al. 2020: 33). Therefore, in hypothesis 3b, it is expected that depression, anxiety and stress are negatively associated with cognitive flexibility. However, it is not supported. In a study that aimed to compare cognitive flexibility abilities, stress and anxiety among athletes, results show that better cognitive performances are negatively related to stress and anxiety. Researchers suggest that cognitive flexibility will improve human performance by modulating anxiety and stress during competition (Han et al. 2011: 221).

The propensity for attention to be drawn more strongly to certain stimuli or ideas than to others is known as attentional bias. Poor sleep quality was linked to a higher risk of attentional bias to negative stimuli, whereas excellent sleep quality was linked to a lower risk of attentional bias to negative stimuli and a higher capacity for task-focused attention. There are several things that might make people sleepy throughout the day, including poor quality of sleep, sleep disorders, and some medications (Pagel 2009: 391). In studies using the dot-probe task as the attentional bias paradigm, the absolute value of the participants' attentional bias scores is taken, and higher values indicate stronger effects for negative stimulus or avoidance of negative stimulus (Vervoort et al. 2021: 644512). Therefore, sleep quality was expected to be negatively associated with attentional bias in Hypothesis 2c and daytime sleepiness was expected to be negatively associated with attentional bias in Hypothesis 2f. However, our hypotheses were not supported.

In the current study, Hypothesis 3c was supported, which suggested that coronavirus anxiety would be positively associated with attentional bias. Previous studies also show that coronavirus anxiety is positively associated with attentional bias, consistent with the findings of the current study (Albery et al. 2021: 1367).

4.3. EVALUATION GROUP COMPARISONS IN THE CONTEXT OF RELEVANT LITERATURE

The data obtained in this study show that sleep quality differs according to depression, anxiety and stress symptom levels, similar to previous studies. Cellini and his colleagues (2020: 13074) investigated the effects of restraint measures on 1310 Italian participants' daily habits, such as sleep-wake rhythms and digital media use in COVID-19 period. As we predicted in Hypothesis 1c, the results of the study found that the sleep quality was worse in people with higher levels of depression, anxiety and stress symptomatology.

Previous studies suggest that depression has important effects on executive functions. Almondes and colleagues (2016: 1547) showed that individuals without depression had 68.4% higher motor programming scores, 3 times higher inhibitory control scores, and 3 times higher working memory scores than individuals with depression. As a result of the current study, it was observed that depression scores did not differ for cognitive flexibility, inhibition, and attentional bias. This proves that the subjects of the current study were healthy individuals who were not depressed.

In addition, the result of the current study indicated that the sleep quality of the participants differed according to the level of depression. In a study, daytime sleepiness, sleep quality, and depression were evaluated in two groups, shift workers and day shift workers only (Alhifzi et al. 2018: 19). Results showed that there was a significant increase in daytime sleepiness and poor sleep quality in people working in a shift working system, and there is a strong relationship between poor sleep quality and depression as we found in the current study.

Excessive concern and fear are characteristics of anxiety, which makes it challenging to control feelings and thoughts (Emmelkamp and Ehring 2014: 11). According to research, anxiety makes it harder for people to suppress their worries, and the level of anxiety is correlated with executive dysfunction (Eysenck 1985: 580). O'Rourke and colleagues (2020: 220) examined EF, coping and anxiety in their study. The results showed that both EF deficit and disengagement coping strategies are associated with increased anxiety. In addition, it has been shown that strong coping skills can moderate the relationship between EF and anxiety. Coping skills were not examined in the current study, coping skills may also be considered in future studies. However, there is some evidence that consistent with current results which indicates there was no difference in the executive functions and attentional bias experienced by participants with both normal anxiety level and clinical emotional states. For example, twenty-nine healthy participants took part in a functional magnetic resonance imaging (fMRI) research by Fales, Becerril, Luking, and Barch (2010: 204) to investigate the effects of anxiety on cognitive functioning in the context of emotional distractions. The findings revealed that performance or brain activity were not significantly changed by anxiety.

Stress is linked to the inability to restrain an impulsive or aggressive attitude (Lazarus 1991: 149). According to research, stress can make it harder to control impulsive and violent behavior, and the amount of difficulty controlling these behaviors is correlated with the level of stress (Selye 1976: 123). Field and Powell (2007: 562) studied the effects of stress on alcohol craving and attentional bias for alcohol-related cues in their study with 44 heavy social drinker participants. The results indicated that participants showed significant attentional bias in cues about alcohol acting as a stressor. However, in the current study found that there was no difference in attentional bias scores experienced by both normal stress level and clinical emotional states toward COVID-19 related visuals. Moreover, research indicates stress may negatively affect the cognitive functions (McEwen and Sapolsky 1995: 209). Fabio, Picciotto and Caprì (2022: 7559) studied the effects of stress on executive functions and automatic processes in 88 healthy subjects aged 18-30 years. Results showed that stress impairs cognitive flexibility, working memory, and verbal fluency. However, this finding contrasts with our results which indicates inhibition and cognitive flexibility did not differ according to scores of participants with normal anxiety and clinical emotional states (mild to extreme severe level of anxiety). Although it is not entirely clear whether stress affects working memory, inhibition, and cognitive flexibility, some studies demonstrate that stress can increase inhibition (Schwabe et al. 2013: 2324; Shields et al. 2015: 653).

Finally, it is hypothesized that the sleep quality and attentional bias scores will differ between participants who infected with and without COVID-19 in Hypothesis 4. There are limited resources in the available literature regarding Hypothesis 4a which predict that there will be difference of sleep quality of people with and without COVID-19. Despite, the current findings are consistent with the limited research conducted. In the study, which included 189 patients hospitalized for COVID-19, mental health and sleep quality of patients requiring clinical intervention were examined after the diagnosis of COVID-19. According to the findings, 54% of the individuals experienced poor sleep quality (Akıncı and Başar 2021: 169).

In Hypothesis 4b, it was predicted that the attentional bias scores of the participants would differ according to the COVID-19 status. Crivelli and her colleagues (2021: 243) were examined the cognitive functions of participants who survived COVID-19 without a history of cognitive impairment. Forty-five post-COVID-19 patients and forty-five control participants underwent neuropsychological assessment of cognitive domains such as memory, language, attention, executive functions, and visuospatial skills. The results show that the impairments can be detected predominantly in executive functions and attention and have a smaller effect on memory and language. However, this finding is contrary with the findings of Miskowiak and his friends (2021: 42) who noted that in terms of cognitive impairments, hospital stays, total oxygen requirements, and a marker for the severity of acute illness, there are no correlations between the severity of COVID-19 and cognitive performance. These findings are consistent with the findings of the current study that the attentional bias scores of the participants did not differ according to the COVID-19 status.

4.5. EVALUATION OF THE RESULTS OF THE LINEAR REGRESSION ANALYZES OF THE VARIABLES IN THE CONTEXT OF THE RELEVANT LITERATURE

In this study, attentional bias was found to predict inhibition. According to studies, when under attention-seeking settings, those with high trait anxiety have trouble focusing on both threat- and non-threat-related distractions (Fox 1994: 166). For instance, if a person has a tendency to pay attention to unpleasant stimuli, they may find it difficult to divert their attention from them and are more likely to experience emotional discomfort or overload (Bar-Haim et al. 2010; Dennis-Tiwary et al. 2019: 881). Additionally, attentional bias may reduce the efficiency of cognitive control techniques like working memory, which may focus attention away from distractions and toward pertinent information (McNally 2019: 11; Dennis-Tiwary et al. 2019: 881). Inhibition and attentional bias are also associated because cognitive and neurological mechanisms including attentional control networks and emotional control systems affect both (Joormann 2004: 143).

Moreover, when the findings of the current research were examined; it was observed that disinhibition predicts poor sleep quality. According to studies, those who are more disinhibited have a great difficulty falling asleep, remaining asleep, and getting enough restorative sleep (Marques et al. 2015: 220). This could be because people with higher level of disinhibition are more prone to engage in activities that impair sleep, such staying up late or taking coffee or alcohol right before bed (Carskadon 1990: 6). Disinhibition can also cause stress or anxiety, which can impair the quality of sleep (Shen et al. 2018: 2586). For instance, Ballesio, Ottaviani, and Lombardo (2019: 672) looked at whether a sample of people with insomnia are more likely to engage in rumination, the defining feature and persistent cause of insomnia. The findings indicate that a tendency to consider the negative effects of sleeplessness is connected to a difficulty to properly inhibit mental representations.

Another important finding of the study is attentional bias was predicted COVID-19 anxiety. According to studies, those who are more prone to attentional bias toward unfavorable information are more anxious about the COVID-19 (Albery et al.

2021: 1367). This is due to the fact that they frequently concentrate on the harmful effects of the virus, such as the incidence, fatalities, and financial costs (Li and Li 2022: 6). Feng and her colleagues (2022: 104168) sought to identify the cognitive processes that predict anxiety and worry when people are exposed to various stressors. According to the findings, interpretation bias accounts for the distinctive variation in anxiety and worry and cognitive processes can predict changes in anxiety and worry during stressful future situations.

One of the most important contributions of the current study is that COVID-19 anxiety predicts poor sleep quality. Correspondingly, reviewed literature revealed similar findings. Research conducted in China during the COVID-19 epidemic found that participants' anxiety symptoms grew the greatest, followed by depressive symptoms and sleep disruptions (Huang and Zhao 2020: 5). Furthermore, Yelpaze (2021: 47) in a study investigating the relationship of sleep problems with emotion regulation and anxiety, it was reported that Covid-19 anxiety was a strong predictor of poor sleep quality.

4.6. EVALUATION OF MEDIATION ANALYSIS RESULTS IN THE CONTEXT OF RELEVANT LITERATURE

Reviewed literature indicated that emotional arousal is one way that attentional bias toward COVID-19 cues might lead to disinhibition (McGeown 2021). Strong emotional responses to COVID-19 stimuli, such as fear or worry, can enhance impulsivity and reduce inhibitory control (Sadiković et al. 2020: 2133). For instance, those who are worried about the pandemic may be more likely to act impulsively or take risks in order to deal with their emotions (Naeem 2021: 377).

Furthermore, anxiety related to COVID-19 and disinhibition both alter the body's stress response and may interfere with sleep. Stress causes the body to release hormones like cortisol and adrenaline, which can interfere with a person's ability to get to sleep and stay asleep. Moreover, Sympathetic activation can lead to an increase in attentional bias, which is the propensity to focus more attention on some environmental cues than others. This occurs as a result of sympathetic activation's enhancement of the activity of the brain's attentional system, which focuses attention on stimuli that may be dangerous (Bardeen and Daniel 2017: 73). With the production of adrenaline, which has been demonstrated to improve the processing of emotionally relevant stimuli, sympathetic activation can increase attentional bias (Elzinga and Bremner 2002: 3). Sympathetic nervous system engages and direct one's attention to the source of the sound, helping people to rapidly determine whether there is a threat (Porges and Furman 2011: 110).

Also, by raising the activity of the locus coeruleus, a tiny brainstem region that is important in controlling arousal and attention, sympathetic activation can also worsen attentional bias (Unsworth and Robison 2017: 1286). The neurotransmitter norepinephrine, which is released by the locus coeruleus, stimulates the brain's attentional system and can heighten the salience of some stimuli (Berridge and Waterhouse 2003: 35).

Therefore, one of the most important contributions of this study to the literature is the fifth hypothesis which suggests the relationship of attentional bias with sleep quality is mediated by Covid-19 anxiety and inhibition has been confirmed. Sympathetic activation enhances the processing of emotionally charged inputs, which can interfere with sleep, while also raising the release of norepinephrine and adrenaline, which in turn raises the activity of the brain's attention system (Bardeen and Daniel 2017: 74; Berridge and Waterhouse 2003: 33; Elzinga and Bremner 2002: 14). However, hypothesis 5b which the relationship of attentional bias with sleep quality is mediated by cognitive flexibility were not supported. Studies indicated that it might be less likely for attentional bias and cognitive flexibility to be associated since they require different brain processes (Malinowski 2013). Additionally, it might be challenging to compare the link between attentional bias and cognitive flexibility since different measurement techniques may have varying sensitivities and restrictions (Mogg and Bradley 2016: 79). Additionally, the task switching paradigm utilized in this study to test cognitive flexibility seems to be difficult for all participants, and research indicated that people tend to perform best when faced with difficult tasks (Han et al. 2011: 221).

It was found that the attentional bias was not correlated with poor sleep quality. The previous findings showed that people who meet the minimum criteria for insomnia show attentional bias (Jones et al. 2005: 249). At this point, it seems extremely important to emphasize that attentional bias was measured by bedroom objects (Jones et al. 2005: 249), that's why the previous findings are different from the current study findings. In other words, the attentional bias which was measured among Covid-19 related visuals is not correlated with sleep quality. On the other hand, attentional bias was positively correlated with Covid-19 Anxiety. This result is congruent with previous findings which showed the relationship between attentional bias and health anxiety (Cannito et al. 2020: 7). Furthermore, the association between attentional bias and anxiety was shown in the past (Clarke et al. 2020: 103751). It was also found that the Covid-19 Anxiety has positively correlated with poor sleep quality in the current study. The previous literature findings support the current study results with showing the association between sleep quality and anxiety during Covid-19 (Chen et al. 2022: 527). When indirect effect is taken into consideration, it was found that Covid-19 Anxiety has an indirect effect between attentional bias and poor sleep quality. The mediating role of anxiety was shown in the literature which include also sleep related variables such as sleep wake quality (Fabbri et al. 2022: 172). Overall, attentional bias of individuals is associated with their Covid-19 Anxiety. Therefore, it can be argued that regulating Covid-19 Anxiety may be effective in preventing poor sleep quality.

Another hypothesis of the current study which was about the relationship between attentional bias and poor sleep quality and the indirect effect of inhibitory control between these variables was supported. As it mentioned above the relationship between attentional bias and poor sleep quality was not significantly correlated. On the other hand, attentional bias was significantly and positively correlated with disinhibition. The previous findings were consistent with the current study results which showed that attentional bias variability negatively correlated with inhibitory attention control (Clarke et al. 2020: 103751). Furthermore, the current study showed that disinhibition was significantly and positively correlated with poor sleep quality. This finding was supported previous literature which showed that sleep quality was significantly associated with inhibitory control performance (Li et al. 2021: 664). Also, sleep deprivation was correlated with low inhibition (Anderson and Platten 2011: 463). The indirect effect of disinhibition between attentional bias and poor sleep quality was significant. Consistently, the indirect effect of inhibition was shown in the current literature among diverse variables (Da Silva et al. 2022: 113966). As a result, attentional bias seems to be associated with disinhibition, and disinhibition can be resulted in poor sleep quality.

4.7. LIMITATIONS, CONCLUSION, AND SUGGESTIONS FOR FUTURE RESEARCH

The results of this study led to the conclusion that the relationship of attentional bias with sleep quality is mediated by Covid-19 anxiety and disinhibition. Moreover, the participants' sleep characteristics scores, as sleep quality and daytime sleepiness, differed according to depression, anxiety, and stress scores. In addition, cognitive flexibility was not correlated with sleep characteristics and depression, anxiety, and stress scores of participants. Inhibitory control was correlated with sleep quality and attentional bias. Additionally, COVID-19 anxiety was correlated with attentional bias. However, while the sleep quality scores of the participants differed according to the COVID-19 status, the attentional bias scores did not.

The current study has many limitations and strengths. It fills the gap arising from the absence of a study in the literature exploring the relationship between sleep quality, executive functions, and attentional bias during Covid-19 pandemic among healthy adult subjects. A possible reason for the lack of support in some hypotheses might be due to the sample size of our study. In future studies, it might be useful to study with a larger sample group. In addition, the task switching task used to measure cognitive flexibility was not distinctive as it was challenging for all participants. In addition, some studies indicate that task switching does not measure pure cognitive flexibility process and is also effective in memory and inhibition processes (Miguel 2012). Similar study might be conducted in the future by using a different task switching paradigm. In addition, information on executive function and sleep characteristics of the participants in the pre-COVID-19 period is not available. Participants might have some impairments in executive function and sleep characteristics prior to the COVID-19 period. Additionally, our measure of sleep quality may not have been sensitive enough to capture individual differences in sleep quality.

Health systems administrators concentrate testing, preventing spreading, and providing patient care during the acute phase of the epidemic, but it's important to remember that patients' psychological needs as well (Cullen et al. 2020: 311). As seen in the current study, the urgent determination of psychological interventions in cases such as infectious epidemics is of critical importance in terms of protecting the psychological health of the public and not causing problems such as sleep problems and executive dysfunction brought about by the deterioration of psychological health.

REFERENCES

ACHERMANN Peter and BORBÉLY Alexander A. (2003), "Mathematical Models of Sleep Regulation", *Frontiers in Bioscience-Landmark*, Vol. 8, pp. 683-693.

ADAM Kirstine and OSWALD Ian (1977) "Sleep Is For Tissue Restoration" *Journal of the Royal College of Physicians of London*, Vol. 11, pp. 376-388.

AĞARGÜN Mehmet Yücel, KARA Hayrettin and ANLAR Ömer (1996), "Pittsburgh Uyku Kalitesi İndeksinin Geçerliği ve Güvenirliği", *Türk Psikiyatri Dergisi*, Vol. 7, No. 2, pp. 107-115.

ÅKERSTEDT Torbjörn, HUME Ken, MINORS David and WATERHOUSE Jim (1994). "The Meaning of Good Sleep: A Longitudinal Study of Polysomnography and Subjective Sleep Quality", *Journal of Sleep Research*, Vol. 3, No. 3, pp. 152-158.

AKINCI Tuba and BAŞAR Hatice Melek (2021), "Relationship Between Sleep Quality and The Psychological Status of Patients Hospitalised with COVID-19" *Sleep Medicine*, Vol. 80, pp. 167-170.

ALBERY Ian P., SPADA Marcantonio M. and NIKČEVIĆ Ana V. (2021). "The COVID-19 Anxiety Syndrome and Selective Attentional Bias Towards COVID-19-Related Stimuli In UK Residents During The 2020–2021 Pandemic", *Clinical Psychology & Psychotherapy*, Vol. 28, No. 6, pp. 1367-1378.

ALEMANNO Federica, HOUDAYER Elise, PARMA Anna, SPINA Alfio, DEL FORNO Alessandra, SCATOLINI Alessandra, ANGELONE Sara, BRUGLİERA Luigia, TETTAMANTI Andrea, BERETTA Luigi and IANNACCONE Sandro (2021), "COVID-19 Cognitive Deficits After Respiratory Assistance in The Subacute Phase: A COVID-Rehabilitation Unit Experience", *Plos one*, Vol. 16, No. 2, e0246590.

ALHIFZI Sulaiman, AL-GHONIMY Aseel, AL ABOUDI Malak, AL ABDULLAH Rawan, OLAISH Awad and BAHAMMAM Ahmad S. (2018), "Assessment of Sleep Quality, Daytime Sleepiness, and Depression Among Emergency Physicians Working In Shifts", *Journal of Nature and Science of Medicine*, Vol. 1. No. 1, pp .17-21.

ALI Kashif, MUFTI Umamah and MUFTI Aliya (2020), "Impact of COVID-19 Lockdown on Sleep Quality in Students: A Cross Sectional Study", *Annals of International Medical and Dental Research*, Vol. 6, No. 6, pp. 1- 3.

ALMONDES Katie M., COSTA, Monica V., MALLOY-DINIZ Leandro F., and DINIZ Breno S. (2016), "The Relationship Between Sleep Complaints, Depression, and Executive Functions on Older Adults", *Frontiers in Psychology*, Vol. 7, pp. 1547.

AMERICAN PSYCHIATRIC ASSOCIATION, (2022), *Diagnostic and Statistical Manual Of Mental Disorders* (5th ed., text rev.).

AMSTADTER Ananda (2008), "Emotion Regulation and Anxiety Disorders", *Journal of Anxiety Disorders*, Vol. 22, No. 2, pp. 211–221.

AMZICA Florin and STERIADE Mircea (2002), "The Functional Significance Of K-Complexes", *Sleep Medicine Reviews*, Vol. 6, No. 2, pp. 139-149.

ANDERS Thomas F. and EIBEN Lisa A. (1997) "Pediatric Sleep Disorders: A Review Of The Past 10 Years", *Journal of The American Academy of Child & Adolescent Psychiatry*, Vol. 36, No. 1, pp. 9-20.

ANDERSON Basil, STORFER-ISSER Amy, TAYLOR H. Gerry, ROSEN Carol L. and REDLINE Susan (2009), "Associations of Executive Function with Sleepiness And Sleep Duration In Adolescents", *Pediatrics*, Vol. 123, No. 4, pp. e701-e707.

ANDERSON Clare and PLATTEN Charlotte R. (2011) "Sleep Deprivation Lowers Inhibition And Enhances Impulsivity to Negative Stimuli", *Behavioural Brain Research*, Vol. 217, No. 2, pp. 463-466.

ANDERSON Kent W. and SKIDMORE Jay R. (1995), "Empirical Analysis of Factors in Depressive Cognition: The Cognitive Triad Inventory", *Journal of Clinical Psychology*, Vol. 51, No. 5, pp. 603-609.

ANTONY James W., SCHÖNAUER Monika, STARESINA Bernhard P., and CAIRNEY Scott A. (2019), "Sleep Spindles and Memory Reprocessing", *Trends In Neurosciences*, Vol. 42, No. 1, pp. 1-3.

ARMITAGE Roseanne (1995), “The Distribution of Eeg Frequencies In Rem And Nrem Sleep Stages In Healthy Young Adults”, *Sleep*, Vol. 18, No. 5, pp. 334-341.

ARNSTEN Amy F. (2009), “Stress Signalling Pathways That Impair Prefrontal Cortex Structure and Function”, *Nature reviews neuroscience*, Vol. 10, No. 6, pp. 410-422.

ASHCRAFT Mark H. and KIRK Elizabeth P. (2001), “The Relationships Among Working Memory, Math Anxiety, and Performance”, *Journal of Experimental Psychology: General*, Vol. 130, No. 2, pp. 224.

ASSEFA Samson Z., DIAZ-ABAD Montserrat, WICKWIRE Emerson M., and SCHARF Steven M. (2015), “The Functions of Sleep”, *AIMS Neuroscience*, Vol. 2, No. 3, pp. 155-171.

ATALAN Abdulkadir (2020), “Is the Lockdown Important to Prevent The COVID-19 Pandemic? Effects On Psychology, Environment and Economy-Perspective”, *Annals of medicine and surgery*, Vol. 56, pp. 38-42.

BALLESIO Andrea, OTTAVIANI Cristina and LOMBARDO Caterina (2019), “Poor Cognitive Inhibition Predicts Rumination About Insomnia in A Clinical Sample”, *Behavioral Sleep Medicine*, Vol. 17, No. 5, pp. 672-681.

BANKS Jonathan B. and BOALS Adriel (2017), “Understanding the Role of Mind Wandering In Stress-Related Working Memory Impairments”, *Cognition and Emotion*, Vol. 31, No. 5, pp. 1023-1030.

BARDEEN Joseph R. and DANIEL Thomas A (2017), “A Longitudinal Examination Of The Role of Attentional Control in The Relationship Between Posttraumatic Stress and Threat-Related Attentional Bias: An Eye-Tracking Study”, *Behaviour Research and Therapy*, Vol. 99, pp. 67-77.

BAR-HAIM Yair, HOLOSHITZ Yael, ELDAR Sharon, FRENKEL Tahl I, MULLER, David, CHARNEY Dennis S., PINE Daniel S., NATHAN A. Fox and WALD Ilan (2010), “Life-Threatening Danger and Suppression of Attention Bias to Threat”, *American Journal of Psychiatry*, Vol. 167, No. 6, pp. 694-698.

BAR-HAIM Yair, LAMY Dominique, PERGAMIN Lee, BAKERMANS-KRANENBURG Marian J. and VAN IJZENDOORN Marinus H. (2007), “Threat-Related Attentional Bias in Anxious and Nonanxious Individuals: A Meta-Analytic Study”, *Psychological Bulletin*, Vol. 133, No. 1, pp. 1.

BARNARD Megan P. and CHAPMAN Peter (2016), “Are Anxiety and Fear Separable Emotions in Driving? A Laboratory Study of Behavioural and Physiological Responses to Different Driving Environments”, *Accident Analysis & Prevention*, Vol. 86, pp. 99-107.

BECK Aaron T. (1970), “Cognitive Therapy: Nature and Relation to Behavior Therapy”, *Behavior Therapy,* Vol. 1, No. 2, pp. 184-200.

BECK Aaron T., EMERY Gary and GREENBERG Ruth L. (2005) *Anxiety Disorders And Phobias: A Cognitive Perspective*. Basic Books.

BECK Aaron T., WARD Clyde H., MENDELSON Myer, MOCK John and ERBAUGH James (1961), “An Inventory for Measuring Depression”, *Archives of General Psychiatry*, Vol. 4, No. 6, pp. 561-571.

BECK Francois, LEGER Damien, CORTAREDONA Sebastien, VERGER Pierre, PERETTI-WATEL Patrick and COCONEL group (2021), “Would We Recover Better Sleep at The End of Covid-19? A Relative Improvement Observed at The Population Level with The End of The Lockdown In France”, *Sleep medicine*, Vol. 78, pp. 115-119.

BECKHAM Ernest Edward, LEBER William R., WATKINS John T., BOYER Jenny L. and COOK Jacque B. (1986), “Development of An Instrument to Measure Beck's Cognitive Triad: The Cognitive Triad Inventory”, *Journal of Consulting and Clinical Psychology*, Vol. 54, No. 4, pp. 566.

BEEBE Dean W. and GOZAL David (2002), “Obstructive Sleep Apnea and The Prefrontal Cortex: Towards A Comprehensive Model Linking Nocturnal Upper Airway Obstruction to Daytime Cognitive and Behavioral Deficits”, *Journal of Sleep Research*, Vol. 11, No. 1, pp. 1-16.

BENHAM Grant (2021), “Stress and Sleep in College Students Prior To And During The COVID-19 Pandemic”, *Stress and Health*, Vol. 37, No. 3, pp. 504-515.

BENITEZ Andreana and GUNSTAD John (2012), “Poor Sleep Quality Diminishes Cognitive Functioning Independent of Depression and Anxiety in Healthy Young Adults”, *The Clinical Neuropsychologist*, Vol. 26, No. 2, pp. 214-223.

BERGER Ralph J. and PHILIPS Nathan H. (1993), “Sleep and Energy Conservation” *Physiology*, Vol. 8, No. 6, pp. 276-281.

BERGER Ralph J. and PHILIPS Nathan H. (1995), "Energy Conservation and Sleep", *Behavioural Brain Research*, Vol. 69, No. 1-2, pp. 65-73.

BERRIDGE Craig W. and WATERHOUSE Barry D. (2003), "The Locus Coeruleus–Noradrenergic System: Modulation of Behavioral State and State-Dependent Cognitive Processes" *Brain research reviews*, Vol. 42, No. 1, pp. 33-84.

BERTUCCIO Rebecca F. and RUNION Megan C. (2020), "Considering Grief In Mental Health Outcomes of COVID-19", *Psychological Trauma: Theory, Research, Practice, and Policy*, Vol. 12, No. S1, pp. S87.

BIÇER Ismail, ÇAKMAK Cuma, DEMIR Halil and KURT Mehmet Emin (2020), "Koronavirüs Anksiyete Ölçeği Kısa Formu: Türkçe Geçerlik ve Güvenirlik Çalışması" *Anatolian Clinic the Journal of Medical Sciences*, Vol. 25(Special Issue on COVID 19), pp. 216-225.

BILGEL Nazan and BAYRAM Nuran (2010), "Depresyon Anksiyete Stres Ölçeğinin (DASS-42) Türkçeye Uyarlanmış Şeklinin Psikometrik Özellikleri", *Nöropsikiyatri Arşivi*, Vol. 47, No. 2, pp. 118-126.

BILGEL Nazan and BAYRAM Nuran (2014), "The Epidemiology of Depression, Anxiety, Stress and Anger in Turkish High School Students", *British Journal of Education, Society & Behavioural Science*, Vol. 4, No. 9, pp. 1153-1170.

BLANCHARD Robert J., BLANCHARD Caroline D., GRIEBEL Guy and NUTT David (2008), "Introduction to The Handbook on Fear and Anxiety", *Handbook of Behavioral Neuroscience*, No. 17, pp. 3-7.

BLAYA Carolina, DORNELLES Marina, BLAYA Rodrigo, KIPPER Letícia, HELDT Elizeth, ISOLAN Luciano, BOND Michael and MANFRO Gisele Gus (2006), "Do Defense Mechanisms Vary According to The Psychiatric Disorder?", *Brazilian Journal of Psychiatry*, No. 28, pp. 179-183.

BOALS Adriel and BANKS Jonathan B. (2020), "Stress and Cognitive Functioning During a Pandemic: Thoughts from Stress Researchers", *Psychological Trauma: Theory, Research, Practice, and Policy*, Vol. 12, No. S1, pp. S255.

BORBÉLY Alexander A. and ACHERMANN Peter (1992), "Concepts and Models of Sleep Regulation: An Overview", *Journal of Sleep Research*, Vol. 1, No. 2, pp. 63-79.

BORBELY Alexander A. and TOBLER Irene (1985), "Homeostatic and Circadian Principles in Sleep Regulation in The Rat", *Brain Mechanisms of Sleep*, pp. 35-44.

BRAEM Senne and EGNER Tobias (2018), "Getting A Grip on Cognitive Flexibility", *Current Directions in Psychological Science*, Vol. 27, No. 6, pp. 470-476.

BULL Rebecca and SCERIF Gaia (2001), "Executive Functioning as A Predictor of Children's Mathematics Ability: Inhibition, Switching, And Working Memory", *Developmental Neuropsychology*, Vol. 19, No. 3, pp. 273-293.

BUYSSE Daniel J., REYNOLDS III Charles F., MONK Timothy H., BERMAN Susan R. and KUPFER David J. (1989), "The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research", *Psychiatry Research*, Vol. 28, No. 2, pp. 193-213.

BUYUKDURA Jeyhan S., McCLINTOCK Shawn M. and CROARKIN Paul E. (2011), "Psychomotor Retardation in Depression: Biological Underpinnings, Measurement, And Treatment", *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, Vol. 35, No. 2, pp. 395-409.

CALVO Manuel G., GUTIERREZ Aida and FERNÁNDEZ-MARTÍN Andrés (2012), "Anxiety And Deficient Inhibition of Threat Distractors: Spatial Attention Span and Time Course", *Journal of Cognitive Psychology*, Vol. 24, No. 1, pp. 66-78.

CAMPOS-MORALES Rosa M., VALENCIA-FLORES Matilde, CASTAÑO-MENESES Alejandra, CASTAÑEDA-FIGUEIRAS Sandra and MARTÍNEZ-GUERRERO José (2005), "Sleepiness, Performance and Mood State in A Group of Mexican Undergraduate Students", *Biological Rhythm Research*, Vol. 36, No. 1-2, pp. 9-13.

CANNITO Loreta, DI CROSTA Adolfo, PALUMBO Rocco, CECCATO Irene, ANZANI Stefano, La MALVA Pasquale, PALUMBO Riccardo and DI DOMENICO, Alberto (2020), "Health Anxiety and Attentional Bias Toward Virus-Related Stimuli During The COVID-19 Pandemic" *Scientific Reports*, Vol. 10, No. 1, pp. 1-8.

CAPELLINI Isabella, McNAMARA Patrick, PRESTON Brain T., NUNN Charles L and BARTON Robert A. (2009), "Does Sleep Play a Role in Memory Consolidation? A Comparative Test", *PLoS One*, Vol. 4, No. 2, pp. e4609.

CARLEY David W. and FARABI Sarah S. (2016), "Physiology of Sleep", *Diabetes Spectrum*, Vol. 29, No. 1, pp. 5-9.

CARLSON Stephanie M., MOSES Louis J. and BRETON Casey (2002), "How Specific Is the Relation Between Executive Function and Theory of Mind? Contributions Of Inhibitory Control and Working Memory", *Infant and Child Development: An International Journal of Research and Practice*, Vol. 11, No. 2, pp. 73-92.

CARRILLO-VICO Antonio, LARDONE Patricia J., ÁLVAREZ-SÁNCHEZ Nuria, RODRÍGUEZ-RODRÍGUEZ Ana and GUERRERO Juan M. (2013), "Melatonin: Buffering the Immune System", *International Journal of Molecular Sciences*, Vol. 14, No. 4, pp. 8638-8683.

CARSKADON Mary A. (1990), "Patterns of Sleep and Sleepiness in Adolescents", *Pediatrician*, Vol. 17, No. 1, pp. 5-12.

CARSKADON Mary A. and DEMENT William C. (2005), "Normal Human Sleep: An Overview", *Principles and Practice of Sleep Medicine*, Vol. 4, No. 1, pp. 13-23.

CARSKADON Mary A., DEMENT William C., MITLER Merrill M., GUILLEMINAULT Christian, ZARCONE Vincent P. and SPIEGEL Rene (1976), "Self-Reports Versus Sleep Laboratory Findings In 122 Drug-Free Subjects with Complaints of Chronic Insomnia", *Am J Psychiatry*, Vol. 133, No. 12, pp. 1382-1388.

CASAGRANDE Maria, FAVIERI Francesca, TAMBELLI Renata and FORTE Giuseppe (2020), "The Enemy Who Sealed the World: Effects Quarantine Due to the COVID-19 On Sleep Quality, Anxiety, And Psychological Distress in The Italian Population", *Sleep medicine*, Vol. 75, pp. 12-20.

CÁSSARO Fábio A. and PIRES Luiz F. (2020), "Can We Predict the Occurrence Of COVID-19 Cases? Considerations Using a Simple Model of Growth", *Science of the Total Environment*, Vol. 728, pp. 138834.

CATES Marshall E., CLARK Andraya, WOOLLEY Thomas W. and SAUNDERS Amy (2015) "Sleep Quality Among Pharmacy Students. American Journal of Pharmaceutical Education", Vol. 79, No. 1. pp. 09.

CELLINI Nicola, CANALE Natale, MIONI Giovanna and COSTA Sebastiano (2020), "Changes in Sleep Pattern, Sense of Time and Digital Media Use During COVID-19 Lockdown in Italy", *Journal of Sleep Research*, Vol. 29, No. 4, pp. e13074.

CELLINI Nicola, CONTE Francesca, De ROSA Oreste, GIGANTI Fiorenza, MALLOGGI Serena, REYT Mathilde, GUILLEMIN Camille, SCHMIDT Christina, MUTO Vincenzo and FICCA Gianluca (2021), "Changes in Sleep Timing and Subjective Sleep Quality During The COVID-19 Lockdown in Italy and Belgium: Age, Gender and Working Status as Modulating Factors", *Sleep Medicine*, Vol. 77, pp. 112-119.

CHAMBERLIN Nancy L., ARRIGONI Elda, CHOU Thomas C., SCAMMELL Thomas E., GREENE Ross W. and SAPER Clifford B. (2003), "Effects of Adenosine on Gabaergic Synaptic Inputs to Identified Ventrolateral Preoptic Neurons", Neuroscience, Vol. 119, No. 4, pp. 913-918.

CHANG Anne-Marie, AESCHBACH Daniel, DUFFY Jeanne F. and CZEISLER Charles A. (2015), "Evening Use of Light-Emitting Ereaders Negatively Affects Sleep, Circadian Timing, And Next-Morning Alertness", *Proceedings of the National Academy of Sciences*, Vol. 112, No. 4, pp. 1232-1237.

CHEE Michael W. and CHOO Wei Chieh (2004), "Functional Imaging of Working Memory After 24 Hr of Total Sleep Deprivation", *Journal of Neuroscience*, Vol. 24, No. 19, pp. 4560-4567.

CHEN Qiyu, DAI Wenjuan, LI Guangming and MA Ning (2022), "The Impact of Screen Time Changes on Anxiety During The COVID-19 Pandemic: Sleep and Physical Activity as Mediators", *Sleep and Biological Rhythms*, Vol. 20, No. 4, pp. 521-531.

CHEUNG Angeles M., MITSIS Effie M. and HALPERIN Jeffery M. (2004), "The Relationship of Behavioral Inhibition to Executive Functions in Young Adults", *Journal of Clinical and Experimental Neuropsychology*, Vol. 26, No. 3, pp. 393-404.

CHOI Edmond Pui Hang, HUI Bryant Pui Hung and WAN Eric Yuk Fai (2020), "Depression and Anxiety in Hong Kong During COVID-19", *International Journal of Environmental Research and Public Health*, Vol. 17, No. 10, pp. 3740.

CHOKROVERTY Sudhansu (1994), "An Overview of Sleep", *Sleep Disorders Medicine*, pp. 7-16.

CHOKROVERTY Sudhansu (2017), "Overview of Normal Sleep", In *Sleep Disorders Medicine*, Springer, New York, NY, pp. 5-27.

CISLER John M. and KOSTER Ernst H. (2010), "Mechanisms of Attentional Biases Towards Threat in Anxiety Disorders: An Integrative Review", *Clinical Psychology Review*, Vol. 30, No. 2, pp. 203-216.

CLARKE Patrick J., MARINOVIC Welber, TODD Jemma, BASANOVIC Julian, CHEN Nigel T. and NOTEBAERT Lies (2020), "What Is Attention Bias Variability? Examining The Potential Roles of Attention Control and Response Time Variability in Its Relationship with Anxiety", *Behaviour Research and Therapy*, Vol. 135, pp. 103751.

COUYOUMDJIAN Alessandro, SDOIA Stefano, TEMPESTA Daniela, CURCIO Giuseppe, RASTELLINI Elisabetta, De GENNARO Luigi and FERRARA Michele (2010), "The Effects of Sleep and Sleep Deprivation on Task-Switching Performance", *Journal of Sleep Research*, Vol. 19, (1-Part-I), pp. 64-70.

CRICK Francis and MITCHISON Graeme (1983), "The Function of Dream Sleep", *Nature*, Vol. 304, No. 5922, pp. 111-114.

CRISTOFORI Irene, COHEN-ZIMERMAN Shira And GRAFMAN Jordan (2019), "Executive Functions", *Handbook of Clinical Neurology*, Vol. 163, pp. 197-219.

CRIVELLI Lucía, CALANDRI Ismael, CORVALÁN Nicolas, CARELLO María Agostina, KELLER Greta, MARTÍNEZ Carlos, ARRUABARRENA Micaela and ALLEGRI Ricardo (2021), "Cognitive Consequences Of COVID-19: Results of A Cohort Study from South America", *Arquivos De Neuro-Psiquiatria*, Vol. 80, pp. 240-247.

CULLEN Walter, GULATI Gautam and KELLY Brendan D (2020), “Mental Health in the COVID-19 Pandemic”, *QJM: Monthly Journal of The Association of Physicians*, Vol. 113, No, 5, pp. 311–312.

CZEISLER Charles A., DUFFY Jeanne F., SHANAHAN Theresa L., BROWN Emery N., MITCHELL Jude F., RIMMER David W., RONDA Joseph M., SILVA Edward J., ALLAN James S., EMENS Jonathan S., DIJK Derk-Jan and KRONAUER Richard E. (1999), “Stability, Precision, And Near-24-Hour Period of The Human Circadian Pacemaker”, *Science*, Vol. 284, No. 5423, pp. 2177-2181.

DA SILVA Weslley Quirino Alves, CABRAL Daniel Aranha Rego, BIGLIASSI Marcelo, BORTOLOTTI Henrique, HUSSEY Erika, WARD Nathan and FONTES Eduardo Bodnariuc (2022), “The Mediating Role of Inhibitory Control in The Relationship Between Prefrontal Cortex Hemodynamics and Exercise Performance in Adults with Overweight or Obesity”, Physiology & Behavior, Vol. 257, pp. 113966.

DAJANI Dina R. and UDDIN Lucina Q. (2015), “Demystifying Cognitive Flexibility: Implications For Clinical and Developmental Neuroscience”, *Trends in Neurosciences*, Vol. 38, No. 9, pp. 571-578.

DANG-VU Thien Thanh, SCHABUS Manuel, DESSEILLES Martin, STERPENICH Virginie, BONJEAN Maxime and MAQUET Pierre (2010), “Functional Neuroimaging Insights into The Physiology of Human Sleep”, *Sleep*, Vol. 33, No. 12, pp. 1589-1603.

DAVIDSON Jonathan and TURNBULL Craig D. (1986), “Diagnostic Significance of Vegetative Symptoms in Depression”, *The British Journal of Psychiatry*, Vol. 148, No. 4, pp. 442-446.

DEGUTIS Joseph, ESTERMAN Michael, McCULLOCH Bay, ROSENBLATTAndrew, 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.

DEMENT William C. (1998), “The Study of Human Sleep: A Historical Perspective”, *Thorax*, Vol. 53, suppl 3, pp. S2-S7.

DEMIR Ahmet U., ARDIC Sadık, FIRAT Hikmet, KARADENIZ Derya, AKSU Murat, UCAR Zeynep Zeren, SEVIM Serhan, OZGEN Fuat, YILMAZ Hikmet, ITIL Oya, PEKER Yuksel, AYGUL Fatma, KIRAN Sibel, GELBAL Selahattin, CEPNİ Zafer and AKOZER Mehmet (2015), "Prevalence of Sleep Disorders in The Turkish Adult Population Epidemiology of Sleep Study", *Sleep and Biological Rhythms*, Vol. 13, No. 4, pp. 298-308.

DENIZ Mehmet Engin and SÜMER Adem Serkan (2010), "Farklı Özanlayış Düzeylerine Sahip Üniversite Öğrencilerinde Depresyon, Anksiyete ve Stresin Değerlendirilmesi", *Eğitim ve Bilim*, Vol. 35, No. 158.

DENNIS John P. and VANDER WAL Jillon S. (2010), "The Cognitive Flexibility Inventory: Instrument Development and Estimates of Reliability and Validity", *Cognitive Therapy and Research*, Vol. 34, No. 3, pp. 241-253.

DENNIS-TIWARY Tracy A., ROY Amy Krain, DENEFRIO Samantha and MYRUSKI Sarah (2019), "Heterogeneity of The Anxiety-Related Attention Bias: A Review and Working Model for Future Research", *Clinical Psychological Science*, Vol. 7, No. 5, pp. 879–899.

DEROGATIS Leonard R. and MELISARATOS Nick (1983), "The Brief Symptom Inventory: An Introductory Report", *Psychological Medicine*, Vol. 13, No. 3, pp. 595-605.

DIAMOND Adele (1990), "Developmental Time Course in Human Infants and Infant Monkeys, and the Neural Bases of, Inhibitory Control in Reaching", *Annals of the New York Academy of Sciences*, Vol. 608, No. 1, pp. 637-676.

DIAMOND Adele (2013), "Executive Functions", *Annual Review of Psychology*, Vol. 64, No. 135, pp. 136-154.

DOI Yuriko, MINOWA Masumi and TANGO Toshiro (2003), "Impact and Correlates of Poor Sleep Quality in Japanese White-Collar Employees", Sleep, Vol. 26, No.4, pp.467-471.

DOWSETT Sharon M. and LIVESEY David J. (2000), "The Development of Inhibitory Control in Preschool Children: Effects of "Executive Skills" Training", *Developmental Psychobiology: The Journal of The International Society for Developmental Psychobiology*, Vol. 36, No. 2, pp. 161-174.

DUDENEY Joanne, SHARPE Louise, SICOURI Gemma, LORIMER Sarah, DEAR Blake F., JAFFE Adam, SERVADURAI Hiran and HUNT Caroline 2017),“Attentional Bias in Children with Asthma With and Without Anxiety Disorders”, *Journal of Abnormal Child Psychology*, Vol. 45, No. 8, pp. 1635-1646.

EDWARDS Mark S., EDWARDS Elizabeth J. and LYVERS Michael (2017), “Cognitive Trait Anxiety, Stress and Effort Interact to Predict Inhibitory Control”, *Cognition and Emotion*, Vol. 31, No, 4, pp. 671-686.

ELZINGA Bernet M. and BREMNER J. Douglas (2002), “Are the Neural Substrates of Memory the Final Common Pathway in Posttraumatic Stress Disorder (PTSD)?”, *Journal of Affective Disorders*, Vol. 70, No. 1, pp. 1-17.

EMMELKAMP Paul and EHRING Thomas (Eds.) (2014), “The Wiley Handbook Of Anxiety Disorders”, John Wiley & Sons, pp. 5-13.

EUGENE Andy R. and MASIAK Jolanta (2015), “The Neuroprotective Aspects Of Sleep”, MEDtube Science, Vol. 3, No. 1, pp. 35.

EYSENCK Michael W. (1985), “Anxiety and Cognitive-Task Performance”, Personality and Individual Differences, Vol. 6, No. 5, pp. 579-586.

EYSENCK Michael W. and DERAKSHAN Nazanin (2011), “New Perspectives in Attentional Control Theory”, *Personality and Individual Differences*, Vol. 50, No. 7, pp. 955-960.

FABBRI Marco, BERACCI Alessia, MARTONI Monica, MENEO Debora, TONETTI Lorenzo and NATALE Vincenzo (2021), “Measuring Subjective Sleep Quality: A Review”, *International Journal of Environmental Research and Public Health*, Vol. 18, No. 3, pp 1082.

FABBRI Marco, SIMIONE Luca, MARTONI Monica and MIROLLI Marco (2022), “The Relationship between Acceptance and Sleep–Wake Quality before, during, and after the First Italian COVID-19 Lockdown”, *Clocks & Sleep*, Vol. 4, No. 1, pp. 172-184.

FABIO Rosa Angela, PICCIOTTO Giulia and CAPRÌ Tindara (2022), “The Effects Of Psychosocial and Cognitive Stress On Executive Functions and Automatic Processes in Healthy Subjects: A Pilot Study”, *Current Psychology*, Vol. 41, No. 11, pp. 7555-7564.

FALES Christina L., BECERRIL Karla E., LUKING Katherine R. and BARCH Deanna M. (2010), "Emotional-Stimulus Processing in Trait Anxiety Is Modulated by Stimulus Valence During Neuroimaging of a Working-Memory Task", *Cognition and Emotion*, Vol. 24, No. 2, pp. 200-222

FAVIERI Francesca, FORTE Giuseppe, AGOSTINI Francesca, GIOVANNOLI Jasmine, Di PACE Enrico, LANGHER Viviana, TAMBELLI Renata, PAZZAGLIA Mariella, GIANNINI Anna Maria and CASAGRANDE Maria (2021), "The Cognitive Consequences of the COVID-19 Pandemic on Members of The General Population in Italy: A Preliminary Study on Executive Inhibition", *Journal of Clinical Medicine*, Vol. 11, No. 1, pp. 170.

FEINBERG Irwin and FLOYD Thomas C. (1979), "Systematic Trends Across The Night In Human Sleep Cycles", Psychophysiology, Vol. 16, No. 3, pp. 283-291.

FENG Ya-Chun, KRAHÉ Charlotte, KOSTER Ernst H., LAU Jennifer Y. and HIRSCH Colette R. (2022), "Cognitive Processes Predict Worry and Anxiety Under Different Stressful Situations", *Behaviour Research and Therapy*, Vol. 157, pp. 104168.

FERGUSON Heather J., BRUNSDON Victoria E. and BRADFORD Elisabeth E. (2021), "The developmental trajectories of executive function from adolescence to old age", *Scientific reports*, Vol. 11, No. 1, pp. 1-17.

FERNANDES Blossom (2017), "Executive Functions, Emotion Regulation and Mental Health Problems in Children and Adolescents", Doctoral Dissertation, University of Roehampton.

FIELD Matt and POWELL Hannah (2007), "Stress Increases Attentional Bias For Alcohol Cues in Social Drinkers Who Drink to Cope", *Alcohol & Alcoholism*, Vol. 42, No. 6, pp. 560-566.

FINK George (2016), "Stress, Definitions, Mechanisms, And Effects Outlined: Lessons From Anxiety", In *Stress: Concepts, Cognition, Emotion, And Behavior,* Academic Press, pp. 3-11.

FIORENZATO Eleonora, ZABBERONI Silvia, COSTA Alberto and CONA Giorgia (2021), "Cognitive and Mental Health Changes and Their Vulnerability Factors Related To COVID-19 Lockdown in Italy", *PLoS One*, Vol. 16, No. 1, pp. e0246204

FORTIER-BROCHU Émilie, BEAULIEU-BONNEAU Simon, IVERS Hans and MORIN Charles M. (2012), "Insomnia and Daytime Cognitive Performance: A Meta-Analysis", *Sleep Medicine Reviews*, Vol. 16, No. 1, pp. 83-94.

FOX Elaine (1994), "Attentional Bias in Anxiety: A Defective Inhibition Hypothesis", *Cognition & Emotion*, Vol. 8, No. 2, pp. 165-195.

FRIEDMAN Naomi P. and MIYAKE Akira (2004), "The Relations Among Inhibition And Interference Control Functions: A Latent-Variable Analysis", *Journal of Experimental Psychology: General*, Vol. 133, No. 1, pp. 101.

FUEGGLE Simone (2018), "The Relationship Between Sleep and Cognitive Control Across Development: Evidence from Behavioural And Electrophysiological Perspectives", Doctoral Dissertation, University of Western Australia.

FUNAHASHI Shintaro and ANDREAU Jorge M. (2013), "Prefrontal Cortex and Neural Mechanisms of Executive Function", *Journal of Physiology-Paris*, Vol. 107, No. 6, pp. 471-482.

GADIE Andrew, SHAFTO Meredith, LENG Yue and KIEVIT Rogier A. (2017), "How Are Age-Related Differences in Sleep Quality Associated with Health Outcomes? An Epidemiological Investigation in A UK Cohort Of 2406 Adults", *BMJ open*, Vol. 7, No. 7, pp. e014920.

GALLOP David (1988, January), "Chapter Eight: Aristotle on Sleep, Dreams, And Final Causes", In *Proceedings of The Boston Area Colloquium in Ancient Philosophy*, Vol. 4, No. 1, pp. 257-290

GENET Jessica J. and SIEMER Matthias (2011), "Flexible Control in Processing Affective And Non-Affective Material Predicts Individual Differences in Trait Resilience", *Cognition and Emotion*, Vol. 25, No. 2, pp. 380-388.

GEORGE Darren and MALLERY Paul (2019), "IBM SPSS Statistics 26 Step by Step: A Simple Guide and Reference (16th ed.)", Routledge.

GILBERT Sam J. and BURGESS Paul W (2008), "Executive function", *Current Biology*, Vol. 18, No. 3, pp. R110- R114.

GOLDSTEIN David S. (2010), "Adrenal Responses to Stress", *Cellular And Molecular Neurobiology*, Vol. 30, No. 8, pp. 1433–1440.

GOLDSTEIN Andrea N. and WALKER Matthew P. (2014), "The Role of Sleep In Emotional Brain Function", *Annual Review of Clinical Psychology*, Vol. 10, pp. 679.

GULIA Kamelesh K. and KUMAR Velayudhan Mohan (2018), "Sleep Disorders In The Elderly: A Growing Challenge", *Psychogeriatrics*, Vol. 18, No. 3, pp. 155-165.

GUPTA Ravi, GROVER Sandeep, BASU Aniruddha, KRISHNAN Vijay, TRIPATHI Adarsh, SUBRAMANYAM Alka, ... and AVASTHI Ajit (2020), "Changes in Sleep Pattern and Sleep Quality During COVID-19 Lockdown", *Indian Journal of Psychiatry*, Vol. 62, No, 4, pp. 370-378.

HALL Ryan C., HALL Richard C., and CHAPMAN Marcia J. (2008), "The 1995 Kikwit Ebola Outbreak: Lessons Hospitals and Physicians Can Apply to Future Viral Epidemics", *General Hospital Psychiatry*, Vol. 30, No. 5, pp. 446-452.

HAN Doug Hyun, PARK Hyung Woo, KEE Baik Seok, NA Churl, NA Do-Hyun E, and ZAICHKOWSKY Leonard (2011), "Performance Enhancement with Low Stress and Anxiety Modulated by Cognitive Flexibility", *Psychiatry Investigation*, Vol. 8, No. 3, pp. 221.

HARRISON Yvonne and HORNE James A. (2000), "The Impact of Sleep Deprivation On Decision Making: A Review", *Journal of Experimental Psychology: Applied*, Vol. 6, No. 3, pp. 236.

HARVEY Allison G., WATKINS Edward and MANSELL Warren (2004), "Cognitive Behavioural Processes Across Psychological Disorders: A Transdiagnostic Approach to Research and Treatment", Oxford University Press, USA.

HASHER Lynn and ZACKS Rose T. (1979), "Automatic and Effortful Processes In Memory", *Journal of Experimental Psychology: General*, Vol. 108, No. 3, pp. 356.

HASLER Gregor (2010), "Pathophysiology of Depression: Do We Have Any Solid Evidence Of Interest to Clinicians?", *World Psychiatry: Official Journal of The World Psychiatric Association (WPA)*, Vol. 9, No. 3, pp. 155–161.

HAYES Andrew F. (2017), "Introduction to Mediation, Moderation, And Conditional Process Analysis: A Regression-Based Approach", Guilford Publications.

HENSHER David A., BECK Matthew J. and WEI Edward (2021), "Working From Home And Its Implications for Strategic Transport Modelling Based on The Early Days of the COVID-19 Pandemic", *Transportation Research Part A: Policy and Practice*, Vol. 148, pp. 64-78.

HESTER Robert and LUIJTEN Maartje (2014), “Neural Correlates of Attentional Bias In Addiction”, *CNS spectrums*, Vol. 19, No. 3, pp. 231-238.

HINZ Andreas, KLEIN Annette M., BRÄHLER Elmar, GLAESMER Heide, LUCK Tobias, RIEDEL-HELLER Steffi G, WIRKNER Kerstin and HILBERT Anja (2017), “Psychometric Evaluation of The Generalized Anxiety Disorder Screener GAD-7, Based on A Large German General Population Sample”, *Journal of Affective Disorders*, Vol. 210, pp. 338-344.

HISLER Garret C. and Twenge Jean M. (2021), “Sleep Characteristics of US Adults Before And During The COVID-19 Pandemic”, *Social Science & Medicine*, Vol. 276, pp. 113849.

HORNE James A. (1988), “Sleep Loss And “Divergent” Thinking Ability”, *Sleep*, Vol. 11, No. 6, pp. 528-536.

HOROWITZ Mardi J. and BECKER Stephanie S. (1971), “Cognitive Response To Stressful Stimuli”, *Archives of General Psychiatry*, Vol. 25, No. 5, pp. 419-428.

HOUBEN Sarah and BONNECHÈRE Bruno (2022), “The Impact of COVID-19 Infection on Cognitive Function and the Implication for Rehabilitation: A Systematic Review and Meta-Analysis”, *International Journal of Environmental Research and Public Health*, Vol. 19, No. 13, pp. 7748.

HOWELL Andrew J., JAHRIG Jesse C. and POWELL Russell A. (2004), “Sleep Quality, Sleep Propensity and Academic Performance”, *Perceptual and Motor Skills*, Vol. 99, No. 2, pp. 525-535.

HUANG Yeen and ZHAO Ning (2020), “Generalized Anxiety Disorder, Depressive Symptoms And Sleep Quality During COVID-19 Outbreak in China: A Web-Based Cross-Sectional Survey”, *Psychiatry Research*, Vol. 288, pp.1- 6.

HYUN Sunah, HAHM Hyeouk Chris, WONG Ga Tin Fifi, ZHANG Emily and LIU Cindy H. (2021), “Psychological Correlates of Poor Sleep Quality Among US Young Adults During The COVID-19 Pandemic”, *Sleep Medicine*, Vol. 78, pp. 51-56.

IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

INGRAM Joanne, HAND Christopher J. and MACIEJEWSKI Greg (2021), "Social Isolation During Covid-19 Lockdown Impairs Cognitive Function", *Applied Cognitive Psychology*, Vol. 35, No. 4, pp. 935-947.

İNÖNÜ Handan (2021), "COVID-19 Pandemisi ve Uyku Bozuklukları: COVID-Somnia", *Tuberk Toraks*, Vol. 69, No. 3, pp. 387-391.

IZCI Bilgay, ARDIC Sadık, FIRAT Hikmet, SAHIN Altay, ALTINORS Meltem and KARACAN Ismet (2008), "Reliability and Validity Studies of The Turkish Version of The Epworth Sleepiness Scale", *Sleep and Breathing*, Vol. 12, No. 2, pp. 161-168.

JAHRAMI Haitham, BAHAMMAM Ahmed S., ALGAHTANI Haifa, EBRAHIM Ahmed, FARIS MoezAlislam, ALEID Kawthar, ... and HASAN Zainab (2021), "The Examination of Sleep Quality for Frontline Healthcare Workers During the Outbreak Of COVID-19", *Sleep and Breathing*, Vol. 25, No. 1, pp. 503-511.

JOHNS Murray W. (1992), "Reliability and Factor Analysis of The Epworth Sleepiness Scale", *Sleep*, Vol. 15, No. 4, pp. 376-381.

JONES Barry T., MACPHEE Lauren M., BROOMFIELD Niall M., JONES Benedict C. and ESPIE Colin A. (2005), "Sleep-Related Attentional Bias in Good, Moderate, And Poor (Primary Insomnia) Sleepers", *Journal of Abnormal Psychology*, Vol. 114, No. 2, pp. 249.

JOORMANN Jutta (2004), "Attentional Bias in Dysphoria: The Role of Inhibitory Processes", *Cognition and Emotion*, Vol. 18, No. 1, pp. 125-147.

JOUVET Michel (1975), "The Function of Dreaming: A Neurophysiologist's Point of View", In *Handbook of Psychobiology*, pp. 499-527.

KABELOĞLU Vasfiye and GÜL Günay (2021), "Covid-19 Salgını Sırasında Uyku Kalitesi Ve Ilişkili Sosyal ve Psikolojik Faktörlerin Araştırılması", *Journal of Turkish Sleep Medicine*, Vol. 2, pp. 97-104.

KAHN Michal, SHEPPES Gal and SADEH Avi (2013), "Sleep and Emotions: Bidirectional Links and Underlying Mechanisms", *International Journal of Psychophysiology*, Vol. 89, No. 2, pp. 218-228.

KALAT James W. (2015), "Biological Psychology", *Cengage Learning.*

KARAKAŞ Sirel (2013), “Bilnot-Yetişkin (2 Cilt Takım)”, Eğitim YayineviKARAKAŞ Sirel and KARAKAŞ H. Muammer (2000), “Yönetici Işlevlerin Ayrıştırılmasında Multidisipliner Yaklaşım: Bilişsel Psikolojiden Nöroradyolojiye”, *Klinik Psikiyatri*, Vol. 3, No. 4, pp. 215-27.

KATSUKI Fumi and CONSTANTINIDIS Christos (2014), “Bottom-Up and Top-Down Attention: Different Processes and Overlapping Neural Systems”, The Neuroscientist, Vol. 20, No. 5, pp. 509-521.

KAVANAU J. Lee (1996), “Memory, Sleep, And Dynamic Stabilization of Neural Circuitry: Evolutionary Perspectives”, *Neuroscience & Biobehavioral Reviews*, Vol. 20, No. 2, pp. 289-311.

KELLER Arielle S., LEIKAUF John E., HOLT-GOSSELIN Bailey, STAVELAND Brooke R. and WILLIAMS Leanne M. (2019), “Paying Attention to Attention in Depression” *Translational Psychiatry*, Vol. 9, No. 1, pp. 1-12.

KESSLER Ronald C., de JONGE Peter, SHAHLY Victoria, VAN LOO Hanna M., WANG Philip S. E. and WILCOX Marsha A. (2014), “Epidemiology of Depression”.

KILLGORE William D. (2010), “Effects Of Sleep Deprivation On Cognition”, *Progress in Brain Research*, Vol. 185, pp. 105-129.

KNUFINKE Melanie, NIEUWENHUYS Arne, GEURTS Sabine A., COENEN Anton M. and KOMPIER Michiel A. (2018), “Self-Reported Sleep Quantity, Quality and Sleep Hygiene in Elite Athletes”, *Journal of Sleep Research*, Vol. 27, No. 1, pp. 78-85.

KOCALEVENT Rüya Daniela, HINZ Andreas and BRÄHLER Elmar (2013), “Standardization Of the Depression Screener Patient Health Questionnaire (PHQ-9) In the General Population”, *General Hospital Psychiatry*, Vol. 35, No. 5, pp. 551-555.

KOSTER Ernst H. W., CROMBEZ Geert, VERSCHUERE Bruno and De HOUWER Jan (2006), “Attention to Threat in Anxiety-Prone Individuals: Mechanisms Underlying Attentional Bias”, *Cognitive Therapy and Research*, Vol. 30, pp. 635-643.

KRONHOLM Erkki, SALLINEN Mikael, SUUTAMA Timo, SULKAVA Raimo, ERA Pertti and PARTONEN Timo (2009), "Self-Reported Sleep Duration and Cognitive Functioning in The General Population", *Journal of Sleep Research*, Vol. 18, No. 4, pp. 436-446.

KRUEGER, James M. and OBÁL Ferenc (1993), "A Neuronal Group Theory of Sleep Function", *Journal of Sleep Research*, Vol. 2, No. 2, pp. 63–69.

KRYSTAL Andrew D. and EDINGER Jack D. (2008), "Measuring Sleep Quality", *Sleep Medicine*, No. 9, pp. S10-S17.

LAU Jennifer Y. and WATERS Allison M. (2017), "Annual Research Review: An Expanded Account of Information-Processing Mechanisms in Risk for Child and Adolescent Anxiety and Depression", *Journal of Child Psychology and Psychiatry*, Vol. 58, No. 4, pp. 387-407.

LAZARUS Richard S. (1991), "Emotion and Adaptation", Oxford University Press.

LEAL Pollyana C., GOES Tiago Costa, da SILVA Luis Carlos Ferreira and TEIXEIRA-SILVA Flavia (2017), "Trait Vs. State Anxiety in Different Threatening Situations", *Trends in Psychiatry and Psychotherapy*, Vol. 39, pp. 147-157.

LEE Sherman A. (2020), "Coronavirus Anxiety Scale: A Brief Mental Health Screener For COVID-19 Related Anxiety", *Death Studies*, Vol. 44, No. 7, pp. 393-401.

LEGER Damien, BAYON Virginie, OHAYON Maurice M., PHILIP Pierre, EMENT Philippe, METLAINE Arnaud, CHENNAOUI Mounir and FARAUT Brice (2014), "Insomnia and Accidents: Cross-Sectional Study (EQUINOX) On Sleep-Related Home, Work and Car Accidents In 5293 Subjects with Insomnia From 10 Countries", *Journal of Sleep Research*, Vol. 23, No. 2, pp. 143-152.

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.

LEZAK Muriel D. (1982), "The Problem of Assessing Executive Functions", *International Journal of Psychology*, Vol. 17, No. 1-4, pp. 281-297.

LI Lin, YU Qian, ZHAO Wenrui, HEROLD Fabian, CHEVAL Boris, KONG Zhaowei, ... and ZOU Liye (2021), "Physical Activity and Inhibitory Control: The Mediating Role of Sleep Quality and Sleep Efficiency", *Brain Sciences*, Vol. 11, No. 5, pp. 664.

LI Shiyi and LI Xiao (2022), "The Relationship Between Attentional Bias, Anxiety Sensitivity, And Depression and Anxiety Symptoms: Evidence from The Covid-19 Pandemic in China", *Frontiers in Public Health*, Vol. 10, pp. 1-8.

LI Sijia, WANG Yilin, XUE Jia, ZHAO Nan and ZHU Tingshao (2020), "The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users", *International Journal of Environmental Research and Public Health*, Vol. 17, No. 6, pp. 2032.

LIAN Yan Hong, FANG Jun, ZHOU Hui-Dan, JIANG Hui Fang and XIE Kang-Jie (2019), "Sufentanil Preconditioning Protects Against Hepatic Ischemia-Reperfusion Injury by Suppressing Inflammation", *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, Vol. 25, pp. 2265.

LICHSTEIN Kenneth L. and MORIN Charles M. (2000), "Treatment of Late-Life Insomnia", *Sage*.

LIN Nan, DEAN Alfred and ENSEL Walter M. (2013), "Social Support, Life Events, And Depression", *Academic Press*.

LITTNER Michael R., KUSHIDA Clete, WISE Merril, DAVILA David G., MORGENTHALER Timothy, LEE-CHIONG Teofilo, ... and KRAMER Milton (2005), "Practice Parameters for Clinical Use of The Multiple Sleep Latency Test and The Maintenance of Wakefulness Test", *Sleep*, Vol. 28, No. 1, pp. 113-121.

LIU Nianqi., ZHANG Fan, WEI Cun, JIA Yanpu, SHANG Zhilei, SUN Luna, ... and Liu Weizhi (2020), "Prevalence and Predictors of PTSS During COVID-19 Outbreak in China Hardest-Hit Areas: Gender Differences Matter", Psychiatry Research, Vol. 287, pp. 112921.

LIU Yong, WHEATON Anne G, CHAPMAN Daniel P and CROFT Janet B (2013), "Sleep Duration and Chronic Diseases Among Us Adults Age 45 Years and Older: Evidence from the 2010 Behavioral Risk Factor Surveillance System", *Sleep*, Vol, 36, No. 10, pp. 1421-1427.

LOVIBOND Peter F. and LOVIBOND Sydney Harold (1995), "The Structure Of Negative Emotional States: Comparison of The Depression Anxiety Stress Scales (DASS) With the Beck Depression and Anxiety Inventories", *Behaviour Research and Therapy*, Vol. 33, No. 3, pp. 335-343.

LU Jun, SHERMAN David, DEVOR Marshall and SAPER Clifford B (2006), "A Putative Flip–Flop Switch for Control of Rem Sleep", *Nature*, Vol. 441, No. 7093, pp. 589-594.

LUIJTEN Maartje, VELTMAN Dick J., HESTER Robert, SMITS Marion, PEPPLINKHUIZEN Lolke and FRANKEN Ingmar H. (2012), "Brain Activation Associated with Attentional Bias in Smokers Is Modulated by A Dopamine Antagonist", Neuropsychopharmacology, Vol. 37, No, 13, pp. 2772-2779.

LUNA Beatriz, PADMANABHAN Aarthi and O'HEARN Kirsten (2010), "What Has FMRI Told Us About the Development of Cognitive Control Through Adolescence?", *Brain and Cognition*, Vol. 72, No. 1, pp. 101-113.

MACLEOD Colin and CLARKE Patrick J. (2015), "The Attentional Bias Modification Approach To Anxiety Intervention", *Clinical Psychological Science*, Vol. 3, No. 1, pp. 58-78.

MACLEOD Colin and GRAFTON Ben (2016), "Anxiety-Linked Attentional Bias And Its Modification: Illustrating The Importance Of Distinguishing Processes And Procedures In Experimental Psychopathology Research", Behaviour Research and Therapy, Vol. 86, pp. 68-86.

MACLEOD Colin, GRAFTON Ben and NOTEBAERT Lies (2019), "Anxiety-Linked Attentional Bias: Is It Reliable?", *Annual Review of Clinical Psychology*, Vol. 15, pp. 529-554.

MACLEOD Colin, MATHEWS Andrew and TATA Philip (1986), "Attentional Bias In Emotional Disorders", *Journal of abnormal psychology*, Vol. 95, No. 1, pp. 15.

MALIK John, LO Yu-Lun and WU Hau-Tieng (2018, "Sleep-Wake Classification Via Quantifying Heart Rate Variability by Convolutional Neural Network", *Physiological Measurement*, Vol. 39, No. 8, pp. 085004.

MALINOWSKI Peter (2013), "Neural Mechanisms of Attentional Control in Mindfulness Meditation", *Frontiers in Neuroscience*, Vol. 7, No. 8.

MARELLI Sara, CASTELNUOVO Alessandra, SOMMA Antonella, CASTRONOVO Vincenza, MOMBELLI Samantha, BOTTONI Daniela, ... and FERINI-STRAMBI Luigi (2021), "Impact Of COVID-19 Lockdown on Sleep Quality in University Students and Administration Staff", *Journal of Neurology*, Vol. 268, No. 1, pp. 8-15.

MARINO Miguel, LI Yi, RUESCHMAN Michael N, WINKELMAN John W., ELLENBOGEN Jeffrey M., SOLET Jo M., ... and BUXTON Orfeu M. (2013), "Measuring Sleep: Accuracy, Sensitivity, And Specificity of Wrist Actigraphy Compared to Polysomnography", *Sleep*, Vol. 36, No. 11, pp. 1747-1755.

MARQUES Daniel Ruivo, ALLEN GOMES Ana, CLEMENTE Vanda, SANTOS Jose Moutinho and CASTELO-BRANCO Miguel (2015), "Hyperarousal and Failure to Inhibit Wakefulness in Primary Insomnia:"Birds of A Feather"?", *Sleep and Biological Rhythms*, Vol. 13, No. 3, pp. 219-228.

MARTELLA Diana, CASAGRANDE Maria and LUPIÁÑEZ Juan (2011), "Alerting, Orienting And Executive Control: The Effects of Sleep Deprivation on Attentional Networks", *Experimental Brain Research*, Vol. 210, No. 1, pp. 81-89.

MARTIN Matthew M. and RUBIN Rebecca B. (1995), "A New Measure of Cognitive Flexibility", *Psychological Reports*, Vol. 76, No. 2, pp. 623-626.

MASON John W. (1975), "A Historical View of The Stress Field" *Journal of Human Stress*, Vol. 1, No. 2, pp. 22-36.

MATHEWS Andrew and MacLEOD Colin (2005), "Cognitive Vulnerability to Emotional Disorders", *Annual Review of Clinical Psychology (2005)*, Vol. 1, No. 1, pp. 167-195.

MCEWEN Bruce S. and SAPOLSKY Robert M. (1995), "Stress and Cognitive Function", *Current Opinion in Neurobiology*, Vol. 5, No. 2, pp. 205-216.

MCGEOWN Laura (2021), "Dietary Restraint and Stress-Induced Alterations In Eating: Exploring the Role of Heart Rate Variability as A Proxy for Self-Regulation, Attentional Bias, And Perceived Safety", *Doctoral Dissertation*.

MCGINTY Dennis and SZYMUSIAK Ronald (1990), "Keeping Cool: A Hypothesis About The Mechanisms and Functions of Slow-Wave Sleep", *Trends in Neurosciences*, Vol. 13, No. 12, pp. 480-487.

MCHUGH POWER Joanna, TANG Jianjun, KENNY Rose Ann, LAWLOR Brian A., and KEE Frank (2020), "Mediating the Relationship Between Loneliness and Cognitive Function: The Role of Depressive and Anxiety Symptoms", *Aging & Mental Health*, Vol. 24, No. 7, pp. 1071-1078.

MCNALLY Richard J. (2001), "On the Scientific Status of Cognitive Appraisal Models of Anxiety Disorder", *Behaviour Research and Therapy*, Vol. 39, No. 5, pp. 513-521.

MCNALLY Richard J. (2019), "Attentional Bias for Threat: Crisis Or Opportunity?", *Clinical Psychology Review*, Vol. 69, pp. 4-13.

MCNAMARA Patrick, JOHNSON Patricia, McLAREN Deirdre, HARRIS Erica, BEAUHARNAIS Catherine and AUERBACH Sanford (2010), "REM And NREM Sleep Mentation", *International Review of Neurobiology*, Vol. 92, pp. 69-86.

MENDONÇA Fabio, MOSTAFA Sheikh Shanawaz, MORGADO-DIAS Fernando, RAVELO-GARCIA Antonio G. and PENZEL Thomas (2019), "A Review of Approaches for Sleep Quality Analysis", *Ieee Access*, Vol. 7, pp. 24527-24546.

MIGNOT Emmanuel (2008), "Why We Sleep: The Temporal Organization Of Recovery", *PLoS biology*, Vol. 6, No. 4, pp. e106.

MIGUEL Paula (2012), "The Effects of Anxiety on Cognitive Performance", Doctoral Dissertation, Royal Holloway, University of London.

MIROWSKY John and ROSS Catherine E. (2017), "Social Causes of Psychological Distress", *Routledge*.

MISKOWIAK Kamilla W., JOHNSEN Stine, SATTLER Stefan M., NIELSEN Sandra, KUNALAN Keerthana, RUNGBY Jørgen, LAPPERRE Thérèse S. and PORSBERG Celeste (2021), "Cognitive Impairments Four Months After COVID-19 Hospital Discharge: Pattern, Severity and Association with Illness Variables", *European Neuropsychopharmacology*, Vol. 46, pp. 39-48.

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.

MOGG Karin and BRADLEY Brendan P. (2016), “Anxiety And Attention To Threat: Cognitive Mechanisms and Treatment with Attention Bias Modification”, *Behaviour Research and Therapy*, Vol. 87, pp. 76-108.

MOGG Karin, McNAMARA James, POWYS Mark, RAWLINSON Hanna, SEIFFER Anna and BRADLEY Brendan P (2000), “Selective Attention To Threat: A Test Of Two Cognitive Models Of Anxiety”, Cognition & Emotion, Vol. 14, No. 3, pp. 375-399.

MOLLAYEVA Tatyana, THURAIRAJAH Pravheen, BURTON Kirsteen,

MOLLAYEVA Shirin, SHAPIRO Colin M and COLANTONIO Angela (2016), “The Pittsburgh Sleep Quality Index as A Screening Tool for Sleep Dysfunction in Clinical and Non-Clinical Samples: A Systematic Review and Meta-Analysis”, *Sleep medicine reviews*, Vol. 25, pp. 52-73.

MORTERÁ Priscilla and HERCULANO-HOUZEL Suzana (2012), “Age-Related Neuronal Loss in The Rat Brain Starts at The End of Adolescence”, *Frontiers in Neuroanatomy*, Vol. 6, No. 45, pp. 1-9.

NAEEM Muhammad (2021), “Understanding The Customer Psychology Of Impulse Buying During COVID-19 Pandemic: Implications for Retailers”, *International Journal of Retail & Distribution Management*, Vol. 49, No. 3, pp. 377-393.

NAKADA Liane Yuri Kondo and URBAN Rodrigo Custodio (2020), “Covid-19 Pandemic: Impacts on The Air Quality During the Partial Lockdown in São Paulo State, Brazil”, *Science of the Total Environment*, Vol. 730, pp. 139087.

NAPIERALA Matthew A. (2012), “What is the Bonferroni Correction?”, *Aaos Now*, pp. 40-41.

NIR Yuval, MASSIMINI Marcello, BOLY Melanie and TONONI Guilio (2013), “Sleep and Consciousness”, In *Neuroimaging of Consciousness*, Springer, Berlin, Heidelberg, pp. 133-182.

NWEZE Tochukwu and NWANI Wisdom (2020), “Contributions of Working Memory and Inhibition to Cognitive Flexibility in Nigerian Adolescents”, *Developmental Neuropsychology*, Vol. 45, No. 3, pp. 118-128.

O’CONNOR Edward J., CROZIER Alyson J., MURPHY Alistair and IMMINK Maarten A (2022), “Dispositional Mindfulness May Have Protected Athletes from Psychological Distress During COVID-19 in Australia”, *Perceptual and Motor Skills*, pp. 670- 695

O’KEEFFE Fiadhnait, LIÉGEOIS Frédérique, EVE Megan, GANESAN Vijeya, KING John and MURPHY Tara (2014), “Neuropsychological and Neurobehavioral Outcome Following Childhood Arterial Ischemic Stroke: Attention Deficits, Emotional Dysregulation, And Executive Dysfunction”, Child Neuropsychology, Vol. 20, No. 5, pp. 557-582.

O’ROURKE Elisabeth J., HALPERN Leslie F. and VAYSMAN Renata (2020), “Examining the Relations Among Emerging Adult Coping, Executive Function, and Anxiety”, *Emerging Adulthood*, Vol. 8, No. 3, pp. 209-225.

O'CONNOR Rory C., WETHERALL Karen, CLEARE Seonaid, McCLELLAND Heather, MELSON Ambrose J., NIEDZWIEDZ Claire L., ... and ROBB Kathryn A. (2021), “Mental Health and Well-Being During The COVID-19 Pandemic: Longitudinal Analyses of Adults in The UK COVID-19 Mental Health & Wellbeing Study”, *The British Journal of Psychiatry*, Vol. 218, No. 6, pp. 326-333.

OHAYON Maurice M., CARSKADON Mary A., GUILLEMINAULT Christian and VITIELLO Michael V. (2004), “Meta-Analysis of Quantitative Sleep Parameters from Childhood to Old Age in Healthy Individuals: Developing Normative Sleep Values Across the Human Lifespan”, *Sleep*, Vol. 27, No. 7, pp. 1255-1273.

OKUN Michele L., MANCUSO Roberta A., HOBEL Calvin J., SCHETTER Christine Dunkel and COUSSONS-READ Mary (2018), “Poor Sleep Quality Increases Symptoms of Depression and Anxiety in Postpartum Women”, *Journal of Behavioral Medicine*, Vol. 41, No. 5, pp. 703-710.

OPPENHEIM A. Leo (1956), “The Interpretation of Dreams in the Ancient Near East”, With a Translation of an Assyrian Dream-book, *Transactions of the American Philosophical Society*, Vol. 46, No. 3, pp. 179-373.

ORZECH Kathryn M., SALAFSKY David B. and HAMILTON Lee Ann (2011), “The State Of Sleep Among College Students at A Large Public University”, Journal of American College Health, Vol. 59, No. 7, pp. 612-619.

OTSUKA Yuichiro, KANEITA Yoshitaka, ITANI Osamu, NAKAGOME Sachi, JIKE Maki and OHIDA Takashi (2017), "Relationship Between Stress Coping and Sleep Disorders Among The General Japanese Population: A Nationwide Representative Survey", *Sleep Medicine*, Vol. 37, pp. 38-45.

PAGEL James F. (2009), "Excessive Daytime Sleepiness", *American Family Physician*, Vol. 79, No. 5, pp. 391-396.

PAGEL James F. and BARNES Bennett L. (2001), "Medications for The Treatment of Sleep Disorders: An Overview", J Clin Psych, Vol. 3, pp. 118–125

PAL Dinesh and MALLICK Birendra N. (2007), "Neural Mechanism of Rapid Eye Movement Sleep Generation with Reference To REM-OFF Neurons in Locus Coeruleus", *Indian Journal of Medical Research*, Vol. 125, pp. 721-739.

PATEL Aakash K., REDDY Vamsi and ARAUJO John F. (2021), "Physiology, Sleep Stages", *In StatPearls [Internet]*, StatPearls Publishing.

PAUS Tomas (2005), "Mapping Brain Maturation And Cognitive Development During Adolescence", *Trends In Cognitive Sciences*, Vol. 9, No. 2, pp. 60-68.

PETEET John R. (2020), "COVID-19 Anxiety", *Journal of Religion and Health*, Vol. 59, No. 5, pp. 2203-2204.

PIETROBELLI Angelo, PECORARO Luca, FERRUZZI Alessandro, HEO Moonseong, FAITH Myles, ZOLLER Thomas, ... and HEYMSFIELD Steven B. (2020), "Effects Of COVID-19 Lockdown on Lifestyle Behaviors in Children with Obesity Living in Verona, Italy: A Longitudinal Study", *Obesity*, Vol. 28, No. 8, pp. 1382-1385.

PILCHER June J. and HUFFCUTT Allen I (1996), "Effects of Sleep Deprivation on Performance: A Meta-Analysis", Sleep, Vol. 19, No. 4, pp. 318-326.

PILCHER June J., GINTER, Douglas R. and SADOWSKY Brigitte (1997), "Sleep Quality Versus Sleep Quantity: Relationships Between Sleep and Measures of Health, Well-Being and Sleepiness in College Students", *Journal of Psychosomatic Research*, Vol. 42, No. 6, pp. 583-596.

PODLESEK Anja, MARTINČEVIĆ Marina and VRANIĆ Andrea (2021), "Can Inhibition Or Shifting Training Enhance Cognitive Abilities in Emerging Adults?", *Psihološka Obzorja*, Vol. 30, pp. 138-152.

PORGES Stephen W. and FURMAN Senta A. (2011), "The Early Development Of The Autonomic Nervous System Provides A Neural Platform For Social Behaviour: A Polyvagal Perspective", *Infant And Child Development*, Vol. 20, No. 1, pp. 106-118.

PORRAS-SEGOVIA Alejandro, PEREZ-RODRIGUEZ Maria M., LÓPEZ-ESTEBAN Pilar, COURTET Philippe, LÓPEZ-CASTROMÁN Jorge, CERVILLA Jorge A and BACA-GARCÍA Enrique (2019), "Contribution of Sleep Deprivation to Suicidal Behaviour: A Systematic Review", *Sleep Medicine Reviews*, Vol. 44, pp. 37-47.

RABINOVICI Gil D., STEPHENS Melanie L. and POSSIN Katherine L. (2015), "Executive Dysfunction", *CONTINUUM: Lifelong Learning in Neurology*, Vol. 21, No. 3, pp. 646.

RACHMAN Stanley (2004), "Anxiety (Clinical Paychology: A Modular Course)". *nature*, Vol. 9, No. 1.

RAFIQUE Nazish, AL-ASOOM Lubna Ibrahim, ALSUNNI Ahmed Abdulrahman, SAUDAGAR Farhat Naadem, ALMULHIM Latifah and ALKALTHAM Gaeda (2020), "Effects of Mobile Use on Subjective Sleep Quality", *Nature and Science of Sleep*, Vol. 12, pp. 357.

RANA Brinda K., PANIZZON Matthew S, FRANZ Carol E., SPOON Kelly M., JACOBSON Kristen C., XIAN Hong, ... and KREMEN William S. (2018), "Association of Sleep Quality on Memory-Related Executive Functions in Middle Age", *Journal of the International Neuropsychological Society*, Vol. 24, No. 1, pp. 67-76.

RASK Eva, OLSSON Tommy, SODERBERG Stefan, ANDREW Ruth, LIVINGSTONE Dawn E, JOHNSON Owe and WALKER Brian R. (2001), "Tissue-Specific Dysregulation of Cortisol Metabolism in Human Obesity", *The Journal of Clinical Endocrinology & Metabolism*, Vol. 86, No. 3, pp. 1418-1421.

REIMUND Eric (1994), "The Free Radical Flux Theory of Sleep", *Medical Hypotheses*, Vol. 43, No. 4, pp. 231–233.

ROGERS Robert D. and MONSELL Stephen (1995), "Costs of A Predictible Switch Between Simple Cognitive Tasks", *Journal of Experimental Psychology: General*, Vol. 124, No. 2, pp. 207.

RUBIA Katya, RUSSELL Tamara, OVERMEYER Stephan, BRAMMER Michael J, BULLMORE Edward T, SHARMA Tonmoy, ... and TAYLOR Eric (2001), "Mapping Motor Inhibition: Conjunctive Brain Activations Across Different Versions of Go/No-Go and Stop Tasks", *Neuroimage*, Vol. 13, No. 2, pp. 250-261.

RUGER Melanie, ST HILAIRE Melissa A., BRAINARD George C., KHALSA Sat-Bir S., KRONAUER Richard E., CZEISLER Charles A. and LOCKLEY Steven W. (2013), "Human Phase Response Curve to A Single 6.5 H Pulse of Short-Wavelength Light", *The Journal of Physiology*, Vol. 591, No. 1, pp. 353-363.

RUNDO Jessica Vensel and DOWNEY III Ralph (2019), "Polysomnography", *Handbook of Clinical Neurology*, Vol. 160, pp. 381-392.

SAADAT Saeida, RAWTANI Deepak and HUSSAIN Chaudhery Mustansar (2020), "Environmental Perspective Of COVID-19", *Science of The Total Environment*, Vol. 728, pp. 138870.

SADIKOVIĆ Selka, BRANOVAČKI Bojan, OLJAČA Milan, MİTROVİĆ Dušanka, PAJİĆ Dejan and SMEDEREVAC Snežana (2020), "Daily Monitoring of Emotional Responses to The Coronavirus Pandemic in Serbia: A Citizen Science Approach", *Frontiers in Psychology*, Vol. 11, pp. 2133.

SAGLIETTO Andrea, D'ASCENZO Fabrizio, ZOCCAI Giuseppe Biondi and De FERRARI Gaetano Maria (2020), "COVID-19 in Europe: The Italian Lesson", *The Lancet*, Vol. 395, No. 10230, pp. 1110-1111.

ŞAHIN Leyla and AŞÇIOĞLU Meral (2013), "Uyku Ve Uykunun Düzenlenmesi", *Sağlık Bilimleri Dergisi*, Vol. 22, No. 1, pp. 93-98.SAHIN Nesrin Hisli and DURAK Ayşegül (1994), "Kisa Semptom Envanteri (Brief Symptom Invetory-BSI): Turk Gencleri Icin Uyarlanmasi", *Türk Psikoloji Dergisi*.

SALLEH, M. Razali (2008), "Life Event, Stress and Illness", *The Malaysian Journal of Medical Sciences: MJMS*, Vol. 15, No. 4, pp. 9.

ŞANSAL Fırat, GÖKDAG Yunus Engin, ŞAHIN Duygu, KESKIN Yasemin, YILMAZ Özge Yılmaz and AKIN Ata (2014, April), "Frontal Brain Activation During a Go/Nogo Response Inhibition Task: An FNIRS Study", In *2014 22nd Signal Processing and Communications Applications Conference (SIU)*, pp. 2047-2049.

SAPER Clifford B., CANO Georgina and SCAMMELL Thomas E. (2005), "Homeostatic, Circadian, And Emotional Regulation of Sleep", *Journal of Comparative Neurology*, Vol. 493, No. 1, pp. 92-98.

SAPER Clifford B., FULLER Patrick M., PEDERSEN Nigel P., LU Jun and SCAMMELL Thomas E. (2010), "Sleep State Switching", *Neuron*, Vol. 68, No. 6, pp. 1023-1042.

SAVAŞIR Işık and ŞAHIN Nesrin H. (Eds.). (1997), "Bilişsel-Davranışçı Terapilerde Değerlendirme: Sık Kullanılan Ölçekler", *Türk Psikologlar Derneği*.

SAVEANU Radu V. and NEMEROFF Charles B. (2012), "Etiology of Depression: Genetic And Environmental Factors", *Psychiatric Clinics*, Vol. 35, No. 1, pp. 51-71.

SAYGILI Sefa, AKINCI Ayşe Çil, ARIKAN Hülya and DERELI Ebru (2011), "Sleeping Quality and Fatigue Among University Students", *Ejovoc (Electronic Journal Of Vocational Colleges)*.

ŞAYIK Dilek, YIĞIT Deniz, AÇIKGÖZ Ayfer, ÇOLAK Ertuğrul and MUMCU Özlem (2020), "Koronavirüs Anksiyete Ölçeğinin Türkçe Geçerliliği ve Güvenirliği", *Eskisehir Medical Journal*, Vol. 2, No. 1, pp. 16-22.

SCHÄFER Judith, BERNSTEIN Amit, ZVIELLI Ariel, HÖFLER Michael, WITTCHEN Hans-Ulrich and SCHÖNFELD Sabine (2016), "Attentional Bias Temporal Dynamics Predict Posttraumatic Stress Symptoms: A Prospective–Longitudinal Study Among Soldiers", *Depression and Anxiety*, Vol. 33, No. 7, pp. 630-639.

SCHAPKIN Sergei A., FALKENSTEIN Michael, MARKS Anke and GRIEFAHN Barbara (2006), "Executive Brain Functions After Exposure to Nocturnal Traffic Noise: Effects of Task Difficulty and Sleep Quality", *European Journal of Applied Physiology*, Vol. 96, No. 6, pp. 693-702.

SCHULZ Hartmut and SALZARULO Piero (2012), "Forerunners of REM Sleep", *Sleep medicine reviews*, Vol. 16, No. 1, pp. 95-108.

SCHWABE Lars, HÖFFKEN Oliver, TEGENTHOFF Martin and WOLF Oliver T. (2013), "Stress-Induced Enhancement of Response Inhibition Depends on Mineralocorticoid Receptor Activation" *Psychoneuroendocrinology*, Vol. 38, No. 10, pp. 2319-2326.

SCOTT Stacey B., GRAHAM-ENGELAND Jennifer E., ENGELAND Christopher G., SMYTH Joshua M., ALMEIDA David M., KATZ Mindy J., LIPTON Richard B.., … and SLIWINSKI Martin J. (2015), "The Effects of Stress on Cognitive Aging, Physiology and Emotion (ESCAPE) Project", *BMC psychiatry*, Vol. 15, pp. 146.

SEEL Ronald T., KREUTZER Jeffrey S., ROSENTHAL Mitchell, HAMMOND Flora M., CORRIGAN John D. and BLACK Kertia (2003), "Depression After Traumatic Brain Injury: A National Institute on Disability and Rehabilitation Research Model Systems Multicenter Investigation", *Archives of Physical Medicine and Rehabilitation*, Vol. 84, No. 2, pp. 177-184.

SELVI Yavuz, GULEC Mustafa, AGARGUN Mehmet Yüzel and BESIROGLU Lutfullah (2007), "Mood Changes After Sleep Deprivation in Morningness–Eveningness Chronotypes In Healthy Individuals", *Journal Of Sleep Research*, Vol. 16, No. 3, pp. 241-244.

SELYE Hans (1956), "What is Stress", *Metabolism*, Vol. 5, No. 5, pp. 525-530.

SELYE Hans (1976), "Stress In Health And Disease Butterworth's", *Inc. Boston, MA*.

SHANSKY Rebecca M. And LIPPS Jennifer (2013), "Stress-Induced Cognitive Dysfunction: Hormone-Neurotransmitter Interactions in The Prefrontal Cortex", *Frontiers in Human Neuroscience*, Vol. 7, pp. 123.

SHEN Lin, van SCHIE Jason, DITCHBURN Graeme, BROOK Libby and BEI Bei (2018), "Positive and Negative Emotions: Differential Associations With Sleep Duration And Quality in Adolescents", *Journal of Youth And Adolescence*, Vol. 47, No. 12, pp. 2584-2595.

SHEREEN Muhammad Adnan, KHAN Suliman, KAZMI Abeer, Bashir Nadia and Siddique Rabeea (2020), "COVID-19 Infection: Emergence, Transmission, And Characteristics of Human Coronaviruses", *Journal of Advanced Research*, Vol. 24, pp. 91-98.

SHIELDS Grant S., BONNER Joseph C. and MOONS Wesley G. (2015), "Does Cortisol Influence Core Executive Functions? A Meta-Analysis of Acute Cortisol Administration Effects on Working Memory, Inhibition, And Set-Shifting", *Psychoneuroendocrinology*, Vol. 58, pp. 91-103.

SHIELDS Grant S., MOONS Wesley G., TEWELL Carl A. and Yonelinas Andrew P. (2016), "The Effect of Negative Affect on Cognition: Anxiety, Not Anger, Impairs Executive Function", *Emotion*, Vol. 16, No. 6, pp. 792.

SHIELDS Grant S., SAZMA Matthew A. and YONELINAS Andrew P. (2016), "The Effects Of Acute Stress on Core Executive Functions: A Meta-Analysis and Comparison with Cortisol", *Neuroscience & Biobehavioral Reviews*, Vol. 68, pp. 651-668.

SIEGEL Jerome M. (2003), "Why We Sleep: The Reasons That We Sleep Are Gradually Becoming Less Enigmatic", *Scientific American*, Vol. 289, No. 5, pp. 92.

SIEGEL Jerome M. (2004), "The Neurotransmitters of Sleep", *J Clin Psychiatry*, Vol. 65(Suppl 16), pp. 4-7.

DA SILVA Flavia Rodrigues, GUERREIRO Renato de Carvalho, ANDRADE Henrique De Araújo Andrade, STIELER Eduardo, SILVA Andressa and de MELLO Marco Túlio (2020), "Does the Compromised Sleep and Circadian Disruption of Night and Shiftworkers Make Them Highly Vulnerable To 2019 Coronavirus Disease (COVID-19)?", *Chronobiology international*, Vol. 37, No. 5, pp. 607-617.

SIMMS Nina K., FRAUSEL Rebecca R. and RICHLAND Lindsey E. (2018), "Working Memory Predicts Children's Analogical Reasoning", *Journal of Experimental Child Psychology*, Vol. 166, pp. 160-177.

SIMONS Anne D., ANGELL Karyn L., MONROE Scott M. and THASE Michael E. (1993), "Cognition and Life Stress In Depression: Cognitive Factors And The Definition, Rating, And Generation Of Negative Life Events", *Journal of Abnormal Psychology*, Vol. 102, No. 4, pp. 584.

SIMPSON Andrew and RIGGS Kevin J. (2005), "Inhibitory and Working Memory Demands Of the Day–Night Task in Children", *British Journal of Developmental Psychology*, Vol. 23, No. 3, pp. 471-486.

SMITH Julius O. and ABEL Jonathan S. (1999), "Bark and ERB Bilinear Transforms", *IEEE Transactions on Speech and Audio Processing*, Vol. 7, No. 6, pp. 697-708.

SNYDER Hannah R., KAISER Roselinde H., WHISMAN Mark A., TURNER Amy E., GUILD Ryan M and MUNAKATA Yuko (2014), "Opposite effects of anxiety and depressive symptoms on executive function: The case of selecting among competing options" *Cognition & emotion*, Vol. 28, No. 5, pp. 893-902.

SPIELBERGER Charles D. (1966), "Theory and Research on Anxiety", *Anxiety and Behavior*, Vol. 1, No. 3, pp. 3-20.

STEFFENS David C. and POTTER Guy G. (2008), "Geriatric Depression and Cognitive Impairment", *Psychological Medicine*, Vol. 38, No. 2, pp. 163-175.

STEVNER Angus, VIDAURRE Diego, CABRAL Joana, RAPUANO Kristina, NIELSEN Søren Føns Vind, TAGLIAZUCCHI Enzo, ... and KRINGELBACH Morten L. (2019), "Discovery of Key Whole-Brain Transitions and Dynamics During Human Wakefulness and Non-REM Sleep", *Nature Communications*, Vol. 10, No. 1, pp. 1-14.

STICKGOLD Robert (2005), "Sleep-Dependent Memory Consolidation", *Nature*, Vol. 437, No. 7063, pp. 1272-1278.

STICKGOLD Robert (2013), "Parsing the Role of Sleep in Memory Processing", *Current Opinion in Neurobiology*, Vol. 23, No. 5, pp. 847-853.

SZABÓ Marianna (2011), "The Emotional Experience Associated with Worrying: Anxiety, Depression, Or Stress?", *Anxiety, Stress, & Coping*, Vol. 24, No. 1, pp. 91-105.

TABACHNICK Barbara G., FIDELL Linda S. and ULLMAN Jodie B. (2013), "Using Multivariate Statistics", *Boston, MA: pearson*, Vol. 6, pp. 497-516.

TALERO-GUTIÉRREZ Claudia, MORENO Carlos B., GONZÁLEZ-REYES Rodrigo, PALACIOS Leonardo, DE LA PEÑA Francisco and MUÑOZ-DELGADO, Jairo (2008), "Sleep Evaluation Scales and Questionnaires: A Review", *Actas Esp Psiquiatr*, Vol. 36, No. 1, pp. 50-59.

TARGA Adriano D., BENÍTEZ Ivan D., MONCUSÍ-MOIX Anna, ARGUIMBAU Maria, DE BATLLE Jordi, DALMASES Mireia and BARBÉ Ferran (2021), "Decrease in Sleep Quality During COVID-19 Outbreak", *Sleep and Breathing*, Vol. 25, No. 2, pp. 1055-1061.

THIBEAU Sherilyn, MCFALL G. Peggy, WIEBE Sandra A., ANSTEY Kaarin J. and DIXON Roger A (2016), "Genetic Factors Moderate Everyday Physical Activity Effects on Executive Functions in Aging: Evidence from the Victoria Longitudinal Study", *Neuropsychology*, Vol. 30, No. 1, pp. 6.

THOITS Peggy A. (1983), "Dimensions of Life Events That Influence Psychological Distress: An Evaluation and Synthesis of The Literature", *Psychosocial stress*, pp. 33-103.

THOMAS Maria, SING Helen, BELENKY Gregory, HOLCOMB Henry, MAYBERG Helen, DANNALS Robert, ... and REDMOND Daniel (2000), "Neural Basis of Alertness and Cognitive Performance Impairments During Sleepiness. I. Effects Of 24 H Of Sleep Deprivation on Waking Human Regional Brain Activity", *Journal of Sleep Research*, Vol. 9, No. 4, pp. 335-352.

TORUN YAZIHAN Nakşidil, AYDIN Hamdullah and KARAKAŞ Sirel (2007), "Neuropsychological Profile in Different Levels of Obstructive Sleep Apnea", *Sleep and Biological Rhythms*, Vol. 5, pp. 85–94.

TRILL Maria Die (2013), "Anxiety and Sleep Disorders in Cancer Patients", *EJC supplements*, Vol. 11, No. 2, pp. 216.

TUCKER Adrienne M., WHITNEY Paul, BELENKY Gregory, HINSON John M. and VAN DONGEN Hans P. (2010), "Effects of Sleep Deprivation on Dissociated Components of Executive Functioning", *Sleep*, Vol. 33, No. 1, pp. 47-57.

VAN DE LANGENBERG Daniella, VLAANDEREN Jelle J., DOLLÉ Martijn E., ROOKUS Matti A., van KERKHOF Linda W. and VERMEULEN Roel C. (2019), "Diet, Physical Activity, And Daylight Exposure Patterns in Night-Shift Workers and Day Workers", *Annals of Work Exposures and Health*, Vol. 63, No. 1, pp. 9-21.

UNSWORTH Nash and ROBISON Matthew K. (2017), "A Locus Coeruleus-Norepinephrine Account of Individual Differences in Working Memory Capacity and Attention Control", *Psychonomic Bulletin & Review*, Vol. 24, pp. 1282-1311.

VANABLE Peter A., AIKENS James E., TADIMETI Lakshminarayana, CARUANA-MONTALDO Brendan and MENDELSON Wallace B. (2000), "Sleep Latency and Duration Estimates Among Sleep Disorder Patients: Variability as A Function of Sleep Disorder Diagnosis, Sleep History, And Psychological Characteristics", *Sleep: Journal of Sleep Research & Sleep Medicine*, pp.1-9.

VANDEKERCKHOVE Marie, WEISS Rolf, SCHOTTE Christiaan, EXADAKTYLOS Vasileios, HAEX Bart, VERBRAECKEN Johan and CLUYDTS Raymond (2011), "The Role of Presleep Negative Emotion in Sleep Physiology", *Psychophysiology*, Vol. 48, No. 12, pp. 1738-1744.

VARDOULAKIS Sotiris, SHEEL Meru, LAL Aparna and GRAY Darren (2020), "COVID-19 Environmental Transmission and Preventive Public Health Measures", *Australian and New Zealand Journal of Public Health*.

VENUS Kahlie (2019), "Sleep Quality and Executive Function: Does Emotion Regulation And Stress Mediate This Relationship in College Students?", *A Thesis Presented* (Doctoral Dissertation, California State University Dominguez Hills).

VERVOORT Leentje, BRAUN Maya, De SCHRYVER Maarten, NAETS Tiffany, KOSTER Ernst H and BRAET Caroline (2021), "A Pictorial Dot Probe Task to Assess Food-Related Attentional Bias in Youth with And Without Obesity: Overview of Indices and Evaluation of Their Reliability", *Frontiers in Psychology*, Vol. 12, pp. 644512.

VISU-PETRA Laura, MICLEA Mircea and VISU-PETRA George (2013), "Individual Differences in Anxiety and Executive Functioning: A Multidimensional View", *International Journal of Psychology*, Vol. 48, No. 4, pp. 649-659.

VOITSIDIS Panteleimon, GLIATAS Ioannis, BAIRACHTARI Vasiliki, PAPADOPOULOU Kalliopi, PAPAGEORGIOU Georgios, PARLAPANI Eleni, SYNGELAKIS Markos, HOLEVA Vasiliki and DIAKOGIANNIS Ioannis (2020), "Insomnia During The COVID-19 Pandemic in A Greek Population", *Psychiatry research*, Vol. 289, pp. 113076.

WALKER Matthew P. (2008), "Cognitive Consequences of Sleep and Sleep Loss", *Sleep medicine*, Vol. 9, pp. S29-S34.

WALKER Matthew P. (2008), "Sleep-Dependent Memory Processing", *Harvard Review of Psychiatry*, Vol. 16, No. 5, pp. 287-298.

WALKER Matthew P., BRAKEFIELD Tiffany, MORGAN Alexandra, HOBSON J. Allan and STICKGOLD Robert (2002), "Practice with Sleep Makes Perfect: Sleep-Dependent Motor Skill Learning", *Neuron*, Vol. 35, No. 1, pp. 205-211.

WAQAS Ahmed, REHMAN Abdul, MALIK Aamenah, MUHAMMAD Umer, KHAN Sarah and MAHMOOD Nadia (2015), "Association of Ego Defense Mechanisms With Academic Performance, Anxiety And Depression in Medical Students: A Mixed Methods Study", *Cureus*, Vol. 7, No. 9, pp. 1- 16.

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.

WHO (2022), COVID-19 Dashboard. Geneva: World Health Organization, 2020, https://covid19.who.int/ (last cited: [2022])

WILCKENS Kristine A., WOO Sarah G., KIRK Afton R., ERICKSON Kirk I. and WHEELER Mark E. (2014), "Role of Sleep Continuity and Total Sleep Time in Executive Function Across the Adult Lifespan", *Psychology and Aging*, Vol. 29, No. 3, pp. 658.

WILHELM Ines, PREHN-KRISTENSEN Alexander and BORN Jan (2012), "Sleep-Dependent Memory Consolidation–What Can Be Learnt from Children?", *Neuroscience & Biobehavioral Reviews*, Vol. 36, No. 7, pp. 1718-1728.

WILLIAMS David R. (2012), "Miles to Go Before We Sleep: Racial Inequities In Health", *Journal of Health and Social Behavior*, Vol. 53, No. 3, pp. 279-295.

WOODS Heather Cleland and SCOTT Holly (2016), "# Sleepyteens: Social Media Use In Adolescence Is Associated with Poor Sleep Quality, Anxiety, Depression and Low Self-Esteem", *Journal of Adolescence*, Vol. 51, pp. 41-49.

WU Koulong and WEI Xuemei (2020), "Analysis of Psychological and Sleep Status And Exercise Rehabilitation of Front-Line Clinical Staff in The Fight Against COVID-19 In China", *Medical Science Monitor Basic Research*, Vol. 26, pp. e924085-1-7.

YARIBEYGI Habib, PANAHI Yunes, SAHRAEI Hedayat, JOHNSTON Thomas P. and SAHEBKAR Amirhossein (2017), "The Impact of Stress on Body Function: A review", *EXCLI journal*, Vol. 16, pp. 1057.

YELPAZE Ismail (2021), "Predictiveness of Covid-19 Anxiety and Emotion egulation on Sleep Quality: The Moderator Effect of Gender", *International Journal of Psychology and Educational Studies*, Vol. 8(Özel Sayı), pp. 45-56.

YETKİN Sinan and AYDIN Hamdullah (2014), "Bir Semptom ve Bir Hastalık Olarak Uykusuzluk", *Türk Uyku Tıbbi Dergisi*, Vol. 1, No. 1, pp. 1-8.

YETKİN Sinan and ÖZGEN Fuat (2007), "Tarihsel Bakış İçinde Depresyon", *Türkiye Klinikleri Dahili Tıp Bilimleri Dergisi*, Vol. 3, No. 47, pp. 1-5.

YOUNG Michael E., SUTHERLAND Steven C. and MCCOY Anthony W. (2018), "Optimal Go/No-Go Ratios to Maximize False Alarms", *Behavior Research Methods*, Vol. 50, No. 3, pp. 1020-1029.

YU Yongjuan, YU Yongju, and LIN Yigang (2020), "Anxiety and Depression Aggravate Impulsiveness: The Mediating and Moderating Role of Cognitive Flexibility", *Psychology, Health & Medicine*, Vol. 2, No. 1, pp. 25-36.

ZEIGLER-HILL Virgil and SHACKELFORD Todd K. (Eds.). (2020), "Encyclopedia Of Personality and Individual Differences", *Cham: Springer International Publishing*.

ZOKAEINIKOO Maryam (2016), "Automatic Sleep Stages Classification". ZVIELLI Arielle, BERNSTEIN Amit and KOSTER Ernst H. (2015), "Temporal Dynamics of Attentional Bias", *Clinical Psychological Science*, Vol. 3, No. 5, pp. 772-788.

APPENDICES

APPENDIX A

APPROVAL OF THE SOCIAL AND HUMANITIES ETHICS COMMITTEE OF CANKAYA UNIVERSITY

ÇANKAYA ÜNİVERSİTESİ
SOSYAL VE BEŞERİ BİLİMLER
BİLİMSEL ARAŞTIRMA VE YAYIN ETİĞİ KURULU

Sayı : E-90705970-605-87964 16.09.2021
Konu : Etik Kurul Kararı (Dr.Öğretim Üyesi Nakşidil Yazıhan)

REKTÖRLÜK MAKAMINA

Çankaya Üniversitesi Fen Edebiyat Fakültesi Psikoloji Bölümü öğretim elemanlarından Dr.Öğretim Üyesi Nakşidil Yazıhan'ın sorumlu araştırmacı olduğu ***"Dikkatte Yanlılık ve Yürütücü İşlevlerin COVID-19 Pandemisi Sırasında Sağlıklı Yetişkinlerin Uyku Özelliklerine Etkisi "*** isimli proje (yüksek lisans öğrencisi Aleyne Üste'nin tez çalışması) ile ilgili başvurusu kurulumuzca incelenmiş olup, oy birliği ile etik açıdan uygun olduğuna karar verilmiştir. Üyelerce imzalanmış Kurul Kararı ekte sunulmuştur.

Bilgilerinize saygılarımla arz ederim.

Prof. Dr. Mehmet Mete DOĞANAY
Etik Kurul Başkanı

Ek: Etik Kurul Kararı (Sayı 48)

Bu belge güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Kodu: ABF0876A-8E86-41AE-9340-BE5355A0A209 Belge Doğrulama Adresi: https://www.turkiye.gov.tr/cankaya-universitesi-ebys

Adres: Çankaya Üniversitesi Eskişehir Yolu 29. Km. Yukarıyurtçu Mahallesi Mimar Sinan Caddesi No:4 06790, Etimesgut/ANKARA
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APPENDIX B

THE STUDY SURVEY

COVID-19 Pandemisi Sırasında Dikkat Yanlılığı ve Yönetici İşlev Bozukluğunun Sağlıklı Yetişkinlerin Uyku Özellikleri Üzerindeki Etkisi

Bilgilendirilmiş Onam Formu

Değerli Katılımcı,

Araştırmaya katılmayı kabul etmeden önce, lütfen araştırma ile ilgili aşağıda bulunan bilgileri dikkatlice okumak için birkaç dakikanızı ayırınız. Araştırma ile ilgili herhangi bir sorunuz olursa veya araştırmanın amacına yönelik verilen bilgiler dışında daha fazla bilgiye ihtiyaç duyarsanız araştırmacıya önceden sorabilir ya da aşağıda iletişim bilgileri olan araştırmacıyla iletişim kurabilirsiniz.

Bu çalışma Psk. Aleyna Nur Üste tarafından Dr. Nakşidil Yazıhan denetimi altında yürütülmektedir. Çalışmanın amacı, COVID-19 pandemisi sırasında sağlıklı yetişkinlerin uyku kalitesi, yürütücü işlevler ve dikkat yanlılığı arasındaki ilişkiyi araştırmaktır. Çalışmaya gelmeden en az bir saat önceden kafeinli yiyecek ve içecekleri tüketimini sonlandırmış olmanız gerekmekte. Çalışmada ilk olarak anketleri doldurmanız beklenmektedir. Daha sonra ise dikkatte yanlılık ve yürütücü işlevler hakkında veri elde edilmesi için bilgisayar görevleri kullanılacaktır. Çalışma yaklaşık 50 dakika sürecektir.

Anket ve bilgisayar görevi, katılımcılarda rahatsızlık yaratabilecek sorular içermemektedir. Çalışmaya katılımınız zorunlu değildir ve katılmayı reddetme hakkına sahipsiniz. Çalışmadan, istediğiniz bir anda, açıklama yapmaksızın çekilme hakkına sahipsiniz. Cevaplarınız kesinlikle gizlilikle korunacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilen veriler bilimsel amaçlarla kullanılacaktır.

BİLGİLENDİRİLMİŞ ONAY FORMU

Araştırma Danışmanının Adı: Nakşidil YAZIHAN, nyazihan@cankaya.edu.tr

Araştırmacıların Adları: Aleyna Nur ÜSTE, aleynaustee@gmail.com

Her ifadeye katıldığınızı belirtmek için lütfen yanda bulunan kutuları işaretleriniz.

1. Bilgileri okuyup anladığımı ve soru sorma fırsatımın olduğunu onaylıyorum. ☐
2. Katılımımın gönüllü olduğunu ve açıklama yapmaksızın, istediğim bir anda araştırmadan çekilebileceğimi anlıyorum. ☐
3. Bu araştırmaya katılmayı kabul ediyorum. ☐

<u>Katılımcı Bilgileri</u>

İsim & Soyisim:

Yaş:

Cinsiyet:

Demografik Bilgi Formu

Çalışmaya katılımınız zorunlu değildir ve katılmayı reddetme hakkına sahipsiniz. Çalışmadan, istediğiniz bir anda, açıklama yapmaksızın çekilme hakkına sahipsiniz. Cevaplarınız kesinlikle gizlilikle korunacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilen veriler bilimsel amaçlarla kullanılacaktır.

DEMOGRAFİK BİLGİLER

Yaş :

Cinsiyet : Kadın ( ) Erkek ( )

Kilo :

Boy :

En son mezun olunan okul : Ortaokul ( ) Lise ( )

Üniversite ( ) Yüksel Lisans/ Doktora ( )

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

Evetse: Tam zamanlı/ Yarı zamanlı

Çalışıyor musunuz : Evet ( ) Hayır ( )

Evetse: Tam zamanlı/ Yarı zamanlı/ Vardiyalı

Meslek : ……………………………………………………………………………………

İşinizde/ İşlerinizde genellikle haftada kaç saat çalışıyorsunuz? ………………………….

Aktif olarak bilgisayar kullanıyor musunuz?...

Medeni Durum : Evli ( ) Bekar ( ) Boşanmış ( )

Çocuğunuz var mı? : Evet ( ) Hayır ( )

Evet ise kaç tane? : ………………………………………………………………………

Çocuklarınız dışında evde bakmakla yükümlü olduğunuz başka biri var mı? : ....

Kendi gelir düzeyinizi nasıl tanımlarsınız?

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

GENEL BİLGİLER

Herhangi kronik bir rahatsızlığınız var mı?

Evet (Belirtiniz:....................) Hayır ( )

Herhangi bir ilaç kullanıyor musunuz?

Evet (Belirtiniz:.....................) Hayır ( )

Daha önce hiç tedavi gerektiren bir psikolojik rahatsızlık geçirdiniz mi?

Evet (Belirtiniz: ....) Hayır ( )

Günlük yaşamınızı etkileyecek bir görme kaybınız var mı?

Evet ( ) Hayır ( )

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

Evet (Belirtiniz: …………….) Hayır ( )

COVID- 19 hastalığı geçirdiniz mi? Evet ( )Hayır ( )

Evet ise hastanede yatarak tedavi almanız gerekti mi? Kaç gün sürdü ve belirtiler nelerdi?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………….

Belirtilerin şiddeti _____HAFİF _____ORTA _____ŞİDDETLİ

Şu anda, COVID sebebi ile genel sağlığınızı etkilediğini düşündüğünüz belirtileriniz var mı?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

…………………………………………………………………….

COVID- 19 nedeniyle bir yakınınızı ya da tanıdığınızı kaybettiniz mi? Evet ( ) Hayır ( )

Sigara kullanıyor musunuz? Evet ( ) Hayır ( )

Eğer evetse ne sıklıkla ve miktarda………………………………………………..

Alkol kullanıyor musunuz? Evet ( ) Hayır ( )

Eğer evetse ne sıklıkla ve miktarda………………………………………………..

Gün içinde kafein tüketiyor musunuz? Evet ( ) Hayır ( )

Eğer evetse ne sıklıkla ve miktarda………………………………………………..

Aşağıda belirtilen içecek türlerinden son bir hafta içerisinden en çok tükettiğiniz üç tanesini seçiniz.

a) Çay e) Espresso ı) Kola

b) Yeşil çay f) Cappuccino i) Meşrubat

c) Türk kahvesi g) Filtre kahve j) Meyveli gazoz

d) Neskafe h) Ice Tea k) Enerji içeceği

Son 8 saattir bu içeceklerden hangilerini ne miktarda tükettiniz?

…………………………………………….

Uykuya geçiş ortamınızda size eşlik eden birey/bireyler var mı? (örneğin; yurt odasında oda arkadaşı, kardeşiniz, çocuğunuz, eşiniz… gibi) varsa (kaç kişi) belirtiniz.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

…………………………………………………………………………………….

Aşağıdaki belirtilerden hangileri sizde vardır?

	EVET	HAYIR
a) Gece uykuya dalmakta güçlük çekiyorum.	_____	_____
b) Uykuya daldıktan sonra sık uyanıyorum.	_____	_____
c) Uykuya daldıktan sonra uyandığımda tekrar uyumakta güçlük çekiyorum.	_____	_____
d) Sabah uyanmakta güçlük çekiyorum.	_____	_____
e) Sabah erken uyanıyorum.	_____	_____
f) Sabah yorgun ve uykumu almamış olarak uyanıyorum.	_____	_____
g) Gece uykuda horladığım söyleniyor.	_____	_____
h) Gece uykuda nefesimin kesildiği söyleniyor.	_____	_____
i) Gece boğulma hissi ile uyanıyorum.	_____	_____
j) Bütün gün kendimi uykulu ve yorgun hissediyorum.	_____	_____
k) Sabah baş ağrısı ile uyanıyorum.	_____	_____
l) Sabah ağız kuruluğu ile uyanıyorum.	_____	_____
m) Gündüz istemsiz uyku ataklarım oluyor	_____	_____
n) Uykuda bazı davranışlarım olduğu söyleniyor. (konuşma, yürüme, tekme atma vb.)	_____	_____

Ailenizde uyku ile ilgili yukarda belirtilen veya farklı şikayetlere sahip birey/bireyler var mı? Varsa yakınlığınızı da belirterek şikayetleri yazınız.

………

………

……………………………………………………………………………...

Uyku ile ilgili şikâyetlerinizin varsa günlük yaşantınıza etkileri nelerdir?

(*Aşağıdaki durumların şiddetini O (yok)'dan 10 en şiddetliye kadar lütfen puanlayın*)

Gün boyunca…

Kendimi yorgun hissediyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Kendimi uykulu hissediyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Kendimi çökkün, keyifsiz hissediyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Sinirli oluyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Dikkatimi toplamakta güçlük yaşıyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Çalışma performansım düşüyor [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

İşimde bu yüzden sorunlar yaşıyorum [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Uyku probleminiz (varsa) ne zaman başladı?

Covid döneminden önce ( ) Covid Dönemi ile birlikte ( )

Uyku düzeniniz ne kadar doyurucu ya da tatmin edici?

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

İLETİŞİM BİLGİLERİ

Telefon : E- mail adresi :

KSE

Aşağıda, insanların bazen yaşadıkları belirtilerin ve yakınmaların bir listesi verilmiştir. Listedeki her maddeyi lütfen dikkatle okuyunuz. Daha sonra, o belirtinin SİZDE BUGÜN DAHİL, SON BİR HAFTADIR NE KADAR VAR OLDUĞUNU yandaki bölmede uygun olan yere işaretleyiniz. Her belirti için sadece bir yeri işaretlemeye ve hiçbir maddeyi atlamamaya özen gösteriniz. Yanıtlarınızı kurşun kalemle işaretleyiniz. Eğer fikir değiştirirseniz ilk yanıtınızı siliniz.

Yanıtlarınızı aşağıdaki ölçeğe göre değerlendiriniz:

Bu belirtiler son bir haftadır sizde ne kadar var?

0. Hiç yok **3. Epey var**

1. Biraz var **4. Çok fazla var**

2. Orta derecede var

Bu belirtiler son bir haftadır sizde ne kadar var?

	0	1	2	3	4
İçinizdeki sinirlilik ve titreme hali					
Baygınlık, baş dönmesi					
Bir başka kişinin sizin düşüncelerinizi kontrol edeceği fikri					
Başınıza gelen sıkıntılardan dolayı başkalarının suçlu olduğu duygusu					
Olayları hatırlamada güçlük					
Çok kolayca kızıp öfkelenme					
Göğüs (kalp) bölgesinde ağrılar					
Meydanlık (açık) yerlerden korkma duygusu					
Yaşamınıza son verme düşünceleri					
İnsanların çoğuna güvenilmeyeceği hissi					
İştahta bozukluklar					
Hiçbir nedeni olmayan ani korkular					
Kontrol edemediğiniz duygu patlamaları					
Başka insanlarla beraberken bile yalnızlık hissetmek					
İşleri bitirme konusunda kendini engellenmiş hissetmek					
Yalnızlık hissetmek					
Hüzünlü, kederli hissetmek					
Hiçbir şeye ilgi duymamak					
Ağlamaklı hissetmek					
Kolayca incinebilme, kırılmak					
İnsanların sizi sevmediğine, kötü davrandığına inanmak					
Kendini diğerlerinden daha aşağı görme					
Mide bozukluğu, bulantı					
Diğerlerinin sizi gözlediği ya da hakkınızda konuştuğu duygusu					
Uykuya dalmada güçlük					
Yaptığınız şeyler tekrar tekrar doğru mu diye kontrol etmek					

Karar vermede güçlükler					
Otobüs, tren, metro gibi umumi vasıtalarla seyahatlerden korkmak					
Nefes darlığı, nefessiz kalmak					
Sıcak-soğuk basmaları					
Sizi korkuttuğu için bazı eşya, yer yada etkinliklerden uzak kalmaya çalışmak					
Kafanızın “bomboş” kalması					
Bedeninizin bazı bölgelerinde uyuşmalar, karıncalanmalar					
Günahlarınız için cezalandırılmanız gerektiği					
Gelecekle ilgili umutsuzluk duyguları					
Konsantrasyonda (dikkati bir şey üzerinde toplama) güçlük/zorlanmak					
Bedeninizin bazı bölgelerinde zayıflık, güçsüzlük hissi					
Kendini gergin ve tedirgin hissetmek					
Ölme ve ölüm üzerine düşünceler					
Birini dövme, ona zarar verme, yaralama isteği					
Bir şeyleri kırma, dökme isteği					
Diğerlerinin yanındayken yanlış bir şeyler yapmamaya çalışmak					
Kalabalıklarda rahatsızlık duymak					
Bir başka insana hiç yakınlılık duymamak					
Dehşet ve panik nöbetleri					
Sık sık tartışmaya girmek					
Yalnız bırakıldığında/kalındığında sinirli hissetmek					
Başarılarınız için diğerlerinden yeterince takdir görmemek					
Yerinde duramayacak kadar kendini tedirgin hissetmek					
Kendini değersiz görmek					
Eğer izin verirseniz insanların sizi sömüreceği duygusu					
Suçluluk duyguları					
Aklınızda bir bozukluk olduğu fikri					

<u>EUÖ</u>

Uygulama: Aşağıdaki durumlarda uyuma olasılığınız nedir?

Soruları her zamanki yaşantınızı düşünerek cevaplayınız. Bunlardan birini son zamanlarda yapmamış olsanız bile, eğer böyle bir durum olsa idi, nasıl davranacağınızı düşünerek cevaplayınız.

Her durum için **en uygun sayıyı** aşağıdaki ölçeği kullanarak cevaplayınız.

0 = Asla uyumam

1 = Uyuma olasılığım az

2 = Uyuma olasılığım var

3 = Büyük olasılıkla uyurum

Durum	**Uyuma olasılığım**			
Oturup bir şeyler okurken	0	1	2	3
Televizyon seyrederken	0	1	2	3
Hareketsiz olarak toplum içinde otururken (örneğin; tiyatro veya herhangi bir toplantıda)	0	1	2	3
Ara vermeden en az bir saat süren bir araba yolculuğunda yolcu olarak seyahat ederken (şoför olarak değil)	0	1	2	3
Boş vaktim olduğunda dinlenmek için öğleden sonraları uzandığımda	0	1	2	3
Birisiyle oturup konuşurken	0	1	2	3
Alkol almadığım bir öğlen yemeğinden sonra hareketsizce otururken	0	1	2	3
Araç kullanırken, trafikte araba bir kaç dakika için durduğunda	0	1	2	3

<u>PUKİ</u>

Uygulama: *Aşağıdaki sorular, sadece son bir ay içindeki uyku alışkanlıklarınızla ilişkilidir. Cevaplarınızı son bir ayda, çoğu gün ve geceyi kapsayan en uygun cevaba göre işaretleyin. Lütfen bütün soruları cevaplayın.*

Son bir ayda,

1. Genellikle ne zaman yatarsınız?___________________

2. Yattıktan sonra, uykuya dalmak ne kadar vakit alır (dakika)?______________

3. Genellikle sabah kaçta kalkarsınız?_________________

4. Gece uyuduğunuz gerçek süre kaç saattir? (Bu süre yatakta geçirdiğiniz süreden farklı olabilir) _______________

5. Son bir aydır, ne kadar sıklıkla, ... nedeniyle uyku sorunu yaşadınız?

	Geçtiğimiz ay içinde hiçbir zaman (0)	Haftada birden az (1)	Haftada bir ya da iki defa (2)	Haftada üç ya da daha fazla (3)
30 dakika içinde uykuya dalamama				
Gecenin ortasında ya da sabah erken uyanma				
Tuvalete kalkmak zorunda olma				
Rahat nefes alamama				
Öksürük ya da gürültülü horlama				
Üşüme				
Sıcak hissetme				
Kötü rüyalar				
Ağrı				
Diğer nedenler, lütfen neden(ler)i tanımlayın, ne kadar sıklıkla bu neden(ler)den ötürü uyku sorunu yaşadınız:				
Son bir aydır, ne kadar sıklıkla uyumak için ilaç kullandınız?				

Son bir aydır, ne kadar sıklıkla, araba kullanırken, yemek yerken ya da sosyal aktivitelerde kendinizi uyanık tutmada güçlük yaşadınız?				
Son bir aydır, bir şeyler yaparken, konuya ilginizi devam ettirmede sorun ne sıklıkla yaşadınız?				
	Çok iyi (0)	Kısmen iyi (1)	Kısmen kötü (2)	Çok kötü (3)
Son bir aydır, uyku kalitenizi genel olarak nasıl puanlarsınız?				
B1:______ B2:______ B3:______ B4:______ B5:______ B6:______B7:_______ Toplam PUKİ Skoru: _______________				

DASS

NO	SON 1 HAFTADAKİ DURUMUNUZ	Hiçbir zaman	Bazen ve arasıra	Çok sık	Her zaman
1	Oldukça önemsiz şeyler için üzüldüğümü farkettim	0	1	2	3
2	Ağzımda kuruluk olduğunu farkettim	0	1	2	3
3	Hiç olumlu duygu yaşayamadığımı farkettim	0	1	2	3
4	Soluk almada zorluk çektim (*örneğin fizik egzersiz yapmadığım halde aşırı hızlı nefes alma, nefessiz kalma gibi)*	0	1	2	3
5	Hiçbir şey yapamaz oldum	0	1	2	3
6	Olaylara aşırı tepki vermeye meyilliyim	0	1	2	3
7	Bir sarsaklık duygusu vardı *(sanki bacaklarım beni taşıyamayacakmış gibi)*	0	1	2	3
8	Kendimi gevşetip salıvermek zor geldi	0	1	2	3
9	Kendimi, beni çok tedirgin ettiği için sona erdiğinde çok rahatladığım durumların içinde buldum	0	1	2	3
10	Hiçbir beklentimin olmadığı hissine kapıldım	0	1	2	3
11	Keyfimin pek kolay kaçırılabildiği hissine kapıldım	0	1	2	3
12	Sinirsel enerjimi çok fazla kullandığımı hissettim	0	1	2	3
13	Kendimi üzgün ve depressif hissettim	0	1	2	3
14	Herhangi bir şekilde *geciktirildiğimde (asansörde, trafik ışıklarında, bekletildiğimde)* sabırsızlandığımı hissettim	0	1	2	3
15	Baygınlık hissine kapıldım	0	1	2	3
16	Neredeyse herşeye karşı olan ilgimi kaybettiğimi hissettim	0	1	2	3
17	Birey olarak değersiz olduğumu hissettim	0	1	2	3
18	Alıngan olduğumu hissettim	0	1	2	3
19	Fizik egzersiz veya aşırı sıcak hava olmasa bile belirgin biçimde terlediğimi gözledim *(örneğin ellerim terliyordu*)	0	1	2	3
20	Geçerli bir neden olmadığı halde korktuğumu hissettim	0	1	2	3
21	Hayatın değersiz olduğunu hissettim	0	1	2	3
22	Gevşeyip rahatlamakta zorluk çektim	0	1	2	3
23	Yutma güçlüğü çektim	0	1	2	3
24	Yaptığım işlerden zevk almadığımı farkettim	0	1	2	3
25	Fizik egzersiz söz konusu olmadığı halde kalbimin hareketlerini hissettim *(kalp atışlarımın hızlandığını veya düzensizleştiğini hissettim)*	0	1	2	3
26	Kendimi perişan ve hüzünlü hissettim	0	1	2	3
27	Kolay sinirlendirilebildiğimi farkettim	0	1	2	3
28	Panik haline yakın olduğumu hissettim	0	1	2	3
29	Bir şey canımı sıktığında kolay sakinleşemediğimi farkettim	0	1	2	3

30	Önemsiz fakat alışkın olmadığım bir işin altından kalkamayacağım korkusuna kapıldım	0	1	2	3
31	Hiçbir şey bende heyecan uyandırmıyordu	0	1	2	3
32	Birşey yaparken ikide bir rahatsız edilmeyi hoş göremediğimi farkettim.	0	1	2	3
33	Sinirlerimin gergin olduğunu hissettim	0	1	2	3
34	Oldukça değersiz olduğumu hissettim	0	1	2	3
35	Beni yaptığım işten alıkoyan şeylere dayanamıyordum	0	1	2	3
36	Dehşete düştüğümü hissettim	0	1	2	3
37	Gelecekte ümit veren birşey göremedim	0	1	2	3
38	Hayatın anlamsız olduğu hissine kapıldım	0	1	2	3
39	Kışkırtılmakta olduğumu hissettim	0	1	2	3
40	Panikleyip kendimi aptal durumuna düşüreceğim durumlar nedeniyle endişelendim.	0	1	2	3
41	Vücudumda *(örneğin ellerimde)* titremeler oldu.	0	1	2	3
42	Bir iş yapmak için gerekli olan ilk adımı atmada zorlandım	0	1	2	3

KAÖ

Son 2 hafta içinde aşağıdaki aktiviteleri ne sıklıkla yaşadınız?

		Hiçbir zaman 0	Nadir, bir veya iki günden az 1	Birkaç gün 2	7 günden fazla 3	Son iki haftada neredeyse her gün 4
1	Koronavirüs ile ilgili haberleri okuduğum veya dinlediğim zaman başımın döndüğünü ve sersemleştiğimi hissettim veya bayılacakmış gibi oldum.					
2	Koronavirüsü düşündüğüm için uykuya dalmada ya da uyumada sorun yaşadım.					
3	Koronavirüs ile ilgili konuları düşündüğümde ya da bu konulara maruz kaldığımda inme inmiş gibi hissettim veya donup kaldım.					
4	Koronavirüs ile ilgili konuları düşündüğümde ya da bu konulara maruz kaldığımda iştahım kaçtı.					
5	Koronavirüs ile ilgili konuları düşündüğümde ya da bu konulara maruz kaldığımda mide bulantısı ya da mide problemleri yaşadım.					

ABSTRACT

THE EFFECTS OF ATTENTIONAL BIAS AND EXECUTIVE DYSFUNCTION ON SLEEP CHARACTERISTICS OF HEALTHY ADULTS DURING COVID-19 PANDEMIC

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M.A. in Psychology

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February 2023, 137 pages

The current study was aimed to fill the gap arising from the absence of a study in the literature exploring the relationship between sleep quality, executive functions, and attentional bias during COVID-19 pandemic in healthy adult subjects. Moreover, the mediating effects of disinhibition and COVID-19 anxiety in the relationship between attentional bias and poor sleep quality were tested by mediation analysis. 102 healthy adults between the ages of 18-40 participated in the study voluntarily. Participants in the study were evaluated by Brief Symptom Inventory (BSI- 53), Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Depression, Anxiety and Stress Scale (DASS-42), COVID-19 Anxiety Scale (CAS), Visual Dot-Probe Task, Task Switching Paradigm and Go/No go Task. The findings indicated that the association of attentional bias with sleep quality was mediated by Covid-19 anxiety and disinhibition. While it was found that the sleep characteristics scores of the participants differed according to their depression, anxiety, and stress scores, it was concluded that cognitive flexibility was not associated with sleep characteristics and psychological distress scores. Additionally, COVID-19 anxiety has been associated with attentional bias. Finally, the findings obtained from the current study were evaluated in the light of the previous literature and suggestions were made for future studies.

Keywords: Sleep quality, psychological distress, COVID-19 anxiety, executive functions, attentional bias.

ÖZET

COVID-19 PANDEMİSİ SIRASINDA DİKKAT YANLILIĞI VE YÖNETİCİ İŞLEV BOZUKLUĞUNUN SAĞLIKLI YETİŞKİNLERİN UYKU ÖZELLİKLERİ ÜZERİNDEKİ ETKİSİ

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Bu çalışma, sağlıklı yetişkin deneklerde Covid-19 pandemisi sırasında uyku kalitesi, yürütücü işlevler ve dikkat yanlılığı arasındaki ilişkiyi araştıran literatürde bir çalışmanın bulunmamasından kaynaklanan boşluğu doldurmayı amaçlanmıştır. Ayrıca dikkat yanlılığı ile düşük uyku kalitesi arasındaki ilişkide disinhibisyon ve COVID-19 kaygısının aracılık etkileri test edilmiştir. Araştırmaya 18-40 yaş arası 102 sağlıklı yetişkin gönüllü katılmıştır. Çalışmaya katılanlar Kısa Semptom Envanteri (KSE-53), Pittsburgh Uyku Kalitesi İndeksi (PSQI), Epworth Uykululuk Ölçeği (ESS), Depresyon, Anksiyete ve Stres Ölçeği (DASS-42), COVID-19 Anksiyete Ölçeği (CAS) ile değerlendirilmiştir. Visual Dot- Probe Görevi, Görev Değiştirme Paradigması ve Yap/Yapma Görevi Deneysel paradigmaları yürütücü işlevleri ölçmede kullanılmıştır. Bulgular, dikkat yanlılığının uyku kalitesi ile ilişkisine Covid-19 kaygısı ve disinhibisyonun aracılık ettiğini göstermiştir. Katılımcıların uyku özellikleri puanlarının depresyon, anksiyete ve stres puanlarına göre farklılaştığı bulunurken; bilişsel esnekliğin uyku özellikleri ve psikolojik sıkıntı puanları ile ilişkili olmadığı sonucuna varılmıştır. Ek olarak, COVID-19 kaygısı dikkat yanlılığı ile anlamlı düzeyde ilişkili bulunmuştur. Son olarak mevcut çalışmadan elde edilen bulgular önceki literatür ışığında değerlendirilmiş ve gelecek çalışmalar için önerilerde bulunulmuştur.

Anahtar Kelimeler: Uyku kalitesi, psikolojik sıkıntı, COVID-19 kaygısı, yürütücü işlevler, dikkat yanlılığı.

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LIST OF ABBREVIATIONS

COVID-19	: Coronavirus Pandemic
EF	: Executive Functions
RAS	: Reticular Activating System
LC	: Locus Ceruleus
VLPO	: Ventrolateral Preoptic Region
REM	: Rapid Eye Movement
NREM	: Non-repeat Eye Movement
EEG	: Electroencephalogram
PSQI	: Pittsburgh Sleep Quality Index
ESS	: Epworth Sleepiness Scale
HA	: Health Anxiety

CHAPTER I

INTRODUCTION

Coronavirus pandemic (COVID-19) has negative impact on many people's life and people have faced with many challenges, such as economic problems, isolation, life threatening stress, depression, sleep problems (O'Connor et al. 2021: 330). Both the contagious epidemics themselves and the measures taken to contain the epidemic are associated with significant symptoms, including severe psychological distress and poor sleep quality (Jahrami et al. 2021: 504; Wu and Wei 2020: 6). Sleep deprivation has been linked to deficits of higher cognitive functioning particularly reduced inhibition and task switching (Killgore 2010: 122; Kronholm et al. 2009: 437; Venus 2019: 45). Executive functions (EF) are high-level cognitive processes that facilitate new behavioral patterns and optimize one's approach to unfamiliar situations (Gilbert and Burgess 2008: 111). During the covid-19 pandemic not only sleep paterns were changed but also executive functioning has been affected (Benham 2021: 506). According to the research, people reported that they had later bedtime and wake-up times and lower sleep quality compared to pre- coronavirus pandemic, despite they had longer sleep duration (Ali et al. 2020: 1; Benham 2021: 513; Marelli et al. 2021: 14). According to the current evidence, sleep deprivation result with problems such as difficulties in controlling emotions or impulses, deficit in attention and concentration, inability to perform complex tasks or multi-procedures, difficulty in solving problems and learning or processing new information (Rabinovici et al. 2015: 646). Attentional bias is defined as facilitating rapid and early detection of potential hazards and information and responding appropriately (Bar-Haim et al. 2007: 1; Luijten et al. 2012: 2777; O'Keeffe et al. 2014: 580). Based on the reviewed literature the purpose of the study is to fill the gap arising from the absence of a study in the literature exploring the relationship between sleep quality, executive functions, and attentional bias during Covid-19 pandemic in healthy adult subjects.

1.1. WHAT IS SLEEP?

Sleep is an important physiological activity for maintaining one's mental and physical health (İnönü 2021: 389; Otsuka et al. 2017: 39). When the history of sleep research was examined, it was among the priority areas of neuroscience in the 1940s-1950s, while these views were reevaluated in the 1990s (Chokroverty 2017: 25; Dement 1998: 6). From ancient times to the present, numerous cultures have been interested in sleep (Chokroverty 2017: 25). Ancient Romans, Egyptians, and Greeks all had varied methods of describing sleep, including identifying the gods that give sleepers dreams (Oppenheim 1956: 182). In the following years, Aristotle observed that sleep is an awareness station in the heart, which is considered the center of sensation and sensitivity (Gallop 1988: 261).

As sleep studies with brain imaging techniques have increased, it was possible to study the sleeping and waking brain cycles, sleep stages and sleep states in depth (Chokroverty 1994: 8). However, despite progress in this area, it is not possible to give a definite answer to the questions of what sleep is and why we sleep. Sleep is also the outcome of a combination of afferent impulses being passively withdrawn from the brain and functional activation of certain neurons in specific brain areas (Carskadon and Dement 2005: 21; Chokroverty 2017: 6).

The Reticular Activating System (RAS) in the brainstem, spinal cord, and cerebral cortex, as well as the Bulbar Synchronizing Region (BSR) in the medulla, coordinate sleep and wakefulness (Vandekerckhove et al. 2011: 1740). A large network of subcortical structures and pathways supports the cortical activation required to sustain wakefulness (Carley and Farabi 2016: 6). The primary neurochemicals of this arousal system are excitatory norepinephrine, which releases from the locus ceruleus (LC), laterodorsal tegmentum of the pons and orexin which comes from the perifornical area, histamine which comes from the tuberomammillary nucleus, serotonin which comes from the midline raphe nuclei, acetylcholine which comes from the pedunculopontine tegmentum and dopamine which comes from the ventral periaccuductal gray matter (Carley and Farabi, 2016: 6).

Suppression of activity in the arousal systems is necessary for the initiation and maintenance of sleep. The inhibitory neurons of the ventrolateral preoptic region (VLPO), which are active during sleep, are responsible for this process (Saper et al. 2005: 93). In the basal forebrain, adenosine builds up when you're awake and drops as you sleep longer. VLPO is a likely candidate for the "sleep switch" since adenosine stimulates VLPO neurons in vivo and adenosine receptors are present in VLPO (Carley and Farabi 2016: 8; Chamberlin et al. 2003: 917). Touch, pain, sound, and vision are all transmitted through RAS. While awake, the component of the RAS in the brainstem transfers incoming inputs to the cortex. (Şahin and Aşçıoğlu 2013: 97). The 5 cortices receive very few stimuli throughout the sleep process. Serotonin, dopamine, histamine, norepinephrine, and acetylcholine are neurotransmitters that play a role in sleep as mentioned above (Siegel 2004: 6).

1.1.1. Four Stages of Sleep

Sleep cannot be considered as a homogeneous process (Walker 2008: 30). Rapid eye movement (REM) sleep, which is linked to active dreaming, and non-rapid eye movement (NREM) sleep are the two main stages of sleep (McNamara et al. 2010: 84). It appears that reciprocal inhibition between monoaminergic neurons and a specific group of cholinergic neurons in the brainstem regulates the transitions between NREM and REM sleep (Lu et al. 2006: 592). These cholinergic neurons that are "REM-on" have connections that are mutually inhibiting with noradrenergic and serotonergic (raphe) neurons (Lu et al. 2006: 593; Saper et al. 2010: 1040). These behaviors might be classified as wakefulness, NREM and REM sleep (Chokroverty 2017: 25; Stevner et al. 2019: 12). Noradrenergic and serotonergic neurons become almost completely silent when REM sleep is induced, but REM-on cholinergic neurons become maximally active. A typical cycle between NREM and REM is produced by the light and dark information as a result of these neurons' alternation between activity and inhibition (Carley and Farabi 2016: 8).

The characteristics of cells in different brain regions during NREM sleep and their contribution to the sleep process are also different. While most neurons in the cerebral cortex and other forebrain regions diminish or stop firing, most neurons in the brainstem directly above the spinal cord only slightly do so. Cortical neurons fire synchronously in a very low-frequency rhythm during NREM sleep. As a result, NREM sleep is characterized by relatively steady heart and breathing rates, and exceedingly seldom vivid dreams (Siegel 2003: 92).

The medulla and basal forebrain govern NREM sleep generators, whereas the pons and basal forebrain govern REM sleep generators. Neurons in the brainstem reticular formation dorsally and the posterior hypothalamus and basal forebrain ventrally facilitate the nonspecific thalamocortical projection pathway, which provides alertness (Carskadon and Dement 2005: 21). The Suprachiasmatic Nucleus (SKN) is a photosensitive circadian pacemaker that receives inputs from the retina both directly and indirectly. The average human circadian rhythm is 25 hours (24.7 to 25.2 hours on average) (Czeisler et al. 1999: 2180). The signals from the rostral pons and caudal midbrain area reach the diencephalon's paramedian midbrain reticular formation, where they are separated into two and terminate in the thalamus and hypothalamus, which are responsible for wakefulness (Pal and Mallick 2007: 722). The thalamocortical, basalocortical, and hypothalamocortical pathways must next excite the thalamus. The thalamocortical, basalocortical, and hypothalamocortical circuits must then activate the brain (Pal and Mallick, 2007: 722). These excitations are caused by the ascending reticular activating system, and glutamate is the principal neurotransmitter involved. Cholinergic transmissions are sent by the pontomesencephalic tegmental neurons, noradrenergic transmissions are sent by the LC, serotonergic transmissions are sent by the raphe nucleus, and hypocretinergic transmissions are sent by the posterolateral hypothalamus (Pal and Mallick 2007: 723). Glutamate, an excitatory neurotransmitter, is the major neurotransmitter of the ascending reticular activating system and plays an active role in the waking brain (Kalat 2015: 19).

Throughout the night, REM and NREM phases of sleep alternate. When one's impact fades, the other grows stronger and takes oversleep (Carskadon and Dement 2005: 22). After the initial awakening period, the first (N1), second (N2), and third (N3) stages of NREM sleep occur. NREM sleep is categorized into stages N1, N2, N3, with each stage denoting a deeper degree of sleep (Patel et al. 2021). According to studies, over 75% of sleep time is spent in NREM stages, with N2 phase accounting for most of this duration (Malik et al. 2018). N1, N2, N3, and REM make up the first four to five sleep cycles of an average night's sleep (Feinberg and Floyd 1979: 284). An entire sleep cycle lasts between 90 and 110 minutes (Carskadon and Dement 2005: 21). The first REM stage is shorter than the other stages, and as the night progress on, longer REM stages and a corresponding decline in deep sleep (NREM) take place (Patel et al. 2021).

The N1 stage which also called light sleep lasts about one to five minutes and accounts for 5% of total sleep time. The onset of this stage of the lightest sleep occurs when more than half of the alpha waves are replaced by low amplitude mixed frequency (LAMF) activity. Skeletal muscles have tone and breathing usually happens at a normal rate (Patel et al. 2021).

Another stage is N2 also called deeper sleep. As the individual's heart rate and body temperature decrease, this phase of sleep signifies deeper sleep (Gulia et al. 2018: 163). It is distinguished by the presence of K-complexes, sleep spindles, or both. The superior temporal gyri, anterior cingulate, insular cortices, and thalamus all experience sleep spindles, which are brief, intense bursts of neuronal activity that cause calcium influx into cortical pyramidal cells (Nir et al. 2013: 133). It is thought that this mechanism is essential for synaptic plasticity (Dang-Vu et al. 2010: 1590). Numerous studies indicate that sleep spindles are crucial for the consolidation of memory, particularly procedural and declarative memory (Antony et al. 2019:2 ; Stickgold 2013: 850; Wilhelm et al. 2012: 1718). It has been demonstrated that K-complexes have a role in preserving memory consolidation and sleep (Amzica and Steriade 2002: 139). Stage 2 sleep begins with a cycle that lasts around 25 minutes and gets longer each cycle after that, making up finally about 45-50 percent of total sleep.

The next stage is the N3 stage, also called slow-wave sleep (SWS). The signals in this stage, which is regarded as the deepest stage of sleep, are known as delta waves and have a significantly higher amplitude and lower frequency (Patel et al. 2021). The hardest stage to awaken from is this one; some people may not even be awakened by loud noises (over 100 decibels). As people get older, they often spend more time in the N2-stage of sleep rather than the slow, delta-wave slumber.

The last stage is called rapid eye movement sleep or paradoxical sleep. In REM sleep, most brain cells in both the forebrain and brainstem regions are highly active and signal to other nerve cells at rates close to or higher than those seen in the waking state. The overall energy consumption of the brain during REM sleep is just as high as when awake (Siegel 2003: 92; Mignot 2008: 106). During this stage, the brightest vivid dreams take place. Two complementary physiological processes involving neurotransmitters, which are substances that physically transfer impulses from one neuron to another at the synapse, prevent majority of muscle movements during REM sleep. In order to actively deactivate these motor neurons, the brain stops releasing particular neurotransmitters that would otherwise stimulate them. Instead, alternative neurotransmitters are released. Rapid eye movements are possible because this process has no effect on the motor neurons that manage the muscles that move the eyes (Siegel 2003: 92; Williams 2012: 280).

REM sleep alternates with NREM sleep at intervals of 60 minutes in infants and approximately 90 minutes in adults. During REM sleep, the EEG pattern is similar to stage-I sleep, but sawtooth waves called rhythmic theta/delta bursts are occasionally seen in REM sleep (Armitage 1995: 340). In EEG, low-voltage, mixed-frequency activity is associated with very low muscle tone. Rapid eye movements are the only characteristic of this stage of sleep.

1.1.2. Neurobiological Mechanisms of Sleep

A circadian drive (Process C) and a homeostatic mechanism (Process S) that builds up during waking and diminishes during sleep are both included in the model for sleep regulation put out by Borbely and his colleagues (Borbely and Tobler 1985: 43; Achermann and Borbély 2003: 683). Homeostatic process mediates the increase in "sleep pressure" during waking hours and the decrease in "sleep pressure" when a person is sleeping. Along with this, it may also be addressed in the ultradian process, which is sleep-related process that is characterized by the alternating of the two primary sleep phases, non-REM sleep and REM sleep (Borbély and Achermann 1992: 64). The multimodal sleep/wake patterns, internal desynchrony, and progression of daytime drowsiness may all be explained by the interaction of Process S with Process C. There are clear connections between certain brain systems and the processes proposed by diverse theories (Borbély and Achermann 1992: 64).

Evaluation method of the sleep called as polysomnogram, that includes electroencephalogram (EEG), electromyogram, electrooculogram, electrocardiogram, pulse oximetry, airflow, and respiratory effort (Åkerstedt et al. 1994: 157; Patel et al. 2021; Zokaeinikoo 2016: 773). These techniques are often carried out overnight and necessitate at least 6 hours of observation. An EEG specifically uses tiny electrodes applied to the scalp to record brain wave patterns. The standard evaluation for assessing sleep-related respiratory abnormalities such as central sleep apnea, obstructive sleep apnea, and sleep-related hypoventilation/hypoxia or other disorders like narcolepsy, periodic limb movement disorder and nocturnal seizures are all determined by the polysomnogram (Rundo and Downey III 2019: 381; Marino et al. 2013: 1751). To conclude, the first REM cycle starts about 90 minutes after falling asleep. The time between the onset of sleep and the end of the first REM sleep is called a sleep cycle (Pagel and Barnes 2001: 119).

Additionally, there is a structure to individual sleep quality that may be assessed using self-report questionnaires (Talero-Gutiérrez et al. 2008: 54). This kind of evaluation is largely subjective and involves both quantitative factors like sleep length, the frequency of awakenings, and latency as well as qualitative factors like resting mood or imaginative content (Talero-Gutiérrez et al. 2008: 55). The most commonly used scale for measuring sleep quality is the Pittsburgh Sleep Quality Index (PSQI), which consists of 19 items and is grouped into seven components: quality, delay, duration, efficiency and sleep changes, sleeping pill use, and daytime dysfunction (Mendonça et al. 2019: 24528). A proper night's sleep should not be the only focus of a sleep research; daytime performance should also be examined (Anders and Eiben 1997). The Epworth Sleepiness Scale (ESS) has been proposed specifically for that purpose, as a simple method for measuring the general level of daytime sleepiness or sleep propensity in adults (Johns 1992: 376).

As a result, sleep is a key process that allows your body and mind to recover so that you can wake up feeling refreshed and vigilant (Walker 2008: 30). The body can stay healthy and stave off sickness with the aid of adequate sleep (Eugene and Masiak 2015: 35). The body's resilience is boosted by hormones that are released that combat free radicals, such as melatonin. During sleep, most cells, particularly immune system cells, replenish and repair themselves (Carrillo-Vico et al. 2013: 8652). Moreover, the brain cannot function effectively without enough sleep (Eugene and Masiak 2015: 35). People’s capacity to focus, think clearly, and process memories might be hampered by insufficient sleep which can have serious consequences (Horne 1988: 528; Stickgold 2005: 1273; Pilcher and Huffcutt 1996: 318; Yetkin and Aydın 2014: 2). In the light of the current knowledge, getting a good night's sleep is considered as essential to living a healthy life.

In this section, the studies carried out to conceptualize sleep characteristics are included and the processes of the related concept are tried to be conveyed. To conclude, sleep is characterized by different stages with associated autonomous nervous system operations as mentioned above. Sleep is a component of the circadian cycle, and it is an intricate physiological process that is unique to every person and typically lasts for around one-third of the lifespan (Schulz and Salzarulo 2012: 95). In the next section, function of sleep, sleep quality and results of sleep deprivation, which occurs with the decrease of sleep quality, will be given.

1.1.3. Function of Sleep

There have been a lot of theories on how sleep works since the late 20th century (Assefa et al. 2015: 169). Berger and Philips claimed that energy conservation is sleep's principal purpose in the middle of the 1990s (Berger and Philips 1993: 277; Berger and Phillips 1995: 67). The occurrence of REM sleep, which is characterized by heightened brain activity, metabolism, and energy expenditure, presents a challenge to this view. Energy conservation is unlikely to be the primary cause of sleep since the overall quantity of bodily energy conserved during sleep is relatively less compared to alertness (Assefa et al, 2015: 169). Furthermore, Reimund (1994: 232) proposed that sleep serves as a restorative activity by scavenging free radicals that build up in the brain during waking. This does not, however, explain the advantages of REM sleep or the advantages of sleep for other organs. According to Krueger and Obál (1993: 63) and Kavanau (1996: 290), sleep stabilizes usage-related synapses and preserves underused synapses, respectively. According to Jouvet's (1975: 524) theory, sensory and motor circuits mature in a way that is dependent on activity during REM sleep, which favors neuronal activation. This theory, however, primarily addresses REM sleep and ignores the purposes of non-REM sleep. REM sleep was examined by Crick and Mitchison (1983: 111) as a memory eraser that eliminates or diminishes memories of undesirable acts. Moreover, thermoregulatory theory, is supported by data on enhanced sleep following wake-up heat loads, wake-up hypothermia following sleep deprivation, and the intimate relationship between sleep circadian cycles and body temperature (McGinty and Szymusiak 1990: 481). It was discovered more than ten years ago that complete sleep deprivation in rats results in death. Despite significantly more food consumption, these animals are losing weight, which indicates excessive heat loss. For unknown causes, animals passed away within 10 to 20 days rather than if they were given no food at all but were allowed to sleep normally (Siegel 2003: 92). It's unclear if a lack of sleep alone is lethal or if additional symptoms of brain damage are responsible. Human sleep deprivation studies have demonstrated that even little reductions in nightly sleep time led to an increase in tiredness. Being drowsy while operating a vehicle or performing other jobs that needs for continual attention is just as risky as drinking alcohol before performing them (Siegel 2003: 92).

In summary, the above-mentioned theories of sleep function have addressed different aspects of sleep. Although there is no common view on the basic function of sleep, it has been proven that all living things must spend a certain amount of time in sleep and that inadequate has negative effects on general health (Assefa et al. 2015: 170).

1.1.4. Sleep Quality

Sleep is crucial for memory consolidation, physical growth, learning, mood control, and overall quality of life. The feeling of being healthy, vigilant, and ready for a new day is referred as sleep quality (Capellini et al. 2009: 4609). As a result, when discussing variances in the actual sleep experience, the term "sleep quality" is utilized (Carskadon et al. 1976: 1383; Krystal and Edinger 2008: 16). Sleep quality encompasses quantitative measures such as sleep latency, time to fall asleep, sleep duration, and number of times a person wakes up during the night (Krystal and Edinger 2008: 16). Sleep latency is defined as the time between going to bed to sleep and onset of sleep (Littner et al. 2005: 113). Sleep latency and total sleep duration are of central importance in the diagnosis and treatment of insomnia and related sleep disorders (Vanable et al. 2000: 7). According to several research, those who use mobile devices late at night may have worse quality sleep due to the blue light they generate. Since majority of mobile devices emit blue light in the 400–495 nm and 460–480 nm ranges, which might impair melatonin synthesis and induce a phase shift in the human circadian clock (Rask et al. 2001: 1418; Rüger et al. 2013; Rafique et al. 2020: 357). Long sleep latency and sleep problems have both been linked to decreased melatonin levels (Chang et al. 2015: 1233).

Another factor affecting sleep quality is implementation of sleep hygiene. The term "sleep hygiene" refers to a set of behavioral habits that are both beneficial for improving sleep quality. These include having regular bedtimes and wake-up times, limiting alcohol and caffeine intake, engaging in regular exercise, eating healthy, and taking advantage of environmental elements that promote good sleep (Lichstein and Morin 2000: 46; Knufinke et al. 2018: 79).

Adults who have continuous sleep deprivation have poor sleep quality, which may raise their risk for health issues and impair their ability to think clearly and perform well in school and at work (Liu et al. 2013: 1421; Doi et al. 2003: 467). To determine whether indicators of health, happiness, and fatigue were more strongly associated with the quantity or quality of sleep, a seven-day sleep diary and other questionnaires about health, happiness, and drowsiness were given to participants (Pilcher et al. 1997: 586).The findings indicate that, compared to people with normal sleep quality, participants who slept an average of 7 hours per day had superior associations with health, affect balance, life satisfaction, emotions, melancholy, anger, weariness, and uncertainty.

Consequently, lack of sleep has been linked to a deterioration in cognitive performance, immune system, attention problems, deterioration in basic human functions and high blood pressure. Moreover, numerous experimental research has demonstrated that decreased cognitive performance is a result of sleep deprivation (Howell et al. 2004: 525; Harrison and Horne 2000: 236).

1.2. EXECUTIVE FUNCTIONS

Executive functions (EF) are high-level cognitive processes that facilitate new behavioral patterns and optimize one's approach to unfamiliar situations (Gilbert and Burgess 2008: 113). The prefrontal cortex, which is responsible for controlling and supervising the functioning by observing the activations in other cortical and subcortical structures and sending command signals known as top-down signaling to ensure the regular operation of multiple neural systems, is a crucial structure for executive functions (Funahashi and Andreau 2013: 475). EFs enable us to manage our relationships, plan future goal comprehends difficult or abstract concepts, and solve previously unsolved problems (Cristofori et al. 2019: 199). How we organize our lives, how we plan and then implement these plans is largely driven by EFs (Lezak 1982: 195). There is consensus that there are three basic EFs (Diamond 2013; Lehto et al. 2003; Lezak 1982; Miyake et al. 2000) namely, inhibition, working memory and cognitive flexibility.

Diamond (2013: 137) defines inhibition as the capacity to control one's automatic reactions to overcome significant internal or external pull, working memory as the capacity to retain knowledge in order to enable task completion and cognitive flexibility is the capacity to think about several sources and types of information at once and to transition between them when performing a task. Since EFs are largely independent activities, not all are impacted equally; genetics (Thibeau et al. 2016: 6) or lifestyle choices may have an impact on age-related EF reduction (Miyake et al. 2000: 52).

EFs have diverse aging and developmental patterns, with early adulthood seeing prolonged growth (Luna et al. 2010: 112). As people become older seeing a drop brought on by structural and functional alterations in the prefrontal cortex (Paus 2005: 61; Luna et al. 2010: 112). Ferguson and his colleagues (2021: 2) noted a steady increase in working memory ability from youth to early adulthood, which was followed by reductions in both inhibitory control and working memory beginning around the age of 30 to 40 and lasting until later. Moreover, with aging changes in sleep patterns are specifically connected to total sleep duration, sleep continuity, and slow-wave sleep (Ohayon et al. 2004: 1256). A shift in the sleep-wake cycle appears to be a side effect of aging. Changes in prefrontal regions and their connections might help to explain some of the difficulties in performing executive tasks (Morterá and Herculano-Houzel 2012: 6). As mentioned above, findings indicate that the age factor is important in the functioning of executive functions. On the basis of previous literature, while investigating the effectiveness of executive functions, it seems extremely important to include only young adult individuals in the study in order to eliminate cognitive impairments that develop due to aging.

The prefrontal regions are vulnerable to inadequate sleep which is harmful for the brain regions' that has a role in EFs (Thomas et al. 2000: 350). It is understood from literature findings that sleep has an important impact in EFs. Moreover, not only aging and sleep but also stress has negative effect on executive functions (Shields et al. 2016: 792). Stress is assumed to be one of the causes of impairment in executive functions (Diamond 2013: 153; Shansky and Lipps 2013: 123). Shields, Sazma, and Yonelinas (2016: 792) concluded from their meta-analysis research that stress impairs WM, inhibition, and cognitive flexibility. Additionally, they highlighted that stress enhances response inhibition (Schwabe et al. 2013: 2319) which means that it leads to a cognitive state of automatic and reactive processing. Lower level of stress also improves executive motor function, which should make it simpler to connect with or withdraw from the current stressor (Shields et al. 2016: 652). To elaborate, attention is influenced by both the top-down process—the immediate motivation of the observer—and the bottom-up process, the salience of the stimuli and no matter where the information comes from. Research has shown that people tend to focus on whatever is evoking the most emotion at the time (Katsuki and Constantinidis 2014: 516). For instance, according to Mogg et al. (2000: 382), when exposed to highly frightening stimuli relative to less threatening stimuli, Subject display a bias towards threating stimulus.

In the line with the theoretical background, it has been noted that there is a strong relationship between executive functions, psychological distress, and sleep. In order to identify and analyze any impairment, the neuropsychological examination should cover a variety of executive function domains. To conclude, sleep and stress seem to have an important role on executive functions, which will be discussed in more detail in the following sections.

1.2.1. Inhibitory Control

Inhibition control can be defined as the ability to resist the strongest response bias (Dowsett and Livesey 2000: 162). In other words, it provides an extraordinary flexibility and freedom to choose and control our actions (Diamond 1990: 637). There are two different inhibition processes, interference control and response inhibition (Diamond 2013: 141). Inhibition of thoughts and memories in interference control is called cognitive inhibition, while inhibition at the attention level is called selective and focused attention. Response inhibition refers to the ability to suppress inappropriate, irrelevant, or inadequate actions (Zeigler-Hill and Shackelford 2020).

Inhibition is considered essential for EF, and most inhibition tasks do not involve purely inhibition measures and do not benefit from a single inhibition process (Simpson and Riggs 2005: 483). Goals need to be kept in mind to know what is relevant or appropriate and what to inhibit. By focusing particularly intensively on information held in mind, the possibility of this information to guide behavior is increased, thus reducing the possibility of an inhibitory error, and working memory is required for all these processes (Carlson et al. 2002: 79). As mentioned above, inhibition is identified by many researchers as a key executive function. However, Barkley (1997, as cited in Cheung et al. 2004: 395) suggested that behavioral inhibition should be studied separately from executive functions. According to him, executive functions are divided into four as nonverbal working memory, verbal working memory, self-regulation of affect, and reconstitution emphasizing that any change in behavioral inhibition impairs executive functions. Furthermore, inhibition of an initial dominating reaction, stopping a continuing response, and maintaining a latency without being disrupted by competing events and responses are the three processes that make up behavioral inhibition, according to Barkley. There are different methods to measure inhibition control such as Stroop test, Flanker test, stop-signal task and go/ no-go task are among the main tests used to measure inhibition control (Karakaş 2013).

1.2.2. Working Memory

Working memory refers to the cognitive processes involved in temporarily storing information while a person is simultaneously processing incoming information or retrieving information from long-term storage (Karakaş and Karakaş 2000: 216). Processes such as mentally rearranging elements, translating instructions into action plans, incorporating new information into thought or action plans, evaluating alternatives, and deriving a general principle, or mentally relating information to see relationship between items or ideas all require working memory (Diamond 2013: 143). In addition, our ability to see connections between seemingly unrelated things and to separate different elements from the whole is critical for considering our past experiences and future hopes that we remember when making plans or decisions (Simms et al. 2018: 174).

Inhibitory control and working memory might be considered as two mechanisms that complement one another. To recognize what is suitable and what is unimportant, one must keep their aims in mind (Diamond 2013: 147). This knowledge directs the person's actions and helps him/her lower his/her mistake rate (Diamond 2013: 147). For example, in the go/nogo task, which is one of the most basic tasks used to measure inhibition, there are two situations as act and no act. However, it is necessary to keep in mind in which case which process will be processed (Rubia et al. 2001). Additionally, Bull and Scerif (2001: 289) used the Wisconsin Card sorting task to assess EF working memory and the findings demonstrate a link between poor task performance and deficits in working memory and inhibition. Since maintaining knowledge properly and rapidly in potentially distracting situations is crucial, it appears that there is a connection between inhibition and working memory (Fernandes

2017). In the current study, no direct assessment of working memory was taken, but it is considered that working memory will be a complementary mechanism for the Go/No-go and Task Switching tasks to be used in inhibition and cognitive flexibility measurements.

1.2.3. Cognitive Flexibility

Cognitive flexibility can be defined as a person's awareness of the availability of options and alternatives in any situation, willingness to be flexible and adapt to the situation, and self-efficacy to be flexible (Martin and Rubin 1995: 625). It occurs as a property of EF and is typically a structure measured in the laboratory using shifting or task switching behavior paradigms (Dajani and Uddin 2015: 573).

Another feature of cognitive flexibility is that it allows the perspectives to be changed spatially or cognitively. For the person to change his perspective, he must block (inhibit) his previous perspective and load a different perspective into the working memory or activate the existing one (Braem and Egner 2018: 472). It is believed that for a mental state to change, to alter the present perspective inhibition and to actively comprehend the new perspective working memory are required (Diamond 2013: 143). Additionally, since the other two EF sub-skills are dependent on cognitive flexibility, the evaluation of cognitive flexibility alone can be difficult since the decline of one sub-skill impacts the other (Nweze and Nwani 2020: 124). Therefore, task-switching and set-shifting tasks are generally used to measure cognitive flexibility (Dennis and Vander Wal 2010: 243).

Shifting between different conditions are frequently studied using the task switching paradigm (Miyake et al. 2000: 56). The task change condition is one of them; in this condition, participants are required to transition between the two situations quickly. A trial block of one of the two tasks and a block of the other task are repeated under the repetitive condition. The task switch cost is calculated by comparing task switching to task repetition, and this provides details about a person's cognitive abilities and capacity for situational adaptation (Genet and Siemer 2011: 396). Additionally, it has been suggested that there is a connection between executive function deficits and emotional dysregulation, and impairment in cognitive flexibility are linked to both depression and rumination, which are maladaptive thought patterns that draw attention to one's unpleasant emotional state (Whitmer and Banich 2007: 548).

1.2.4. Attentional Bias

For the adaptation process of humans, selective attention to appetitive and aversive stimuli is important (Cisler and Koster 2010: 204; Koster et al. 2006: 635; Zvielli et al 2015: 773). According to the theories, it is suggested that selective attention will be allocated to emotionally evocative information, so fast and early processing of motivational information is functionally very important. (Hester and Luijten 2014: 231; Schäfer et al. 2016: 638; Zvielli et al. 2015: 774). Attentional bias can be associated to a group of information processing biases that underlie a variety of addictions (Luijten et al. 2012: 2772) and anxiety (MacLeod and Grafton 2016: 69). For instance, fear facilitates individuals' perception of danger from the environment and helps organisms respond effectively to threatening situations (Bar-Haim et al. 2007: 1). Researchers revealed that those with high anxiety sensitivity were more likely to engage in threatening information compared to those with low anxiety by using different assessment tasks (Cisler and Koster 2010: 212; Mathews and MacLeod 2005: 167). For example, in a study of children with asthma and anxiety disorders, it was investigated whether these children display attention biases towards threatening stimuli. In addition to self-report and parent-report questionnaires for measuring child asthma and anxiety variables, a visual dot-probe task was used to measure attentional bias. The results show that children with anxiety disorders exhibit poorer attentional control and there is a significant association between reduced asthma symptoms and an attentive bias towards asthma stimuli (Dudeney et al. 2017: 1644).

Two complementary cognitive approaches can be mentioned for pathological anxiety (McNally 2001: 518). The first of these is the traditional approach, which argues that pathological anxiety is the basis of one's false beliefs (Beck et al. 2005). The other approach uses cognitive science to reveal the underlying causes of anxiety disorders based on theories of experimental psychology (Harvey et al. 2004: 46). However, there are some controversial opinions regarding these two approaches due to the fact that reaction time and observational self-report measures are not sufficient to measure attentional bias for threat (McNally 2001: 518; McNally 2019: 7). Despite all these controversial views, the experimental approach consists of two different research paradigms regarding content-related cognitive biases and deficiencies in content-independent biases (McNally 2019: 7).

Early studies on this field focused on paradigms that assess attention, interpretation, and memory to explain the biases that support the processing of threat-related information. However, because anxiety disorder patients may perceive uncertainty as threatening and selectively recall threatening experiences, there may be a possibility of experiencing recurrent episodes of distress. Therefore, it is very important to identify the difference between the procedure and the process itself to measure a latent cognitive process (MacLeod and Clarke 2015: 59; McNally 2019: 11; Cisler and Koster 2010: 212). Another research approach argues that emotional disorders may occur due to cognitive deficits, ignoring the emotional value that the information processed by the person (Eysenck and Derakshan 2011: 957). Moreover, difficulties in executive control over attention might lead to difficulties that inhibit attention to threat, which is an indication that the two research approaches are interrelated (McNally 2019: 11).

1.3. RELATIONSHIP BETWEEN SLEEP AND EXECUTIVE FUNCTION

Lack of sleep can impair a person's emotional and cognitive functioning, which will impact their social and professional performance (Leger et al. 2014: 143; Fabbri et al. 2021: 1082). A concept put out by Beebe and Gozal (2002: 14) connected frontal brain dysfunction, hypoxia, and sleep disruption. According to the model, sleep disruption, nocturnal hypoxemia, and hypercarbia lessen the efficiency of sleep-related restorative processes. This results in a range of biochemical and cellular stressors, disrupts functional homeostasis, and changes the survival of neurons and glia in certain brain areas. According to the hypothesis, these biochemical and cellular processes are principally responsible for the malfunctioning of the cerebral cortex's anterior areas. It's crucial to understand that injuries to brain areas other than the frontal cortex can also cause executive dysfunction. For example, among the daytime symptoms of apnea in people with obstructive sleep apnea syndrome (OSAS), the most striking ones are cognitive disorders such as forgetfulness, memory deficits, attention deficit and concentration disorder (Torun Yazıhan et al. 2007: 85). This executive dysfunction typically occurs in higher-risk situations, including social interactions, traffic, and work-related tasks (Beebe and Gozal 2002: 14). Therefore, as part of a neuropsychological assessment, executive skills should always be assessed.

Rana and her colleagues (2018: 67) conducted a study with 1220 middle-aged male twins to examine the relationship of sleep quality between memory and executive functions of middle-aged adults. In this study, while the sleep quality of the participants was examined with the Pittsburgh Sleep Quality Index, executive function performances were evaluated with tasks such as inhibitory and interference control, set changing and episodic memory. In conclusion, visuospatial episodic memory accuracy was substantially correlated with sleep quality but not verbal episodic memory accuracy. In addition, when executive functions were correlated with memory processes, sleep quality was related to three of the four executive functions. These include working memory updates, working memory demands, and adjust shifting in a task with episodic memory tampering resistance.

In a study conducted by Benitez and Gunstad (2012: 220) with 67 healthy young adults using PSQI, the relationship between sleep quality, personality and executive functions was examined. The findings demonstrated a correlation between low levels of sleep quality (i.e., general sleep quality, length, and drug usage) and greater levels of sadness and anxiety, as well as poor performance on attention and executive function. Another study was conducted with 23 healthy participants to examine the effects of sleep deprivation on executive functions (Tucker et al. 2010: 48). A battery of tasks including a modified Sternberg task, a questioned recall task, and a phonemic verbal fluency task were used to assess executive functions. In the study, it was shown that sleep deprivation reduced the performance of dissociated non-executive components of cognition in executive function tasks, such as control task performance. Additionally, sleep deprivation had no discernible effects on the executive functions of working memory scanning activity or resistance to proactive intervention.

According to a study conducted by Walker and colleagues (2002: 205), the amount of NREM sleep the night before and cognitive function measures were significantly positively correlated. A total of 62 participants were instructed to practice on the motor skill task in this research. Participants who trained at 10:00 in the morning did not performed better when evaluated again 12 hours later. However, they significantly improved by 18.9% at 10:00 the following morning. Similar to this, after just 12 hours of training, those who trained at 10 p.m. shown a substantial improvement of 20.5%. Additionally, they claimed that only one night of sleep was necessary for a motor skill task to observe improvement. This development was especially noticeable in the 2nd NREM phases occured in the last third of the night.

Based on some studies, lack of sleep has been associated with not only executive functions but also attention regulation difficulties, impaired cognition, delayed reactions (Wilckens et al. 2014: 658) and mood abnormalities (Selvi et al. 2007: 244). The medical literature also states that characteristics including gender (Orzech et al. 2011: 617), academic achievement (Cates et al. 2015: 9), general health, socioeconomic situation, and amount of stress (Saygılı et al. 2011) might have an impact on a person's ability to sleep.

1.4. COVID-19 INTRODUCTION

In December 2019, a disease like pneumonia cases began to occur in Wuhan City, Hubei Province, China (Atalan 2020: 38; Saglietto et al. 2020: 1110). Research has revealed that the emerging cases are a new type of coronavirus that was previously unknown, and this virus in the new form has been named Coronavirus 2019 or COVID-19 because it appeared in 2019 (Atalan 2020: 41). The origin of the virus is thought to be the Huanan seafood market in Wuhan city and although, it was thought to be transmitted only from animal to human at first, it was understood that the virus could be transmitted from human to human with the fact that the virus started to be seen in people who did not visit the seafood market (Shereen et al. 2020: 96). It is known that the pathway of transmission of COVID-19 from person to person is similar to the scattering of droplets, which is the principle of transmission of respiratory diseases. In such cases, it is known that a sick person may be very likely to infect the people around them by coughing or sneezing, so environmental factors play an important role in the transmission of the virus (Cássaro and Pires 2020: 138834; Saadat et al. 2020: 138870; Vardoulakis et al. 2020: 1). The COVID-19 outbreak is spreading very rapidly, and according to the data of the World Health Organization (2022), more than 600 million people have been reported to infected by the coronavirus so far. In many parts of the world, restrictions affecting most of life were in place to prevent or reduce the spread of the coronavirus, and people are expected to comply with hygiene rules (Nakada and Urban 2020: 139087). Some of these restrictions were working from home, school vacations, quarantine, and lockdown in areas with a high number of cases (Hensher et al. 2021: 65; Pietrobelli et al. 2020: 1382). When all these restrictions were taken into consideration, it is inevitable that disruptions affected functioning of daily routines and accordingly changes in cognitive functioning (Ingram et al. 2021: 935).

1.4.1. Effects of COVID-19 on Sleep Characteristics

The duration of the restriction due to COVID-19 varied according to the course of the epidemic and the countries, and some countries have had to extend the lockdown by days, which caused the population to be intensely affected (Atalan 2020: 40). It is expected that radical changes in daily life and fear of contamination create stress on individuals and seriously affect mental health and sleep (Voitsidis et al. 2020: 113076). For example, a total of 2,427 people participated in a study conducted with Greek population. They were asked to participate in various online questionnaires such as contact with COVID-19 and COVID-19-related negative attitudes, Athens Insomnia Scale (AIS), the Intolerance to Uncertainty scale (IUS), and the Patient Health Questionnaire-2 (PHQ-2) Depression Scale. The results showed that 37.6% of the participants suffered from sleep problems, and if people live in urban areas, they were more vulnerable to sleep problems. Furthermore, participants who were not sure that they or their relatives have contracted the virus showed higher insomnia scores compared to other participants (Voitsidis et al. 2020: 113076).

In another study conducted with 2291 Italian participants, the effects of the COVID-19 outbreak on sleep quality, general anxiety and psychological distress were investigated (Casagrande et al. 2020: 12). The results show that 57.1% of the participants experienced poor sleep quality, 32.1% experienced high anxiety and 41.8% experienced high distress. Additionally, women, younger participants, and participants who had worries about being infected with COVID-19 were found to be more likely to develop sleep disturbances, high anxiety, and distress.

A study conducted by Beck and his colleagues (2021: 117), researchers investigated the prevalence of sleep problems in the general population of France during the COVID-19 period. In the study, the participants were asked to evaluate their sleep covering the previous 8 days, 49% reported that they had sleep problems, and 74% of the participants who re-evaluated after 2 weeks of lockdown reported that they had sleep problems. Female participants reported more sleep problems compared to male participants. Additionally, younger participants reported more sleep problems than older participants.

Another study showed that during COVID-19 lockdown, people started woke up later and spent more time in bed as their sleep habits changing but their quality of sleep was worse. In addition, it was found that the relationship with the increase in sleep difficulties was stronger in people with high levels of depression, anxiety, and stress (Cellini et al. 2020: 13074). In another study, data were collected from 2272 participants (1622 Italians and 650 Belgians), using an online questionnaire. The aim of the study was to figure out how the duration of lockdown affects reported sleep characteristics in Italians and Belgians, specifically in terms of sleep duration and subjective quality (Cellini et al. 2021: 112). Participants were asked to report their perceived sleep quality and sleep patterns retrospectively throughout the quarantine. According to the results of the study, both Italian and Belgian participants had delayed sleep times and increased time spent in bed, moreover their sleep quality was significantly impaired. Furthermore, women, individuals in a more negative mood, and those who perceive the pandemic situation as highly stressful were found to be the most vulnerable.

Nationally representative sleep patterns from previous years and during the pandemic were examined in a study investigating pre- and post-COVID-19 sleep features in the United States. The average sleep length did not vary between 2018 and 2020, but shorter sleep duration and a higher number of days of difficulty falling asleep, remaining asleep, and feeling tired were shown to be more common in 2020. In addition, Adults' sleep health in the United States was poorer in 2020 than it was in 2018, particularly among those under the age of 60 (Hisler and Twenge 2021: 113849).

Flexibility in schedules due to social constraint resulted in changes in wake and bedtime (Targa et al. 2021: 1055). Recent studies have shown that people awaken and sleep later under quarantine, potentially had a risk of using digital devices just before bed (Gupta et al. 2020: 374). In addition, less exposure to sunshine, reduced daytime activity, and altered mealtimes may disrupt circadian rhythms, which in turn influence sleep (Silva et al. 2020: 612; van de Langenberg et al. 2019: 17). Additionally, mood fluctuates were considerably during this period, which was directly connected to sleep quality (Lian et al. 2019: 2265; Liu et al. 2020: 112921).

1.4.2. COVID- 19 and Executive Functions

Empirical evidence show that Covid-19 may affect certain people's cognitive ability to think rationally (Houben and Bonnechère 2022: 7748). In research conducted by Alemanno and his colleagues (2021), the Mini Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA), the Hamilton Depression Rating Scale, and the Functional Independence Scale were used to assess cognitive abilities of 87 patients with COVID-19 (FIM). According to the results 80% of the 87 patients were found to have cognitive deficits, and 43 percent of those who improved after a month did so because of signs of post-traumatic stress disorder. Additionally, distraction, which has been observed to increase during the COVID-19 pandemic, caused by anxiety and stress, which limit a person's cognitive resources (Boals and Banks 2020: 255).

Based on the correlation between the COVID-19 period and psychological conditions, a study including 90 Italian volunteers examined alterations in executive function in patients with post-traumatic stress symptoms (PTSS). According to the findings of the study, participants with high PTSS demonstrated deficits in inhibiting dominant responses measured with the Stroop task and the Go/No-Go task (Favieri et al. 2021: 170).

According to a study by Cannito and his colleagues (2020: 1), higher health anxiety (HA) was predicted by an attentional bias paradigm by using a visual dot probe tests included virus related stimuli. This study based on the fact that the rapid spread and contagion of COVID-19 increases health anxiety (HA) in humans. Results indicated that HA level predicted a preference and bias for things connected to viruses. Another study with 286 individuals sought to add to the body of research supporting the COVID-19 anxiety syndrome concept (Albery et al. 2021: 1367). In order to predict the levels of generalized anxiety and depression, they compared the COVID-19 anxiety syndrome with personality, health anxiety, and COVID-19 anxiety measures. They also found a correlation between higher COVID-19 psychological distress scores and health anxiety scores by means of attentional bias towards COVID-19-related stimuli.

1.5. PSYCHOLOGICAL DISTRESS

Today, anyone might face the psychological conditions such as depression, anxiety, and stress (Bilgel and Bayram 2014: 1153; Mirowsky and Ross 2017). Distress might be analyzed under two basic categories as depression and anxiety and is characterized as an uncomfortable subjective state (Mirowsky and Ross 2017). Depression is the inability to move on from feelings of sadness, depression, loneliness, hopelessness, or worthlessness (APA 2022; Seel et al. 2003: 181). It is also characterized by death wishes, difficulty sleeping, sobbing, and a sense that everything is an effort (Kessler et al. 2014). Depression has an impact on a person's thoughts, feelings, and ability to manage everyday tasks like sleeping, studying, eating, or working (Kessler et al. 2014). Anxiety is characterized by tension, restlessness, worry, irritability, and fear (Szabó 2011: 102). People with high anxiety levels may struggle to focus, have stomach issues, sleep issues, appetite issues, and have a challenging time managing their anxiety (Trill 2013: 216). Anxiety and stress are two very related concepts (Spielberger 1966: 4). Stress might be defined as an internal condition of the body known as stress encompasses psychological, physiological, and cellular responses (Mason 1975: 24). Stress also might be defined as the body's general response to demands or challenges of any kind, whether they be psychological or physical (Selye 1956: 525). While anxiety is driven by feelings of anxiety and conditions that we see as threatening, accompanied by external factors such as academic achievement and relationships; It is a situation in which feelings of stress, anxiety, disappointment, and impatience prevail and are accompanied by cognitive distortions (Amstadter 2008: 213).

1.5.1. Depression

From childhood through maturity, negative life experiences have a significant impact on how depression develops (Lin et al. 2013; Yetkin and Özgen 2007: 4). The cognitive triad model, which Beck uses to explain depression, contends that a person's perceptions of himself, the outside world, and the future become negatively distorted (Beckham et al. 1986: 566). The negative self-perceptions that a person has, such as believing they are insufficient, deficient, ill, or imperfect, make up the first aspect of the cognitive triangle (Anderson and Skidmore 1995: 603). These people frequently believe they are worthless than others and feel completely unworthy. The second factor is the individual's propensity to adversely perceive their events. For the individual, the world is seen as a place filled with challenges, that is unable to handle (Beck 1970). Finally, the last factor includes the person's pessimistic outlook on the future. It is the unfavorable conviction that one's problems will never end. External variables including upbringing, social situation, cultural issues, poor education level, and life stress may also be significant contributors to depression in addition to cognitive theories (Saveanu and Nemeroff 2012: 51). Depression might happen spontaneously, without a cause, as a side effect of another illness, drug, or alcohol use, postpartum, or as a response to a traumatic experience (Hasler 2010: 157). It may cause decreased appetite, sleep disturbances, decreased libido (Davidson and Turnbull 1986: 445) psychomotor changes (Buyukdura et al. 2011: 398) and deterioration in cognitive functions (Steffens and Potter 2008: 169).

1.5.2. Anxiety

Anxiety might be defined as a sensation of unpleasant suspense brought on by the tight, disturbing expectation of a potentially dangerous yet ambiguous occurrence (Rachman 2004). Anxiety might manifest itself in many different forms, impacting a person's emotions, provoking unfavorable thoughts, and producing unpleasant bodily sensations (Blanchard et al. 2008: 3). In terms of time, it has a tough beginning and an unclear finish (Rachman 2004). State anxiety, which is experienced in response to a perceived threat in a specific situation, and trait anxiety, which depends on how an individual perceives the world and responds to it, are the two categories of anxiety (Leal et al. 2017: 154). These two types of anxiety are highly correlated with one another depending on how they develop and how intense they are.

People who struggle to regulate their anxiety may have trouble focusing, Gasyroimstestinal problems, sleep problems, and may feel tight, weak, and irritated (Emmelkamp and Ehring 2014: 11). Furthermore, studies demonstrate that anxiety of any kind has a detrimental impact on cognitive tasks (Eysenck 1985: 580). Whatever the anxiety-inducing circumstance is the person may respond differently in different conditions. It is crucial to comprehend the anxiety-provoking circumstance because mental processes like thinking, emotion, and memory are employed to consciously cope with the anxiety-provoking event by assisting the person in acting consciously (Emmelkamp and Ehring 2014: 6). However, defense mechanisms against anxiety might unconsciously employed (Waqas et al. 2015: 1). These defensive systems come in a variety of configurations depending on the level, type, and length of the anxiety as well as the growth and traits of the layers that make up the personality (Blaya et al. 2006: 186). Some of them are adaptive and effective defensive mechanisms that contribute significantly to personality development and the preservation of mental health (Emmelkamp and Ehring 2014: 11). Recent studies have shown that individuals who are typically distressed selectively pay attention to danger cues (Barnard and Chapman 2016: 105; MacLeod et al. 2019: 549). Pre attentive processing can exacerbate the danger and contribute to the beginning of anxiety (MacLeod et al. 1986: 15), making it a possible treatment target for the person (Lau and Waters 2017: 391).

1.5.3. Stress

According to Mason (1975: 23), stress is an internal condition of the body characterized by cellular, physiological, and emotional responses. Since stress is a personalized phenomenon that may vary across individuals, depending on the person's fragility and resilience, its meaning varies for people under different conditions such as different age, gender, education level, income level. (Fink 2016: 4). Unpleasant emotional experiences, which are frequently represented by certain stress-related emotions, such as anxiety, anger, sorrow, envy, fear, guilt, and humiliation, are the source of stress (Lazarus 1991: 148).

When under danger, a person automatically responds with a "fight or flight" response to defend themselves or acts swiftly in response to stress; as a result, hazardous situations are either overcome or the individual is protected by avoiding them (Goldstein 2010: 1433). Which coping strategy an individual exhibits depends on how he assesses the input. Anxiety and depression may both arise if the stimulus is perceived as a danger that threatens to upset the biopsychosocial balance of the person (Selye 1976: 123). In addition to depression and anxiety, stress might cause sleep problems, heart diseases, eating disorders and a more sensitive immune system (Salleh 2008: 9). Stress may have a detrimental impact on how well the brain functions (McEwen and Sapolsky 1995: 206).

1.5.4. Effects of Psychological Distress on Sleep

Increases in psychological distress have frequently been linked to unpleasent, unexpected, and stressful life events (Thoits 1983: 33). Life events are characterized as objective occurrences that seriously reorganize a person's behavior and disturb or threaten to disturb their usual sequence of activity (Simons et al. 1993: 584). It is suggested that the anxiety experienced during the COVID-19 is accompanied by increased concern about resolving its long-term personal and societal effects (Peteet 2020: 2203). These unfavorable feelings impact sleep as well (Shen et al. 2018: 2584).

In a study conducted in January 2020 with the participation of 170 participants, it was aimed to investigate the effects of social capital, which refers to networks that facilitate cooperation and coordination between individuals and groups., on sleep quality during the COVID-19 pandemic. Personal Social Capital Scale 16 (PSCI-16), anxiety using the Self-Rating Anxiety Scale (SAS), stress using the Stanford Acute Stress Reaction (SASR) scale, and sleep quality of the participants using the Pittsburgh Sleep Quality Index (PSQI). The results show that anxiety is associated with stress and decreased sleep quality, and that the combination of anxiety and stress reduces the positive effects of social capital on sleep quality (Li et al. 2020: 2032). It is believed that one of sleep's primary purposes is to restore health and refresh people while also repairing tiny everyday harm (Adam and Oswald 1977). According to studies, poor sleep quality increases the risk of several mental health problems, particularly depression and anxiety (Woods and Scott 2016: 44; Okun et al. 2018: 703; Hyun et al. 2021: 54). Additionally, because sleep irregularities are risk factor for suicidal ideation and suicide attempts, sleep problems are linked to both depression and suicide at different ages (Porras-Segovia et al. 2019: 39).

1.5.5. Effects of Psychological Distress on Executive Functions

There is research that suggests that psychological distress might impair executive functions because it changes the brain's capacity for concentration, clear thinking, and decision-making (Shields et al. 2016: 665). As well as numerous research have established the detrimental impact of stress and anxiety on cognitive abilities (Visu-Petra et al. 2013: 649; Snyder et al. 2014: 897; Banks and Boals 2017: 1023; McHugh Power et al. 2020: 1071). Anxiety interacts cognitive processing's key dimensions, including awareness, attention, perception, judgment, and memory

(Rachman 2004). Studies have typically shown that mental performance can be hampered by excessive levels of anxiety (Ashcraft and Kirk 2001: 224).

A lexical decision-making task with distracting neutral and threat terms was employed in a study by Calvo, Gutiérrez, and Fernandez-Martin (2012: 66) to examine the impact of anxiety. An unrelated study word was delivered either 300 ms or 1000 ms following the distractor in either supervised (foveal) or unsupervised (parafoveal) settings. The findings demonstrated that group differences were only apparent when the distractor was a threat phrase delivered at a fixation point that had been observed. The high-anxiety group had greater distractor intervention than the low-anxiety group when the poll word was offered at 1000ms, but at 300ms, there was no difference between the groups. In essence, it demonstrates how anxiety impacts the way the inhibitory function works while distractions are being watched. Additionally, it was suggested that high anxiety required a longer distraction intervention than low anxiety.

Daily stresses might have a detrimental effect on cognitive performance (Miguel 2012). The prefrontal cortex region, which has a high concentration of stress hormone receptors, and other sections of the temporal lobe that are crucial for cognition, like the hippocampus and amygdala, are all significantly impacted by stress (Arnsten 2009; Yaribeygi et al. 2017). In a study conducted with 30 volunteer female participants, 15 of the participants were included in the control group and 15 in the stress group. The results suggested that negative and repetitive thoughts increase when stress occurs (Horowitz and Becker 1971). The control group watched the comedy "The Runner," in which a runner travels by his house and recalls it without any upsetting incidents. On the other side, the stress group saw the more upsetting film "Subincision," which had depictions of bodily harm, nudity, harassment, and blood. After then, both groups reported their own sensations and ideas. Comparing the participants' intrusive, unfavorable thoughts after viewing the stressful movie to those of the control group who saw the less stressful movie, the findings revealed an increase. The ability to repress unwelcome thoughts, which is a sign of cognitive impairment, is found to decline as intrusive thoughts increases (Diamond 2013: 149). It is important to note that depending on the intensity and persistence of the psychological distress, these effects may differ from person to person.

1.5.6. Psychological Distress During COVID-19

As mentioned above, due to the mandatory restrictions made during the COVID-19 period, people had to create a new routine by disrupting their usual order. During this time, a lot of people experienced loneliness, uncertainty, fear of getting sick, spiritual distress, and sadness (Peteet 2020: 2203). Additionally, numerous areas of everyday life have been affected by the epidemic and the methods used to stop its spread, such as lockdown and social isolation, which have left many people feeling stressed and anxious (Choi et al. 2020). During the COVID-19 period, those who contracted the virus or lost loved ones due to the virus had to experience grief and suffering, those who were lonely or lost their jobs, felt financially alone and vulnerable. In addition, the unknown nature of the disease is thought to cause stress and anxiety (Bertuccio and Runion 2020). Furthermore, it is thought that long-term impacts of stress include the expediting the cognitive deterioration in a number of domains, including the capacity to focus and pay attention (Scott et al. 2015). For this reason, it seems important to detect the psychological problems experienced by people during the COVID-19 period and to investigate their effects on cognitive functions that may develop accordingly.

1.6. CURRENT STUDY AND HYPOTHESIS

Epidemic has had a negative impact on people's mental health, which may result in psychiatric crises (Hall, Hall and Chapman 2008). Studies demonstrate that deterioration in anxiety, depression and stress levels have negative impacts on the executive functions of the person (Shields et al. 2016: 651). The COVID-19 pandemic has caused significant stress and disruption for many people, leading to increased rates of psychological distress and sleep problems (Fiorenzato et al. 2021). In the light of previous findings, in the current study, the Brief Symptom Inventory (BSI-53), which is a self-report scale, was used to measure general psychlogical symptoms of the participants (Derogatis and Melisaratos 1983), Depression, Anxiety and Stress Scale (DASS-42) was used to measure the symptoms of depression, anxiety and stress (Lovibond and Lovibond 1995), and the Coronavirus Anxiety Scale (CAS) was used to evaluate the dysfunctional anxiety due to coronavirus (Lee 2020).

Age seems to be an important factor in studies measuring the functioning of executive functions. Studies show that executive function performance declines with increasing age. In particular, while an increase in memory skills was observed in the period until adolescence and early adulthood, a decrease was observed in both memory and inhibition functions in the period that started at the age of 40 and continued thereafter (Ferguson et al. 2021: 15). It has been noted that sleep disturbances are more common due to aging and pathological aging is associated with a rise in sleep disturbances (Gadie et al. 2017).

Additionally, poor sleep quality due to aging leads to excessive daytime sleepiness (Fortier-Brochu et al. 2012), and cognitive impairments (Martella et al. 2011). Based on these studies, the current study's sample consisted of healthy adults aged 18-40 years. In the light of studies emphasizing changes in sleep characteristics and its adverse effect on cognitive functioning including executive functions, we used PSQI for sleep quality (Buysse et al. 1989); ESS for daytime sleepiness (Johns 1992: 379) in current study.

According to research, the central executive's inhibiting and shifting processes are independent of one another and operate in synchrony (Miguel 2012). However, task switching was connected to the suppression of the distracting information, according to Friedman and Miyake's (2004: 101) research. Therefore, in the present study, Task Switching and Go/No-go tasks, which measure executive functions as cognitive flexibility and inhibition were used. In line with the reviewed literature and findings of research it is generally agreed that neurocognitive dysfunctions, attention deficiencies, reduced cognitive function, depression, anxiety, stress, and impulsivity are all linked to sleep disturbances (Mollayeva et al. 2016: 59). The present study it is hypothesized that people with poor executive functions will be more biased towards images related to COVID-19, that these individuals will have higher levels of depression, anxiety and stress, and as a result, their sleep quality will be worse. Since the current study is not an experimental study, the relationships between the factors were examined.

As a result, the following hypotheses will be tested:

Hypothesis 1. It is expected that there will be a positive relationship between poor sleep characteristics and indicators of psychological distress as depression, anxiety, stress, and COVID-19 anxiety.

Hypothesis 1a: It is expected that there will be a positive relationship between poor sleep quality and depression, anxiety, stress, and COVID-19 anxiety.

Hypothesis 1b: It is expected that there will be a positive relationship between daytime sleepiness and depression, anxiety, stress, and COVID-19 anxiety.

Hypothesis 1c: It is expected that sleep quality differs according to depression, anxiety, and stress levels.

Hypothesis 2. It is expected that there will be a positive relationship between sleep characteristics and executive functions.

Hypothesis 2a: It is expected that poor sleep quality positively associated with decreased inhibitory control.

Hypothesis 2b: It is expected that greater sleep quality is positively associated with cognitive flexibility.

Hypothesis 2c: It is expected that sleep quality is negatively associated with attentional bias towards COVID-19 related stimuli.

Hypothesis 2d: It is expected that daytime sleepiness negatively associated with inhibitory control.

Hypothesis 2e: It is expected that daytime sleepiness is negatively associated with cognitive flexibility.

Hypothesis 2f: It is expected that daytime sleepiness is positively associated with attentional bias towards COVID-19 related stimuli.

Hypothesis 2g: It is expected that the attentional bias scores will differ between those with high and low sleep quality.

Hypothesis 3. It is expected that there will be a positive relationship between psychological distress and executive functions.

Hypothesis 3a: It is expected that depression, anxiety, and stress are negatively associated with inhibitory control.

Hypothesis 3b: It is expected that depression, anxiety and stress are negatively associated with cognitive flexibility.

Hypothesis 3c: It is expected that Coronavirus anxiety is positively associated with attentional bias towards COVID-19 related stimuli.

Hypothesis 4. It is expected that sleep quality and attentional bias scores will differ between those with and without history of COVID-19.

Hypothesis 4a: Participants who had history of COVID-19 were expected to report lower sleep quality than participants who did not.

Hypothesis 4b: Participants who had history of COVID-19 were expected to have higher attentional bias scores than participants who did not.

Hypothesis 5. It is expected that inhibition, cognitive flexibility, and coronavirus anxiety have a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.

Hypothesis 5a: It is expected that inhibition has a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.

Hypothesis 5b: It is expected that cognitive flexibility has a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.

Hypothesis 5c: It is expected that coronavirus anxiety has a mediating role in the relationship between attentional bias towards COVID-19 related stimuli and sleep quality.

CHAPTER II

METHOD

2.1. PARTICIPANTS AND RECRUITMENT

Participants consisted of (N = 102) healthy adults with age range of 18- 40. The final set of data had 98 individuals and was used in the primary analysis following the data screening procedure and the removal of outliers. Recruitment was carried out by an invitation to participate in the study. The current study was cross-sectional study and convenience sampling was applied. Inclusion criteria for participation in the study required was as follows; Being between the ages of 18-40, not having an internal medical or neurological disease, not having a visual impairment that affects daily life, being actively using a computer, being at least a high school graduate. Gender distributions of participants were heterogeneous.

2.2. PROCEDURE

The study took place in two stages as questionnaires and computer tasks. A written informed consent form was obtained from all participants by following ethical standards of Çankaya University Ethical Committe. In the first phase of the study, 5 different questionnaire was used. These questionnaires provide information about the individual's sleep quality and general well-being. Questionnaires consisted of Demographic Form, written version of Brief Symptom Inventory (BSI- 53), Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Depression, Anxiety and Stress Scale (DASS-42) and COVID-19 Anxiety Scale (CAS). The second phase of the study included computer experimentation. Before participating in the experiments, subjects were instructed not to consume caffeinated beverages in the last hour. All experiments were conducted in a quiet, neutral environment that is free from distractions. Participants were invited to study verbally and through social media announcements. After the participants completed the written forms, they completed the computer tasks.

Participants were asked to sit in front of a laptop screen while maintaining a distance of approximately 60 cm from the screen throughout the entire task. First, the Go/No go task was presented to evaluate the inhibitory control, then the Task Switching task to evaluate the cognitive flexibility, and finally the Dot Probe task was presented to evaluate their attentional bias against virus-related visuals.

2.3. DATA COLLECTION TOOLS

2.3.1. Demographic Form

In the demographic information form, there were questions to collect information about age, gender, weight, size, marital status, education level, income level, work status, computer usage information, visual impairment information, general health, whether the participant has had COVID-19, if s/he had symptom severity and COVID-19 related brief information, general sleep evaluation, caffeine consumption and telephone or e-mail information to be able to contact them if they request further information about study.

2.3.2. The Coronavirus Anxiety Scale (CAS)

The CAS was developed by Lee in 2020 to measure coronavirus-related dysfunctional anxiety as open access. The scale might be considered as a self-reported mental health screening tool and the Cronbach alpha value of the scale was found to be 0.93 (Lee 2020: 393). The Cronbach Alpha reliability coefficient of the study, for which Turkish validity and reliability analyzes were performed, was calculated as 0.832. The factor loads of the scale, which consists of a single factor and 5 items, vary between 0.625 and 0.784 (Biçer et al. 2020: 217). In the planned study using a 5-point scale, participants will be requested to respond to a series of questions regarding to assess anxiety associated with the COVID-19 pandemic. The scale consists of 5 questions and one dimension. Scoring of the scale is “0” for “never”, “1” for “Rarely, less than one or two days”, “2” for “A few days”, “3” for “more than 7 days” and “4” for “almost daily in the last two weeks”. A participant's total score of 9 or above indicates coronavirus-related dysfunctional anxiety, and a high total scale score may be indicative of the participant's problematic symptoms that may require further evaluation and/or treatment (Şayık et al. 2020: 18).

2.3.3. Pittsburgh Sleep Quality Index (PSQI)

The PSQI was developed by Buysse and his collegues in 1989 and it is a self-report scale used to evaluate sleep quality and sleep disturbance in the last month (Buysse et al. 1989). The validity and reliability of the index for Turkey was determined by Ağargün, Kara, and Anlar (1996) and it was concluded that it was suitable for Turkish society. Turkish PSQI was found to be a scale with a very high degree of reliability (Cronbach's Alpha = 0.80). There are 7 components of PSQI; subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping pills, and daytime dysfunction (Buysse et al. 1989). While some components are specified with a single item, some are obtained by grouping several items. Each item is scored between 0-3 according to frequency, and the range of scores that can be obtained from this scale is 0-21. A total score above 5 indicates poor sleep quality.

2.3.4. Brief Symptom Inventory (BSI)

Brief Symptom Inventory developed by Derogotis (1994) which is a short but valid and reliable scale that makes a general psychopathology assessment. It might be defined as short version of Symptom Checklist’s (SCL-90-R). It was developed as a result of studies with the SCL-90-R. The SCL-90-R consists of 90 items distributed over 9 factors. As a result of the evaluations, a short symptom inventory was created by selecting a total of 53 items with the highest load in each factor. 53 items consist of five sub-dimensions as anxiety, depression, negative self, somatization, and anger. Like the SCL-90-R in BSI, it is a Likert-type scale that requires self-evaluation. It was developed with the aim of catching some psychological symptoms that may occur in both healthy samples and various medical and psychiatric patients. BSI was originally consisted of three global indexes and nine sub-dimensions as "Somatization", "Obsessive-Compulsive Disorder", "Interpersonal Sensitivity", "Depression", "Anxiety Disorder", "Hostility", "Phobic Anxiety", "Paranoid Thoughts", and "Psychoticism". The Turkish adaptation of the study was made by Şahin and Durak (1994) and it was found that it consisted of five factors: "Anxiety", "Depression", "Negative Self", "Somatization" and "Hostility". The three scales of Global Discomfort Detector are “Global Severity Index”, “Positive Symptom Total”, which have different scoring methods and depending on the scoring type, and “Positive

Symptom Distress Index”. The items were assessed on a scale of 0 to 4, with 0 indicating "not at all" and 4 indicating "too much." A score is obtained for each subscale by dividing the total determined for each subscale by the number of items in that subscale. A rise in each subtest score and the overall symptom score indicates a high level of psychological symptoms. The "Global Severity Index" measures how stressful something is. This number ranges from 0 to 4. It is calculated by multiplying the sum of the subscales by 53. The total score derived by accepting all positive values as one, except for the elements marked as 0, is known as the "Positive Symptom Total." The range for this score is 0 to 53. By dividing the sum of the subscales by the amount of symptoms, the "Positive Symptom Distress Index" is calculated (Savaşir 1997). The Cronbach Alpha internal consistency coefficients derived from the total internal consistency score were .96 and .95, respectively, according to three separate studies by Sahin and Durak (1994); the coefficients obtained for the subscales varied between.55 and.86. According to studies on criterion-related validity, the BSI's correlation with the "Social Comparison Scale" was between –.14 and –.34, the "Submissiveness Scale" was between.16 and.42, the "Susceptibility to Stress Scale" was between.24 and.36, and the "Beck Depression Inventory" was between.34 and.70. In the construct validity study, the sample was divided into end groups as "prone to stress" and "not prone to stress" based on the scores obtained from the "Stress-Susceptibility Scale," and only three items (4, 8, 26) of the 53 items were statistically significant in determining the item validity of the scale. It was discovered that the significance level could not be attained. The overall score of the scale was analyzed, and it was discovered that the scale could discriminate these two extreme groups at a substantial level.

2.3.5. Epworth Sleepiness Scale

Epworth Sleepiness Scale (ESS) is a subjective scale developed by Johns (1992: 379) that assesses sleepiness. A four-point Likert scale is used in ESS. It is graded on a scale of 0 to 3, with a high score indicating tiredness. The 0–5 point range is considered normal, the 6–10 point range is considered normal but with increased daytime sleepiness, the 11-12 point range is considered increased but with moderate daytime sleepiness, the 13-15 point range is considered increased, and moderate daytime sleepiness is 16-24 points. The interval is also lengthened, resulting in significant daytime sleepiness. The ESS is a valid and reliable scale for assessing general sleepiness, as well as a valid and reliable test that may be used in studies on sleep and sleep disorders in Turkey (Cronbach's alpha = 0.86), according to the researchers (İzci et al. 2008: 165).

2.3.6. Depression Anxiety Stress Scale (DASS)

The Depression, Anxiety Stress Scale (DASS) was created by Lovibond and Lovibond (1995: 335) and measures 14 for depression (for example, I can't think of anything positive), 14 for anxiety (for example, my lips are dry), and 14 for stress (for example, my surroundings). There are 42 entries in the category "events that make me nervous". The scale is a four-point Likert scale: 0 is “absolutely inappropriate for me”, 1 is “slightly acceptable for me”, 2 is “generally appropriate for me”, and 3 is “completely appropriate for me”. High scores on the depression, anxiety, and stress aspects suggest that the person is dealing with a mental health issue. A range of 0-9 for depression, 0-7 for anxiety and 0-14 for stress is considered normal. Scores above these ranges (above cut- off level) indicate the degree of clinical emotional states ranging from mild to extreme severe (Lovibond and Lovibond, 1995: 335). For each sub-dimension, the total scores of the scale without reversed items vary from 0 to 42 (Deniz and Sümer, 2010). Bilgel and Bayram, (2010: 118) developed the Turkish version of the scale. The corrected item-total correlations for DASS were found to range between .51 and .75. The DASS internal consistency coefficients were found to be.89 for the entire scale and .90, .92, and .92 for the depression, anxiety, and stress sub-dimensions, respectively. The scale's test-retest reliability results revealed that the correlation coefficients between the two applications were .98 (p.001) for all three sub-dimensions and .99 for the entire scale. The Spierman-Brown split-half reliability scores for the total scale were .96, and for depression, anxiety, and stress components, they were .95, .98, and .95, respectively (Deniz and Sümer, 2010).

2.3.7. Visual Dot-Probe Task

The dot probe task was developed by Macleod and his colleagues (1986: 15) to measure attentional bias towards threatening stimuli. This task was carried out based on the dot-probe procedure presented by Cannito and his colleagues (2020: 1). Permission was obtained from the researcher of the study to use the attentional bias paradigm and a standardized set of 60 images. Later, a study was carried out to adapt 60 images to the Turkish population. The following section contains more detailed information about stimuli selection.

In Visual Dot-Probe task, for a typical laptop screen size, images were presented in a 6x7cm box to both the left and right of the fixation cross with a distance of 10cm between the two. 10 pairs of virus-related/neutral objects were presented 4 times based on four possible object/probe combinations, resulting in a total of 40 test trials. In order to reduce possible habituation to stimuli that may occur when virus-related images are found in all trials, 40 complete trials, each presented four times, were included in the attentional bias task consisting of 10 pairs of neutral images. These filler trials were presented randomly mixed with test trials. The task was presented to the participant in two blocks as 10 practice trials and 80 task trials. Firstly, after the fixation cross (+) is shown in the middle of the screen (500ms), two side-by-side objects were presented for 1000ms. The position of the images was chosen randomly, either to the left or right of the fixation cross. Then, both objects were disappeared, and a probe (X) was appeared at the location of one of the two objects (1000 ms), prompting participants to press a key (E) if the poll is on the left, and another key (I) if the poll is on the right. Attentional bias was determined by the difference in reaction times between congruent trials (when the probe replaces threatening stimuli) and incongruent trials (when the probe replaces neutral stimuli). Participants who focus their attention on the threatening stimulus were expected to have faster response times (i.e., shorter) in trials in which the probe replaces threatening virus-related objects than in trials in which neutral objects are replaced.

2.3.8. Stimuli Selection

To measure attentional bias towards COVID-19, a visual dot probe paradigm was used (Cannito et al. 2020: 3). Since the original study was conducted in Italy, images were familiar to the Italian people in the original study. An online Google Survey was created in order to adapt the study into Turkish and to identify the images that Turkish participants associate with the idea of COVID-19. In the online survey, in which 103 people participated, a total of 60 standardized object images for size and brightness from the web were presented to the participants. In this survey, participants were asked to rate how much the objects they saw were associated with COVID-19, from 0 (not at all) to 100 (extremely). As a result of the scores of the participants, 10 objects strongly associated with the virus (rating score between 95.1 and 64.9) were evaluated in the category of virus-related stimuli, while 30 objects weakly associated with the virus (evaluation score between 14.5 and 6.8) were neutral stimuli evaluated in the neutral stimulus category.

Table 1. Mean score and standard deviation (SD) to the question: "How much from 0 (not at all) to 100 (very much), is this picture associated with the idea of COVID- 19"

Image Type	Trial	Description	Mean score	S.D.
Virus-related 1	Test	HES Code	95.1	18
Virus-related 2	Test	Blue Mask	92.8	13.6
Virus-related 3	Test	N95 Mask	91	18.4
Virus-related 4	Test	Hand Sanitizer	85.9	26.4
Virus-related 5	Test	Portable Hand Sanitizer	85	23.8
Virus-related 6	Test	Face Shield	84.5	29.3
Virus-related 7	Test	Thermometer	83.9	24.7
Virus-related 8	Test	Lemon Cologne	82.9	23.4
Virus-related 9	Test	Blue Gloves	62.4	32.6
Virus-related 10	Test	Syringe	64.9	35.1
Neutral 1	Test	Air Freshener	14.5	21.6
Neutral 2	Test	Tire Repair Kit	2.1	5.7
Neutral 3	Test	Radiator Cleaner	6.2	18
Neutral 4	Test	Shaving Foam	5.4	16.8
Neutral 5	Test	Shaving Cologne	6.4	18.8
Neutral 6	Test	Fertilizer	6.2	15.3
Neutral 7	Test	Hand Lotion	14.2	27
Neutral 8	Test	Foot Deodorant	2.9	10
Neutral 9	Test	Sunscreen	2.4	5.9
Neutral 10	Test	Hair Foam	3	11.2
Filler 1	Filler	Coffee Pot	7.5	18.9
Filler 2	Filler	Iron	6.8	16.1
Filler 3	Filler	Remote Control	16	26.3
Filler 4	Filler	Saltshaker	3.3	11.7
Filler 5	Filler	Hair Dryer	3.1	10.4
Filler 6	Filler	Hair Removal Device	7.1	18
Filler 7	Filler	Water Carafe	5.9	15.3
Filler 8	Filler	Toothbrush	14.4	28.1
Filler 9	Filler	Jar	2.3	6.7
Filler 10	Filler	Flower Watering Can	4	13
Filler 11	Filler	Teapot	10.2	23
Filler 12	Filler	Saucepan	5.5	16.3
Filler 13	Filler	Storage Container	2.8	9.1
Filler 14	Filler	Storage Box	9.4	21.6
Filler 15	Filler	Food Processor	3.3	10.4
Filler 16	Filler	Stapler	2.1	6.8
Filler 17	Filler	Flowerpot	5.8	19.5
Filler 18	Filler	Kitchen Scale	8.8	20.1
Filler 19	Filler	Pan	4.8	16.6
Filler 20	Filler	Blender	5.4	15.4

2.3.9. Go/ No/Go Task

The Go/No go task was used to measure behavioral inhibition. This paradigm reflects processes related to the management of motor behaviors, such as associating applied or inhibited voluntary motor movements with stimuli (Smith and Abel 1999). Participants was presented with two types of stimuli, one is asked to respond to a stimulus, and another is asked to suppress their response. Thus, two different cognitive efforts as pressing and not pressing were displayed (Şansal et al. 2014). The current study, adopted from Favieri and his colleagues' study (2021: 170). Two oval stimuli of various colors were placed in the center of the screen with a black background (red: No-Go stimuli; green: Go Stimuli). The target stimulus (Go) and non-target stimulus (No-Go) were displayed on the screen at random for 2000 milliseconds, followed by 500 milliseconds of blank screen. During the experiment, the participant was asked to keep their attention fixed on the center of the screen. When the green oval appeared in the center of the screen, participants were expected to press the spacebar as rapidly as possible. The participant had to wait for the stimulus to vanish after the red oval appeared. After each incorrect response, feedback was given as "you shouldn't have pressed but you did" or "you should have pressed but you didn't". One hundred twenty trials were conducted (96 Go trials, 24 No-Go trials), with correctness comments provided. To test the inhibition motor component, the percentage of improper reactions to "No-Go" stimuli (False Alarms) was used.

The Go/No-go task is frequently used to evaluate behavioral inhibition with the presumption that people who respond to no-go cues more frequently, or who have a greater false alarm rate, will find it more difficult to suppress a dominant response (Young et al. 2018)

2.3.10. Task Switching Task

Task Switching Paradigm first developed by Rogers and Monsell (1995) and it was used to measure cognitive flexibility. The participants were shown letter-number matching in a square divided into four. Participants were asked to respond by pressing the "B" key for consonants or the "N" key for vowels when the match was shown in one of the top two quadrants. When the match was shown in the sub-dials, they were asked to answer by pressing "B" for odd numbers and "N" for even numbers. The first block of trials consists of 25 trials, and participants are shown only the stimuli from the upper two quadrants. In this section, they are expected to respond only to letters. The second block consists of 25 trials and participants were shown only the stimulus from the lower two quadrants. In this section, they are expected to respond to numbers only. The third and fourth blocks consist of a total of 300 trials. In this section, they were expected to respond to both letters and numbers. Matches were presented clockwise on consecutive dials, with two attempts for letters followed by two attempts for numbers; a task change occurs every two attempts. Switching between tasks is often reflected in this task as a slowing down immediately after a task transition (Podlesek et al. 2021: 149).

CHAPTER III

RESULTS

3.1. OVERVIEW

In this section, data cleaning and data scanning processes, data analysis, descriptive statistics, correlation analysis, group comparisons and mediation analysis are presented before testing hypotheses. First of all, information about the process of examining the data was presented. Then, descriptive statistics and binary correlations of the study data were explained. Finally, the results of testing the main hypothesis of the study were presented. Both descriptive statistics and correlations were analyzed by using the IBM SPSS Statistics (Version 25). The study's moderation analyses were carried out using PROCESS Macro 3.3 for SPSS (Hayes 2017).

3.2 DATA SCREENING AND DATA CLEANING

To determine the outliers, the initially measured values were standardized. Then, it was checked whether each z score was in the range of -3.29 and 3.29 (Tabachnick and Fidell 2013). The 3 participants outside this range were determined as outliers and were not included in the analysis. In addition, it was aimed to determine multivariate outliers using Mahalanobis distance analysis, but as a result of the analysis, there was no multivariate outlier. Moreover, one of the participants excluded from the study because she did not meet the age criteria. Consequently, final set of data included 98 participants.

Table 2: Means, Standard Deviations, Skewness and Kurtosis Values

Variables	Mean	SD	Skewness	Kurtosis
Attentional Bias	.11	.22	.74	1.94
Inhibition	4.32	3.66	.98	.56
Cognitive Flexibility	456.87	248.69	.52	-.47
Sleep Quality	6.20	3.14	.57	-.30
Daytime Sleepiness	8.21	3.98	.11	-.24
DASS				
Depression	10.48	10	1.21	.87
Anxiety	9.84	7.61	.61	-.78
Stress	16.21	10.05	.45	-.77
COVID-19 Anxiety	2.28	2.86	1.10	.12
Valid N (listwise)				98

The means, standard deviations, skewness and kurtosis values of the study variables are presented in Table 2. The distributions of the study variables were examined considering skewness and kurtosis values. In this study, when testing whether the data showed a normal distribution, skewness, and kurtosis values in the range of -2 to 2 (George and Mallery 2019) were accepted as criteria. The skewness and kurtosis values of the study variables were presented in Table 2. This assumption seems to be valid for the variables of attentional bias, inhibition, cognitive flexibility, sleep quality, daytime sleepiness, depression, anxiety, stress, and COVID-19 anxiety. These arguments led to the conclusion that suitable parametric tests might be utilized for data analysis.

3.3. DESCRIPTIVE STATISTICS AND BIVARIATE CORRELATIONS AMONG STUDY VARIABLES

In this section, descriptive statistics to get a sense of the basic characteristics of the collected data of the current study and bivariate correlation measurements are presented, which allow to evaluate the strength and direction of the relationship between the variables.

3.3.1. Descriptive Statistics

Demographic findings of the participants (*N* = 98) were shown in Table 3. According to the findings of the participants consisting of 98 people were examined, 74.5% of the individuals were female and 25.5% were male. The participants were between ages of 20 and 40. According to the level of education, 19.4% of the participants were high school graduates, 69.4% were university students or university graduates, and 11.2% were masters/doctoral students or graduates. On the other hand, the socioeconomic status (SES) of the participants was examined, the conclusion was that 19.4% of them were low income, 65.3% were middle class income, 15.3% were upper middle income. Moreover, 45.9% of respondents reported having COVID-19 and 54.1% not. Participants who had experienced COVID-19 reported the severity of the disease as 3.1% mild, 35.7% moderate, and 7.1% severe.

Table 3. Demographic Characteristics of the Participants

Variables	***n***	**%**
Gender		
Female	73	74.5
Male	25	25.5
Occupation		
Officeholder	6	6.1
Private Sector Employee	44	44.9
Student	40	40.8
Unemployed	8	8.2
Marital Status		
Married	28	28.6
Single	70	71.4
Educational Status		
High School	19	19.4
University	68	69.4
Master' Degree/ PhD	11	11.2
Socioeconomic Status (SES)		
Low Income	19	19.4
Middle Class Income	64	65.3
Upper Middle Income	15	15.3
COVID-19 Status		
Yes	45	45.9
No	53	54.1
COVID-19 Symptom Severity		
Mild	3	3.1
Moderate	35	35.7
Severe	7	7.1

3.3.2. Correlation Findings Regarding Sleep Characteristics, Psychological Distress Sub-dimensions, Executive Functions, and Attentional Bias Tasks

A Pearson correlation analysis was conducted for the sleep quality, daytime sleepiness, depression, anxiety, stress, COVID-19 anxiety, attentional bias, inhibition, and cognitive flexibility scores of the participants to examine the relationship between sleep characteristics, psychological distress, attentional biases, and executive functions. Table 4. presents the bivariate correlations among the study's variables. Results show that there was a positive and significant relationship between sleep quality and daytime sleepiness (r = .401, $p < .01$), depression (r = .469, $p < .01$), anxiety (r = .428, $p < .01$), stress (r = .427, $p < .01$), Coronavirus anxiety (r = .293, $p < .01$) and Inhibition (r = .258, $p < .05$). In other words, sleep quality was associated with daytime sleepiness, depression, anxiety, stress, coronavirus anxiety and inhibition. On the other hand, there was insufficient data to draw a conclusion on the relationship between sleep quality and attentional bias. In other words, this relationship was positive but not significant (r = .039, $p > .05$). Moreover, the relationship between sleep quality and cognitive flexibility was negative and not significant (r = -.102, $p > .05$).

Daytime sleepiness had positive and significant relationship with depression (r = .392, $p < .01$), anxiety (r = .380, $p < .01$) and stress (r = .359, $p < .01$). Moreover, results show that there was a positive relationship between daytime sleepiness and coronavirus anxiety (r = .184, $p > .05$), attentional bias (r = .047, $p > .05$) and inhibition (r = .156, $p > .05$), however these relationships were not significant. In addition, the relationship between daytime sleepiness and cognitive flexibility was negative and insignificant (r = -.087, $p > .05$).

Table 4. Bivariate Correlations between Study Variables

	1	2	3	4	5	6	7	8	9
1.Depression	1								
2.Anxiety	.772**	1							
3.Stress	.776**	.860**	1						
4.Sleep Quality	.469**	.428**	.427**	1					
5.Attentional Bias	.023	.254*	.231*	.039	1				
6.Inhibitory Control	-.007	.106	.064	.258*	.452**	1			
7.Cognitive Flexibility	-.168	-.079	-.149	-.102	.024	-.066	1		
8.Daytime Sleepiness	.392**	.380**	.359**	.401**	.047	.156	-.087	1	
9.Covid-19 Anxiety	.225	.346**	.335**	.293**	.372**	.172	-.128	.184	1

Note. *$p < .05$, **$p < .01$.

Depression had positive and significant association with anxiety (r = .772, $p < .01$), stress (r = .776, $p < .01$) and COVID-19 anxiety (r = .225, $p < .05$). Additionally, results show that there was a positive but not significant relationship between depression and attentional bias (r = .023, $p > .05$). Furthermore, the relationship between depression and inhibition (r = -.007, $p > .05$) and cognitive flexibility was insignificant (r = -.168, $p > .05$).

Anxiety was positively and significantly correlated with stress (r = .860, $p < .01$), coronavirus anxiety (r = .346, $p < .01$) and attentional bias (r = .254, $p < .05$). There was positive but not significant correlation between anxiety and inhibition (r = .106, $p > .05$). On the other hand, there was no significant correlation between anxiety and cognitive flexibility (r = -.079, $p > .05$).

There was positive and significant correlation between stress and COVID-19 anxiety (r = .335, $p < .01$) and attentional bias (r = .231, $p < .05$). Moreover, there was not significant correlation between stress and inhibition (r = .064, $p > .05$). There was no significant correlation between stress and cognitive flexibility (r = -.149, $p > .05$).

COVID-19 anxiety was positively and significantly correlated with attentional bias (r = .372, $p < .01$). Inhibition (r = .172, $p < .05$) was also positively correlated with coronavirus anxiety. On the contrary, there was no significant correlation between coronavirus anxiety and cognitive flexibility (r = -.128, $p > .05$).

Similarly, attentional bias was positively and significantly correlated with inhibition (r = .452, $p < .01$). There was no significant correlation between attentional bias and cognitive flexibility (r = .024, $p < .05$). Moreover, there was negative and not significant correlation between inhibition and cognitive flexibility (r = -.066, $p > .05$).

3.4. FINDINGS REGARDING MEAN COMPARISONS BETWEEN GROUPS

Independent sample t-test was conducted to find out whether the attentional bias, inhibition and cognitive flexibility scores of participants differ according to their sleep quality and depression, anxiety, and stress levels. Bonferroni correction was made by dividing the critical P value (α) by the number of comparisons made (Napierala 2012).

3.4.1. Results of T- test for Sleep Quality Groups

As presented in Table 5, results indicated that inhibitory control differed significantly according to participants' sleep quality scores which a total score above 5 indicated poor sleep quality and 5 and below indicated high sleep quality. Compared to participants with poor sleep quality (M = 5.22, SD = 3.78), participants with high sleep quality (M = 3.20, SD = 3.20), showed greater inhibitory control (t(95.837) = -2.86, p = .005). Additionally, there was no significant effect for attentional bias (t(90.588) = -2.29, p = .025). Moreover, participants with poor sleep quality (M = .154, SD = .251) showed higher attentional bias scores than high sleep quality (M = .59, SD = .158). Furthermore, although those with high sleep quality (M = 469.75, SD = 236.83) scored higher inhibition than those with poor sleep quality (M = 446.38, SD = 259.69), there was no significant effect for cognitive flexibility (t(96) = .461 p = .646).

Table 5. Differences Between Participants with High and Low Sleep Quality

	Sleep Quality	N	x̄	SD	t Test		
					t	**df**	**P**
Attentional Bias	High	44	.059	.158	-2.285	90.588	.025
	Low	54	.154	.251			
Inhibition	High	44	3.20	3.203	-2.860	95.837	.005**
	Low	54	5.22	3.780			
Cognitive Flexibility	High	44	469.754	236.830	.461	96	.646
	Low	54	446.380	259.691			
COVID-19 Anxiety	High	44	1.55	2.654	-2.332	96	.022
	Low	54	2.87	2.908			

Note. *p<.01, **p<.00

COVID-19 anxiety scores were not differed significantly according to participants' sleep quality. Compared to participants with high sleep quality (*M* = 1.09, *SD* = 2.13), participants with poor sleep quality (*M* = 2.85, *SD* = 3.00), showed greater COVID-19 anxiety ($t(96) = -3.33$, $p = .001$). The results of the comparison of the COVID-19 anxiety scores of the participants with high and low sleep quality are shown in Table 6.

3.4.2. Results of Independent Samples T- Test for Depression, Anxiety and Stress Groups

Additionally, an independent-samples t-test was conducted to compare sleep quality for depression in normal and clinical emotional states (above cut-off level). A range of 0-9 for depression, 0-7 for anxiety and 0-14 for stress is considered normal. Scores above these ranges indicate the clinical emotional states (Lovibond and Lovibond 1995: 335). There was a significant difference on sleep quality in the normal depression scores (*M* = 5.37, *SD* = 2.91) and clinical emotional state depression scores (*M* = 7.46, *SD* = 3.08); ($t(96) = -3.39$ $p = .01$). Also there was significant difference for daytime sleepiness ($t(96) = -2.48$ $p = .015$). In other words, participants with clinical emotional state scores (*M* = 9.41, *SD* = 4.18) show higher daytime sleepiness scores than normal depression scores (*M* = 7.42, *SD* = 3.66).

There was no significant effect for attentional bias ($t(96) = -1.68$ $p = .29$). Although, participants with clinical emotional state depression score (*M* = .141, *SD* = .286) show greater bias than normal depression scores (*M* = .092, *SD* = .160). Clinical emotional state depression levels (*M* = 4.51, *SD* = 3.74) and normal depression levels (*M* = 4.19, *SD* = 3.63) participants' inhibitory control scores did not differed significantly ($t(96) = -.431$ $p = .67$). Additionally, cognitive flexibility was also not differed significantly ($t(96) = .963$ $p = .34$). Participants with clinical emotional state depression scores (*M* = 427.09, *SD* = 257.57) show greater cognitive flexibility than normal depression scores (*M* = 476.55, *SD* = 242.86)

Table 6. Differences between Depression Score Levels

	Depression level	N	x̄	S	t Test		
					t	df	P
Sleep Quality	Normal	59	5.37	2.918	-3.394	96	.001*
	Clinical Emotional States	39	7.46	3.077			
Daytime Sleepiness	Normal	59	7.42	3.663	-2.484	96	.015
	Clinical Emotional States	39	9.41	4.178			
Attentional Bias	Normal	59	.092	.159	-.958	53.790	.342
	Clinical Emotional States	39	.140	.285			
Inhibition	Normal	59	4.19	3.627	-.431	96	.668
	Clinical Emotional States	39	4.51	3.741			
Cognitive Flexibility	Normal	59	476.554	242.859	.963	96	.338
	Clinical Emotional States	39	427.092	257.570			

Note. *p<.01, **p<.00

Findings indicated that there was significant difference for sleep quality ($t(96) = -4.38$, $p < .00$) between participants with clinical emotional state anxiety levels ($M = 7.53$, $SD = 3.20$) and normal anxiety level ($M = 4.98$, $SD = 2.56$). However, there was insignificant difference for daytime sleepiness $t(96) = -3.73$ $p < .00$ between participants with clinical emotional state anxiety levels ($M = 9.68$, $SD = 3.91$) and normal anxiety level ($M = 6.86$, $SD = 3.57$). Although, participants with clinical emotional state anxiety levels ($M = .157$, $SD = .273$) showed greater attentional bias than participants with normal anxiety level ($M = .070$, $SD = .143$). There was no significant difference for attentional bias ($t(96) = -1.96$, $p = .054$). Moreover, there was no significant difference for inhibitory control ($t(96) = -.39$, $p = .70$) between participants with clinical emotional state anxiety levels ($M = 4.47$, $SD = 3.03$) and normal anxiety level ($M = 4.18$, $SD = 4.180$). Finally, there was no significant difference for cognitive flexibility ($t(96) = .350$, $p = .727$) between participants with clinical emotional state anxiety levels ($M = 447.66$, $SD = 252.85$) and normal anxiety level ($M = 465.36$, $SD = 247.01$).

Table 7. Differences Between Anxiety Score Levels

	Anxiety level	N	x̄	SD	t Test		
					t	**df**	**P**
Sleep Quality	Normal	51	4.98	2.557	-4.341	88.092	.000**
	Clinical Emotional States	47	7.53	3.195			
Sleepiness	Normal	51	6.86	3.567	-3.730	96	.000**
	Clinical Emotional States	47	9.68	3.913			
Attentional Bias	Normal	51	.069	.142	-1.963	68.125	.054
	Clinical Emotional States	47	.157	.272			
Inhibition	Normal	51	4.18	4.180	-.393	96	.695
	Clinical Emotional States	47	4.47	3.028			
Cognitive Flexibility	Normal	51	480.917	465.355	.350	96	.727
	Clinical Emotional States	47	445.211	447.664			

Note. *p<.01, **p<.00

Results indicated that there was significant difference for sleep quality ($t(96) = -3.92$, $p < .00$) between participants with higher stress levels ($M = 7.34$, $SD = 3.13$) and normal stress level ($M = 5.02$, $SD = 2.71$). There was insignificant difference for daytime sleepiness ($t(96) = -2.30$, $p = .02$) between participants with higher stress levels ($M = 9.10$, $SD = 4.13$) and normal stress level ($M = 7.29$, $SD = 3.63$). Similarly, there was insignificant difference for attentional bias ($t(96) = -2.38$, $p = .020$) between participants with higher stress levels ($M = .161$, $SD = .274$) and normal stress level ($M = .060$, $SD = .121$). Moreover, there was no significant difference for inhibitory control ($t(96) = -.18$, $p = .86$) between participants with higher stress levels ($M = 4.38$, $SD = 3.42$) and normal stress level ($M = 4.25$, $SD = 3.93$). Finally there was no there was no significant difference for cognitive flexibility ($t(96) = .621$, $p = .536$) between participants with higher stress levels ($M = 441.53$, $SD = 258.22$) and normal stress level ($M = 472.53$, $SD = 240.04$).

Table 8. Differences Between Stress Score Levels

	Stress Level	N	x̄	SD	t Test		
					t	df	P
Sleep Quality	Normal	48	5.02	2.709	-3.917	96	.000**
	Clinical Emotional States	50	7.34	3.127			
Sleepiness	Normal	48	7.29	3.632	-2.299	96	.024
	Clinical Emotional States	50	9.10	4.127			
Attentional Bias	Normal	48	.060	.121	-2.377	68.030	.020
	Clinical Emotional States	50	.161	.274			
Inhibitory Control	Normal	48	4.25	3.928	-.175	96	.861
	Clinical Emotional States	50	4.38	3.416			
Cognitive Flexibility	Normal	48	472.847	240.035	.621	96	.536
	Clinical Emotional States	50	441.532	258.224			

Note. *p<.01, **p<.00

3.4.2. Results of T test for COVID-19 Status Groups

Table 10 represents that t test results of participants according to their COVID-19 status. indicated that there was significant difference for sleep quality ($t(96) = -2.65, p < .05$) between participants who had COVID-19 ($M = 7.09, SD = 3.21$) and who had not COVID-19 ($M = 5.02, SD = 2.90$). However, there was no significant difference for attentional bias ($t(96) = -1.68, p = .097$) between participants who had COVID-19 ($M = .15, SD = .20$) and who had not COVID-19 ($M = .08, SD = .23$).

Table 9. Differences of COVID-19 Status

	COVID-19 Status	N	x̄	S	t Test		
					t	df	P
Sleep Quality	Yes	45	7.09	3.211	-2.650	96	.009*
	No	53	5.45	2.899			
Attentional Bias	Yes	45	.15	.201	-1.677	96	.097
	No	53	.08	.229			

Note. *p<.01, **p<.00

3.5. HYPOTHESIS TESTING

3.5.1. Results of Linear Regression Analyses of Variables

In line with the hypotheses of the research, firstly, a bivariate correlation analysis was performed to determine whether depression, anxiety, stress, COVID-19 anxiety, attentional bias, and executive functions are associated with poor sleep characteristics. It was not necessary to test for the presence of multicollinearity as the independent variables were not significantly correlated. Therefore, simple linear regression analysis was performed to examine the relationships between the variables that were found to be related as a result of the correlation analysis.

Table 10. Predicting the Role of Attentional Bias on Inhibition

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	3.47	.37		9.316	.000	.21	24.716***
AttentionalBias	7.57	1.52	.45	4.972	.000		

Note. ***p < .001, Dependent variable: Inhibition

A simple linear regression analysis was performed to determine how much attentional bias affected inhibition. Pearson correlation analysis results showed that there is a high level of positive and significant relationship between variables β = .45, $t(96) = 9.32$, $p < .001$. According to the results of the regression analysis, the model was found significant $F(1, 96) = 24.716$, $p < .001$, with an R^2 of . 205. In other words, 21% of inhibition can be explained by attentional bias. Results of the regression analysis was presented in Table 8.

Table 11. Predicting the Role of Inhibition on Poor Sleep Quality

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	5.25	.48		10.981	.000	.06	6.865***
Inhibition	.22	.09	.26	2.620	.010		

Note. ***p < .001, Dependent variable: Poor Sleep Quality

Furthermore, another simple linear regression was calculated to predict sleep quality based on inhibition, β = .26, $t(96) = 10.98$, $p < .001$. A significant regression equation was found $F(1,96) = 6.865$, $p < .05$, with an R^2 of .067. Table 9 presents the regression analysis's findings.

Table 12. Predicting the Role of Attentional Bias on Coronavirus Anxiety

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	1.73	.30		5.708	.000	.14	15.450***
AttentionalBias	4.88	1024.	.37	3.931	.000		

Note. ***p < .001, Dependent variable: COVID-19 Anxiety

Table 10 indicates a simple linear regression analysis which used to test if the attentional bias significantly predicted participants' ratings of COVID-19 anxiety. The results of the regression analysis represents the attentional bias explained 13.9% of the variance (R^2 = .139, F(1, 96) = 9.038, p < .05). It was found that attentional bias significantly predicted coronavirus anxiety (β = .37 t(96) = 5.71, p < .001).

Table 13. Predicting the Role of COVID-19 Anxiety on Poor Sleep Quality

Variable	B	SE	Beta(β)	t	p	R^2	F
Constant	5.47	.39		14.023	.000	.09	9.038***
COVID-19 Anxiety	.32	.11	.29	3.006	.003		

Note. ***p < .001, Dependent variable: Poor Sleep Quality

As presented in Table 13 coronavirus anxiety depending on sleep quality was predicted using a simple linear regression analysis, β = .29, t(96) = 14.02, p < .001. A significant regression equation was found F(1,96) = 9.038, p < .05, with an R^2 of .086.

3.5.2. Result of Mediation Analysis

Hayes's PROCESS Model 4 (2018) was used in order to examine mediating role of disinhibition on the relationship between attentional bias and sleep quality. 95% confidence interval and 5000 bootstrapping was taken into consideration. Confidence intervals were expected to not include zero for paths to be considered significant. The results showed that attentional bias was significantly associated with disinhibition (B= 7.57, %95 CI [4.55, 10.60], *SE* = 1.52, *p* = .00). Disinhibition was significantly associated with sleep quality (B= .26, %95 CI [.07, .45], *SE*= .10, *p* =.00). The total effect of attentional bias on sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70), and the direct effect of attentional bias on sleep quality was also insignificant (B= -1.40, %95 CI [-4.56, 1.75], *SE*= 1.59, *p* = .38). The indirect effect of inhibition on the relationship between attentional bias and sleep quality was significant (indirect effect= 1.97, *SE*= .94, %95 CI [.56, 4.17]).

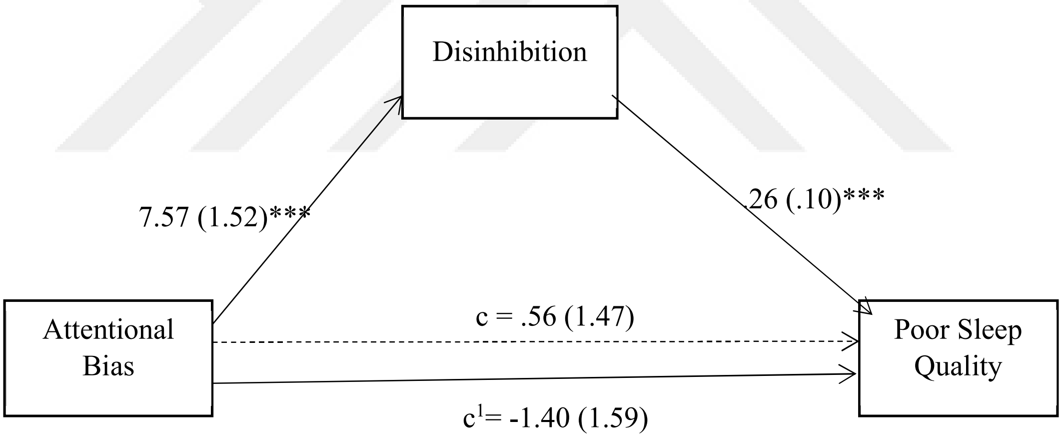

Figure 1. Simple Mediation Model for Disinhibition.

The findings indicated that attentional bias was not significantly associated with cognitive flexibility (B= 27.21, %95 CI [-203.35, 257.77], *SE* = 116.15, *p* = .82). Cognitive flexibility was not significantly associated with poor sleep quality (B= -00. %95 CI [-.004, .001], *SE*= .00, *p* =.56). The total effect of attentional bias on sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70) and the direct effect of attentional bias of attentional bias on sleep quality was not significant (B= .60, %95 CI [-2.31, 3.51], *SE*= 1.47, *p* = .68). The indirect effect of inhibition on the relationship between attentional bias and sleep quality was also not significant (indirect effect= -.04, *SE*= .25, %95 CI [-.47, .57]).

The results showed that attentional bias was significantly associated with COVID-19 Anxiety (B= 4.87, %95 CI [2.41, 7.34], *SE* = 1.24, *p* = .00). COVID-19 Anxiety was significantly associated with poor sleep quality (B= .36, %95 CI [.13, .58], *SE*= .12, *p* =.00). The total effect of attentional bias on poor sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70), and the direct effect of attentional bias on poor sleep quality was also insignificant (B= -1.17, %95 CI [-4.17, 1.84], *SE*= 1.51, *p* = .44). The indirect effect of COVID-19 Anxiety on the relationship between attentional bias and sleep quality was significant (indirect effect= 1.73, *SE*= .76, %95 CI [.50, 3.49]).

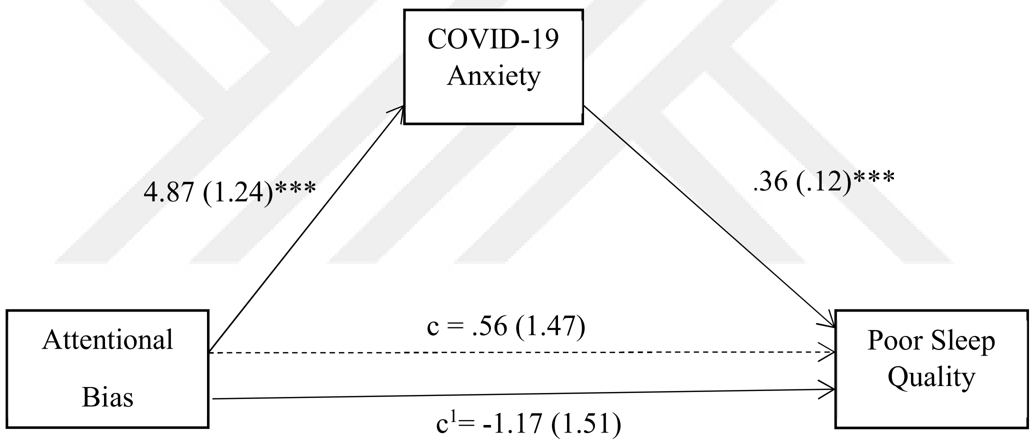

Figure 2. Simple Mediation Model for COVID-19 Anxiety.

The results showed that attentional bias was significantly associated with both disinhibition (B= 7.57, %95 CI [4.55, 10.60], *SE* = 1.52, *p* = .00) and COVID-19 Anxiety (B= 4.87, %95 CI [2.41, 7.34], *SE* = 1.24, *p* = .00). Disinhibition (B= .26, %95 CI [.08, .44], *SE*= .09, *p* =.00) was significantly associated with poor sleep quality, COVID-19 Anxiety was also significantly associated with poor sleep quality (B= .35, %95 CI [.13, .58], *SE*= .11, *p*= .00). The total effect of attentional bias on poor sleep quality was insignificant (B= .56, %95 CI [-2.34, 3.47], *SE*= 1.47, *p* =.70), and the direct effect of attentional bias on poor sleep quality was also insignificant (B= -3.12, %95 CI [-6.32, .08], *SE*= 1.61, *p* = .06). The indirect effect of disinhibition on the association between attentional bias and poor sleep quality was significant (indirect effect= 1.96, *SE*= .89, %95 CI [.64, 4.09]). Also, the indirect effect of COVID-19 anxiety on the association between attentional bias and poor sleep quality was significant (indirect effect= 1.72, %95 CI [.56, 3.27], *SE*= .69). Hence, the total indirect effect was also significant (indirect effect= 3.68, %95 CI [1.72, 6.18], *SE*= 1.15).

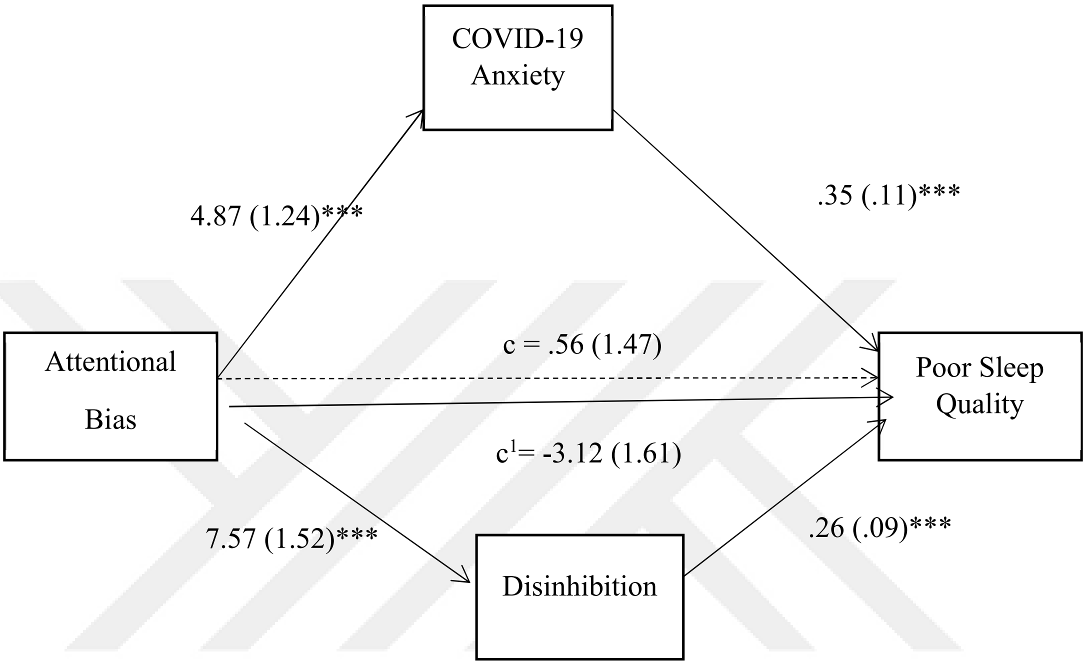

Figure 3. Results of Multiple Mediator Model.

CHAPTER IV

DISCUSSION

4.1. INTRODUCTION

In this section, the findings related to the proposed models and hypotheses will be examined within the framework of the current literature. In other words, findings on the relationship between attentional bias and sleep characteristics, and the effect of executive functions and psychological distress on this process will be presented. Then, the limitations of the study and suggestions for future studies will be presented. Finally, the contributions and implications of the research will be shared.

In the study, the effects of changes in executive functions and attentional bias on sleep characteristics due to the psychological distress experienced by healthy adults in the COVID-19 period were examined. In addition, the relationships between executive functions, sleep characteristics, and psychological distress scores were investigated.

The findings obtained from the research were handled and evaluated in four stages. First, the correlation findings on sleep characteristics, psychological distress sub-dimensions, executive functions and attentional bias tasks were evaluated in the context of the relevant literature. Secondly, the findings of the t-test analysis were evaluated according to the sleep quality, depression, anxiety, and stress levels of the participants. Thirdly, the result of the linear regression analyzes of the variables are discussed in the light of the relevant literature. Finally, the mediation analysis result is discussed and discussed.

4.2. EVALUATION OF THE CORRELATION FINDINGS IN THE CONTEXT OF THE RELEVANT LITERATURE

Although not hypothesized in the current study, it was assumed that poor sleep characteristics would be reported at a higher rate than in the pre-COVID-19 period. Overall, this research reveals that majority of a sample of healthy Turkish people had poor sleep quality during the COVID-19 period (Demir et al. 2015: 306). The data obtained from 7,236 volunteer participants in the study conducted by Huang and Zhao (2020: 5) during the COVID-19 period shows that 35.1% of the participants reported generalized anxiety disorder and 20.1% reported depressive symptoms. When compared with the previous literature, these rates were higher than the pre-COVID-19 pandemic period (Kocalevent et al. 2013: 552; Hinz et al. 2017: 340). When the previous studies evaluating sleep characteristics in our country were examined, it was seen that there were differences in sleep characteristics between pre-COVID-19 and COVID-19 period. For instance, in the study conducted before COVID-19 pandemic, with a sample of 5521 subjects representing the adult population of Turkey, 15.3% of the participants reported insomnia and 5.4% reported excessive daytime sleepiness (Demir et al. 2015: 306). However, in a study conducted in Istanbul in which 352 people participated during the COVID-19 pandemic period, depression, anxiety, and sleep quality of the participants were evaluated. Beck Depression index (BDI) and Beck Anxiety index (BAI) and Pittsburgh Sleep Quality index (PSQI) were used as assessment tools. Results showed that 69.5% of the participants had report poor sleep quality, 18.5% struggled with depression and 24.6% with anxiety (Kabeloğlu and Gül 2021: 99). The results obtained in the current study show that poor sleep characteristics is reported at a higher rate than in the pre-COVID-19 period as assumed. This finding seems to be consistent with previous literature findings that when contagious infectious illnesses expand over the globe, the prevalence of mental problems including depression, anxiety, and sleep problems rises (Kabeloğlu and Gül 2021: 101).

Supporting findings have been obtained for Hypothesis 1, which suggests that there will be a positive relationship between poor sleep characteristics and indicators of psychological distress such as depression, anxiety, stress, and COVID-19 anxiety. First, consistent with Hypothesis 1a, the association between poor sleep quality and depression, anxiety, stress, and COVID-19 anxiety appear to be positive and significant. In other words, participants with poor sleep quality were found to have higher levels of depression, anxiety, stress, and COVID-19 anxiety. The relevant literature reveals that there is a deep-rooted link between sleep problems and psychological distress (Woods and Scott 2016: 45; Hyun et al. 2021: 54; Goldstein and Walker 2014: 679). Stress, anxiety, and depression may all be brought on by not getting enough sleep, and they might all worsen as well (Goldstein and Walker 2014: 679). On the other hand, these mental health issues might also cause sleep disturbances (Kahn et al. 2013: 221). In a study of 2291 participants, 57.1% of participants reported poor sleep quality, 32.1% high anxiety, 41.8% high distress, and 7.6% PTSD symptomatology associated with COVID-19 (Casagrande et al. 2020: 12). Consistent with Hypothesis 1b, the current study shows that the association between daytime sleepiness and depression, anxiety, stress, and COVID-19 anxiety is positive and significant. In a study of 64 healthy young adults, participants who reported higher levels of daytime sleepiness reported higher levels of depressive symptoms (Campos-Morales et al. 2005: 10).

Complex results have been obtained regarding Hypothesis 2, which suggests a positive relationship between sleep characteristics and executive functions. Reviewed literature indicted that the nervous systems of the prefrontal cortex (PFC), which is engaged in executive processes, are particularly sensitive to sleep deprivation (Couyoumdjian et al. 2010: 66). Moreover, it is known that poor sleep quality has been linked to disinhibition, a cognitive process that involves the capacity to regulate or repress thoughts, behaviors, or reactions (Zeigler-Hill and Shackelford 2020). Schapkin and colleagues (2006: 696) proposed that the inhibitory control-related go/no go task would be more impacted because executive tasks are more susceptible to sleep disruptions than non-executive tasks. Despite the fact that research had no discernible impact on performance, it was found that the inhibitory function had decreased over the day. In the line with reviewed literature Hypothesis 2a was supported by current study results. However, Hypothesis 2d, which suggested that daytime sleepiness would be negatively correlated with inhibitory control, was not supported. Although, previous studies have reported that increased levels of daytime sleepiness are associated with lower performance on measures of executive functioning (Anderson et al. 2009: 701). However, similar with our findings, Fueggle (2018: 1) did not find a direct relationship between measures of daytime sleepiness and inhibition in his study.

He suggests that increased levels of daytime sleepiness are not directly related to cognitive control difficulties.

The evidence suggest that sleep deprivation has a detrimental impact on people's capacity to change their behavior rapidly and adaptably in response to shifting environmental demands. Couyoumdjian and colleagues' study (2010: 68), which included 118 university students, participants were randomly assigned to sleep and sleep deprivation groups to test task switching paradigm. The results demonstrated that insufficient sleep reduced task switching accuracy as well as speed. Additionally, participants with sleep deprivation were observed to exhibit greater rates of error and higher task switch costs when compared to sleep group. In our study, we predicted that sleep quality would be positively associated with cognitive flexibility in Hypothesis 2b, and daytime sleepiness negatively associated with cognitive flexibility in Hypothesis 2e. However, our results did not support this hypothesis. Specifically, we found no significant relationship between both sleep quality and daytime sleepiness and cognitive flexibility. Harrison and Horne’s (2000: 236) study revealed that sleep deprived participants have normal reaction times in dull tasks such as reaction time, and even after sleep deprivation, they make compensatory efforts to overcome sleepiness. Similarly, another study shows that participants maintained their performance better on more complex tasks after sleep deprivation (Chee and Choo 2004: 4560).

The functioning of the executive functions of the brain, which include mental processes like attention, working memory, problem-solving, and decision-making, is linked to depression, anxiety, and stress (Shields et al. 2016: 651). According to research, people with depression and anxiety frequently struggle with attention and working memory, which can make it challenging for them to complete daily activities and reach conclusions (Keller et al. 2019: 9). In the line with reviewed literature, it is known that rumination and trouble in controlling unpleasant thoughts are symptoms of depression (DeGutis et al. 2015: 345), stress can pose a challenge to control impulsivity and aggressive attitude, while anxiety can make it difficult to prevent fear and anxiety (Edwards et al. 2017: 674). However, other studies indicate that the association between depression, anxiety, and stress and inhibitory control might be bidirectional, indicating that the absence of inhibitory control can also play a role in the onset and persistence of these disorders (Hasher and Zacks 1979: 356).

Additionally, as these circumstances may result in alterations to the function and structure of the brain that might worsen the inhibitory control (DeGutis et al. 2015: 345), it is hypothesized depression, anxiety and stress are negatively associated with inhibitory control and cognitive flexibility in Hypothesis 3a. However, this hypothesis not supported in current study. In a study conducted during the COVID-19 pandemic, participants reported higher-than-anticipated psychological distress (O'Connor et al. 2022: 683). Similar with our results, no significant relationship was found between executive functions, including working memory and inhibitory control, and psychological distress. Mirowsky and Ross (2017) stated that cognitive problems are distinctly separate from emotional issues like anxiety and depression according to psychiatric diagnostic models.

Reduced cognitive flexibility, which means the capacity to adapt to changing circumstances, think creatively, and generate novel ideas, has been linked to depression, anxiety, and stress. According to studies, people who struggle with anxiety and depression find it harder to move between activities and are less able to filter out extraneous information. Additionally, it has been discovered that stress has a detrimental impact on cognitive flexibility, with high stress levels resulting in a reduced capacity to move between activities and a heightened difficulty in filtering out unnecessary information. It is crucial to remember that these relationships are complicated and that various circumstances may have varied effects on cognitive flexibility. Cognitive flexibility may also influence mood and stress levels. In a study of 477 university students, measures of anxiety, depression, impulsivity, and cognitive flexibility were taken. The results show that higher anxiety and depression scores are associated with lower cognitive flexibility scores and higher levels of impulsivity (Yu et al. 2020: 33). Therefore, in hypothesis 3b, it is expected that depression, anxiety and stress are negatively associated with cognitive flexibility. However, it is not supported. In a study that aimed to compare cognitive flexibility abilities, stress and anxiety among athletes, results show that better cognitive performances are negatively related to stress and anxiety. Researchers suggest that cognitive flexibility will improve human performance by modulating anxiety and stress during competition (Han et al. 2011: 221).

The propensity for attention to be drawn more strongly to certain stimuli or ideas than to others is known as attentional bias. Poor sleep quality was linked to a higher risk of attentional bias to negative stimuli, whereas excellent sleep quality was linked to a lower risk of attentional bias to negative stimuli and a higher capacity for task-focused attention. There are several things that might make people sleepy throughout the day, including poor quality of sleep, sleep disorders, and some medications (Pagel 2009: 391). In studies using the dot-probe task as the attentional bias paradigm, the absolute value of the participants' attentional bias scores is taken, and higher values indicate stronger effects for negative stimulus or avoidance of negative stimulus (Vervoort et al. 2021: 644512). Therefore, sleep quality was expected to be negatively associated with attentional bias in Hypothesis 2c and daytime sleepiness was expected to be negatively associated with attentional bias in Hypothesis 2f. However, our hypotheses were not supported.

In the current study, Hypothesis 3c was supported, which suggested that coronavirus anxiety would be positively associated with attentional bias. Previous studies also show that coronavirus anxiety is positively associated with attentional bias, consistent with the findings of the current study (Albery et al. 2021: 1367).

4.3. EVALUATION GROUP COMPARISONS IN THE CONTEXT OF RELEVANT LITERATURE

The data obtained in this study show that sleep quality differs according to depression, anxiety and stress symptom levels, similar to previous studies. Cellini and his colleagues (2020: 13074) investigated the effects of restraint measures on 1310 Italian participants' daily habits, such as sleep-wake rhythms and digital media use in COVID-19 period. As we predicted in Hypothesis 1c, the results of the study found that the sleep quality was worse in people with higher levels of depression, anxiety and stress symptomatology.

Previous studies suggest that depression has important effects on executive functions. Almondes and colleagues (2016: 1547) showed that individuals without depression had 68.4% higher motor programming scores, 3 times higher inhibitory control scores, and 3 times higher working memory scores than individuals with depression. As a result of the current study, it was observed that depression scores did not differ for cognitive flexibility, inhibition, and attentional bias. This proves that the subjects of the current study were healthy individuals who were not depressed.

In addition, the result of the current study indicated that the sleep quality of the participants differed according to the level of depression. In a study, daytime sleepiness, sleep quality, and depression were evaluated in two groups, shift workers and day shift workers only (Alhifzi et al. 2018: 19). Results showed that there was a significant increase in daytime sleepiness and poor sleep quality in people working in a shift working system, and there is a strong relationship between poor sleep quality and depression as we found in the current study.

Excessive concern and fear are characteristics of anxiety, which makes it challenging to control feelings and thoughts (Emmelkamp and Ehring 2014: 11). According to research, anxiety makes it harder for people to suppress their worries, and the level of anxiety is correlated with executive dysfunction (Eysenck 1985: 580). O'Rourke and colleagues (2020: 220) examined EF, coping and anxiety in their study. The results showed that both EF deficit and disengagement coping strategies are associated with increased anxiety. In addition, it has been shown that strong coping skills can moderate the relationship between EF and anxiety. Coping skills were not examined in the current study, coping skills may also be considered in future studies. However, there is some evidence that consistent with current results which indicates there was no difference in the executive functions and attentional bias experienced by participants with both normal anxiety level and clinical emotional states. For example, twenty-nine healthy participants took part in a functional magnetic resonance imaging (fMRI) research by Fales, Becerril, Luking, and Barch (2010: 204) to investigate the effects of anxiety on cognitive functioning in the context of emotional distractions. The findings revealed that performance or brain activity were not significantly changed by anxiety.

Stress is linked to the inability to restrain an impulsive or aggressive attitude (Lazarus 1991: 149). According to research, stress can make it harder to control impulsive and violent behavior, and the amount of difficulty controlling these behaviors is correlated with the level of stress (Selye 1976: 123). Field and Powell (2007: 562) studied the effects of stress on alcohol craving and attentional bias for alcohol-related cues in their study with 44 heavy social drinker participants. The results indicated that participants showed significant attentional bias in cues about alcohol acting as a stressor. However, in the current study found that there was no difference in attentional bias scores experienced by both normal stress level and clinical emotional states toward COVID-19 related visuals. Moreover, research indicates stress may negatively affect the cognitive functions (McEwen and Sapolsky 1995: 209). Fabio, Picciotto and Caprì (2022: 7559) studied the effects of stress on executive functions and automatic processes in 88 healthy subjects aged 18-30 years. Results showed that stress impairs cognitive flexibility, working memory, and verbal fluency. However, this finding contrasts with our results which indicates inhibition and cognitive flexibility did not differ according to scores of participants with normal anxiety and clinical emotional states (mild to extreme severe level of anxiety). Although it is not entirely clear whether stress affects working memory, inhibition, and cognitive flexibility, some studies demonstrate that stress can increase inhibition (Schwabe et al. 2013: 2324; Shields et al. 2015: 653).

Finally, it is hypothesized that the sleep quality and attentional bias scores will differ between participants who infected with and without COVID-19 in Hypothesis 4. There are limited resources in the available literature regarding Hypothesis 4a which predict that there will be difference of sleep quality of people with and without COVID-19. Despite, the current findings are consistent with the limited research conducted. In the study, which included 189 patients hospitalized for COVID-19, mental health and sleep quality of patients requiring clinical intervention were examined after the diagnosis of COVID-19. According to the findings, 54% of the individuals experienced poor sleep quality (Akıncı and Başar 2021: 169).

In Hypothesis 4b, it was predicted that the attentional bias scores of the participants would differ according to the COVID-19 status. Crivelli and her colleagues (2021: 243) were examined the cognitive functions of participants who survived COVID-19 without a history of cognitive impairment. Forty-five post-COVID-19 patients and forty-five control participants underwent neuropsychological assessment of cognitive domains such as memory, language, attention, executive functions, and visuospatial skills. The results show that the impairments can be detected predominantly in executive functions and attention and have a smaller effect on memory and language. However, this finding is contrary with the findings of Miskowiak and his friends (2021: 42) who noted that in terms of cognitive impairments, hospital stays, total oxygen requirements, and a marker for the severity of acute illness, there are no correlations between the severity of COVID-19 and cognitive performance. These findings are consistent with the findings of the current study that the attentional bias scores of the participants did not differ according to the COVID-19 status.

4.5. EVALUATION OF THE RESULTS OF THE LINEAR REGRESSION ANALYZES OF THE VARIABLES IN THE CONTEXT OF THE RELEVANT LITERATURE

In this study, attentional bias was found to predict inhibition. According to studies, when under attention-seeking settings, those with high trait anxiety have trouble focusing on both threat- and non-threat-related distractions (Fox 1994: 166). For instance, if a person has a tendency to pay attention to unpleasant stimuli, they may find it difficult to divert their attention from them and are more likely to experience emotional discomfort or overload (Bar-Haim et al. 2010; Dennis-Tiwary et al. 2019: 881). Additionally, attentional bias may reduce the efficiency of cognitive control techniques like working memory, which may focus attention away from distractions and toward pertinent information (McNally 2019: 11; Dennis-Tiwary et al. 2019: 881). Inhibition and attentional bias are also associated because cognitive and neurological mechanisms including attentional control networks and emotional control systems affect both (Joormann 2004: 143).

Moreover, when the findings of the current research were examined; it was observed that disinhibition predicts poor sleep quality. According to studies, those who are more disinhibited have a great difficulty falling asleep, remaining asleep, and getting enough restorative sleep (Marques et al. 2015: 220). This could be because people with higher level of disinhibition are more prone to engage in activities that impair sleep, such staying up late or taking coffee or alcohol right before bed (Carskadon 1990: 6). Disinhibition can also cause stress or anxiety, which can impair the quality of sleep (Shen et al. 2018: 2586). For instance, Ballesio, Ottaviani, and Lombardo (2019: 672) looked at whether a sample of people with insomnia are more likely to engage in rumination, the defining feature and persistent cause of insomnia. The findings indicate that a tendency to consider the negative effects of sleeplessness is connected to a difficulty to properly inhibit mental representations.

Another important finding of the study is attentional bias was predicted COVID-19 anxiety. According to studies, those who are more prone to attentional bias toward unfavorable information are more anxious about the COVID-19 (Albery et al.

2021: 1367). This is due to the fact that they frequently concentrate on the harmful effects of the virus, such as the incidence, fatalities, and financial costs (Li and Li 2022: 6). Feng and her colleagues (2022: 104168) sought to identify the cognitive processes that predict anxiety and worry when people are exposed to various stressors. According to the findings, interpretation bias accounts for the distinctive variation in anxiety and worry and cognitive processes can predict changes in anxiety and worry during stressful future situations.

One of the most important contributions of the current study is that COVID-19 anxiety predicts poor sleep quality. Correspondingly, reviewed literature revealed similar findings. Research conducted in China during the COVID-19 epidemic found that participants' anxiety symptoms grew the greatest, followed by depressive symptoms and sleep disruptions (Huang and Zhao 2020: 5). Furthermore, Yelpaze (2021: 47) in a study investigating the relationship of sleep problems with emotion regulation and anxiety, it was reported that Covid-19 anxiety was a strong predictor of poor sleep quality.

4.6. EVALUATION OF MEDIATION ANALYSIS RESULTS IN THE CONTEXT OF RELEVANT LITERATURE

Reviewed literature indicated that emotional arousal is one way that attentional bias toward COVID-19 cues might lead to disinhibition (McGeown 2021). Strong emotional responses to COVID-19 stimuli, such as fear or worry, can enhance impulsivity and reduce inhibitory control (Sadiković et al. 2020: 2133). For instance, those who are worried about the pandemic may be more likely to act impulsively or take risks in order to deal with their emotions (Naeem 2021: 377).

Furthermore, anxiety related to COVID-19 and disinhibition both alter the body's stress response and may interfere with sleep. Stress causes the body to release hormones like cortisol and adrenaline, which can interfere with a person's ability to get to sleep and stay asleep. Moreover, Sympathetic activation can lead to an increase in attentional bias, which is the propensity to focus more attention on some environmental cues than others. This occurs as a result of sympathetic activation's enhancement of the activity of the brain's attentional system, which focuses attention on stimuli that may be dangerous (Bardeen and Daniel 2017: 73). With the production of adrenaline, which has been demonstrated to improve the processing of emotionally relevant stimuli, sympathetic activation can increase attentional bias (Elzinga and Bremner 2002: 3). Sympathetic nervous system engages and direct one's attention to the source of the sound, helping people to rapidly determine whether there is a threat (Porges and Furman 2011: 110).

Also, by raising the activity of the locus coeruleus, a tiny brainstem region that is important in controlling arousal and attention, sympathetic activation can also worsen attentional bias (Unsworth and Robison 2017: 1286). The neurotransmitter norepinephrine, which is released by the locus coeruleus, stimulates the brain's attentional system and can heighten the salience of some stimuli (Berridge and Waterhouse 2003: 35).

Therefore, one of the most important contributions of this study to the literature is the fifth hypothesis which suggests the relationship of attentional bias with sleep quality is mediated by Covid-19 anxiety and inhibition has been confirmed. Sympathetic activation enhances the processing of emotionally charged inputs, which can interfere with sleep, while also raising the release of norepinephrine and adrenaline, which in turn raises the activity of the brain's attention system (Bardeen and Daniel 2017: 74; Berridge and Waterhouse 2003: 33; Elzinga and Bremner 2002: 14). However, hypothesis 5b which the relationship of attentional bias with sleep quality is mediated by cognitive flexibility were not supported. Studies indicated that it might be less likely for attentional bias and cognitive flexibility to be associated since they require different brain processes (Malinowski 2013). Additionally, it might be challenging to compare the link between attentional bias and cognitive flexibility since different measurement techniques may have varying sensitivities and restrictions (Mogg and Bradley 2016: 79). Additionally, the task switching paradigm utilized in this study to test cognitive flexibility seems to be difficult for all participants, and research indicated that people tend to perform best when faced with difficult tasks (Han et al. 2011: 221).

It was found that the attentional bias was not correlated with poor sleep quality. The previous findings showed that people who meet the minimum criteria for insomnia show attentional bias (Jones et al. 2005: 249). At this point, it seems extremely important to emphasize that attentional bias was measured by bedroom objects (Jones et al. 2005: 249), that's why the previous findings are different from the current study findings. In other words, the attentional bias which was measured among Covid-19 related visuals is not correlated with sleep quality. On the other hand, attentional bias was positively correlated with Covid-19 Anxiety. This result is congruent with previous findings which showed the relationship between attentional bias and health anxiety (Cannito et al. 2020: 7). Furthermore, the association between attentional bias and anxiety was shown in the past (Clarke et al. 2020: 103751). It was also found that the Covid-19 Anxiety has positively correlated with poor sleep quality in the current study. The previous literature findings support the current study results with showing the association between sleep quality and anxiety during Covid-19 (Chen et al. 2022: 527). When indirect effect is taken into consideration, it was found that Covid-19 Anxiety has an indirect effect between attentional bias and poor sleep quality. The mediating role of anxiety was shown in the literature which include also sleep related variables such as sleep wake quality (Fabbri et al. 2022: 172). Overall, attentional bias of individuals is associated with their Covid-19 Anxiety. Therefore, it can be argued that regulating Covid-19 Anxiety may be effective in preventing poor sleep quality.

Another hypothesis of the current study which was about the relationship between attentional bias and poor sleep quality and the indirect effect of inhibitory control between these variables was supported. As it mentioned above the relationship between attentional bias and poor sleep quality was not significantly correlated. On the other hand, attentional bias was significantly and positively correlated with disinhibition. The previous findings were consistent with the current study results which showed that attentional bias variability negatively correlated with inhibitory attention control (Clarke et al. 2020: 103751). Furthermore, the current study showed that disinhibition was significantly and positively correlated with poor sleep quality. This finding was supported previous literature which showed that sleep quality was significantly associated with inhibitory control performance (Li et al. 2021: 664). Also, sleep deprivation was correlated with low inhibition (Anderson and Platten 2011: 463). The indirect effect of disinhibition between attentional bias and poor sleep quality was significant. Consistently, the indirect effect of inhibition was shown in the current literature among diverse variables (Da Silva et al. 2022: 113966). As a result, attentional bias seems to be associated with disinhibition, and disinhibition can be resulted in poor sleep quality.

4.7. LIMITATIONS, CONCLUSION, AND SUGGESTIONS FOR FUTURE RESEARCH

The results of this study led to the conclusion that the relationship of attentional bias with sleep quality is mediated by Covid-19 anxiety and disinhibition. Moreover, the participants' sleep characteristics scores, as sleep quality and daytime sleepiness, differed according to depression, anxiety, and stress scores. In addition, cognitive flexibility was not correlated with sleep characteristics and depression, anxiety, and stress scores of participants. Inhibitory control was correlated with sleep quality and attentional bias. Additionally, COVID-19 anxiety was correlated with attentional bias. However, while the sleep quality scores of the participants differed according to the COVID-19 status, the attentional bias scores did not.

The current study has many limitations and strengths. It fills the gap arising from the absence of a study in the literature exploring the relationship between sleep quality, executive functions, and attentional bias during Covid-19 pandemic among healthy adult subjects. A possible reason for the lack of support in some hypotheses might be due to the sample size of our study. In future studies, it might be useful to study with a larger sample group. In addition, the task switching task used to measure cognitive flexibility was not distinctive as it was challenging for all participants. In addition, some studies indicate that task switching does not measure pure cognitive flexibility process and is also effective in memory and inhibition processes (Miguel 2012). Similar study might be conducted in the future by using a different task switching paradigm. In addition, information on executive function and sleep characteristics of the participants in the pre-COVID-19 period is not available. Participants might have some impairments in executive function and sleep characteristics prior to the COVID-19 period. Additionally, our measure of sleep quality may not have been sensitive enough to capture individual differences in sleep quality.

Health systems administrators concentrate testing, preventing spreading, and providing patient care during the acute phase of the epidemic, but it's important to remember that patients' psychological needs as well (Cullen et al. 2020: 311). As seen in the current study, the urgent determination of psychological interventions in cases such as infectious epidemics is of critical importance in terms of protecting the psychological health of the public and not causing problems such as sleep problems and executive dysfunction brought about by the deterioration of psychological health.

REFERENCES

ACHERMANN Peter and BORBÉLY Alexander A. (2003), "Mathematical Models of Sleep Regulation", *Frontiers in Bioscience-Landmark*, Vol. 8, pp. 683-693.

ADAM Kirstine and OSWALD Ian (1977) "Sleep Is For Tissue Restoration" *Journal of the Royal College of Physicians of London*, Vol. 11, pp. 376-388.

AĞARGÜN Mehmet Yücel, KARA Hayrettin and ANLAR Ömer (1996), "Pittsburgh Uyku Kalitesi İndeksinin Geçerliği ve Güvenirliği", *Türk Psikiyatri Dergisi*, Vol. 7, No. 2, pp. 107-115.

ÅKERSTEDT Torbjörn, HUME Ken, MINORS David and WATERHOUSE Jim (1994). "The Meaning of Good Sleep: A Longitudinal Study of Polysomnography and Subjective Sleep Quality", *Journal of Sleep Research*, Vol. 3, No. 3, pp. 152-158.

AKINCI Tuba and BAŞAR Hatice Melek (2021), "Relationship Between Sleep Quality and The Psychological Status of Patients Hospitalised with COVID-19" *Sleep Medicine*, Vol. 80, pp. 167-170.

ALBERY Ian P., SPADA Marcantonio M. and NIKČEVIĆ Ana V. (2021). "The COVID-19 Anxiety Syndrome and Selective Attentional Bias Towards COVID-19-Related Stimuli In UK Residents During The 2020–2021 Pandemic", *Clinical Psychology & Psychotherapy*, Vol. 28, No. 6, pp. 1367-1378.

ALEMANNO Federica, HOUDAYER Elise, PARMA Anna, SPINA Alfio, DEL FORNO Alessandra, SCATOLINI Alessandra, ANGELONE Sara, BRUGLİERA Luigia, TETTAMANTI Andrea, BERETTA Luigi and IANNACCONE Sandro (2021), "COVID-19 Cognitive Deficits After Respiratory Assistance in The Subacute Phase: A COVID-Rehabilitation Unit Experience", *Plos one*, Vol. 16, No. 2, e0246590.

ALHIFZI Sulaiman, AL-GHONIMY Aseel, AL ABOUDI Malak, AL ABDULLAH Rawan, OLAISH Awad and BAHAMMAM Ahmad S. (2018), “Assessment of Sleep Quality, Daytime Sleepiness, and Depression Among Emergency Physicians Working In Shifts”, *Journal of Nature and Science of Medicine*, Vol. 1. No. 1, pp .17-21.

ALI Kashif, MUFTI Umamah and MUFTI Aliya (2020), “Impact of COVID-19 Lockdown on Sleep Quality in Students: A Cross Sectional Study”, *Annals of International Medical and Dental Research*, Vol. 6, No. 6, pp. 1- 3.

ALMONDES Katie M., COSTA, Monica V., MALLOY-DINIZ Leandro F., and DINIZ Breno S. (2016), “The Relationship Between Sleep Complaints, Depression, and Executive Functions on Older Adults”, *Frontiers in Psychology*, Vol. 7, pp. 1547.

AMERICAN PSYCHIATRIC ASSOCIATION, (2022), *Diagnostic and Statistical Manual Of Mental Disorders* (5th ed., text rev.).

AMSTADTER Ananda (2008), “Emotion Regulation and Anxiety Disorders”, *Journal of Anxiety Disorders*, Vol. 22, No. 2, pp. 211–221.

AMZICA Florin and STERIADE Mircea (2002), “The Functional Significance Of K-Complexes”, *Sleep Medicine Reviews*, Vol. 6, No. 2, pp. 139-149.

ANDERS Thomas F. and EIBEN Lisa A. (1997) “Pediatric Sleep Disorders: A Review Of The Past 10 Years”, *Journal of The American Academy of Child & Adolescent Psychiatry*, Vol. 36, No. 1, pp. 9-20.

ANDERSON Basil, STORFER-ISSER Amy, TAYLOR H. Gerry, ROSEN Carol L. and REDLINE Susan (2009), “Associations of Executive Function with Sleepiness And Sleep Duration In Adolescents”, *Pediatrics*, Vol. 123, No. 4, pp. e701-e707.

ANDERSON Clare and PLATTEN Charlotte R. (2011) “Sleep Deprivation Lowers Inhibition And Enhances Impulsivity to Negative Stimuli”, *Behavioural Brain Research*, Vol. 217, No. 2, pp. 463-466.

ANDERSON Kent W. and SKIDMORE Jay R. (1995), “Empirical Analysis of Factors in Depressive Cognition: The Cognitive Triad Inventory”, *Journal of Clinical Psychology*, Vol. 51, No. 5, pp. 603-609.

ANTONY James W., SCHÖNAUER Monika, STARESINA Bernhard P., and CAIRNEY Scott A. (2019), “Sleep Spindles and Memory Reprocessing”, *Trends In Neurosciences*, Vol. 42, No. 1, pp. 1-3.

ARMITAGE Roseanne (1995), “The Distribution of Eeg Frequencies In Rem And Nrem Sleep Stages In Healthy Young Adults”, *Sleep*, Vol. 18, No. 5, pp. 334-341.

ARNSTEN Amy F. (2009), “Stress Signalling Pathways That Impair Prefrontal Cortex Structure and Function”, *Nature reviews neuroscience*, Vol. 10, No. 6, pp. 410-422.

ASHCRAFT Mark H. and KIRK Elizabeth P. (2001), “The Relationships Among Working Memory, Math Anxiety, and Performance”, *Journal of Experimental Psychology: General*, Vol. 130, No. 2, pp. 224.

ASSEFA Samson Z., DIAZ-ABAD Montserrat, WICKWIRE Emerson M., and SCHARF Steven M. (2015), “The Functions of Sleep”, *AIMS Neuroscience*, Vol. 2, No. 3, pp. 155-171.

ATALAN Abdulkadir (2020), “Is the Lockdown Important to Prevent The COVID-19 Pandemic? Effects On Psychology, Environment and Economy-Perspective”, *Annals of medicine and surgery*, Vol. 56, pp. 38-42.

BALLESIO Andrea, OTTAVIANI Cristina and LOMBARDO Caterina (2019), “Poor Cognitive Inhibition Predicts Rumination About Insomnia in A Clinical Sample”, *Behavioral Sleep Medicine*, Vol. 17, No. 5, pp. 672-681.

BANKS Jonathan B. and BOALS Adriel (2017), “Understanding the Role of Mind Wandering In Stress-Related Working Memory Impairments”, *Cognition and Emotion*, Vol. 31, No. 5, pp. 1023-1030.

BARDEEN Joseph R. and DANIEL Thomas A (2017), “A Longitudinal Examination Of The Role of Attentional Control in The Relationship Between Posttraumatic Stress and Threat-Related Attentional Bias: An Eye-Tracking Study”, *Behaviour Research and Therapy*, Vol. 99, pp. 67-77.

BAR-HAIM Yair, HOLOSHITZ Yael, ELDAR Sharon, FRENKEL Tahl I, MULLER, David, CHARNEY Dennis S., PINE Daniel S., NATHAN A. Fox and WALD Ilan (2010), “Life-Threatening Danger and Suppression of Attention Bias to Threat”, *American Journal of Psychiatry*, Vol. 167, No. 6, pp. 694-698.

BAR-HAIM Yair, LAMY Dominique, PERGAMIN Lee, BAKERMANS-KRANENBURG Marian J. and VAN IJZENDOORN Marinus H. (2007), “Threat-Related Attentional Bias in Anxious and Nonanxious Individuals: A Meta-Analytic Study”, *Psychological Bulletin*, Vol. 133, No. 1, pp. 1.

BARNARD Megan P. and CHAPMAN Peter (2016), "Are Anxiety and Fear Separable Emotions in Driving? A Laboratory Study of Behavioural and Physiological Responses to Different Driving Environments", *Accident Analysis & Prevention*, Vol. 86, pp. 99-107.

BECK Aaron T. (1970), "Cognitive Therapy: Nature and Relation to Behavior Therapy", *Behavior Therapy,* Vol. 1, No. 2, pp. 184-200.

BECK Aaron T., EMERY Gary and GREENBERG Ruth L. (2005) *Anxiety Disorders And Phobias: A Cognitive Perspective*. Basic Books.

BECK Aaron T., WARD Clyde H., MENDELSON Myer, MOCK John and ERBAUGH James (1961), "An Inventory for Measuring Depression", *Archives of General Psychiatry*, Vol. 4, No. 6, pp. 561-571.

BECK Francois, LEGER Damien, CORTAREDONA Sebastien, VERGER Pierre, PERETTI-WATEL Patrick and COCONEL group (2021), "Would We Recover Better Sleep at The End of Covid-19? A Relative Improvement Observed at The Population Level with The End of The Lockdown In France", *Sleep medicine*, Vol. 78, pp. 115-119.

BECKHAM Ernest Edward, LEBER William R., WATKINS John T., BOYER Jenny L. and COOK Jacque B. (1986), "Development of An Instrument to Measure Beck's Cognitive Triad: The Cognitive Triad Inventory", *Journal of Consulting and Clinical Psychology*, Vol. 54, No. 4, pp. 566.

BEEBE Dean W. and GOZAL David (2002), "Obstructive Sleep Apnea and The Prefrontal Cortex: Towards A Comprehensive Model Linking Nocturnal Upper Airway Obstruction to Daytime Cognitive and Behavioral Deficits", *Journal of Sleep Research*, Vol. 11, No. 1, pp. 1-16.

BENHAM Grant (2021), "Stress and Sleep in College Students Prior To And During The COVID-19 Pandemic", *Stress and Health*, Vol. 37, No. 3, pp. 504-515.

BENITEZ Andreana and GUNSTAD John (2012), "Poor Sleep Quality Diminishes Cognitive Functioning Independent of Depression and Anxiety in Healthy Young Adults", *The Clinical Neuropsychologist*, Vol. 26, No. 2, pp. 214-223.

BERGER Ralph J. and PHILIPS Nathan H. (1993), "Sleep and Energy Conservation" *Physiology*, Vol. 8, No. 6, pp. 276-281.

BERGER Ralph J. and PHILIPS Nathan H. (1995), "Energy Conservation and Sleep", *Behavioural Brain Research*, Vol. 69, No. 1-2, pp. 65-73.

BERRIDGE Craig W. and WATERHOUSE Barry D. (2003), "The Locus Coeruleus–Noradrenergic System: Modulation of Behavioral State and State-Dependent Cognitive Processes" *Brain research reviews*, Vol. 42, No. 1, pp. 33-84.

BERTUCCIO Rebecca F. and RUNION Megan C. (2020), "Considering Grief In Mental Health Outcomes of COVID-19", *Psychological Trauma: Theory, Research, Practice, and Policy*, Vol. 12, No. S1, pp. S87.

BIÇER Ismail, ÇAKMAK Cuma, DEMIR Halil and KURT Mehmet Emin (2020), "Koronavirüs Anksiyete Ölçeği Kısa Formu: Türkçe Geçerlik ve Güvenirlik Çalışması" *Anatolian Clinic the Journal of Medical Sciences*, Vol. 25(Special Issue on COVID 19), pp. 216-225.

BILGEL Nazan and BAYRAM Nuran (2010), "Depresyon Anksiyete Stres Ölçeğinin (DASS-42) Türkçeye Uyarlanmış Şeklinin Psikometrik Özellikleri", *Nöropsikiyatri Arşivi*, Vol. 47, No. 2, pp. 118-126.

BILGEL Nazan and BAYRAM Nuran (2014), "The Epidemiology of Depression, Anxiety, Stress and Anger in Turkish High School Students", *British Journal of Education, Society & Behavioural Science*, Vol. 4, No. 9, pp. 1153-1170.

BLANCHARD Robert J., BLANCHARD Caroline D., GRIEBEL Guy and NUTT David (2008), "Introduction to The Handbook on Fear and Anxiety", *Handbook of Behavioral Neuroscience*, No. 17, pp. 3-7.

BLAYA Carolina, DORNELLES Marina, BLAYA Rodrigo, KIPPER Letícia, HELDT Elizeth, ISOLAN Luciano, BOND Michael and MANFRO Gisele Gus (2006), "Do Defense Mechanisms Vary According to The Psychiatric Disorder?", *Brazilian Journal of Psychiatry*, No. 28, pp. 179-183.

BOALS Adriel and BANKS Jonathan B. (2020), "Stress and Cognitive Functioning During a Pandemic: Thoughts from Stress Researchers", *Psychological Trauma: Theory, Research, Practice, and Policy*, Vol. 12, No. S1, pp. S255.

BORBÉLY Alexander A. and ACHERMANN Peter (1992), "Concepts and Models of Sleep Regulation: An Overview", *Journal of Sleep Research*, Vol. 1, No. 2, pp. 63-79.

BORBELY Alexander A. and TOBLER Irene (1985), "Homeostatic and Circadian Principles in Sleep Regulation in The Rat", *Brain Mechanisms of Sleep*, pp. 35-44.

BRAEM Senne and EGNER Tobias (2018), "Getting A Grip on Cognitive Flexibility", *Current Directions in Psychological Science*, Vol. 27, No. 6, pp. 470-476.

BULL Rebecca and SCERIF Gaia (2001), "Executive Functioning as A Predictor of Children's Mathematics Ability: Inhibition, Switching, And Working Memory", *Developmental Neuropsychology*, Vol. 19, No. 3, pp. 273-293.

BUYSSE Daniel J., REYNOLDS III Charles F., MONK Timothy H., BERMAN Susan R. and KUPFER David J. (1989), "The Pittsburgh Sleep Quality Index: A New Instrument for Psychiatric Practice and Research", *Psychiatry Research*, Vol. 28, No. 2, pp. 193-213.

BUYUKDURA Jeyhan S., McCLINTOCK Shawn M. and CROARKIN Paul E. (2011), "Psychomotor Retardation in Depression: Biological Underpinnings, Measurement, And Treatment", *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, Vol. 35, No. 2, pp. 395-409.

CALVO Manuel G., GUTIERREZ Aida and FERNÁNDEZ-MARTÍN Andrés (2012), "Anxiety And Deficient Inhibition of Threat Distractors: Spatial Attention Span and Time Course", *Journal of Cognitive Psychology*, Vol. 24, No. 1, pp. 66-78.

CAMPOS-MORALES Rosa M., VALENCIA-FLORES Matilde, CASTAÑO-MENESES Alejandra, CASTAÑEDA-FIGUEIRAS Sandra and MARTÍNEZ-GUERRERO José (2005), "Sleepiness, Performance and Mood State in A Group of Mexican Undergraduate Students", *Biological Rhythm Research*, Vol. 36, No. 1-2, pp. 9-13.

CANNITO Loreta, DI CROSTA Adolfo, PALUMBO Rocco, CECCATO Irene, ANZANI Stefano, La MALVA Pasquale, PALUMBO Riccardo and DI DOMENICO, Alberto (2020), "Health Anxiety and Attentional Bias Toward Virus-Related Stimuli During The COVID-19 Pandemic" *Scientific Reports*, Vol. 10, No. 1, pp. 1-8.

CAPELLINI Isabella, McNAMARA Patrick, PRESTON Brain T., NUNN Charles L and BARTON Robert A. (2009), "Does Sleep Play a Role in Memory Consolidation? A Comparative Test", *PLoS One*, Vol. 4, No. 2, pp. e4609.

CARLEY David W. and FARABI Sarah S. (2016), "Physiology of Sleep", *Diabetes Spectrum*, Vol. 29, No. 1, pp. 5-9.

CARLSON Stephanie M., MOSES Louis J. and BRETON Casey (2002), "How Specific Is the Relation Between Executive Function and Theory of Mind? Contributions Of Inhibitory Control and Working Memory", *Infant and Child Development: An International Journal of Research and Practice*, Vol. 11, No. 2, pp. 73-92.

CARRILLO-VICO Antonio, LARDONE Patricia J., ÁLVAREZ-SÁNCHEZ Nuria, RODRÍGUEZ-RODRÍGUEZ Ana and GUERRERO Juan M. (2013), "Melatonin: Buffering the Immune System", *International Journal of Molecular Sciences*, Vol. 14, No. 4, pp. 8638-8683.

CARSKADON Mary A. (1990), "Patterns of Sleep and Sleepiness in Adolescents", *Pediatrician*, Vol. 17, No. 1, pp. 5-12.

CARSKADON Mary A. and DEMENT William C. (2005), "Normal Human Sleep: An Overview", *Principles and Practice of Sleep Medicine*, Vol. 4, No. 1, pp. 13-23.

CARSKADON Mary A., DEMENT William C., MITLER Merrill M., GUILLEMINAULT Christian, ZARCONE Vincent P. and SPIEGEL Rene (1976), "Self-Reports Versus Sleep Laboratory Findings In 122 Drug-Free Subjects with Complaints of Chronic Insomnia", *Am J Psychiatry*, Vol. 133, No. 12, pp. 1382-1388.

CASAGRANDE Maria, FAVIERI Francesca, TAMBELLI Renata and FORTE Giuseppe (2020), "The Enemy Who Sealed the World: Effects Quarantine Due to the COVID-19 On Sleep Quality, Anxiety, And Psychological Distress in The Italian Population", *Sleep medicine*, Vol. 75, pp. 12-20.

CÁSSARO Fábio A. and PIRES Luiz F. (2020), "Can We Predict the Occurrence Of COVID-19 Cases? Considerations Using a Simple Model of Growth", *Science of the Total Environment*, Vol. 728, pp. 138834.

CATES Marshall E., CLARK Andraya, WOOLLEY Thomas W. and SAUNDERS Amy (2015) “Sleep Quality Among Pharmacy Students. American Journal of Pharmaceutical Education”, Vol. 79, No. 1. pp. 09.

CELLINI Nicola, CANALE Natale, MIONI Giovanna and COSTA Sebastiano (2020), “Changes in Sleep Pattern, Sense of Time and Digital Media Use During COVID-19 Lockdown in Italy”, *Journal of Sleep Research*, Vol. 29, No. 4, pp. e13074.

CELLINI Nicola, CONTE Francesca, De ROSA Oreste, GIGANTI Fiorenza, MALLOGGI Serena, REYT Mathilde, GUILLEMIN Camille, SCHMIDT Christina, MUTO Vincenzo and FICCA Gianluca (2021), “Changes in Sleep Timing and Subjective Sleep Quality During The COVID-19 Lockdown in Italy and Belgium: Age, Gender and Working Status as Modulating Factors”, *Sleep Medicine*, Vol. 77, pp. 112-119.

CHAMBERLIN Nancy L., ARRIGONI Elda, CHOU Thomas C., SCAMMELL Thomas E., GREENE Ross W. and SAPER Clifford B. (2003), “Effects of Adenosine on Gabaergic Synaptic Inputs to Identified Ventrolateral Preoptic Neurons”, Neuroscience, Vol. 119, No. 4, pp. 913-918.

CHANG Anne-Marie, AESCHBACH Daniel, DUFFY Jeanne F. and CZEISLER Charles A. (2015), “Evening Use of Light-Emitting Ereaders Negatively Affects Sleep, Circadian Timing, And Next-Morning Alertness”, *Proceedings of the National Academy of Sciences*, Vol. 112, No. 4, pp. 1232-1237.

CHEE Michael W. and CHOO Wei Chieh (2004), “Functional Imaging of Working Memory After 24 Hr of Total Sleep Deprivation”, *Journal of Neuroscience*, Vol. 24, No. 19, pp. 4560-4567.

CHEN Qiyu, DAI Wenjuan, LI Guangming and MA Ning (2022), “The Impact of Screen Time Changes on Anxiety During The COVID-19 Pandemic: Sleep and Physical Activity as Mediators”, *Sleep and Biological Rhythms*, Vol. 20, No. 4, pp. 521-531.

CHEUNG Angeles M., MITSIS Effie M. and HALPERIN Jeffery M. (2004), “The Relationship of Behavioral Inhibition to Executive Functions in Young Adults”, *Journal of Clinical and Experimental Neuropsychology*, Vol. 26, No. 3, pp. 393-404.

CHOI Edmond Pui Hang, HUI Bryant Pui Hung and WAN Eric Yuk Fai (2020), "Depression and Anxiety in Hong Kong During COVID-19", *International Journal of Environmental Research and Public Health*, Vol. 17, No. 10, pp. 3740.

CHOKROVERTY Sudhansu (1994), "An Overview of Sleep", *Sleep Disorders Medicine*, pp. 7-16.

CHOKROVERTY Sudhansu (2017), "Overview of Normal Sleep", In *Sleep Disorders Medicine*, Springer, New York, NY, pp. 5-27.

CISLER John M. and KOSTER Ernst H. (2010), "Mechanisms of Attentional Biases Towards Threat in Anxiety Disorders: An Integrative Review", *Clinical Psychology Review*, Vol. 30, No. 2, pp. 203-216.

CLARKE Patrick J., MARINOVIC Welber, TODD Jemma, BASANOVIC Julian, CHEN Nigel T. and NOTEBAERT Lies (2020), "What Is Attention Bias Variability? Examining The Potential Roles of Attention Control and Response Time Variability in Its Relationship with Anxiety", *Behaviour Research and Therapy*, Vol. 135, pp. 103751.

COUYOUMDJIAN Alessandro, SDOIA Stefano, TEMPESTA Daniela, CURCIO Giuseppe, RASTELLINI Elisabetta, De GENNARO Luigi and FERRARA Michele (2010), "The Effects of Sleep and Sleep Deprivation on Task-Switching Performance", *Journal of Sleep Research*, Vol. 19, (1-Part-I), pp. 64-70.

CRICK Francis and MITCHISON Graeme (1983), "The Function of Dream Sleep", *Nature*, Vol. 304, No. 5922, pp. 111-114.

CRISTOFORI Irene, COHEN-ZIMERMAN Shira And GRAFMAN Jordan (2019), "Executive Functions", *Handbook of Clinical Neurology*, Vol. 163, pp. 197-219.

CRIVELLI Lucía, CALANDRI Ismael, CORVALÁN Nicolas, CARELLO María Agostina, KELLER Greta, MARTÍNEZ Carlos, ARRUABARRENA Micaela and ALLEGRI Ricardo (2021), "Cognitive Consequences Of COVID-19: Results of A Cohort Study from South America", *Arquivos De Neuro-Psiquiatria*, Vol. 80, pp. 240-247.

CULLEN Walter, GULATI Gautam and KELLY Brendan D (2020), "Mental Health in the COVID-19 Pandemic", *QJM: Monthly Journal of The Association of Physicians*, Vol. 113, No, 5, pp. 311–312.

CZEISLER Charles A., DUFFY Jeanne F., SHANAHAN Theresa L., BROWN Emery N., MITCHELL Jude F., RIMMER David W., RONDA Joseph M., SILVA Edward J., ALLAN James S., EMENS Jonathan S., DIJK Derk-Jan and KRONAUER Richard E. (1999), "Stability, Precision, And Near-24-Hour Period of The Human Circadian Pacemaker", *Science*, Vol. 284, No. 5423, pp. 2177-2181.

DA SILVA Weslley Quirino Alves, CABRAL Daniel Aranha Rego, BIGLIASSI Marcelo, BORTOLOTTI Henrique, HUSSEY Erika, WARD Nathan and FONTES Eduardo Bodnariuc (2022), "The Mediating Role of Inhibitory Control in The Relationship Between Prefrontal Cortex Hemodynamics and Exercise Performance in Adults with Overweight or Obesity", Physiology & Behavior, Vol. 257, pp. 113966.

DAJANI Dina R. and UDDIN Lucina Q. (2015), "Demystifying Cognitive Flexibility: Implications For Clinical and Developmental Neuroscience", *Trends in Neurosciences*, Vol. 38, No. 9, pp. 571-578.

DANG-VU Thien Thanh, SCHABUS Manuel, DESSEILLES Martin, STERPENICH Virginie, BONJEAN Maxime and MAQUET Pierre (2010), "Functional Neuroimaging Insights into The Physiology of Human Sleep", *Sleep*, Vol. 33, No. 12, pp. 1589-1603.

DAVIDSON Jonathan and TURNBULL Craig D. (1986), "Diagnostic Significance of Vegetative Symptoms in Depression", *The British Journal of Psychiatry*, Vol. 148, No. 4, pp. 442-446.

DEGUTIS Joseph, ESTERMAN Michael, McCULLOCH Bay, ROSENBLATTAndrew, 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.

DEMENT William C. (1998), "The Study of Human Sleep: A Historical Perspective", *Thorax*, Vol. 53, suppl 3, pp. S2-S7.

DEMIR Ahmet U., ARDIC Sadık, FIRAT Hikmet, KARADENIZ Derya, AKSU Murat, UCAR Zeynep Zeren, SEVIM Serhan, OZGEN Fuat, YILMAZ Hikmet, ITIL Oya, PEKER Yuksel, AYGUL Fatma, KIRAN Sibel, GELBAL Selahattin, CEPNİ Zafer and AKOZER Mehmet (2015), "Prevalence of Sleep Disorders in The Turkish Adult Population Epidemiology of Sleep Study", *Sleep and Biological Rhythms*, Vol. 13, No. 4, pp. 298-308.

DENIZ Mehmet Engin and SÜMER Adem Serkan (2010), "Farklı Özanlayış Düzeylerine Sahip Üniversite Öğrencilerinde Depresyon, Anksiyete ve Stresin Değerlendirilmesi", *Eğitim ve Bilim*, Vol. 35, No. 158.

DENNIS John P. and VANDER WAL Jillon S. (2010), "The Cognitive Flexibility Inventory: Instrument Development and Estimates of Reliability and Validity", *Cognitive Therapy and Research*, Vol. 34, No. 3, pp. 241-253.

DENNIS-TIWARY Tracy A., ROY Amy Krain, DENEFRIO Samantha and MYRUSKI Sarah (2019), "Heterogeneity of The Anxiety-Related Attention Bias: A Review and Working Model for Future Research", *Clinical Psychological Science*, Vol. 7, No. 5, pp. 879–899.

DEROGATIS Leonard R. and MELISARATOS Nick (1983), "The Brief Symptom Inventory: An Introductory Report", *Psychological Medicine*, Vol. 13, No. 3, pp. 595-605.

DIAMOND Adele (1990), "Developmental Time Course in Human Infants and Infant Monkeys, and the Neural Bases of, Inhibitory Control in Reaching", *Annals of the New York Academy of Sciences*, Vol. 608, No. 1, pp. 637-676.

DIAMOND Adele (2013), "Executive Functions", *Annual Review of Psychology*, Vol. 64, No. 135, pp. 136-154.

DOI Yuriko, MINOWA Masumi and TANGO Toshiro (2003), "Impact and Correlates of Poor Sleep Quality in Japanese White-Collar Employees", Sleep, Vol. 26, No.4, pp.467-471.

DOWSETT Sharon M. and LIVESEY David J. (2000), "The Development of Inhibitory Control in Preschool Children: Effects of "Executive Skills" Training", *Developmental Psychobiology: The Journal of The International Society for Developmental Psychobiology*, Vol. 36, No. 2, pp. 161-174.

DUDENEY Joanne, SHARPE Louise, SICOURI Gemma, LORIMER Sarah, DEAR Blake F., JAFFE Adam, SERVADURAI Hiran and HUNT Caroline 2017),"Attentional Bias in Children with Asthma With and Without Anxiety Disorders", *Journal of Abnormal Child Psychology*, Vol. 45, No. 8, pp. 1635-1646.

EDWARDS Mark S., EDWARDS Elizabeth J. and LYVERS Michael (2017), "Cognitive Trait Anxiety, Stress and Effort Interact to Predict Inhibitory Control", *Cognition and Emotion*, Vol. 31, No, 4, pp. 671-686.

ELZINGA Bernet M. and BREMNER J. Douglas (2002), "Are the Neural Substrates of Memory the Final Common Pathway in Posttraumatic Stress Disorder (PTSD)?", *Journal of Affective Disorders*, Vol. 70, No. 1, pp. 1-17.

EMMELKAMP Paul and EHRING Thomas (Eds.) (2014), "The Wiley Handbook Of Anxiety Disorders", John Wiley & Sons, pp. 5-13.

EUGENE Andy R. and MASIAK Jolanta (2015), "The Neuroprotective Aspects Of Sleep", MEDtube Science, Vol. 3, No. 1, pp. 35.

EYSENCK Michael W. (1985), "Anxiety and Cognitive-Task Performance", Personality and Individual Differences, Vol. 6, No. 5, pp. 579-586.

EYSENCK Michael W. and DERAKSHAN Nazanin (2011), "New Perspectives in Attentional Control Theory", *Personality and Individual Differences*, Vol. 50, No. 7, pp. 955-960.

FABBRI Marco, BERACCI Alessia, MARTONI Monica, MENEO Debora, TONETTI Lorenzo and NATALE Vincenzo (2021), "Measuring Subjective Sleep Quality: A Review", *International Journal of Environmental Research and Public Health*, Vol. 18, No. 3, pp 1082.

FABBRI Marco, SIMIONE Luca, MARTONI Monica and MIROLLI Marco (2022), "The Relationship between Acceptance and Sleep–Wake Quality before, during, and after the First Italian COVID-19 Lockdown", *Clocks & Sleep*, Vol. 4, No. 1, pp. 172-184.

FABIO Rosa Angela, PICCIOTTO Giulia and CAPRÌ Tindara (2022), "The Effects Of Psychosocial and Cognitive Stress On Executive Functions and Automatic Processes in Healthy Subjects: A Pilot Study", *Current Psychology*, Vol. 41, No. 11, pp. 7555-7564.

FALES Christina L., BECERRIL Karla E., LUKING Katherine R. and BARCH Deanna M. (2010), "Emotional-Stimulus Processing in Trait Anxiety Is Modulated by Stimulus Valence During Neuroimaging of a Working-Memory Task", *Cognition and Emotion*, Vol. 24, No. 2, pp. 200-222

FAVIERI Francesca, FORTE Giuseppe, AGOSTINI Francesca, GIOVANNOLI Jasmine, Di PACE Enrico, LANGHER Viviana, TAMBELLI Renata, PAZZAGLIA Mariella, GIANNINI Anna Maria and CASAGRANDE Maria (2021), "The Cognitive Consequences of the COVID-19 Pandemic on Members of The General Population in Italy: A Preliminary Study on Executive Inhibition", *Journal of Clinical Medicine*, Vol. 11, No. 1, pp. 170.

FEINBERG Irwin and FLOYD Thomas C. (1979), "Systematic Trends Across The Night In Human Sleep Cycles", Psychophysiology, Vol. 16, No. 3, pp. 283-291.

FENG Ya-Chun, KRAHÉ Charlotte, KOSTER Ernst H., LAU Jennifer Y. and HIRSCH Colette R. (2022), "Cognitive Processes Predict Worry and Anxiety Under Different Stressful Situations", *Behaviour Research and Therapy*, Vol. 157, pp. 104168.

FERGUSON Heather J., BRUNSDON Victoria E. and BRADFORD Elisabeth E. (2021), "The developmental trajectories of executive function from adolescence to old age", *Scientific reports*, Vol. 11, No. 1, pp. 1-17.

FERNANDES Blossom (2017), "Executive Functions, Emotion Regulation and Mental Health Problems in Children and Adolescents", Doctoral Dissertation, University of Roehampton.

FIELD Matt and POWELL Hannah (2007), "Stress Increases Attentional Bias For Alcohol Cues in Social Drinkers Who Drink to Cope", *Alcohol & Alcoholism*, Vol. 42, No. 6, pp. 560-566.

FINK George (2016), "Stress, Definitions, Mechanisms, And Effects Outlined: Lessons From Anxiety", In *Stress: Concepts, Cognition, Emotion, And Behavior,* Academic Press, pp. 3-11.

FIORENZATO Eleonora, ZABBERONI Silvia, COSTA Alberto and CONA Giorgia (2021), "Cognitive and Mental Health Changes and Their Vulnerability Factors Related To COVID-19 Lockdown in Italy", *PLoS One*, Vol. 16, No. 1, pp. e0246204

FORTIER-BROCHU Émilie, BEAULIEU-BONNEAU Simon, IVERS Hans and MORIN Charles M. (2012), “Insomnia and Daytime Cognitive Performance: A Meta-Analysis”, *Sleep Medicine Reviews*, Vol. 16, No. 1, pp. 83-94.

FOX Elaine (1994), “Attentional Bias in Anxiety: A Defective Inhibition Hypothesis”, *Cognition & Emotion*, Vol. 8, No. 2, pp. 165-195.

FRIEDMAN Naomi P. and MIYAKE Akira (2004), “The Relations Among Inhibition And Interference Control Functions: A Latent-Variable Analysis”, *Journal of Experimental Psychology: General*, Vol. 133, No. 1, pp. 101.

FUEGGLE Simone (2018), “The Relationship Between Sleep and Cognitive Control Across Development: Evidence from Behavioural And Electrophysiological Perspectives”, Doctoral Dissertation, University of Western Australia.

FUNAHASHI Shintaro and ANDREAU Jorge M. (2013), “Prefrontal Cortex and Neural Mechanisms of Executive Function”, *Journal of Physiology-Paris*, Vol. 107, No. 6, pp. 471-482.

GADIE Andrew, SHAFTO Meredith, LENG Yue and KIEVIT Rogier A. (2017), “How Are Age-Related Differences in Sleep Quality Associated with Health Outcomes? An Epidemiological Investigation in A UK Cohort Of 2406 Adults”, *BMJ open*, Vol. 7, No. 7, pp. e014920.

GALLOP David (1988, January), “Chapter Eight: Aristotle on Sleep, Dreams, And Final Causes”, In *Proceedings of The Boston Area Colloquium in Ancient Philosophy*, Vol. 4, No. 1, pp. 257-290

GENET Jessica J. and SIEMER Matthias (2011), “Flexible Control in Processing Affective And Non-Affective Material Predicts Individual Differences in Trait Resilience”, *Cognition and Emotion*, Vol. 25, No. 2, pp. 380-388.

GEORGE Darren and MALLERY Paul (2019), “IBM SPSS Statistics 26 Step by Step: A Simple Guide and Reference (16th ed.)”, Routledge.

GILBERT Sam J. and BURGESS Paul W (2008), “Executive function”, *Current Biology*, Vol. 18, No. 3, pp. R110- R114.

GOLDSTEIN David S. (2010), “Adrenal Responses to Stress”, *Cellular And Molecular Neurobiology*, Vol. 30, No. 8, pp. 1433–1440.

GOLDSTEIN Andrea N. and WALKER Matthew P. (2014), “The Role of Sleep In Emotional Brain Function”, *Annual Review of Clinical Psychology*, Vol. 10, pp. 679.

GULIA Kamelesh K. and KUMAR Velayudhan Mohan (2018), “Sleep Disorders In The Elderly: A Growing Challenge”, *Psychogeriatrics*, Vol. 18, No. 3, pp. 155-165.

GUPTA Ravi, GROVER Sandeep, BASU Aniruddha, KRISHNAN Vijay, TRIPATHI Adarsh, SUBRAMANYAM Alka, ... and AVASTHI Ajit (2020), “Changes in Sleep Pattern and Sleep Quality During COVID-19 Lockdown”, *Indian Journal of Psychiatry*, Vol. 62, No, 4, pp. 370-378.

HALL Ryan C., HALL Richard C., and CHAPMAN Marcia J. (2008), “The 1995 Kikwit Ebola Outbreak: Lessons Hospitals and Physicians Can Apply to Future Viral Epidemics”, *General Hospital Psychiatry*, Vol. 30, No. 5, pp. 446-452.

HAN Doug Hyun, PARK Hyung Woo, KEE Baik Seok, NA Churl, NA Do-Hyun E, and ZAICHKOWSKY Leonard (2011), “Performance Enhancement with Low Stress and Anxiety Modulated by Cognitive Flexibility”, *Psychiatry Investigation*, Vol. 8, No. 3, pp. 221.

HARRISON Yvonne and HORNE James A. (2000), “The Impact of Sleep Deprivation On Decision Making: A Review”, *Journal of Experimental Psychology: Applied*, Vol. 6, No. 3, pp. 236.

HARVEY Allison G., WATKINS Edward and MANSELL Warren (2004), “Cognitive Behavioural Processes Across Psychological Disorders: A Transdiagnostic Approach to Research and Treatment”, Oxford University Press, USA.

HASHER Lynn and ZACKS Rose T. (1979), “Automatic and Effortful Processes In Memory”, *Journal of Experimental Psychology: General*, Vol. 108, No. 3, pp. 356.

HASLER Gregor (2010), “Pathophysiology of Depression: Do We Have Any Solid Evidence Of Interest to Clinicians?”, *World Psychiatry: Official Journal of The World Psychiatric Association (WPA)*, Vol. 9, No. 3, pp. 155–161.

HAYES Andrew F. (2017), “Introduction to Mediation, Moderation, And Conditional Process Analysis: A Regression-Based Approach”, Guilford Publications.

HENSHER David A., BECK Matthew J. and WEI Edward (2021), “Working From Home And Its Implications for Strategic Transport Modelling Based on The Early Days of the COVID-19 Pandemic”, *Transportation Research Part A: Policy and Practice*, Vol. 148, pp. 64-78.

HESTER Robert and LUIJTEN Maartje (2014), “Neural Correlates of Attentional Bias In Addiction”, *CNS spectrums*, Vol. 19, No. 3, pp. 231-238.

HINZ Andreas, KLEIN Annette M., BRÄHLER Elmar, GLAESMER Heide, LUCK Tobias, RIEDEL-HELLER Steffi G, WIRKNER Kerstin and HILBERT Anja (2017), “Psychometric Evaluation of The Generalized Anxiety Disorder Screener GAD-7, Based on A Large German General Population Sample”, *Journal of Affective Disorders*, Vol. 210, pp. 338-344.

HISLER Garret C. and Twenge Jean M. (2021), “Sleep Characteristics of US Adults Before And During The COVID-19 Pandemic”, *Social Science & Medicine*, Vol. 276, pp. 113849.

HORNE James A. (1988), “Sleep Loss And “Divergent” Thinking Ability”, *Sleep*, Vol. 11, No. 6, pp. 528-536.

HOROWITZ Mardi J. and BECKER Stephanie S. (1971), “Cognitive Response To Stressful Stimuli”, *Archives of General Psychiatry*, Vol. 25, No. 5, pp. 419-428.

HOUBEN Sarah and BONNECHÈRE Bruno (2022), “The Impact of COVID-19 Infection on Cognitive Function and the Implication for Rehabilitation: A Systematic Review and Meta-Analysis”, *International Journal of Environmental Research and Public Health*, Vol. 19, No. 13, pp. 7748.

HOWELL Andrew J., JAHRIG Jesse C. and POWELL Russell A. (2004), “Sleep Quality, Sleep Propensity and Academic Performance”, *Perceptual and Motor Skills*, Vol. 99, No. 2, pp. 525-535.

HUANG Yeen and ZHAO Ning (2020), “Generalized Anxiety Disorder, Depressive Symptoms And Sleep Quality During COVID-19 Outbreak in China: A Web-Based Cross-Sectional Survey”, *Psychiatry Research*, Vol. 288, pp.1- 6.

HYUN Sunah, HAHM Hyeouk Chris, WONG Ga Tin Fifi, ZHANG Emily and LIU Cindy H. (2021), “Psychological Correlates of Poor Sleep Quality Among US Young Adults During The COVID-19 Pandemic”, *Sleep Medicine*, Vol. 78, pp. 51-56.

IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

INGRAM Joanne, HAND Christopher J. and MACIEJEWSKI Greg (2021), "Social Isolation During Covid-19 Lockdown Impairs Cognitive Function", *Applied Cognitive Psychology*, Vol. 35, No. 4, pp. 935-947.

İNÖNÜ Handan (2021), "COVID-19 Pandemisi ve Uyku Bozuklukları: COVID-Somnia", *Tuberk Toraks*, Vol. 69, No. 3, pp. 387-391.

IZCI Bilgay, ARDIC Sadık, FIRAT Hikmet, SAHIN Altay, ALTINORS Meltem and

KARACAN Ismet (2008), "Reliability and Validity Studies of The Turkish Version of The Epworth Sleepiness Scale", *Sleep and Breathing*, Vol. 12, No. 2, pp. 161-168.

JAHRAMI Haitham, BAHAMMAM Ahmed S., ALGAHTANI Haifa, EBRAHIM Ahmed, FARIS MoezAlislam, ALEID Kawthar, ... and HASAN Zainab (2021), "The Examination of Sleep Quality for Frontline Healthcare Workers During the Outbreak Of COVID-19", *Sleep and Breathing*, Vol. 25, No. 1, pp. 503-511.

JOHNS Murray W. (1992), "Reliability and Factor Analysis of The Epworth Sleepiness Scale", *Sleep*, Vol. 15, No. 4, pp. 376-381.

JONES Barry T., MACPHEE Lauren M., BROOMFIELD Niall M., JONES Benedict C. and ESPIE Colin A. (2005), "Sleep-Related Attentional Bias in Good, Moderate, And Poor (Primary Insomnia) Sleepers", *Journal of Abnormal Psychology*, Vol. 114, No. 2, pp. 249.

JOORMANN Jutta (2004), "Attentional Bias in Dysphoria: The Role of Inhibitory Processes", *Cognition and Emotion*, Vol. 18, No. 1, pp. 125-147.

JOUVET Michel (1975), "The Function of Dreaming: A Neurophysiologist's Point of View", In *Handbook of Psychobiology*, pp. 499-527.

KABELOĞLU Vasfiye and GÜL Günay (2021), "Covid-19 Salgını Sırasında Uyku Kalitesi Ve Ilişkili Sosyal ve Psikolojik Faktörlerin Araştırılması", *Journal of Turkish Sleep Medicine*, Vol. 2, pp. 97-104.

KAHN Michal, SHEPPES Gal and SADEH Avi (2013), "Sleep and Emotions: Bidirectional Links and Underlying Mechanisms", *International Journal of Psychophysiology*, Vol. 89, No. 2, pp. 218-228.

KALAT James W. (2015), "Biological Psychology", *Cengage Learning.*

KARAKAŞ Sirel (2013), “Bilnot-Yetişkin (2 Cilt Takım)”, Eğitim YayineviKARAKAŞ Sirel and KARAKAŞ H. Muammer (2000), “Yönetici Işlevlerin Ayrıştırılmasında Multidisipliner Yaklaşım: Bilişsel Psikolojiden Nöroradyolojiye”, *Klinik Psikiyatri*, Vol. 3, No. 4, pp. 215-27.

KATSUKI Fumi and CONSTANTINIDIS Christos (2014), “Bottom-Up and Top-Down Attention: Different Processes and Overlapping Neural Systems”, The Neuroscientist, Vol. 20, No. 5, pp. 509-521.

KAVANAU J. Lee (1996), “Memory, Sleep, And Dynamic Stabilization of Neural Circuitry: Evolutionary Perspectives”, *Neuroscience & Biobehavioral Reviews*, Vol. 20, No. 2, pp. 289-311.

KELLER Arielle S., LEIKAUF John E., HOLT-GOSSELIN Bailey, STAVELAND Brooke R. and WILLIAMS Leanne M. (2019), “Paying Attention to Attention in Depression” *Translational Psychiatry*, Vol. 9, No. 1, pp. 1-12.

KESSLER Ronald C., de JONGE Peter, SHAHLY Victoria, VAN LOO Hanna M., WANG Philip S. E. and WILCOX Marsha A. (2014), “Epidemiology of Depression”.

KILLGORE William D. (2010), “Effects Of Sleep Deprivation On Cognition”, *Progress in Brain Research*, Vol. 185, pp. 105-129.

KNUFINKE Melanie, NIEUWENHUYS Arne, GEURTS Sabine A., COENEN Anton M. and KOMPIER Michiel A. (2018), “Self-Reported Sleep Quantity, Quality and Sleep Hygiene in Elite Athletes”, *Journal of Sleep Research*, Vol. 27, No. 1, pp. 78-85.

KOCALEVENT Rüya Daniela, HINZ Andreas and BRÄHLER Elmar (2013), “Standardization Of the Depression Screener Patient Health Questionnaire (PHQ-9) In the General Population”, *General Hospital Psychiatry*, Vol. 35, No. 5, pp. 551-555.

KOSTER Ernst H. W., CROMBEZ Geert, VERSCHUERE Bruno and De HOUWER Jan (2006), “Attention to Threat in Anxiety-Prone Individuals: Mechanisms Underlying Attentional Bias”, *Cognitive Therapy and Research*, Vol. 30, pp. 635-643.

KRONHOLM Erkki, SALLINEN Mikael, SUUTAMA Timo, SULKAVA Raimo, ERA Pertti and PARTONEN Timo (2009), "Self-Reported Sleep Duration and Cognitive Functioning in The General Population", *Journal of Sleep Research*, Vol. 18, No. 4, pp. 436-446.

KRUEGER, James M. and OBÁL Ferenc (1993), "A Neuronal Group Theory of Sleep Function", *Journal of Sleep Research*, Vol. 2, No. 2, pp. 63–69.

KRYSTAL Andrew D. and EDINGER Jack D. (2008), "Measuring Sleep Quality", *Sleep Medicine*, No. 9, pp. S10-S17.

LAU Jennifer Y. and WATERS Allison M. (2017), "Annual Research Review: An Expanded Account of Information-Processing Mechanisms in Risk for Child and Adolescent Anxiety and Depression", *Journal of Child Psychology and Psychiatry*, Vol. 58, No. 4, pp. 387-407.

LAZARUS Richard S. (1991), "Emotion and Adaptation", Oxford University Press.

LEAL Pollyana C., GOES Tiago Costa, da SILVA Luis Carlos Ferreira and TEIXEIRA-SILVA Flavia (2017), "Trait Vs. State Anxiety in Different Threatening Situations", *Trends in Psychiatry and Psychotherapy*, Vol. 39, pp. 147-157.

LEE Sherman A. (2020), "Coronavirus Anxiety Scale: A Brief Mental Health Screener For COVID-19 Related Anxiety", *Death Studies*, Vol. 44, No. 7, pp. 393-401.

LEGER Damien, BAYON Virginie, OHAYON Maurice M., PHILIP Pierre, EMENT Philippe, METLAINE Arnaud, CHENNAOUI Mounir and FARAUT Brice (2014), "Insomnia and Accidents: Cross-Sectional Study (EQUINOX) On Sleep-Related Home, Work and Car Accidents In 5293 Subjects with Insomnia From 10 Countries", *Journal of Sleep Research*, Vol. 23, No. 2, pp. 143-152.

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.

LEZAK Muriel D. (1982), "The Problem of Assessing Executive Functions", *International Journal of Psychology*, Vol. 17, No. 1-4, pp. 281-297.

LI Lin, YU Qian, ZHAO Wenrui, HEROLD Fabian, CHEVAL Boris, KONG Zhaowei, ... and ZOU Liye (2021), “Physical Activity and Inhibitory Control: The Mediating Role of Sleep Quality and Sleep Efficiency”, *Brain Sciences*, Vol. 11, No. 5, pp. 664.

LI Shiyi and LI Xiao (2022), “The Relationship Between Attentional Bias, Anxiety Sensitivity, And Depression and Anxiety Symptoms: Evidence from The Covid-19 Pandemic in China”, *Frontiers in Public Health*, Vol. 10, pp. 1-8.

LI Sijia, WANG Yilin, XUE Jia, ZHAO Nan and ZHU Tingshao (2020), “The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users”, *International Journal of Environmental Research and Public Health*, Vol. 17, No. 6, pp. 2032.

LIAN Yan Hong, FANG Jun, ZHOU Hui-Dan, JIANG Hui Fang and XIE Kang-Jie (2019), “Sufentanil Preconditioning Protects Against Hepatic Ischemia-Reperfusion Injury by Suppressing Inflammation”, *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, Vol. 25, pp. 2265.

LICHSTEIN Kenneth L. and MORIN Charles M. (2000), “Treatment of Late-Life Insomnia”, *Sage*.

LIN Nan, DEAN Alfred and ENSEL Walter M. (2013), “Social Support, Life Events, And Depression”, *Academic Press*.

LITTNER Michael R., KUSHIDA Clete, WISE Merril, DAVILA David G., MORGENTHALER Timothy, LEE-CHIONG Teofilo, ... and KRAMER Milton (2005), “Practice Parameters for Clinical Use of The Multiple Sleep Latency Test and The Maintenance of Wakefulness Test”, *Sleep*, Vol. 28, No. 1, pp. 113-121.

LIU Nianqi., ZHANG Fan, WEI Cun, JIA Yanpu, SHANG Zhilei, SUN Luna, ... and Liu Weizhi (2020), “Prevalence and Predictors of PTSS During COVID-19 Outbreak in China Hardest-Hit Areas: Gender Differences Matter”, Psychiatry Research, Vol. 287, pp. 112921.

LIU Yong, WHEATON Anne G, CHAPMAN Daniel P and CROFT Janet B (2013), “Sleep Duration and Chronic Diseases Among Us Adults Age 45 Years and Older: Evidence from the 2010 Behavioral Risk Factor Surveillance System”, *Sleep*, Vol, 36, No. 10, pp. 1421-1427.

LOVIBOND Peter F. and LOVIBOND Sydney Harold (1995), "The Structure Of Negative Emotional States: Comparison of The Depression Anxiety Stress Scales (DASS) With the Beck Depression and Anxiety Inventories", *Behaviour Research and Therapy*, Vol. 33, No. 3, pp. 335-343.

LU Jun, SHERMAN David, DEVOR Marshall and SAPER Clifford B (2006), "A Putative Flip–Flop Switch for Control of Rem Sleep", *Nature*, Vol. 441, No. 7093, pp. 589-594.

LUIJTEN Maartje, VELTMAN Dick J., HESTER Robert, SMITS Marion, PEPPLINKHUIZEN Lolke and FRANKEN Ingmar H. (2012), "Brain Activation Associated with Attentional Bias in Smokers Is Modulated by A Dopamine Antagonist", Neuropsychopharmacology, Vol. 37, No, 13, pp. 2772-2779.

LUNA Beatriz, PADMANABHAN Aarthi and O'HEARN Kirsten (2010), "What Has FMRI Told Us About the Development of Cognitive Control Through Adolescence?", *Brain and Cognition*, Vol. 72, No. 1, pp. 101-113.

MACLEOD Colin and CLARKE Patrick J. (2015), "The Attentional Bias Modification Approach To Anxiety Intervention", *Clinical Psychological Science*, Vol. 3, No. 1, pp. 58-78.

MACLEOD Colin and GRAFTON Ben (2016), "Anxiety-Linked Attentional Bias And Its Modification: Illustrating The Importance Of Distinguishing Processes And Procedures In Experimental Psychopathology Research", Behaviour Research and Therapy, Vol. 86, pp. 68-86.

MACLEOD Colin, GRAFTON Ben and NOTEBAERT Lies (2019), "Anxiety-Linked Attentional Bias: Is It Reliable?", *Annual Review of Clinical Psychology*, Vol. 15, pp. 529-554.

MACLEOD Colin, MATHEWS Andrew and TATA Philip (1986), "Attentional Bias In Emotional Disorders", *Journal of abnormal psychology*, Vol. 95, No. 1, pp. 15.

MALIK John, LO Yu-Lun and WU Hau-Tieng (2018, "Sleep-Wake Classification Via Quantifying Heart Rate Variability by Convolutional Neural Network", *Physiological Measurement*, Vol. 39, No. 8, pp. 085004.

MALINOWSKI Peter (2013), "Neural Mechanisms of Attentional Control in Mindfulness Meditation", *Frontiers in Neuroscience*, Vol. 7, No. 8.

MARELLI Sara, CASTELNUOVO Alessandra, SOMMA Antonella, CASTRONOVO Vincenza, MOMBELLI Samantha, BOTTONI Daniela, ... and FERINI-STRAMBI Luigi (2021), “Impact Of COVID-19 Lockdown on Sleep Quality in University Students and Administration Staff”, *Journal of Neurology*, Vol. 268, No. 1, pp. 8-15.

MARINO Miguel, LI Yi, RUESCHMAN Michael N, WINKELMAN John W., ELLENBOGEN Jeffrey M., SOLET Jo M., ... and BUXTON Orfeu M. (2013), “Measuring Sleep: Accuracy, Sensitivity, And Specificity of Wrist Actigraphy Compared to Polysomnography”, *Sleep*, Vol. 36, No. 11, pp. 1747-1755.

MARQUES Daniel Ruivo, ALLEN GOMES Ana, CLEMENTE Vanda, SANTOS Jose Moutinho and CASTELO-BRANCO Miguel (2015), “Hyperarousal and Failure to Inhibit Wakefulness in Primary Insomnia:“Birds of A Feather”?”, *Sleep and Biological Rhythms*, Vol. 13, No. 3, pp. 219-228.

MARTELLA Diana, CASAGRANDE Maria and LUPIÁÑEZ Juan (2011), “Alerting, Orienting And Executive Control: The Effects of Sleep Deprivation on Attentional Networks”, *Experimental Brain Research*, Vol. 210, No. 1, pp. 81-89.

MARTIN Matthew M. and RUBIN Rebecca B. (1995), “A New Measure of Cognitive Flexibility”, *Psychological Reports*, Vol. 76, No. 2, pp. 623-626.

MASON John W. (1975), “A Historical View of The Stress Field” *Journal of Human Stress*, Vol. 1, No. 2, pp. 22-36.

MATHEWS Andrew and MacLEOD Colin (2005), “Cognitive Vulnerability to Emotional Disorders”, *Annual Review of Clinical Psychology (2005)*, Vol. 1, No. 1, pp. 167-195.

MCEWEN Bruce S. and SAPOLSKY Robert M. (1995), “Stress and Cognitive Function”, *Current Opinion in Neurobiology*, Vol. 5, No. 2, pp. 205-216.

MCGEOWN Laura (2021), “Dietary Restraint and Stress-Induced Alterations In Eating: Exploring the Role of Heart Rate Variability as A Proxy for Self-Regulation, Attentional Bias, And Perceived Safety”, *Doctoral Dissertation*.

MCGINTY Dennis and SZYMUSIAK Ronald (1990), “Keeping Cool: A Hypothesis About The Mechanisms and Functions of Slow-Wave Sleep”, *Trends in Neurosciences*, Vol. 13, No. 12, pp. 480-487.

MCHUGH POWER Joanna, TANG Jianjun, KENNY Rose Ann, LAWLOR Brian A., and KEE Frank (2020), "Mediating the Relationship Between Loneliness and Cognitive Function: The Role of Depressive and Anxiety Symptoms", *Aging & Mental Health*, Vol. 24, No. 7, pp. 1071-1078.

MCNALLY Richard J. (2001), "On the Scientific Status of Cognitive Appraisal Models of Anxiety Disorder", *Behaviour Research and Therapy*, Vol. 39, No. 5, pp. 513-521.

MCNALLY Richard J. (2019), "Attentional Bias for Threat: Crisis Or Opportunity?", *Clinical Psychology Review*, Vol. 69, pp. 4-13.

MCNAMARA Patrick, JOHNSON Patricia, McLAREN Deirdre, HARRIS Erica, BEAUHARNAIS Catherine and AUERBACH Sanford (2010), "REM And NREM Sleep Mentation", *International Review of Neurobiology*, Vol. 92, pp. 69-86.

MENDONÇA Fabio, MOSTAFA Sheikh Shanawaz, MORGADO-DIAS Fernando, RAVELO-GARCIA Antonio G. and PENZEL Thomas (2019), "A Review of Approaches for Sleep Quality Analysis", *Ieee Access*, Vol. 7, pp. 24527-24546.

MIGNOT Emmanuel (2008), "Why We Sleep: The Temporal Organization Of Recovery", *PLoS biology*, Vol. 6, No. 4, pp. e106.

MIGUEL Paula (2012), "The Effects of Anxiety on Cognitive Performance", Doctoral Dissertation, Royal Holloway, University of London.

MIROWSKY John and ROSS Catherine E. (2017), "Social Causes of Psychological Distress", *Routledge*.

MISKOWIAK Kamilla W., JOHNSEN Stine, SATTLER Stefan M., NIELSEN Sandra, KUNALAN Keerthana, RUNGBY Jørgen, LAPPERRE Thérèse S. and PORSBERG Celeste (2021), "Cognitive Impairments Four Months After COVID-19 Hospital Discharge: Pattern, Severity and Association with Illness Variables", *European Neuropsychopharmacology*, Vol. 46, pp. 39-48.

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.

MOGG Karin and BRADLEY Brendan P. (2016), "Anxiety And Attention To Threat: Cognitive Mechanisms and Treatment with Attention Bias Modification", *Behaviour Research and Therapy*, Vol. 87, pp. 76-108.

MOGG Karin, McNAMARA James, POWYS Mark, RAWLINSON Hanna, SEIFFER Anna and BRADLEY Brendan P (2000), "Selective Attention To Threat: A Test Of Two Cognitive Models Of Anxiety", Cognition & Emotion, Vol. 14, No. 3, pp. 375-399.

MOLLAYEVA Tatyana, THURAIRAJAH Pravheen, BURTON Kirsteen, MOLLAYEVA Shirin, SHAPIRO Colin M and COLANTONIO Angela (2016), "The Pittsburgh Sleep Quality Index as A Screening Tool for Sleep Dysfunction in Clinical and Non-Clinical Samples: A Systematic Review and Meta-Analysis", *Sleep medicine reviews*, Vol. 25, pp. 52-73.

MORTERÁ Priscilla and HERCULANO-HOUZEL Suzana (2012), "Age-Related Neuronal Loss in The Rat Brain Starts at The End of Adolescence", *Frontiers in Neuroanatomy*, Vol. 6, No. 45, pp. 1-9.

NAEEM Muhammad (2021), "Understanding The Customer Psychology Of Impulse Buying During COVID-19 Pandemic: Implications for Retailers", *International Journal of Retail & Distribution Management*, Vol. 49, No. 3, pp. 377-393.

NAKADA Liane Yuri Kondo and URBAN Rodrigo Custodio (2020), "Covid-19 Pandemic: Impacts on The Air Quality During the Partial Lockdown in São Paulo State, Brazil", *Science of the Total Environment*, Vol. 730, pp. 139087.

NAPIERALA Matthew A. (2012), "What is the Bonferroni Correction?", *Aaos Now*, pp. 40-41.

NIR Yuval, MASSIMINI Marcello, BOLY Melanie and TONONI Guilio (2013), "Sleep and Consciousness", In *Neuroimaging of Consciousness*, Springer, Berlin, Heidelberg, pp. 133-182.

NWEZE Tochukwu and NWANI Wisdom (2020), "Contributions of Working Memory and Inhibition to Cognitive Flexibility in Nigerian Adolescents", *Developmental Neuropsychology*, Vol. 45, No. 3, pp. 118-128.

O’CONNOR Edward J., CROZIER Alyson J., MURPHY Alistair and IMMINK Maarten A (2022), “Dispositional Mindfulness May Have Protected Athletes from Psychological Distress During COVID-19 in Australia”, *Perceptual and Motor Skills*, pp. 670- 695

O’KEEFFE Fiadhnait, LIÉGEOIS Frédérique, EVE Megan, GANESAN Vijeya, KING John and MURPHY Tara (2014), “Neuropsychological and Neurobehavioral Outcome Following Childhood Arterial Ischemic Stroke: Attention Deficits, Emotional Dysregulation, And Executive Dysfunction”, Child Neuropsychology, Vol. 20, No. 5, pp. 557-582.

O’ROURKE Elisabeth J., HALPERN Leslie F. and VAYSMAN Renata (2020), “Examining the Relations Among Emerging Adult Coping, Executive Function, and Anxiety”, *Emerging Adulthood*, Vol. 8, No. 3, pp. 209-225.

O'CONNOR Rory C., WETHERALL Karen, CLEARE Seonaid, McCLELLAND Heather, MELSON Ambrose J., NIEDZWIEDZ Claire L., ... and ROBB Kathryn A. (2021), “Mental Health and Well-Being During The COVID-19 Pandemic: Longitudinal Analyses of Adults in The UK COVID-19 Mental Health & Wellbeing Study”, *The British Journal of Psychiatry*, Vol. 218, No. 6, pp. 326-333.

OHAYON Maurice M., CARSKADON Mary A., GUILLEMINAULT Christian and VITIELLO Michael V. (2004), “Meta-Analysis of Quantitative Sleep Parameters from Childhood to Old Age in Healthy Individuals: Developing Normative Sleep Values Across the Human Lifespan”, *Sleep*, Vol. 27, No. 7, pp. 1255-1273.

OKUN Michele L., MANCUSO Roberta A., HOBEL Calvin J., SCHETTER Christine Dunkel and COUSSONS-READ Mary (2018), “Poor Sleep Quality Increases Symptoms of Depression and Anxiety in Postpartum Women”, *Journal of Behavioral Medicine*, Vol. 41, No. 5, pp. 703-710.

OPPENHEIM A. Leo (1956), “The Interpretation of Dreams in the Ancient Near East”, With a Translation of an Assyrian Dream-book, *Transactions of the American Philosophical Society*, Vol. 46, No. 3, pp. 179-373.

ORZECH Kathryn M., SALAFSKY David B. and HAMILTON Lee Ann (2011), “The State Of Sleep Among College Students at A Large Public University”, Journal of American College Health, Vol. 59, No. 7, pp. 612-619.

OTSUKA Yuichiro, KANEITA Yoshitaka, ITANI Osamu, NAKAGOME Sachi, JIKE Maki and OHIDA Takashi (2017), "Relationship Between Stress Coping and Sleep Disorders Among The General Japanese Population: A Nationwide Representative Survey", *Sleep Medicine*, Vol. 37, pp. 38-45.

PAGEL James F. (2009), "Excessive Daytime Sleepiness", *American Family Physician*, Vol. 79, No. 5, pp. 391-396.

PAGEL James F. and BARNES Bennett L. (2001), "Medications for The Treatment of Sleep Disorders: An Overview", J Clin Psych, Vol. 3, pp. 118–125

PAL Dinesh and MALLICK Birendra N. (2007), "Neural Mechanism of Rapid Eye Movement Sleep Generation with Reference To REM-OFF Neurons in Locus Coeruleus", *Indian Journal of Medical Research*, Vol. 125, pp. 721-739.

PATEL Aakash K., REDDY Vamsi and ARAUJO John F. (2021), "Physiology, Sleep Stages", *In StatPearls [Internet]*, StatPearls Publishing.

PAUS Tomas (2005), "Mapping Brain Maturation And Cognitive Development During Adolescence", *Trends In Cognitive Sciences*, Vol. 9, No. 2, pp. 60-68.

PETEET John R. (2020), "COVID-19 Anxiety", *Journal of Religion and Health*, Vol. 59, No. 5, pp. 2203-2204.

PIETROBELLI Angelo, PECORARO Luca, FERRUZZI Alessandro, HEO Moonseong, FAITH Myles, ZOLLER Thomas, ... and HEYMSFIELD Steven B. (2020), "Effects Of COVID-19 Lockdown on Lifestyle Behaviors in Children with Obesity Living in Verona, Italy: A Longitudinal Study", *Obesity*, Vol. 28, No. 8, pp. 1382-1385.

PILCHER June J. and HUFFCUTT Allen I (1996), "Effects of Sleep Deprivation on Performance: A Meta-Analysis", Sleep, Vol. 19, No. 4, pp. 318-326.

PILCHER June J., GINTER, Douglas R. and SADOWSKY Brigitte (1997), "Sleep Quality Versus Sleep Quantity: Relationships Between Sleep and Measures of Health, Well-Being and Sleepiness in College Students", *Journal of Psychosomatic Research*, Vol. 42, No. 6, pp. 583-596.

PODLESEK Anja, MARTINČEVIĆ Marina and VRANIĆ Andrea (2021), "Can Inhibition Or Shifting Training Enhance Cognitive Abilities in Emerging Adults?", *Psihološka Obzorja*, Vol. 30, pp. 138-152.

PORGES Stephen W. and FURMAN Senta A. (2011), “The Early Development Of The Autonomic Nervous System Provides A Neural Platform For Social Behaviour: A Polyvagal Perspective”, *Infant And Child Development*, Vol. 20, No. 1, pp. 106-118.

PORRAS-SEGOVIA Alejandro, PEREZ-RODRIGUEZ Maria M., LÓPEZ-ESTEBAN Pilar, COURTET Philippe, LÓPEZ-CASTROMÁN Jorge, CERVILLA Jorge A and BACA-GARCÍA Enrique (2019), “Contribution of Sleep Deprivation to Suicidal Behaviour: A Systematic Review”, *Sleep Medicine Reviews*, Vol. 44, pp. 37-47.

RABINOVICI Gil D., STEPHENS Melanie L. and POSSIN Katherine L. (2015), “Executive Dysfunction”, *CONTINUUM: Lifelong Learning in Neurology*, Vol. 21, No. 3, pp. 646.

RACHMAN Stanley (2004), “Anxiety (Clinical Paychology: A Modular Course)”. *nature*, Vol. 9, No. 1.

RAFIQUE Nazish, AL-ASOOM Lubna Ibrahim, ALSUNNI Ahmed Abdulrahman, SAUDAGAR Farhat Naadem, ALMULHIM Latifah and ALKALTHAM Gaeda (2020), “Effects of Mobile Use on Subjective Sleep Quality”, *Nature and Science of Sleep*, Vol. 12, pp. 357.

RANA Brinda K., PANIZZON Matthew S, FRANZ Carol E., SPOON Kelly M., JACOBSON Kristen C., XIAN Hong, ... and KREMEN William S. (2018), “Association of Sleep Quality on Memory-Related Executive Functions in Middle Age”, *Journal of the International Neuropsychological Society*, Vol. 24, No. 1, pp. 67-76.

RASK Eva, OLSSON Tommy, SODERBERG Stefan, ANDREW Ruth, LIVINGSTONE Dawn E, JOHNSON Owe and WALKER Brian R. (2001), “Tissue-Specific Dysregulation of Cortisol Metabolism in Human Obesity”, *The Journal of Clinical Endocrinology & Metabolism*, Vol. 86, No. 3, pp. 1418-1421.

REIMUND Eric (1994), “The Free Radical Flux Theory of Sleep”, *Medical Hypotheses*, Vol. 43, No. 4, pp. 231–233.

ROGERS Robert D. and MONSELL Stephen (1995), “Costs of A Predictible Switch Between Simple Cognitive Tasks”, *Journal of Experimental Psychology: General*, Vol. 124, No. 2, pp. 207.

RUBIA Katya, RUSSELL Tamara, OVERMEYER Stephan, BRAMMER Michael J, BULLMORE Edward T, SHARMA Tonmoy, ... and TAYLOR Eric (2001), “Mapping Motor Inhibition: Conjunctive Brain Activations Across Different Versions of Go/No-Go and Stop Tasks”, *Neuroimage*, Vol. 13, No. 2, pp. 250-261.

RUGER Melanie, ST HILAIRE Melissa A., BRAINARD George C., KHALSA Sat-Bir S., KRONAUER Richard E., CZEISLER Charles A. and LOCKLEY Steven W. (2013), “Human Phase Response Curve to A Single 6.5 H Pulse of Short-Wavelength Light”, *The Journal of Physiology*, Vol. 591, No. 1, pp. 353-363.

RUNDO Jessica Vensel and DOWNEY III Ralph (2019), “Polysomnography”, *Handbook of Clinical Neurology*, Vol. 160, pp. 381-392.

SAADAT Saeida, RAWTANI Deepak and HUSSAIN Chaudhery Mustansar (2020), “Environmental Perspective Of COVID-19”, *Science of The Total Environment*, Vol. 728, pp. 138870.

SADIKOVIĆ Selka, BRANOVAČKI Bojan, OLJAČA Milan, MİTROVİĆ Dušanka, PAJİĆ Dejan and SMEDEREVAC Snežana (2020), “Daily Monitoring of Emotional Responses to The Coronavirus Pandemic in Serbia: A Citizen Science Approach”, *Frontiers in Psychology*, Vol. 11, pp. 2133.

SAGLIETTO Andrea, D’ASCENZO Fabrizio, ZOCCAI Giuseppe Biondi and De FERRARI Gaetano Maria (2020), “COVID-19 in Europe: The Italian Lesson”, *The Lancet*, Vol. 395, No. 10230, pp. 1110-1111.

ŞAHIN Leyla and AŞÇIOĞLU Meral (2013), “Uyku Ve Uykunun Düzenlenmesi”, *Sağlık Bilimleri Dergisi*, Vol. 22, No. 1, pp. 93-98.SAHIN Nesrin Hisli and DURAK Ayşegül (1994), “Kisa Semptom Envanteri (Brief Symptom Invetory-BSI): Turk Gencleri Icin Uyarlanmasi”, *Türk Psikoloji Dergisi*.

SALLEH, M. Razali (2008), “Life Event, Stress and Illness”, *The Malaysian Journal of Medical Sciences: MJMS*, Vol. 15, No. 4, pp. 9.

ŞANSAL Fırat, GÖKDAG Yunus Engin, ŞAHIN Duygu, KESKIN Yasemin, YILMAZ Özge Yılmaz and AKIN Ata (2014, April), “Frontal Brain Activation During a Go/Nogo Response Inhibition Task: An FNIRS Study”, In *2014 22nd Signal Processing and Communications Applications Conference (SIU)*, pp. 2047-2049.

SAPER Clifford B., CANO Georgina and SCAMMELL Thomas E. (2005), “Homeostatic, Circadian, And Emotional Regulation of Sleep”, *Journal of Comparative Neurology*, Vol. 493, No. 1, pp. 92-98.

SAPER Clifford B., FULLER Patrick M., PEDERSEN Nigel P., LU Jun and SCAMMELL Thomas E. (2010), “Sleep State Switching”, *Neuron*, Vol. 68, No. 6, pp. 1023-1042.

SAVAŞIR Işık and ŞAHIN Nesrin H. (Eds.). (1997), “Bilişsel-Davranışçı Terapilerde Değerlendirme: Sık Kullanılan Ölçekler”, *Türk Psikologlar Derneği*.

SAVEANU Radu V. and NEMEROFF Charles B. (2012), “Etiology of Depression: Genetic And Environmental Factors”, *Psychiatric Clinics*, Vol. 35, No. 1, pp. 51-71.

SAYGILI Sefa, AKINCI Ayşe Çil, ARIKAN Hülya and DERELI Ebru (2011), “Sleeping Quality and Fatigue Among University Students”, *Ejovoc (Electronic Journal Of Vocational Colleges)*.

ŞAYIK Dilek, YIĞIT Deniz, AÇIKGÖZ Ayfer, ÇOLAK Ertuğrul and MUMCU Özlem (2020), “Koronavirüs Anksiyete Ölçeğinin Türkçe Geçerliliği ve Güvenirliği”, *Eskisehir Medical Journal*, Vol. 2, No. 1, pp. 16-22.

SCHÄFER Judith, BERNSTEIN Amit, ZVIELLI Ariel, HÖFLER Michael, WITTCHEN Hans-Ulrich and SCHÖNFELD Sabine (2016), “Attentional Bias Temporal Dynamics Predict Posttraumatic Stress Symptoms: A Prospective–Longitudinal Study Among Soldiers”, *Depression and Anxiety*, Vol. 33, No. 7, pp. 630-639.

SCHAPKIN Sergei A., FALKENSTEIN Michael, MARKS Anke and GRIEFAHN Barbara (2006), “Executive Brain Functions After Exposure to Nocturnal Traffic Noise: Effects of Task Difficulty and Sleep Quality”, *European Journal of Applied Physiology*, Vol. 96, No. 6, pp. 693-702.

SCHULZ Hartmut and SALZARULO Piero (2012), “Forerunners of REM Sleep”, *Sleep medicine reviews*, Vol. 16, No. 1, pp. 95-108.

SCHWABE Lars, HÖFFKEN Oliver, TEGENTHOFF Martin and WOLF Oliver T. (2013), "Stress-Induced Enhancement of Response Inhibition Depends on Mineralocorticoid Receptor Activation" *Psychoneuroendocrinology*, Vol. 38, No. 10, pp. 2319-2326.

SCOTT Stacey B., GRAHAM-ENGELAND Jennifer E., ENGELAND Christopher G., SMYTH Joshua M., ALMEIDA David M., KATZ Mindy J., LIPTON Richard B.., … and SLIWINSKI Martin J. (2015), "The Effects of Stress on Cognitive Aging, Physiology and Emotion (ESCAPE) Project", *BMC psychiatry*, Vol. 15, pp. 146.

SEEL Ronald T., KREUTZER Jeffrey S., ROSENTHAL Mitchell, HAMMOND Flora M., CORRIGAN John D. and BLACK Kertia (2003), "Depression After Traumatic Brain Injury: A National Institute on Disability and Rehabilitation Research Model Systems Multicenter Investigation", *Archives of Physical Medicine and Rehabilitation*, Vol. 84, No. 2, pp. 177-184.

SELVI Yavuz, GULEC Mustafa, AGARGUN Mehmet Yüzel and BESIROGLU Lutfullah (2007), "Mood Changes After Sleep Deprivation in Morningness–Eveningness Chronotypes In Healthy Individuals", *Journal Of Sleep Research*, Vol. 16, No. 3, pp. 241-244.

SELYE Hans (1956), "What is Stress", *Metabolism*, Vol. 5, No. 5, pp. 525-530.

SELYE Hans (1976), "Stress In Health And Disease Butterworth's", *Inc. Boston, MA*.

SHANSKY Rebecca M. And LIPPS Jennifer (2013), "Stress-Induced Cognitive Dysfunction: Hormone-Neurotransmitter Interactions in The Prefrontal Cortex", *Frontiers in Human Neuroscience*, Vol. 7, pp. 123.

SHEN Lin, van SCHIE Jason, DITCHBURN Graeme, BROOK Libby and BEI Bei (2018), "Positive and Negative Emotions: Differential Associations With Sleep Duration And Quality in Adolescents", *Journal of Youth And Adolescence*, Vol. 47, No. 12, pp. 2584-2595.

SHEREEN Muhammad Adnan, KHAN Suliman, KAZMI Abeer, Bashir Nadia and Siddique Rabeea (2020), "COVID-19 Infection: Emergence, Transmission, And Characteristics of Human Coronaviruses", *Journal of Advanced Research*, Vol. 24, pp. 91-98.

SHIELDS Grant S., BONNER Joseph C. and MOONS Wesley G. (2015), "Does Cortisol Influence Core Executive Functions? A Meta-Analysis of Acute Cortisol Administration Effects on Working Memory, Inhibition, And Set-Shifting", *Psychoneuroendocrinology*, Vol. 58, pp. 91-103.

SHIELDS Grant S., MOONS Wesley G., TEWELL Carl A. and Yonelinas Andrew P. (2016), "The Effect of Negative Affect on Cognition: Anxiety, Not Anger, Impairs Executive Function", *Emotion*, Vol. 16, No. 6, pp. 792.

SHIELDS Grant S., SAZMA Matthew A. and YONELINAS Andrew P. (2016), "The Effects Of Acute Stress on Core Executive Functions: A Meta-Analysis and Comparison with Cortisol", *Neuroscience & Biobehavioral Reviews*, Vol. 68, pp. 651-668.

SIEGEL Jerome M. (2003), "Why We Sleep: The Reasons That We Sleep Are Gradually Becoming Less Enigmatic", *Scientific American*, Vol. 289, No. 5, pp. 92.

SIEGEL Jerome M. (2004), "The Neurotransmitters of Sleep", *J Clin Psychiatry*, Vol. 65(Suppl 16), pp. 4-7.

DA SILVA Flavia Rodrigues, GUERREIRO Renato de Carvalho, ANDRADE Henrique De Araújo Andrade, STIELER Eduardo, SILVA Andressa and de MELLO Marco Túlio (2020), "Does the Compromised Sleep and Circadian Disruption of Night and Shiftworkers Make Them Highly Vulnerable To 2019 Coronavirus Disease (COVID-19)?", *Chronobiology international*, Vol. 37, No. 5, pp. 607-617.

SIMMS Nina K., FRAUSEL Rebecca R. and RICHLAND Lindsey E. (2018), "Working Memory Predicts Children's Analogical Reasoning", *Journal of Experimental Child Psychology*, Vol. 166, pp. 160-177.

SIMONS Anne D., ANGELL Karyn L., MONROE Scott M. and THASE Michael E. (1993), "Cognition and Life Stress In Depression: Cognitive Factors And The Definition, Rating, And Generation Of Negative Life Events", *Journal of Abnormal Psychology*, Vol. 102, No. 4, pp. 584.

SIMPSON Andrew and RIGGS Kevin J. (2005), "Inhibitory and Working Memory Demands Of the Day–Night Task in Children", *British Journal of Developmental Psychology*, Vol. 23, No. 3, pp. 471-486.

SMITH Julius O. and ABEL Jonathan S. (1999), "Bark and ERB Bilinear Transforms", *IEEE Transactions on Speech and Audio Processing*, Vol. 7, No. 6, pp. 697-708.

SNYDER Hannah R., KAISER Roselinde H., WHISMAN Mark A., TURNER Amy E., GUILD Ryan M and MUNAKATA Yuko (2014), "Opposite effects of anxiety and depressive symptoms on executive function: The case of selecting among competing options" *Cognition & emotion*, Vol. 28, No. 5, pp. 893-902.

SPIELBERGER Charles D. (1966), "Theory and Research on Anxiety", *Anxiety and Behavior*, Vol. 1, No. 3, pp. 3-20.

STEFFENS David C. and POTTER Guy G. (2008), "Geriatric Depression and Cognitive Impairment", *Psychological Medicine*, Vol. 38, No. 2, pp. 163-175.

STEVNER Angus, VIDAURRE Diego, CABRAL Joana, RAPUANO Kristina, NIELSEN Søren Føns Vind, TAGLIAZUCCHI Enzo, ... and KRINGELBACH Morten L. (2019), "Discovery of Key Whole-Brain Transitions and Dynamics During Human Wakefulness and Non-REM Sleep", *Nature Communications*, Vol. 10, No. 1, pp. 1-14.

STICKGOLD Robert (2005), "Sleep-Dependent Memory Consolidation", *Nature*, Vol. 437, No. 7063, pp. 1272-1278.

STICKGOLD Robert (2013), "Parsing the Role of Sleep in Memory Processing", *Current Opinion in Neurobiology*, Vol. 23, No. 5, pp. 847-853.

SZABÓ Marianna (2011), "The Emotional Experience Associated with Worrying: Anxiety, Depression, Or Stress?", *Anxiety, Stress, & Coping*, Vol. 24, No. 1, pp. 91-105.

TABACHNICK Barbara G., FIDELL Linda S. and ULLMAN Jodie B. (2013), "Using Multivariate Statistics", *Boston, MA: pearson*, Vol. 6, pp. 497-516.

TALERO-GUTIÉRREZ Claudia, MORENO Carlos B., GONZÁLEZ-REYES Rodrigo, PALACIOS Leonardo, DE LA PEÑA Francisco and MUÑOZ-DELGADO, Jairo (2008), "Sleep Evaluation Scales and Questionnaires: A Review", *Actas Esp Psiquiatr*, Vol. 36, No. 1, pp. 50-59.

TARGA Adriano D., BENÍTEZ Ivan D., MONCUSÍ-MOIX Anna, ARGUIMBAU Maria, DE BATLLE Jordi, DALMASES Mireia and BARBÉ Ferran (2021), "Decrease in Sleep Quality During COVID-19 Outbreak", *Sleep and Breathing*, Vol. 25, No. 2, pp. 1055-1061.

THIBEAU Sherilyn, MCFALL G. Peggy, WIEBE Sandra A., ANSTEY Kaarin J. and DIXON Roger A (2016), “Genetic Factors Moderate Everyday Physical Activity Effects on Executive Functions in Aging: Evidence from the Victoria Longitudinal Study”, *Neuropsychology*, Vol. 30, No. 1, pp. 6.

THOITS Peggy A. (1983), “Dimensions of Life Events That Influence Psychological Distress: An Evaluation and Synthesis of The Literature”, *Psychosocial stress*, pp. 33-103.

THOMAS Maria, SING Helen, BELENKY Gregory, HOLCOMB Henry, MAYBERG Helen, DANNALS Robert, ... and REDMOND Daniel (2000), “Neural Basis of Alertness and Cognitive Performance Impairments During Sleepiness. I. Effects Of 24 H Of Sleep Deprivation on Waking Human Regional Brain Activity”, *Journal of Sleep Research*, Vol. 9, No. 4, pp. 335-352.

TORUN YAZIHAN Nakşidil, AYDIN Hamdullah and KARAKAŞ Sirel (2007), “Neuropsychological Profile in Different Levels of Obstructive Sleep Apnea”, *Sleep and Biological Rhythms*, Vol. 5, pp. 85–94.

TRILL Maria Die (2013), “Anxiety and Sleep Disorders in Cancer Patients”, *EJC supplements*, Vol. 11, No. 2, pp. 216.

TUCKER Adrienne M., WHITNEY Paul, BELENKY Gregory, HINSON John M. and VAN DONGEN Hans P. (2010), “Effects of Sleep Deprivation on Dissociated Components of Executive Functioning”, *Sleep*, Vol. 33, No. 1, pp. 47-57.

VAN DE LANGENBERG Daniella, VLAANDEREN Jelle J., DOLLÉ Martijn E., ROOKUS Matti A., van KERKHOF Linda W. and VERMEULEN Roel C. (2019), “Diet, Physical Activity, And Daylight Exposure Patterns in Night-Shift Workers and Day Workers”, *Annals of Work Exposures and Health*, Vol. 63, No. 1, pp. 9-21.

UNSWORTH Nash and ROBISON Matthew K. (2017), “A Locus Coeruleus-Norepinephrine Account of Individual Differences in Working Memory Capacity and Attention Control”, *Psychonomic Bulletin & Review*, Vol. 24, pp. 1282-1311.

VANABLE Peter A., AIKENS James E., TADIMETI Lakshminarayana, CARUANA-MONTALDO Brendan and MENDELSON Wallace B. (2000), “Sleep Latency and Duration Estimates Among Sleep Disorder Patients: Variability as A Function of Sleep Disorder Diagnosis, Sleep History, And Psychological Characteristics”, *Sleep: Journal of Sleep Research & Sleep Medicine*, pp.1-9.

VANDEKERCKHOVE Marie, WEISS Rolf, SCHOTTE Christiaan, EXADAKTYLOS Vasileios, HAEX Bart, VERBRAECKEN Johan and CLUYDTS Raymond (2011), “The Role of Presleep Negative Emotion in Sleep Physiology”, *Psychophysiology*, Vol. 48, No. 12, pp. 1738-1744.

VARDOULAKIS Sotiris, SHEEL Meru, LAL Aparna and GRAY Darren (2020), “COVID-19 Environmental Transmission and Preventive Public Health Measures”, *Australian and New Zealand Journal of Public Health*.

VENUS Kahlie (2019), “Sleep Quality and Executive Function: Does Emotion Regulation And Stress Mediate This Relationship in College Students?”, *A Thesis Presented* (Doctoral Dissertation, California State University Dominguez Hills).

VERVOORT Leentje, BRAUN Maya, De SCHRYVER Maarten, NAETS Tiffany, KOSTER Ernst H and BRAET Caroline (2021), “A Pictorial Dot Probe Task to Assess Food-Related Attentional Bias in Youth with And Without Obesity: Overview of Indices and Evaluation of Their Reliability”, *Frontiers in Psychology*, Vol. 12, pp. 644512.

VISU-PETRA Laura, MICLEA Mircea and VISU-PETRA George (2013), “Individual Differences in Anxiety and Executive Functioning: A Multidimensional View”, *International Journal of Psychology*, Vol. 48, No. 4, pp. 649-659.

VOITSIDIS Panteleimon, GLIATAS Ioannis, BAIRACHTARI Vasiliki, PAPADOPOULOU Kalliopi, PAPAGEORGIOU Georgios, PARLAPANI Eleni, SYNGELAKIS Markos, HOLEVA Vasiliki and DIAKOGIANNIS Ioannis (2020), “Insomnia During The COVID-19 Pandemic in A Greek Population”, *Psychiatry research*, Vol. 289, pp. 113076.

WALKER Matthew P. (2008), “Cognitive Consequences of Sleep and Sleep Loss”, *Sleep medicine*, Vol. 9, pp. S29-S34.

WALKER Matthew P. (2008), "Sleep-Dependent Memory Processing", *Harvard Review of Psychiatry*, Vol. 16, No. 5, pp. 287-298.

WALKER Matthew P., BRAKEFIELD Tiffany, MORGAN Alexandra, HOBSON J. Allan and STICKGOLD Robert (2002), "Practice with Sleep Makes Perfect: Sleep-Dependent Motor Skill Learning", *Neuron*, Vol. 35, No. 1, pp. 205-211.

WAQAS Ahmed, REHMAN Abdul, MALIK Aamenah, MUHAMMAD Umer, KHAN Sarah and MAHMOOD Nadia (2015), "Association of Ego Defense Mechanisms With Academic Performance, Anxiety And Depression in Medical Students: A Mixed Methods Study", *Cureus*, Vol. 7, No. 9, pp. 1- 16.

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.

WHO (2022), COVID-19 Dashboard. Geneva: World Health Organization, 2020, https://covid19.who.int/ (last cited: [2022])

WILCKENS Kristine A., WOO Sarah G., KIRK Afton R., ERICKSON Kirk I. and WHEELER Mark E. (2014), "Role of Sleep Continuity and Total Sleep Time in Executive Function Across the Adult Lifespan", *Psychology and Aging*, Vol. 29, No. 3, pp. 658.

WILHELM Ines, PREHN-KRISTENSEN Alexander and BORN Jan (2012), "Sleep-Dependent Memory Consolidation–What Can Be Learnt from Children?", *Neuroscience & Biobehavioral Reviews*, Vol. 36, No. 7, pp. 1718-1728.

WILLIAMS David R. (2012), "Miles to Go Before We Sleep: Racial Inequities In Health", *Journal of Health and Social Behavior*, Vol. 53, No. 3, pp. 279-295.

WOODS Heather Cleland and SCOTT Holly (2016), "# Sleepyteens: Social Media Use In Adolescence Is Associated with Poor Sleep Quality, Anxiety, Depression and Low Self-Esteem", *Journal of Adolescence*, Vol. 51, pp. 41-49.

WU Koulong and WEI Xuemei (2020), "Analysis of Psychological and Sleep Status And Exercise Rehabilitation of Front-Line Clinical Staff in The Fight Against COVID-19 In China", *Medical Science Monitor Basic Research*, Vol. 26, pp. e924085-1-7.

YARIBEYGI Habib, PANAHI Yunes, SAHRAEI Hedayat, JOHNSTON Thomas P. and SAHEBKAR Amirhossein (2017), “The Impact of Stress on Body Function: A review”, *EXCLI journal*, Vol. 16, pp. 1057.

YELPAZE Ismail (2021), “Predictiveness of Covid-19 Anxiety and Emotion egulation on Sleep Quality: The Moderator Effect of Gender”, *International Journal of Psychology and Educational Studies*, Vol. 8(Özel Sayı), pp. 45-56.

YETKİN Sinan and AYDIN Hamdullah (2014), “Bir Semptom ve Bir Hastalık Olarak Uykusuzluk”, *Türk Uyku Tıbbi Dergisi*, Vol. 1, No. 1, pp. 1-8.

YETKİN Sinan and ÖZGEN Fuat (2007), “Tarihsel Bakış İçinde Depresyon”, *Türkiye Klinikleri Dahili Tıp Bilimleri Dergisi*, Vol. 3, No. 47, pp. 1-5.

YOUNG Michael E., SUTHERLAND Steven C. and MCCOY Anthony W. (2018), “Optimal Go/No-Go Ratios to Maximize False Alarms”, *Behavior Research Methods*, Vol. 50, No. 3, pp. 1020-1029.

YU Yongjuan, YU Yongju, and LIN Yigang (2020), “Anxiety and Depression Aggravate Impulsiveness: The Mediating and Moderating Role of Cognitive Flexibility”, *Psychology, Health & Medicine*, Vol. 2, No. 1, pp. 25-36.

ZEIGLER-HILL Virgil and SHACKELFORD Todd K. (Eds.). (2020), “Encyclopedia Of Personality and Individual Differences”, *Cham: Springer International Publishing*.

ZOKAEINIKOO Maryam (2016), “Automatic Sleep Stages Classification”. ZVIELLI Arielle, BERNSTEIN Amit and KOSTER Ernst H. (2015), “Temporal Dynamics of Attentional Bias”, *Clinical Psychological Science*, Vol. 3, No. 5, pp. 772-788.

APPENDICES

APPENDIX A

APPROVAL OF THE SOCIAL AND HUMANITIES ETHICS COMMITTEE OF CANKAYA UNIVERSITY

ÇANKAYA ÜNİVERSİTESİ
SOSYAL VE BEŞERİ BİLİMLER
BİLİMSEL ARAŞTIRMA VE YAYIN ETİĞİ KURULU

Sayı : E-90705970-605-87964 16.09.2021
Konu : Etik Kurul Kararı (Dr.Öğretim Üyesi Nakşidil Yazıhan)

REKTÖRLÜK MAKAMINA

Çankaya Üniversitesi Fen Edebiyat Fakültesi Psikoloji Bölümü öğretim elemanlarından Dr.Öğretim Üyesi Nakşidil Yazıhan'ın sorumlu araştırmacı olduğu ***"Dikkatte Yanlılık ve Yürütücü İşlevlerin COVID-19 Pandemisi Sırasında Sağlıklı Yetişkinlerin Uyku Özelliklerine Etkisi "*** isimli proje (yüksek lisans öğrencisi Aleyne Üste'nin tez çalışması) ile ilgili başvurusu kurulumuzca incelenmiş olup, oy birliği ile etik açıdan uygun olduğuna karar verilmiştir. Üyelerce imzalanmış Kurul Kararı ekte sunulmuştur.

Bilgilerinize saygılarımla arz ederim.

Prof. Dr. Mehmet Mete DOĞANAY
Etik Kurul Başkanı

Ek: Etik Kurul Kararı (Sayı 48)

Bu belge güvenli elektronik imza ile imzalanmıştır.

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APPENDIX B

THE STUDY SURVEY

COVID-19 Pandemisi Sırasında Dikkat Yanlılığı ve Yönetici İşlev Bozukluğunun Sağlıklı Yetişkinlerin Uyku Özellikleri Üzerindeki Etkisi

Bilgilendirilmiş Onam Formu

Değerli Katılımcı,

Araştırmaya katılmayı kabul etmeden önce, lütfen araştırma ile ilgili aşağıda bulunan bilgileri dikkatlice okumak için birkaç dakikanızı ayırınız. Araştırma ile ilgili herhangi bir sorunuz olursa veya araştırmanın amacına yönelik verilen bilgiler dışında daha fazla bilgiye ihtiyaç duyarsanız araştırmacıya önceden sorabilir ya da aşağıda iletişim bilgileri olan araştırmacıyla iletişim kurabilirsiniz.

Bu çalışma Psk. Aleyna Nur Üste tarafından Dr. Nakşidil Yazıhan denetimi altında yürütülmektedir. Çalışmanın amacı, COVID-19 pandemisi sırasında sağlıklı yetişkinlerin uyku kalitesi, yürütücü işlevler ve dikkat yanlılığı arasındaki ilişkiyi araştırmaktır. Çalışmaya gelmeden en az bir saat önceden kafeinli yiyecek ve içecekleri tüketimini sonlandırmış olmanız gerekmekte. Çalışmada ilk olarak anketleri doldurmanız beklenmektedir. Daha sonra ise dikkatte yanlılık ve yürütücü işlevler hakkında veri elde edilmesi için bilgisayar görevleri kullanılacaktır. Çalışma yaklaşık 50 dakika sürecektir.

Anket ve bilgisayar görevi, katılımcılarda rahatsızlık yaratabilecek sorular içermemektedir. Çalışmaya katılımınız zorunlu değildir ve katılmayı reddetme hakkına sahipsiniz. Çalışmadan, istediğiniz bir anda, açıklama yapmaksızın çekilme hakkına sahipsiniz. Cevaplarınız kesinlikle gizlilikle korunacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilen veriler bilimsel amaçlarla kullanılacaktır.

BİLGİLENDİRİLMİŞ ONAY FORMU

Araştırma Danışmanının Adı: Nakşidil YAZIHAN, nyazihan@cankaya.edu.tr

Araştırmacıların Adları: Aleyna Nur ÜSTE, aleynaustee@gmail.com

Her ifadeye katıldığınızı belirtmek için lütfen yanda bulunan kutuları işaretleriniz.

1. Bilgileri okuyup anladığımı ve soru sorma fırsatımın olduğunu onaylıyorum. ☐

2. Katılımımın gönüllü olduğunu ve açıklama yapmaksızın, istediğim bir anda araştırmadan çekilebileceğimi anlıyorum. ☐

3. Bu araştırmaya katılmayı kabul ediyorum. ☐

<u>Katılımcı Bilgileri</u>

İsim & Soyisim:

Yaş:

Cinsiyet:

Demografik Bilgi Formu

Çalışmaya katılımınız zorunlu değildir ve katılmayı reddetme hakkına sahipsiniz. Çalışmadan, istediğiniz bir anda, açıklama yapmaksızın çekilme hakkına sahipsiniz. Cevaplarınız kesinlikle gizlilikle korunacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilen veriler bilimsel amaçlarla kullanılacaktır.

DEMOGRAFİK BİLGİLER

Yaş :

Cinsiyet : Kadın ( ) Erkek ( )

Kilo :

Boy :

En son mezun olunan okul : Ortaokul ( ) Lise ( )

Üniversite ( ) Yüksel Lisans/ Doktora ( )

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

Evetse: Tam zamanlı/ Yarı zamanlı

Çalışıyor musunuz : Evet ( ) Hayır ( )

Evetse: Tam zamanlı/ Yarı zamanlı/ Vardiyalı

Meslek : ……………………………………………………………………………………

İşinizde/ İşlerinizde genellikle haftada kaç saat çalışıyorsunuz? ………………………….

Aktif olarak bilgisayar kullanıyor musunuz?...

Medeni Durum : Evli ( ) Bekar ( ) Boşanmış ( )

Çocuğunuz var mı? : Evet ( ) Hayır ( )

Evet ise kaç tane? : ……………………………………………………………………

Çocuklarınız dışında evde bakmakla yükümlü olduğunuz başka biri var mı? : ....

Kendi gelir düzeyinizi nasıl tanımlarsınız?

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

GENEL BİLGİLER

Herhangi kronik bir rahatsızlığınız var mı?

Evet (Belirtiniz:....................) Hayır ( )

Herhangi bir ilaç kullanıyor musunuz?

Evet (Belirtiniz:.....................) Hayır ( )

Daha önce hiç tedavi gerektiren bir psikolojik rahatsızlık geçirdiniz mi?

Evet (Belirtiniz: ....) Hayır ( )

Günlük yaşamınızı etkileyecek bir görme kaybınız var mı?

Evet ( ) Hayır ( )

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

Evet (Belirtiniz: …………….) Hayır ( )

COVID- 19 hastalığı geçirdiniz mi? Evet ( )Hayır ( )

Evet ise hastanede yatarak tedavi almanız gerekti mi? Kaç gün sürdü ve belirtiler nelerdi?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………….

Belirtilerin şiddeti _____HAFİF _____ORTA _____ŞİDDETLİ

Şu anda, COVID sebebi ile genel sağlığınızı etkilediğini düşündüğünüz belirtileriniz var mı?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

…………………………………………………………………….

COVID- 19 nedeniyle bir yakınınızı ya da tanıdığınızı kaybettiniz mi? Evet ( ) Hayır ( )

Sigara kullanıyor musunuz? Evet ( ) Hayır ( )

Eğer evetse ne sıklıkla ve miktarda………………………………………………..

Alkol kullanıyor musunuz? Evet ( ) Hayır ( )

Eğer evetse ne sıklıkla ve miktarda………………………………………………..

Gün içinde kafein tüketiyor musunuz? Evet ( ) Hayır ( )

Eğer evetse ne sıklıkla ve miktarda………………………………………………..

Aşağıda belirtilen içecek türlerinden son bir hafta içerisinden en çok tükettiğiniz üç tanesini seçiniz.

a) Çay	e) Espresso	ı) Kola
b) Yeşil çay	f) Cappuccino	i) Meşrubat
c) Türk kahvesi	g) Filtre kahve	j) Meyveli gazoz
d) Neskafe	h) Ice Tea	k) Enerji içeceği

Son 8 saattir bu içeceklerden hangilerini ne miktarda tükettiniz?

…………………………………………….

Uykuya geçiş ortamınızda size eşlik eden birey/bireyler var mı? (örneğin; yurt odasında oda arkadaşı, kardeşiniz, çocuğunuz, eşiniz… gibi) varsa (kaç kişi) belirtiniz.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

…………………………………………………………………………………….

Aşağıdaki belirtilerden hangileri sizde vardır?

	EVET	HAYIR
a) Gece uykuya dalmakta güçlük çekiyorum.	_____	_____
b) Uykuya daldıktan sonra sık uyanıyorum.	_____	_____
c) Uykuya daldıktan sonra uyandığımda tekrar uyumakta güçlük çekiyorum.	_____	_____
d) Sabah uyanmakta güçlük çekiyorum.	_____	_____
e) Sabah erken uyanıyorum.	_____	_____
f) Sabah yorgun ve uykumu almamış olarak uyanıyorum.	_____	_____
g) Gece uykuda horladığım söyleniyor.	_____	_____
h) Gece uykuda nefesimin kesildiği söyleniyor.	_____	_____
i) Gece boğulma hissi ile uyanıyorum.	_____	_____
j) Bütün gün kendimi uykulu ve yorgun hissediyorum.	_____	_____
k) Sabah baş ağrısı ile uyanıyorum.	_____	_____
l) Sabah ağız kuruluğu ile uyanıyorum.	_____	_____
m) Gündüz istemsiz uyku ataklarım oluyor	_____	_____
n) Uykuda bazı davranışlarım olduğu söyleniyor. (konuşma, yürüme, tekme atma vb.)	_____	_____

Ailenizde uyku ile ilgili yukarda belirtilen veya farklı şikayetlere sahip birey/bireyler var mı? Varsa yakınlığınızı da belirterek şikayetleri yazınız.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………...

Uyku ile ilgili şikâyetlerinizin varsa günlük yaşantınıza etkileri nelerdir?

(*Aşağıdaki durumların şiddetini O (yok)'dan 10 en şiddetliye kadar lütfen puanlayın*)

Gün boyunca…

Kendimi yorgun hissediyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Kendimi uykulu hissediyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Kendimi çökkün, keyifsiz hissediyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Sinirli oluyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Dikkatimi toplamakta güçlük yaşıyorum. [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Çalışma performansım düşüyor [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

İşimde bu yüzden sorunlar yaşıyorum [yok] 0 1 2 3 4 5 6 7 8 9 10 [çok fazla]

Uyku probleminiz (varsa) ne zaman başladı?

Covid döneminden önce ( ) Covid Dönemi ile birlikte ( )

Uyku düzeniniz ne kadar doyurucu ya da tatmin edici?

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

İLETİŞİM BİLGİLERİ

Telefon : E- mail adresi :

KSE

Aşağıda, insanların bazen yaşadıkları belirtilerin ve yakınmaların bir listesi verilmiştir. Listedeki her maddeyi lütfen dikkatle okuyunuz. Daha sonra, o belirtinin SİZDE BUGÜN DAHİL, SON BİR HAFTADIR NE KADAR VAR OLDUĞUNU yandaki bölmede uygun olan yere işaretleyiniz. Her belirti için sadece bir yeri işaretlemeye ve hiçbir maddeyi atlamamaya özen gösteriniz. Yanıtlarınızı kurşun kalemle işaretleyiniz. Eğer fikir değiştirirseniz ilk yanıtınızı siliniz.

Yanıtlarınızı aşağıdaki ölçeğe göre değerlendiriniz:

Bu belirtiler son bir haftadır sizde ne kadar var?

0. Hiç yok **3. Epey var**

1. Biraz var **4. Çok fazla var**

2. Orta derecede var

Bu belirtiler son bir haftadır sizde ne kadar var?

	0	1	2	3	4
İçinizdeki sinirlilik ve titreme hali					
Baygınlık, baş dönmesi					
Bir başka kişinin sizin düşüncelerinizi kontrol edeceği fikri					
Başınıza gelen sıkıntılardan dolayı başkalarının suçlu olduğu duygusu					
Olayları hatırlamada güçlük					
Çok kolayca kızıp öfkelenme					
Göğüs (kalp) bölgesinde ağrılar					
Meydanlık (açık) yerlerden korkma duygusu					
Yaşamınıza son verme düşünceleri					
İnsanların çoğuna güvenilmeyeceği hissi					
İştahta bozukluklar					
Hiçbir nedeni olmayan ani korkular					
Kontrol edemediğiniz duygu patlamaları					
Başka insanlarla beraberken bile yalnızlık hissetmek					
İşleri bitirme konusunda kendini engellenmiş hissetmek					
Yalnızlık hissetmek					
Hüzünlü, kederli hissetmek					
Hiçbir şeye ilgi duymamak					
Ağlamaklı hissetmek					
Kolayca incinebilme, kırılmak					
İnsanların sizi sevmediğine, kötü davrandığına inanmak					
Kendini diğerlerinden daha aşağı görme					
Mide bozukluğu, bulantı					
Diğerlerinin sizi gözlediği ya da hakkınızda konuştuğu duygusu					
Uykuya dalmada güçlük					
Yaptığınız şeyler tekrar tekrar doğru mu diye kontrol etmek					

Karar vermede güçlükler					
Otobüs, tren, metro gibi umumi vasıtalarla seyahatlerden korkmak					
Nefes darlığı, nefessiz kalmak					
Sıcak-soğuk basmaları					
Sizi korkuttuğu için bazı eşya, yer yada etkinliklerden uzak kalmaya çalışmak					
Kafanızın "bomboş" kalması					
Bedeninizin bazı bölgelerinde uyuşmalar, karıncalanmalar					
Günahlarınız için cezalandırılmanız gerektiği					
Gelecekle ilgili umutsuzluk duyguları					
Konsantrasyonda (dikkati bir şey üzerinde toplama) güçlük/zorlanmak					
Bedeninizin bazı bölgelerinde zayıflık, güçsüzlük hissi					
Kendini gergin ve tedirgin hissetmek					
Ölme ve ölüm üzerine düşünceler					
Birini dövme, ona zarar verme, yaralama isteği					
Bir şeyleri kırma, dökme isteği					
Diğerlerinin yanındayken yanlış bir şeyler yapmamaya çalışmak					
Kalabalıklarda rahatsızlık duymak					
Bir başka insana hiç yakınlılık duymamak					
Dehşet ve panik nöbetleri					
Sık sık tartışmaya girmek					
Yalnız bırakıldığında/kalındığında sinirli hissetmek					
Başarılarınız için diğerlerinden yeterince takdir görmemek					
Yerinde duramayacak kadar kendini tedirgin hissetmek					
Kendini değersiz görmek					
Eğer izin verirseniz insanların sizi sömüreceği duygusu					
Suçluluk duyguları					
Aklınızda bir bozukluk olduğu fikri					

EUÖ

Uygulama: Aşağıdaki durumlarda uyuma olasılığınız nedir?

Soruları her zamanki yaşantınızı düşünerek cevaplayınız. Bunlardan birini son zamanlarda yapmamış olsanız bile, eğer böyle bir durum olsa idi, nasıl davranacağınızı düşünerek cevaplayınız.

Her durum için **en uygun sayıyı** aşağıdaki ölçeği kullanarak cevaplayınız.

0 = Asla uyumam

1 = Uyuma olasılığım az

2 = Uyuma olasılığım var

3 = Büyük olasılıkla uyurum

Durum	**Uyuma olasılığım**			
Oturup bir şeyler okurken	0	1	2	3
Televizyon seyrederken	0	1	2	3
Hareketsiz olarak toplum içinde otururken (örneğin; tiyatro veya herhangi bir toplantıda)	0	1	2	3
Ara vermeden en az bir saat süren bir araba yolculuğunda yolcu olarak seyahat ederken (şoför olarak değil)	0	1	2	3
Boş vaktim olduğunda dinlenmek için öğleden sonraları uzandığımda	0	1	2	3
Birisiyle oturup konuşurken	0	1	2	3
Alkol almadığım bir öğlen yemeğinden sonra hareketsizce otururken	0	1	2	3
Araç kullanırken, trafikte araba bir kaç dakika için durduğunda	0	1	2	3

PUKİ

Uygulama: *Aşağıdaki sorular, sadece son bir ay içindeki uyku alışkanlıklarınızla ilişkilidir. Cevaplarınızı son bir ayda, çoğu gün ve geceyi kapsayan en uygun cevaba göre işaretleyin. Lütfen bütün soruları cevaplayın.*

Son bir ayda,

1. Genellikle ne zaman yatarsınız?___________________

2. Yattıktan sonra, uykuya dalmak ne kadar vakit alır (dakika)?______________

3. Genellikle sabah kaçta kalkarsınız?_________________

4. Gece uyuduğunuz gerçek süre kaç saattir? (Bu süre yatakta geçirdiğiniz süreden farklı olabilir) _______________

5. Son bir aydır, ne kadar sıklıkla, ... nedeniyle uyku sorunu yaşadınız?

	Geçtiğimiz ay içinde hiçbir zaman (0)	Haftada birden az (1)	Haftada bir ya da iki defa (2)	Haftada üç ya da daha fazla (3)
30 dakika içinde uykuya dalamama				
Gecenin ortasında ya da sabah erken uyanma				
Tuvalete kalkmak zorunda olma				
Rahat nefes alamama				
Öksürük ya da gürültülü horlama				
Üşüme				
Sıcak hissetme				
Kötü rüyalar				
Ağrı				
Diğer nedenler, lütfen neden(ler)i tanımlayın, ne kadar sıklıkla bu neden(ler)den ötürü uyku sorunu yaşadınız:				
Son bir aydır, ne kadar sıklıkla uyumak için ilaç kullandınız?				

Son bir aydır, ne kadar sıklıkla, araba kullanırken, yemek yerken ya da sosyal aktivitelerde kendinizi uyanık tutmada güçlük yaşadınız?				
Son bir aydır, bir şeyler yaparken, konuya ilginizi devam ettirmede sorun ne sıklıkla yaşadınız?				
	Çok iyi (0)	Kısmen iyi (1)	Kısmen kötü (2)	Çok kötü (3)
Son bir aydır, uyku kalitenizi genel olarak nasıl puanlarsınız?				
B1:______ B2:______ B3:______ B4:______ B5:______ B6:______B7:_______ **Toplam PUKİ Skoru: _________________**				

DASS

NO	SON 1 HAFTADAKİ DURUMUNUZ	Hiçbir zaman	Bazen ve arasıra	Çok sık	Her zaman
1	Oldukça önemsiz şeyler için üzüldüğümü farkettim	0	1	2	3
2	Ağzımda kuruluk olduğunu farkettim	0	1	2	3
3	Hiç olumlu duygu yaşayamadığımı farkettim	0	1	2	3
4	Soluk almada zorluk çektim (*örneğin fizik egzersiz yapmadığım halde aşırı hızlı nefes alma, nefessiz kalma gibi)*	0	1	2	3
5	Hiçbir şey yapamaz oldum	0	1	2	3
6	Olaylara aşırı tepki vermeye meyilliyim	0	1	2	3
7	Bir sarsaklık duygusu vardı *(sanki bacaklarım beni taşıyamayacakmış gibi)*	0	1	2	3
8	Kendimi gevşetip salıvermek zor geldi	0	1	2	3
9	Kendimi, beni çok tedirgin ettiği için sona erdiğinde çok rahatladığım durumların içinde buldum	0	1	2	3
10	Hiçbir beklentimin olmadığı hissine kapıldım	0	1	2	3
11	Keyfimin pek kolay kaçırılabildiği hissine kapıldım	0	1	2	3
12	Sinirsel enerjimi çok fazla kullandığımı hissettim	0	1	2	3
13	Kendimi üzgün ve depressif hissettim	0	1	2	3
14	Herhangi bir şekilde *geciktirildiğimde (asansörde, trafik ışıklarında, bekletildiğimde)* sabırsızlandığımı hissettim	0	1	2	3
15	Baygınlık hissine kapıldım	0	1	2	3
16	Neredeyse herşeye karşı olan ilgimi kaybettiğimi hissettim	0	1	2	3
17	Birey olarak değersiz olduğumu hissettim	0	1	2	3
18	Alıngan olduğumu hissettim	0	1	2	3
19	Fizik egzersiz veya aşırı sıcak hava olmasa bile belirgin biçimde terlediğimi gözledim *(örneğin ellerim terliyordu*)	0	1	2	3
20	Geçerli bir neden olmadığı halde korktuğumu hissettim	0	1	2	3
21	Hayatın değersiz olduğunu hissettim	0	1	2	3
22	Gevşeyip rahatlamakta zorluk çektim	0	1	2	3
23	Yutma güçlüğü çektim	0	1	2	3
24	Yaptığım işlerden zevk almadığımı farkettim	0	1	2	3
25	Fizik egzersiz söz konusu olmadığı halde kalbimin hareketlerini hissettim *(kalp atışlarımın hızlandığını veya düzensizleştiğini hissettim)*	0	1	2	3
26	Kendimi perişan ve hüzünlü hissettim	0	1	2	3
27	Kolay sinirlendirilebildiğimi farkettim	0	1	2	3
28	Panik haline yakın olduğumu hissettim	0	1	2	3
29	Bir şey canımı sıktığında kolay sakinleşemediğimi farkettim	0	1	2	3

30	Önemsiz fakat alışkın olmadığım bir işin altından kalkamayacağım korkusuna kapıldım	0	1	2	3
31	Hiçbir şey bende heyecan uyandırmıyordu	0	1	2	3
32	Birşey yaparken ikide bir rahatsız edilmeyi hoş göremediğimi farkettim.	0	1	2	3
33	Sinirlerimin gergin olduğunu hissettim	0	1	2	3
34	Oldukça değersiz olduğumu hissettim	0	1	2	3
35	Beni yaptığım işten alıkoyan şeylere dayanamıyordum	0	1	2	3
36	Dehşete düştüğümü hissettim	0	1	2	3
37	Gelecekte ümit veren birşey göremedim	0	1	2	3
38	Hayatın anlamsız olduğu hissine kapıldım	0	1	2	3
39	Kışkırtılmakta olduğumu hissettim	0	1	2	3
40	Panikleyip kendimi aptal durumuna düşüreceğim durumlar nedeniyle endişelendim.	0	1	2	3
41	Vücudumda *(örneğin ellerimde)* titremeler oldu.	0	1	2	3
42	Bir iş yapmak için gerekli olan ilk adımı atmada zorlandım	0	1	2	3

KAÖ

Son 2 hafta içinde aşağıdaki aktiviteleri ne sıklıkla yaşadınız?

		Hiçbir zaman 0	Nadir, bir veya iki günden az 1	Birkaç gün 2	7 günden fazla 3	Son iki haftada neredeyse her gün 4
1	Koronavirüs ile ilgili haberleri okuduğum veya dinlediğim zaman başımın döndüğünü ve sersemleştiğimi hissettim veya bayılacakmış gibi oldum.					
2	Koronavirüsü düşündüğüm için uykuya dalmada ya da uyumada sorun yaşadım.					
3	Koronavirüs ile ilgili konuları düşündüğümde ya da bu konulara maruz kaldığımda inme inmiş gibi hissettim veya donup kaldım.					
4	Koronavirüs ile ilgili konuları düşündüğümde ya da bu konulara maruz kaldığımda iştahım kaçtı.					
5	Koronavirüs ile ilgili konuları düşündüğümde ya da bu konulara maruz kaldığımda mide bulantısı ya da mide problemleri yaşadım.					