

THE RELATIONSHIP BETWEEN MINDFULNESS AND SLEEP QUALITY: THE
MEDIATING ROLE OF SMARTPHONE ADDICTION AND BEDTIME
PROCRASTINATION

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PLAGIARISM

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

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ABSTRACT

Bedtime procrastination is a novel field of research compared to the other procrastination types and has often been associated with inadequate sleep and well-being. The present study examined a serial mediation model and hypothesized that smartphone addiction and bedtime procrastination would serially mediate the relationship between mindfulness and sleep quality. Participants were recruited from online platforms and 409 participants filled the survey. The inclusion criteria were being 18 years old and over. Three-hundred-eighty-five of the participants' data were included for the analyses since 24 participants did not follow the instructions. The data collection instruments that were presented to the participants in the present study were demographic information form, Smartphone Addiction Scale, Bedtime Procrastination Scale, and Pittsburgh Sleep Quality Index. The analyses provided support for the serial mediation model. Mindfulness predicted lower levels of smartphone addiction, which in turn predicted lower levels of bedtime procrastination and subsequently better sleep quality. The findings were presented in the concluding part, along with limitations, recommendations for future research, and clinical implications. In conclusion, the findings of the present study support the role of mindfulness on smartphone addiction and bedtime procrastination in relationship with sleep quality.

Key words: mindfulness, smartphone addiction, bedtime procrastination, sleep quality

ÖZET

Uyku vaktini erteleme, literatürdeki diğer erteleme türlerinden daha yeni bir alandır ve genellikle yetersiz uyku ve insanların iyi oluşuyla ilişkilendirilmiştir. Bu çalışmada seri aracılık modeli incelenmiştir ve akıllı telefon bağımlılığı ile uyku vaktini ertelemenin, bilinçli farkındalık ve uyku kalitesi arasındaki ilişkiye seri olarak aracılık edeceği varsayılmıştır. Katılımcılar çevrimiçi platformlardan toplanmıştır ve 409 katılımcı anketi doldurmuştur. Çalışmaya dahil edilme kriteri 18 yaş ve üzeri olmaktır. 24 katılımcı yönergeleri takip etmediği için, 385 katılımcının verileri analizlere dahil edilmiştir. Bu çalışmada katılımcılara sunulan veri toplama araçları Demografik Bilgi Formu, Akıllı Telefon Bağımlılık Ölçeği, Uyku Ertelenme Ölçeği ve Pittsburgh Uyku Kalitesi İndeksi'dir. Analizler, seri aracılık modeline destek sağlamıştır. Bilinçli farkındalık, daha düşük akıllı telefon bağımlılığı seviyelerini tahmin ederek, bunun sonucunda daha düşük uyku vaktini erteleme seviyelerini ve daha iyi uyku kalitesini tahmin etmiştir. Bulgular, sınırlamalar, gelecekteki araştırmalar için öneriler ve klinik çıkarımlarla birlikte sonuç bölümünde sunulmuştur.

Sonuç olarak, bu çalışmanın bulguları, bilinçli farkındalığın akıllı telefon bağımlılığı ve uyku vaktini ertelemenin uyku kalitesi ile ilişkili olan rolünü desteklemektedir.

Anahtar kelimeler: bilinçli farkındalık, akıllı telefon bağımlılığı, yatma vaktini erteleme, uyku kalitesi

To my grandmother,



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1. INTRODUCTION

1.1. Mindfulness

Eastern meditation culture serves as the basis for mindfulness and gradually it has begun to be applied and understood in Western Culture (Baer & Krietemeyer, 2006; Bishop et al., 2004). Mindfulness finds its roots in the Pali word "sati", which was used in the Buddhist tradition 2,500 years ago and refers to being aware, attentive, and remembering (Germer, 2015). Although various definitions have been made in the literature about what mindfulness is and the processes it covers, mindfulness is still not a straightforward concept to define (Aktepe & Tolan, 2020; Langer & Moldoveanu, 2000). The term mindfulness can encompass both a state of being (being aware in the present moment) and a practice for attaining that state (techniques like meditation) (Germer, 2015). "Mindfulness is an awareness that arises when an individual intentionally focuses their attention on the present moment without judging their experiences" (Kabat-Zinn, 2003, p. 145). Langer and Moldoveanu (2000) defined mindfulness as the active process of noticing new information to cultivate a fresh perspective by remaining engaged and aware of one's surroundings. Siegel et al. (2009) emphasized that mindfulness is not a new concept, but rather a natural state of awareness that has been part of the human experience for a long time. Being mindfully aware is about embracing all personal experiences in the present moment without judging or categorizing them as positive or negative, or success or failure (Marlatt & Kristeller, 1999). By letting go of negative thoughts and behavior patterns, mindfulness aims to promote greater well-being and lead to a more fulfilling and meaningful life rather than to escape or avoid suffering (Siegel et al., 2009). Mindfulness also aims to help people face whatever challenges life throws at them. People who practice mindfulness are better able to control their emotions and respond to difficult situations more skillfully because they are able to understand their experiences as passing mental processes rather as unchanging components of who they are (Bishop et al., 2004; Marlatt & Kristeller, 1990).

A meta-analysis by Sumantry and Stewart (2021) suggested that mindfulness can enhance cognitive skills such as attentional ability and executive functioning which are important for daily life. Kabat-Zinn (2015) stated that the greater one's mindfulness, the greater their ability to perceive and understand the world around them and their own inner experience. Kabat-Zinn (2015) stated two different types of mindfulness:

deliberate mindfulness and effortless mindfulness. Deliberate mindfulness is the intentional practice of cultivating mindfulness through regular practice, which can lead to the natural arising of effortless mindfulness in daily life, resulting in greater ease and flow (Kabat-Zinn, 2015). Kabat-Zinn (2015) then added, regardless of how mindfulness is cultivated, in the end, it is still mindfulness.

Mindfulness can be understood as a multidimensional construct that includes several layers and components (Aktepe & Tolan, 2020). Bishop and his colleagues (2004) proposed two key aspects of mindfulness: self-regulating one's attention to avoid distractions from internal or external stimuli, and adopting a specific mindset or attitude towards present-moment experiences. Shapiro et al. (2006) have identified three key components of mindfulness: intention, attention, and attitude. These three components of mindfulness do not act separately from each other, but they work as a whole and complement each other. The initial step towards mindfulness is having the intention to do so. In the context of mindfulness it refers to the motivation why one is engaging in the practice (Shapiro et al., 2016). Attention refers to the ability to focus on the stimuli that we encounter in our environment or within ourselves (Aktepe & Tolan, 2020). By attending to the stimuli as it is, individuals can acquire to attend to the content of their consciousness moment by moment (Shapiro et al., 2006). Attitude refers to the mental stance or qualities that one brings to the present moment experiences (Kabat-Zinn, 2005). The attitude one brings to the act of paying attention can greatly influence the effectiveness and benefits of mindfulness (Shapiro et al., 2016). Together, attention, intention, and attitude form a strong foundation for cultivating mindfulness (Aktepe & Tolan, 2020). Kabat-Zinn (2005) suggests that certain attitudes should be cultivated as a basis for developing mindfulness skills. Non-judging, patience, beginner's mind, trust, non-striving, acceptance, and letting go are considered to be the foundational principles of mindfulness (Kabat-Zinn, 2005). According to Germer (2005), the further we move away from being in the present moment, the more likely we are to experience suffering. The adoption of these attitudes toward experiences leads to the development of mindfulness skills that allow individuals to approach all experiences with non-reactivity, greater awareness, and acceptance resulting in decreased suffering and increased well-being (Kabat-Zinn, 2005; Germer, 2005).

According to Germer (2005), for managing difficult experiences in life, particularly those that we may bring upon ourselves through our own actions or choices, mindfulness can be a helpful tool. Mindfulness shares certain features with concepts

found in psychotherapy, such as mentalization, intersubjectivity, and insight (Davis & Hayes, 2011). Bishop et al. (2004) stated that mindfulness is increasingly being used as a therapeutic tool in modern psychotherapy to help individuals to identify patterns of thoughts, emotions, and behaviors that contribute to emotional distress and maladaptive behavior. Mindfulness is an effective approach that helps manage stress and anxiety, regulates emotions, and trains the mind to be adaptable and resilient in challenging situations, reducing cognitive vulnerability, promoting emotional regulation, improved psychological functioning, and overall well-being, rather than simply addressing symptoms (Bishop et al., 2004; Brown & Ryan, 2003). By promoting emotion regulation capacities, individuals with mood disorders, and anxiety disorders may experience improvement in their emotional well-being and overall functioning (Hölzel et al., 2011). Mindfulness-Based Stress Reduction (Kabat-Zinn, 2003); Mindfulness-Based Cognitive Therapy (Segal et al., 2002); Acceptance and Commitment Therapy (Hayes et al., 1995) are empirically validated mindfulness-based therapies that are being used in psychotherapy at the present time (Germer, 2005).

In essence, mindfulness can be characterized as an elevated level of attentiveness and awareness directed toward the present moment or an individual's current state of being (Brown & Ryan, 2003). Together, awareness and attention form the foundation of one's conscious experience (Brown & Ryan, 2003). Mindfulness, in contrast to functioning on autopilot or being lost in thoughts, entails purposefully concentrating and having consciousness of salient aspects of the present moment, including those in the external surroundings and within oneself (Bishop et al., 2004; Germer, 2005). Mindfulness entails recognizing past experiences while intentionally letting go of distractions, being present at the moment with conscious effort, and having an open-minded attitude, which allows us to fully appreciate and experience each moment (Germer, 2005). Opinions on events in life can be biased and the brain's automatic categorization makes it challenging to accept events objectively, but developing mindfulness can assist in recognizing emotions and viewing life objectively (Kocabal & Ceylan, 2022).

1.2. Addiction

1.2.1. Conceptualization of Addiction

Historically, addiction has been conceptualized as dependency resulting from the consumption of particular substances such as alcohol or drugs, characterized by specific symptoms including craving for the substance, increased tolerance to its effects, and withdrawal when access to the substance is restricted or stopped (Holden, 2001; Mann et al., 2017). Goodman (1990) described addiction as the inability to stop a problematic behavior despite the negative outcomes and the lack of control over it. According to Panova and Carbonell (2018), addiction is characterized by harmful consequences, psychological and physical dependence, and a loss of control over the behavior. Addiction can develop from any activity that is reinforced with a reward (Alavi et al., 2012). Recent research has demonstrated that the neurophysiological processes do not differ due to the reward or stimulation obtained from a chemical or an experience (Holden, 2001; Moattari et al., 2018). Both behavioral and substance-related addictions can act as reinforcement, even though behavioral addictions affect the neurotransmitters indirectly, while substance-related addictions directly affect them (Alavi et al., 2012; Albrecht et al., 2007; Holden, 2001). The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), which was published in 2013, expanded the scope of the chapter on addiction from Substance-Related Disorders to Substance-Related and Addictive Disorders (American Psychiatric Association, 2013). With this change, the concept of addiction has been extended to include not just dependencies on substances but also non-substance-related addictive behaviors, such as excessive gambling, excessive use of the internet, compulsive sexual behavior, and compulsive buying (Grant & Chamberlain, 2016; Mann et al., 2017; Robbins & Clark, 2015). Until now, Gambling Disorder was the only example of behavioral addiction that has been identified in the DSM-5 in the ‘Substance-Related and Addictive Disorders’ section (APA, 2013; Robbins & Clark, 2015). Other behavioral addictions such as compulsive buying, exercise addiction, and internet gaming are categorized as impulsive disorders (APA, 2013). Behaviors are considered addictive when they are taken to an excessive level and result in self-harm (Rosenberg & Feder, 2014). Behavioral addiction is characterized by a reward that comes from engaging in a specific behavior, even when there is no external reward (Robbins & Clark, 2015). According to Black (2013), behavioral addictions are a type of disorder where the symptoms are expressed through one’s actions and are often seen as enjoyable initially, but can be irresistible over time. Addiction is characterized by a shift from finding pleasure in behavior to feeling compelled to engage in it (Roberts & Pirog,

2013). This shift is defined as the “inflection point” by Grover et al. (2011) to mark the motivating factor behind the behavior changes from enjoyment to a physical or psychological wanting. Ceasing or reducing a specific behavior can lead to lifestyle changes, alterations in sleep habits, impatience, and withdrawal (Alavi et al., 2012).

1.2.2. Smartphone Addiction

Smartphones are electronic devices that can be controlled by touching the screen, and that offer a wide range of functionalities and features, full Internet access and the ability to download and install new applications (apps) through the use of operating systems and app stores (Lee et al., 2014; Lin et al., 2014; Ting & Chen, 2020). Smartphones enable easy access to the Internet and social media, making communication more convenient, and also these devices possess the capability of merging the features of a phone, computer, MP3 player, and video player into a single portable device, giving people access to communication networks, entertainment options and useful tools like Global Positioning System (GPS), camera, and health trackers (Kwon et al., 2013; Polat et al., 2021; Ting & Chen, 2020). Smartphones, once considered advanced communication devices, have become an essential part of people’s daily lives due to their high accessibility, with many smartphone users starting and ending their day by interacting with their devices (Lee et al., 2014; Lin et al., 2016). With smartphones, people can perform various financial transactions such as managing bank accounts, paying bills, and obtaining loans without the need to leave their homes (Kumar, 2021). According to a study by We are Social and Hootsuite, as of January 2021, there are approximately 5.22 billion smartphone users worldwide demonstrating the widespread use of smartphones (We are Social & Hootsuite, 2021). Currently, people of all ages around the world commonly use smartphones (Polat et al., 2021). As smartphones have become more prevalent in society and the increment in the accessibility of the Internet through smartphones, excessive use and addiction to these devices have become a significant global problem (Kwon et al., 2013; Lin et al., 2015; Lin et al., 2016; Panova & Carbonell, 2018). Smartphone addiction refers to excessive use of smartphones that negatively impacts an individual’s daily life (Demirci et al., 2014). However, smartphone addiction has not been officially stated as an addiction in DSM-5 (APA, 2013). Smartphone addiction is one type of technological addiction that is a subset of behavioral addictions (Lin et al., 2016). Griffiths (1995) defined technological addiction as a type of addiction that does not involve the use of substances

and instead focuses on an individual's excessive use or engagement with technology or machines. Smartphone use can exhibit signs of addiction, such as a need for increased usage over time, discomfort or negative effects when usage is reduced, difficulty completing tasks without the device, or difficulty controlling the impulse to use the device (Chen et al., 2017; Kwon et al., 2013). In their research, Lin et al. (2014) established that being addicted to smartphones has similarities to substance-related and addictive disorders as described in DSM-5, but its accessibility and internet-based applications make it distinct and prevalent (Lin et al., 2016). Addiction to smartphones is generally composed of four elements, which include: tolerance such as more frequent usage; withdrawal, such as experiencing discomfort or distress when separated from the phone; obsessive smartphone usage, including routinely checking for notifications or messages; and decline in daily functioning and in-person interactions with others (Lin et al., 2014). In order for a behavior to be considered an addiction, both compulsive traits and adverse effects should be seen. This is demonstrated in smartphone addiction through neglect of important activities, excessive focus on the phone, distress when not having access, and persistent use despite the harmful consequences (Sohn et al., 2021). The literature suggests that being addicted to smartphones is also influenced by motives. Chen et al. (2017) found that feeling pleasure while using a smartphone, the desire for mood regulation, using smartphones as a leisure activity, and the fear of being judged by peers are motives that contribute to becoming addicted to smartphones. Excessive smartphone use has been linked to spending more time on the device and engaging in less physical activity like walking, leading to a decrease in energy consumption that can contribute to an increase in fat mass (Kim et al., 2015). Prolonged usage of smartphones is found to contribute to an increased likelihood of developing myopia (McCrann et al., 2021). Cognitive deficits including decreased attention, impaired working memory, and changes in social cognition may potentially result from the excessive use of smartphones (Wacks & Weinstein, 2021). The use of smartphones may have detrimental effects on the brain and related mental functions as well (Pera, 2020). Furthermore, addiction to smartphones has been linked to depression, anxiety, reduced well-being and sleep quality of the individuals (Chen et al., 2017; Pera, 2020; Wang et al., 2019). The prevalence of smartphone addiction was found 38.9% in a UK sample (Sohn et al., 2021). Ataş and Çelik (2019) reported that university students in Turkey check their smartphones an average of 28 times a day. In a Norwegian study of older adults, aged 60 years or older, 20.8% of the participants reported their smartphone usage to be 'very

high' (Busch et al., 2021). In a study conducted by Jain et al. (2019) on 146 medical students in India, 35.6% of the students access their devices 11-20 times a day and within five minutes of waking up in the morning, the majority of the students begin using their smartphones. Similarly, a 29.8% of prevalence rate was found in a study that was conducted by Chinese medical college students (Chen et al., 2017). Regarding which group is more susceptible to addiction, there is no consensus on gender differences in smartphone addiction, however gender-related studies have been conducted (Al-Barashdi et al., 2015). Lee et al. (2017) found the likelihood of smartphone addiction was 2.7 times higher in women than men. Demirci et al. (2015) found that the female sex is an independent factor that affects smartphone addiction. However, Devis-Devis et al. (2009) found that boys used their phones more often than girls.

To sum up, the features and functionalities of smartphones have made these devices more common and overused in daily life, increasing the potential for addiction to them (Lee et al., 2014). The addiction criteria of smartphones include increased usage over time, discomfort when usage is reduced or restricted, difficulty completing tasks without the device, or difficulty controlling the urge to use the device (Lin et al., 2014). Excessive smartphone use is linked to cognitive deficits (Wacks & Weinstein, 2021), physical and mental health problems (Chen et al., 2017; Kim et al., 2015; Mccrann et al., 2021; Pera, 2020; Wang et al., 2019). Smartphone addiction has been found to be prevalent in different age groups, gender, and countries, with prevalence rates ranging from 20.8% to 38.9% (Ataş & Çelik, 2019; Busch et al., 2021; Chen et al., 2017). Smartphone addiction might be driven by various motives, including the enjoyment derived from using the device, the need for mood regulation, the use of smartphones for leisure activities, and the fear of peer judgment (Chen et al., 2017).

1.2.3. Smartphone Addiction and Sleep Quality

Studies have revealed that the electromagnetic radiation emitted by mobile phones can alter sleep patterns and delay the production of melatonin (Loughran et al., 2005; Wood et al., 2006). Smartphone addiction is a factor that lowers the quality of sleep (Kumar et al., 2019). Demirci et al. (2015) found a positive relationship between smartphone addiction and both subjective sleep quality and sleep disturbance. In the study by Schweizer and colleagues, it was found that adolescents who have smartphones tend to sleep less compared to those without smartphones (Schweizer et al., 2017).

Additionally, research has shown that the use of various social media networks and smartphone addiction have an influence on sleep quality (Gündoğmuş et al., 2019). In a study of 409 female college students, Wang et al. (2017) suggested that smartphone dependence and health-related behaviors are predictors of sleep quality. It has been suggested that excessive use of media and new technologies such as smartphones interfere with sleep by taking up time that could be used for sleep or other activities that promote good sleep habits which can result in less sleep or poor sleep quality, negatively affecting overall health and well-being (Cain & Gradisar, 2010). Zhang & Wu (2020), also stated that smartphone addiction is positively correlated with poor sleep quality.

Based on the research it can be concluded smartphones can significantly affect sleep patterns and sleep quality (Demirci et al., 2015). The radiation emitted by smartphones can interfere with melatonin production and sleep patterns, and excessive smartphone use and addiction have been linked to lower sleep quality and greater sleep disturbances. Excessive smartphone use, which has an impact on sleep quality, also negatively affects overall health and well-being (Zhang & Wu, 2020).

1.2.4. Smartphone Addiction and Mindfulness

Mindfulness is a way to regulate oneself and one's thoughts and the awareness that arises via purposeful, in-the-moment, non-judgemental attention to the experience as it develops from moment to moment (Cheng et al., 2020; Kabat-Zinn, 2003). Mindfulness has been demonstrated to enhance an individual's abilities of self-regulation (Hölzel et al., 2011). Lately, mindfulness is seen as having a positive impact on providing effective techniques for managing and helping people to overcome addiction and psychological issues (Cheng et al., 2020). Smartphone addiction has been found to be related to a decrease in self-control (Song & Park, 2019). A study by Regan et al. (2020) suggested that higher levels of mindfulness can help mitigate the negative effects of nomophobia (fear of not having access to a mobile phone contact, Olivencia-Carrión et al., 2018) on problematic smartphone use. Liu et al. (2017) found that practising mindfulness can help with the negative effects of smartphone addiction on sleep quality. Specific mindfulness techniques can both decrease withdrawal symptoms in individuals with smartphone addiction, while also regulating the emotional anxiety that is commonly linked with smartphone addiction (Cheng et al., 2020). Brewer et al. (2011) found that people were more likely to be successful in quitting-smoking when using mindfulness programmes than those with traditional quitting-smoking

programmes. Neuroplasticity allows the brain to adjust and change based on experiences and stimuli, while both mindfulness and smartphone addiction use can affect the brain, mindfulness might counteract the negative effects of excessive smartphone usage (Kim et al., 2018). Based on Kim et al. (2018) qualitative and quantitative findings, a lack of mindfulness contributes to an extended duration of social media use, resulting in increased health problems and a decline in the quality of life. One of the key advantages of mindfulness is that “it disconnects individuals from undesirable behavior patterns, automatic thoughts, and habits” (Brown & Ryan, 2013). Changing one's smartphone usage habits can depend on improving the awareness feature. However, there is not enough evidence of whether mindfulness may overcome this habit or not (Kim et al., 2018).

Hence, mindfulness has been demonstrated to enhance self-regulation and is seen as having a positive impact on managing addiction (Cheng et al., 2020). While both mindfulness and smartphone addiction can affect the brain, mindfulness can counteract the negative effects of excessive smartphone usage by disconnecting individuals from undesirable behavior patterns and habits. Despite that, it is not yet clear whether mindfulness can entirely overcome smartphone addiction (Kim et al., 2018).

1.2.5. Smartphone Addiction and Bedtime Procrastination

When smartphone usage is constantly prompted and users attempt to multitask between a task and smartphone use, the individual's task-related activity is fragmented, which can cause task completion to be delayed (Aalbers et al., 2022). A pioneering study by Zhang and Wu (2020) demonstrated that the relationship between smartphone addiction and sleep quality is mediated by bedtime procrastination. According to Aalbers et al. (2022) an increase in smartphone usage is associated with an increase in procrastination. Individuals with a dependency on their smartphones may struggle with putting down the device and managing distractions before bedtime, leading to increased bedtime procrastination (Zhang & Wu, 2020). For example, a study conducted on 815 young adults found that more than 12% of the participants use their smartphones instead of sleeping (Rod et al., 2018). People may put off bedtime to use their smartphones for entertainment, which can initially bring happiness but as the enjoyment decreases, they use their phones more to try to get that feeling back, sacrificing sleep in the process which leads to bedtime procrastination (Geng et al., 2021). People may also postpone their bedtime by using smartphones due to the inhibition of melatonin production by the

smartphone's light and the availability of engaging apps that can get their attention and make people lose their sense of time (Geng et al., 2021).

1.3. Bedtime Procrastination

1.3.1. Conceptualization of Procrastination

The word procrastination derives from its Latin origin of *pro*, meaning “forward, or on behalf of ” and *crastinus*, meaning “of tomorrow” (Klein, 1971). Steel (2007) defined procrastination as the deliberate delaying of a desired course of action while anticipating negative consequences. Procrastination is a harmful, dysfunctional, and problematic phenomenon that is encountered in almost every domain of life (Hen & Goroshit, 2018; Klingsieck, 2013; Kroese et al., 2014; Steel, 2007). Chun Chu and Choi (2005) classified procrastinators into two types: active and passive procrastinators. Active procrastinators deliberately halt their work and prioritize more immediate tasks as a means of managing their time, whereas passive procrastinators may not deliberately delay their tasks but instead postpone them due to indecisiveness and slow follow-through (Chun Chu & Choi, 2005). According to Ferrari (1994), there are two types of procrastination: decisional and behavioral procrastination. Decisional procrastinators deliberately postpone making decisions within a specific time range, even though they could have made the decision earlier. On the other hand, behavioral procrastinators delay starting or completing tasks to avoid confronting their fear of failure or not being good enough (Ferrari, 1994). Research shows that procrastination decreases with age (Steel, 2007) and compared to males, women are less procrastinators (Burka & Yuen, 2008). Depression (Flett et al., 1995; Solomon & Rothblum, 1984) and anxiety (Flett et al., 1995; Solomon & Rothblum, 1984; Beswick et al., 1988) are negative mental health states that procrastination is associated with by research. Tice and Baumeister (1997) stated that at the end of the academic term, procrastinators were shown to have greater stress and sickness levels than non-procrastinators. Stead and colleagues (2010) found a positive relationship between high levels of procrastination and poor mental health. Although the relationship between mental health and procrastination has been extensively studied, less attention has been paid to the effects of procrastination on the physical state of health (Sirois et al., 2003).

1.3.2. Conceptualization of Bedtime Procrastination

Going to bed later than planned, regardless of any external circumstances, is defined as bedtime procrastination by Kroese and colleagues (2014) for the first time in the literature. Putting off going to bed is a topic with limited research (Magalhães et al., 2020), and procrastination in this area can result in negative health outcomes, representing a particular instance of procrastination's impact on health (Kroese et al., 2014). Bedtime procrastination is a common occurrence in today's society (Chung et al., 2020). Approximately 53.1% of individuals reported that they go to bed later than they desired at least 2 days out of the week (Kroese et al., 2014). Earlier studies have indicated that an increased frequency of delaying bedtime is linked to higher levels of stress, both chronic and temporary anxiety, and signs of depression (Hill et al., 2022). Delaying bedtime is a specific type of procrastination behavior as it is confined to the evening hours, in contrast to other forms of procrastination behaviors that can be performed at any time during the day (e.g., studying) (Kroese et al., 2014). Deferring a task that an individual considers unpleasant, such as composing a report or doing the laundry, is a common form of procrastination (Magalhães et al., 2020). Gershuny (2013), conducted a study to investigate the levels of enjoyment associated with different daily events among participants from the USA and UK. The results suggested that sleeping is typically seen as enjoyable by most people, with higher than average self-reported satisfaction, indicating that it is not purposely avoided (Gershuny, 2013). Bedtime procrastination has been characterized as a failure in self-regulation (Kroese et al., 2014; Nauts et al., 2019; Sirois et al., 2018). Alternative explanations were also proposed for this phenomenon. Okay et al. (2022) reported that individuals who perceive ample time are less likely to procrastinate bedtime, while those who feel time-constrained tend to delay bedtime to maximize their remaining time. Chronotypes of individuals have also been studied in the scope of bedtime procrastination. Chronotype refers to the variation in the preferred timing of sleep and wakefulness among individuals (Vitale & Weydahl, 2017). A previous study found that individuals with a later chronotype reported more frequent bedtime procrastination than earlier chronotypes (Kühnel et al., 2018). Bedtime routines are also the correlates of bedtime procrastination. A negative attitude towards bedtime routines (e.g., taking a shower, removing makeup), and aversion to waking up to the next day's activities (e.g., picking the next day's outfit, packing lunch) were associated with bedtime procrastination

(Nauts et al., 2016). People could deliberately, mindlessly, and strategically put off going to bed (Nauts et al., 2019). Deliberate procrastination of bedtime is doing the type of behavior intentionally despite knowing that the outcome will be worse; the failure to stick to their nighttime plans is linked to complaints of preoccupation or inattention is mindless procrastination; purposefully going to bed later than intended because thinking that doing so would have a benefit is strategic delay (Nauts et al., 2019).

The studies demonstrate that the concept of bedtime procrastination, defined as going to bed later than intended, is a relatively new area of research that can have negative health consequences (Kroese et al., 2014). It is a specific type of procrastination that only occurs in the evening (Kroese et al., 2014) and characterized as a self-regulation failure (Sirois et al., 2018). Studies suggest that people who frequently delay going to bed may experience higher levels of stress, anxiety, and depression (Hill et al., 2022). Factors such as chronotype (Kühnel et al., 2018), attitudes towards bedtime routines (Nauts et al., 2016), and time constraints (Okay et al., 2022) can influence bedtime procrastination. Individuals may procrastinate bedtime intentionally, mindlessly, or strategically (Nauts et al., 2016).

1.3.3. Bedtime Procrastination and Mindfulness

By enhancing mindfulness, individuals can improve their capacity to manage their attention, which can aid them in staying focused on their pre-sleep routine and avoiding potential distractions like social media that could disturb their sleep. (Teoh & Wong, 2023). Valshtein et al. (2020) found that self-regulation strategies are effective in helping participants follow through on their intentions to go to bed at the time they intended to rather than procrastinating and going to bed later than their intention. A study by Sirois et al. (2018) reported that higher levels of self-compassion is associated with lower levels of bedtime procrastination. Mindfulness has been shown to be related to attention control and emotion regulation (Neff, 2003; Valshtein et al., 2020), so it is likely that mindfulness could be an effective intervention for addressing bedtime procrastination (Teoh & Wang, 2023).

1.3.4. Bedtime Procrastination and Sleep Quality

Bedtime procrastination behavior is associated with insufficient sleep (Kroese et al., 2014; Kroese et al., 2016) and fewer hours of sleep (Herzog-Krzywoszanska &

Krzywoszanski, 2019) which in turn affects personal well-being (Kroese et al., 2014a). A pioneer meta-analysis that examined the relationship between bedtime procrastination and sleep outcomes suggests that bedtime procrastination is associated with inadequate sleep, low sleep quality, and shorter sleep duration (Hill et al., 2022). As previously stated, bedtime procrastination may be linked to factors such as chronotype and self-control, both of which can impact both psychological and physiological aspects of sleep quality (Ma et al., 2022). Ma et al. (2022) demonstrated that students who exhibit more bedtime procrastination behaviors are likely to have worse sleep quality. Also, their study revealed significant correlations between bedtime procrastination and subjective sleep quality, as well as sleep duration (Ma et al., 2022). Similarly, Kroese et al. (2014) showed that bedtime procrastination reduces sleep hours and leads to poor sleep quality. Overall, bedtime procrastination is associated with several negative sleep-related factors as well as lower self-control and evening chronotype (Hill et al., 2022).

1.4. Definition of Sleep and Sleep Quality

1.4.1. Conceptualization of Sleep

Sleep is a temporary state of reduced awareness and responsiveness to one's surroundings and external stimuli (Carskadon & Dement, 2005). In a similar vein, Chokroverty (2017) defined sleep in humans as a state where the consciousness of the external world diminishes. Lying down in a recumbent position, complete stillness, and closed eyes are usually characterized by typical indicators of sleep (Carskadon & Dement, 2005). Sleep is a crucial aspect of both physical and mental health, and is an essential phenomenon for daily activity for maintaining overall well-being (Şendir et al., 2007). The amount of time it takes to fall asleep, the duration of the sleep cycle, the overall duration of sleep, the consistency of sleep patterns, and the quality of sleep are features of sleep (Krystal & Edinger, 2008; Şendir et al., 2007). Sleep is divided into two categories: NREM and REM. NREM is further divided into four levels, starting with the lightest stage I and reaching the deepest stage IV, and REM represents the phase where one experiences dreaming (Kumar, 2008).

1.4.2. Sleep Quality

Rowe introduced the concept of sleep quality to the field of psychology in 1911. Rowe's study examined the connection between sleep, barometric conditions, mental work, emotional tone, and other factors. Rowe found that sleep quality, not quantity, is crucial when evaluating sleep's correlation with psycho-physical activities and environmental factors (1911). Despite being widely used in the literature, there is no standard or uniform understanding of what 'sleep quality' represents (Krystal & Edinger, 2008). Kline (2013) defined sleep quality in the Encyclopedia of Behavioral Medicine as a person's contentment with their sleep experience, which encompasses aspects like the ease of falling asleep, the duration of sleep, the ability to remain asleep, and the degree of awakening refreshment. Sleep quality encompasses both qualitative and quantitative features of sleep (Şendir et al., 2007). The length of sleep, sleep latency, and the number of times a person wakes up during sleep are quantitative aspects of sleep, while the perceived depth of sleep is a qualitative aspect of sleep (Buysse et al., 1988). Sleep quality is defined as the extent to which a person experiences a sense of refreshed energy, alertness, and preparedness for the coming day (Şendir et al., 2007). Pilcher et al. (1997) conceptualized sleep quality as a measure of how well a person sleeps, including factors such as the frequency of nighttime awakenings, the amount of time spent in deep sleep, and overall contentment with the sleep experience. The importance of sleep quality as a clinical concept might be attributed to the fact that it is frequently mentioned as a reason for concern and that it can be a major signal of a number of health issues (Buysse et al., 1988; Nelson et al., 2022) such as exhaustion (Chan, 2009), daytime dysfunction (Visvalingam et al., 2020), depression (Jaradat et al., 2019), and anxiety (Jaradat et al., 2019).

1.4.3. Sleep Quality and Mindfulness

Being mindful can help individuals to release negative thoughts or sensations which can help them to achieve a more relaxed state, leading to better sleep quality (Bogusch et al., 2016). Bogusch et al. (2016) suggested that mindfulness may help to reduce the symptoms of anxiety and depression which in turn can lead to improved sleep quality. Therefore, the indirect association between sleep quality and mindfulness can be attributed to the decrease in negative emotions that may disturb sleep. Individuals who are more mindful in general are more likely to experience better sleep quality and feel more energetic and alert in the morning (Howell et al., 2008). A study that examined the relationship between mindfulness, well-being, and different types of sleep

dysfunction found that as mindfulness and well-being increased, the incidence of sleep problems tended to decrease. Overall, mindfulness may play a protective role in promoting good sleep quality and reducing the risk of sleep problems (Howell et al., 2010). Also, individuals who are more predisposed to mindfulness tend to experience better sleep quality and greater vitality (Allen & Kiburz, 2011). According to Rusch et al. (2018), mindfulness meditation significantly improved sleep quality when compared with non-specific active controls in randomized controlled trials. Individuals who report higher levels of acting with awareness are more likely to experience fewer dysfunctional sleep beliefs and fewer sleep disturbances which could potentially lead to improved sleep (Garland et al., 2013). The act of non-judging, which involves adopting a non-evaluative approach to one's thoughts and emotions, may reduce dysfunctional sleep attitudes and beliefs leading to better sleep quality (Garland et al., 2013). Based on previous research, mindfulness has been linked to better sleep quality (Bogusch et al., 2016; Howell et al., 2010; Teoh & Wong, 2023).

1.5. Present Study

The aim of this study is to investigate the mediating roles of smartphone addiction and bedtime procrastination in the relationship between mindfulness and the sleep quality of adults. The hypotheses of the study are stated below:

Hypothesis 1: Higher levels of mindfulness are associated with better sleep quality.

Hypothesis 2: Higher levels of mindfulness are associated with lower levels of smartphone addiction.

Hypothesis 3: Smartphone addiction mediates the relationship between mindfulness and sleep quality.

Hypothesis 4: Higher levels of mindfulness are associated with lower levels of bedtime procrastination.

Hypothesis 5: Smartphone addiction and bedtime procrastination serially mediates the relationship between mindfulness and sleep quality.

Hypothesis 6: Bedtime procrastination mediates the relationship between mindfulness and sleep quality.

Hypothesis 7: Higher levels of smartphone addiction are associated with higher levels of bedtime procrastination

Along with the stated hypotheses, the present study also examined how demographic variables such as age and gender relate to study variables. The study investigated the relationship between variables such as night shift work, personal responsibilities, drug use that may impact sleep, and diagnosed mental illness with study variables.



2. METHOD

This section contains information about the participants, the data collection instruments and the statistical methods used in the analysis of the data, respectively.

2.1. Participants

Four-hundred-nine participants, over the age of 18, participated in this study via Google Forms. The data of 24 participants who did not respond in accordance with the expected form responses and had missing data were not included in the study. The final sample size was 385 after removing those participants' data. In the final sample size, 134 (34.8%) of the participants were men and 250 (64.9%) of them were women (one participant did not specify). The participants' ages ranged from 18 to 72 ($M = 35.64$, $SD = 14.20$; 2 participants did not report age). Three hundred sixty-three participants did not work the night shift in the past month while 22 worked the night shift. Three hundred forty-two out of 385 participants indicated that they did not take medication that might have an influence on their sleep. Thirty-one out of 385 participants stated that they had been diagnosed with a sleep disorder in the last 1 month. 172 participants stated that they had personal responsibilities that prevented them from sleeping in the last month. Thirty-six out of 385 participants stated that they had a diagnosed psychological disorder. Two of the participants were diagnosed with neurodevelopmental disorders (e.g., ADHD), twenty-two of the participants were diagnosed with anxiety disorders (e.g., panic disorder), seven of the participants were diagnosed with depressive disorders (e.g., major depressive disorder, and dysthymia), three of the participants were diagnosed with obsessive-compulsive and related disorders (e.g., obsessive-compulsive disorder), one of the participants was diagnosed with eating disorders (e.g., bulimia nervosa), one of the participants was diagnosed with bipolar disorder.

2.2. Data Collection Instruments

In the present study, participants were asked to fill demographic information form, Cognitive and Affective Mindfulness Scale-Revised (Feldman et al., 2007; Çatak, 2012), Smartphone Addiction Scale (Kwon et al., 2013; Demirci et al., 2014), Bedtime

Procrastination Scale (Kroese et al., 2014; Dinç et al., 2016) and Pittsburgh Sleep Quality Index (Buysse et al., 1989; Ağargün et al., 1996).

2.2.1. Demographic Information Form

A demographic information form was created by the researcher. Participants indicated their age and gender. In addition, participants were asked 5 questions that might have an effect on delayed sleep times and sleep quality. These questions included working night shifts, personal responsibilities, diagnosed sleep disorder, use of medication that can affect sleep and diagnosed mental illness.

2.2.2 Cognitive and Affective Mindfulness Scale (CAMS-R)

CAMS-R is a multidimensional self-report scale that assesses mindfulness comprehensively. The scale was developed by Feldman et al. (2007) and adapted into Turkish by Çatak (2012). CAMS-R assesses attention, focus on the present, awareness and acceptance dimensions of mindfulness. It is a short, practical instrument that is designed in daily language for individuals without any experience in mindfulness. The scale consists of 10 items rated on a 4-point Likert scale ranging from 1 being “Rarely/Not at all” to 4 being “Almost Always”. Calculating the sum of all items gives the CAMS-R overall score and higher scores indicate higher levels of mindfulness. The internal consistency coefficient for CAMS-R was 0.77 for the student sample and 0.73 for the community sample in the Turkish adaptation study (Çatak, 2012). The internal consistency of the 10-item CAMS-R was reported as 0.78 (Feldman et al., 2007). In the present study, a similar internal consistency coefficient was found (Cronbach’s alpha = 0.72).

2.2.3 Smartphone Addiction Scale

The Smartphone Addiction Scale (SAS) is a self-report scale developed by Kwon et al. (2013). The scale has been adapted to Turkish by Demirci et al. (2014) to determine addiction to smartphones in Turkish society. The scale consists of 33 self-report items ranging from 1 (definitely not), to 6 (absolutely yes). There is no cut-off point and as the score obtained from the scale increases the risk of smartphone addiction increases too. As a result of the factor analysis, a structure with 7 factors was obtained; (a) disturbing daily life and tolerance, (b) withdrawal symptoms, (c) positive

anticipation, (d) cyberspace-oriented relationships, (e) overuse, (f) social network dependence, (g) physical symptoms. A total score of the scale can also be calculated. Cronbach's alpha coefficient for the total score was found to be 0.95. Within the scope of the current study, we focused on the total score. The SAS is a brief scale that is simple for participants to understand and simple for practitioners to score and use. For the current study, the scale had a high Cronbach's alpha of 0.93.

2.2.4 Bedtime Procrastination Scale

The Bedtime Procrastination Scale (BPS) was developed by Kroese et al. (2014) to evaluate the propensity to postpone going to bed. The Bedtime Procrastination Scale was adapted to Turkish by Dinç et al. (2016). BPS consists of 9 self-report items scored on a 5-point Likert-type scale. Participants were asked to evaluate the scale ranging from 1 (totally against) to 5 (totally agreeable). Higher scores indicate higher levels of bedtime procrastination. The Cronbach internal consistency of the Turkish version was calculated to be 0.71. The internal consistency for BPS was found as 0.92 (Kroese et al., 2014). Similarly, in the present study, the internal consistency score was 0.90.

2.2.5 Pittsburgh Sleep Quality Index (PSQI)

Pittsburgh Sleep Quality Index was developed by Buysse et al. (1989) and adapted into Turkish by Ağargün et al. (1996). Pittsburgh Sleep Quality Index allows a reliable distinction between those with "good sleepers" and those with "poor sleepers". PSQI consists of 24 items, 19 of which are self-reported and 5 of which are answered by a roommate or spouse. Items that are answered by a spouse or a roommate are not included in the scoring and are only used for clinical purposes. The final self-report item about having a roommate or a spouse was also not included in the scoring. Self-report questions include 7 different components about sleep quality; (a) subjective sleep quality, (b) sleep latency, (c) sleep duration, (d) habitual sleep efficiency, (e) sleep disturbance, (f) use of sleep medication, (g) daytime dysfunction. Some of the components (subjective sleep quality, sleep duration and use of sleep medication) were specified by a single item, and some others (sleep latency, sleep efficiency, sleep disturbance and daytime dysfunction) were obtained by grouping several items. Each item is evaluated over 0-3 points and the sum of 7 components gives the overall PSQI

score range between 0-21. A high total score indicates “poor sleep quality”. Cronbach's alpha internal consistency coefficient was found to be 0.80 for the Turkish adaptation version. It is a valid and reliable scale that is easy to use for individuals, easy to interpret for clinicians, and can be used in sleep-related research and clinical evaluation of patients (Ağargün et al., 1996). The Cronbach alpha level for the original study was 0.83 (Buysse et al., 1989). The scale had a slightly lower Cronbach's alpha value (0.68) in the present study.

2.3. Procedure

The ethical permission for the present study was approved by Yeditepe University Human and Social Research Ethics Committee prior to data collection. Data collection was done through an online platform, Google Forms. Each participant was presented with an informed consent form and only those who approved the form were presented with the questions in the rest of the questionnaire. Participation in the study took an average of 15 minutes and the answers of the participants were collected anonymously. The study was announced via various platforms such as LinkedIn, WhatsApp and Instagram. The questionnaire was filled by people from different universities and workplaces. In addition, with the help of some academic staff it was delivered to different departments of some universities. The data was collected from December 2022 to January 2023. At the end of the study, a debriefing form including brief information about the study and a contact address for their comments and questions was presented to the participants.

2.4. Data Analysis

Data analyses were performed using The Statistical Package for Social Sciences (SPSS) 26 and PROCESS v4.2 (Hayes, 2017). Prior to conducting the main analyses, preliminary analyses such as normality analyses, reliability analyses, and descriptive statistics were performed. An inspection was conducted to determine the presence of any missing values in the data. Data from 24 participants were not included in the analysis because they did not follow the instructions. As a result, data from 385 participants were included in the analysis.

In addition to visual inspections, the values of skewness and kurtosis were used to evaluate the normality of the data.

For each measuring tool used in the present study, the values of skewness and kurtosis were within the range of -2 to +2. Pearson's Correlation analyses were conducted to determine the relationship between study variables (mindfulness, smartphone addiction, bedtime procrastination, and sleep quality), and descriptives statistics were listed. Independent samples *t*-test and correlation analysis were conducted to determine if demographic variables had an impact on the outcome variable. SPSS macro PROCESS version 4.2 (Hayes, 2022) model 6, (e.g., serial mediation analysis) was used to perform hypotheses testing.

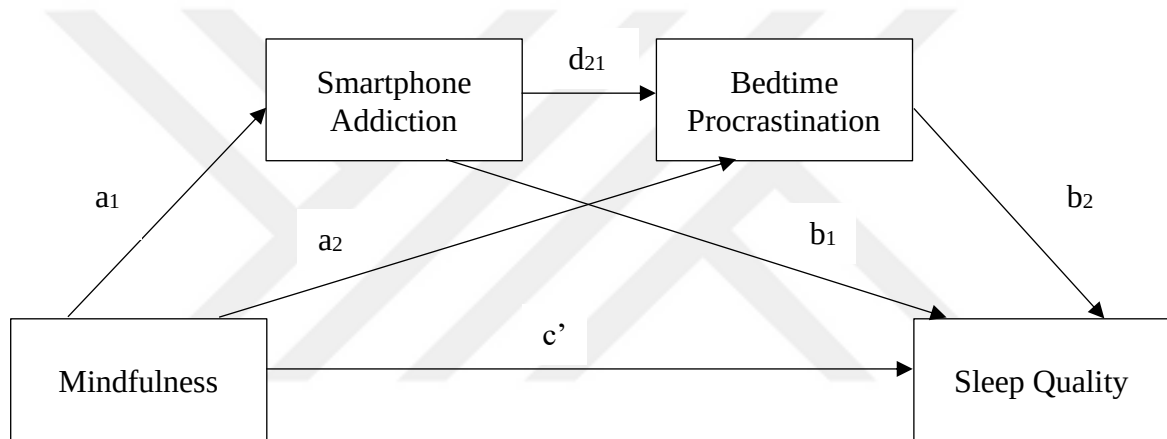


Figure 1. *The serial mediation model used in the current study (Hayes, 2022)*

3. RESULTS

3.1. Descriptive Statistics and Correlations of the Study Variables

Means, standard deviations, skewness, and kurtosis values of the study variables were examined. Findings were given in Table 1.

Table 1

Descriptive Statistics of the Study Variables

Study Variables	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
CAMS-R	28.18	4.74	-.120	.081
SAS	83.65	24.82	.391	-.207
BPS	25.38	8.27	.026	-.808
PSQI	6.60	3.18	.430	-.349

Note. CAMS-R: Cognitive and Affective Mindfulness Scale-Revised; SAS: Smartphone Addiction Scale; BPS: Bedtime Procrastination Scale; PSQI: Pittsburgh Sleep Quality Index

To determine the association between mindfulness, smartphone addiction, bedtime procrastination and sleep quality Pearson's correlation analyses were conducted. Table 2 shows the correlation between study variables. The results indicate a significant negative relationship between mindfulness and smartphone addiction, mindfulness and bedtime procrastination, and mindfulness and poor sleep quality. In contrast, there was a significant positive relationship between smartphone addiction and bedtime procrastination, smartphone addiction and poor sleep quality, and bedtime procrastination and poor sleep quality.

Table 2

Correlation Coefficients of the Association Among Study Variables

Study Variables	Mindfulness	SA	BeP	Sleep quality
Mindfulness	-			

SA	-.333**	-		
BeP	-.323**	.321**	-	
Sleep quality	-.277**	.288**	.513**	-

Note. SA = Smartphone addiction; BeP = Bedtime procrastination. Higher scores in sleep quality represent lower sleep quality.

** . Correlation is significant at the 0.01 level (2-tailed).

To investigate the association of demographic variables and the outcome measure, sleep quality, independent sample *t*-tests and correlation analyses were carried out. Among these variables, those that had a significant effect on sleep quality were included in the study as a covariate in the main analysis (c.f. Teoh & Wong, 2023). The findings showed that the quality of sleep was lower among participants who had responsibilities that could potentially affect their sleep, those who were diagnosed with sleep disorders, and those who were taking medication that could interfere with their sleep, as opposed to those who did not face such obligations or issues. Also, women tended to have poorer sleep quality than men. Additionally, a correlation analysis between age and sleep quality showed a significant correlation. Therefore, the variables stated above were controlled as covariates in the main analyses. The results of the independent sample *t*-test were listed in Table 3.

Table 3

The Descriptive Statistics and Effects of Demographic Variables on Sleep Quality

Demographic Variables		Yes	No	<i>t</i> value
Worked night shifts in the past month	<i>n</i>	22	363	-1.369
	<i>M</i>	7.50	6.54	
	<i>SD</i>	3.349	3.175	
Have personal responsibilities that prevent sleeping in the past month	<i>n</i>	172	213	-6.922***
	<i>M</i>	7.78	5.64	
	<i>SD</i>	3.153	2.890	

Diagnosed with any sleep disorder in the past month	n <i>M</i> <i>SD</i>	29 8.59 3.224	356 6.44 3.135	-3.545***
Use of medication in the past month that could affect sleep	n <i>M</i> <i>SD</i>	43 9.40 3.382	342 6.25 2.988	-6.416***
Diagnosed with a mental illness	n <i>M</i> <i>SD</i>	36 7.56 3.410	349 6.50 3.154	-1.900
Demographic Variable		Women	Men	<i>t</i> value
Gender	n <i>M</i> <i>SD</i>	250 6.93 3.202	134 5.98 3.094	2.805*

Note. * $p < .05$, *** $p < .001$, Higher scores in sleep quality represent lower sleep quality.

3.2. Mediation Analysis

In order to examine the mediating role of smartphone addiction and bedtime procrastination between the relationship of mindfulness and sleep quality a serial mediation analysis was performed. The independent variable for this analysis was mindfulness, while the dependent variable was sleep quality. The mediators were identified as smartphone addiction and bedtime procrastination respectively. The significance of the mediating variables was determined by 10000 bootstrap samples and a 95% confidence interval. The serial mediation model and regression coefficients were given in Figure 1.

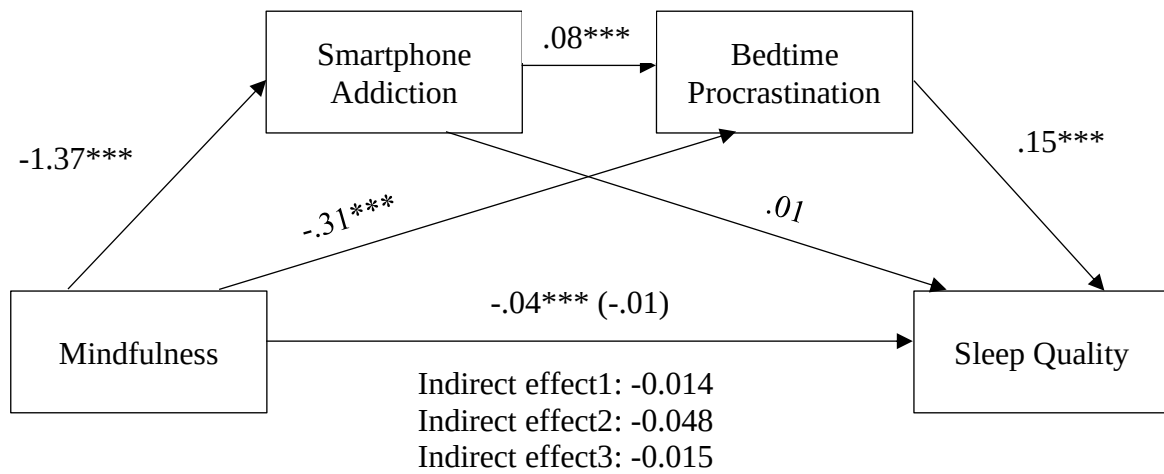


Figure 2. The serial mediation effect of smartphone addiction and bedtime procrastination in the relationship between mindfulness and sleep quality. The regression coefficients displayed are unstandardized and have been rounded up to two decimal places. The values between mindfulness and sleep quality are the total effect (given in parenthesis) and the direct effect. * $p < .05$, ** $p < 0.01$, *** $p < .001$. Higher scores in sleep quality represent lower sleep quality.

Table 4

Indirect Effect(s) of Mindfulness on Sleep Quality

	Effect	Boot SE	BootLLCI	BootULCI
Total:	-.078	.018	-.114	-.044
Ind1:	-.014	.009	-.032	.001
Ind2:	-.0481	.015	-.080	-.019
Ind3:	-.015	0.005	-.026	-.007

Note. Total = total indirect effect; Ind1= mindfulness > smartphone addiction > sleep quality; Ind2 = mindfulness > bedtime procrastination > sleep quality; Ind3 = mindfulness > smartphone addiction > bedtime procrastination > sleep quality.

SPSS macro PROCESS version 4.2 (Hayes, 2022) model 6, (e.g., serial mediation analysis) was used to perform hypotheses testing. According to the serial mediation analysis results, the first outcome variable is smartphone addiction. Mindfulness significantly predicted

lower levels of smartphone addiction ($b = -1.372$, $t = -5.194$, $p < 0.001$). Additionally, mindfulness predicted lower levels of bedtime procrastination ($b = -0.311$, $t = -3.493$, $p < 0.001$). Smartphone addiction significantly predicted bedtime procrastination ($b = 0.073$, $t = 0.016$, $p < 0.001$). However, the effect of smartphone addiction on sleep quality was not significant, so smartphone addiction did not significantly predict sleep quality ($b = 0.106$, $t = 1.866$, $p = 0.627$). Bedtime procrastination significantly predicted poor sleep quality ($b = 0.154$, $t = 9.064$, $p < 0.001$). Mindfulness, as the predictor in the current study, significantly predicted better sleep quality, $b = -0.112$, $t = -3.539$, $p = 0.0005$).

The indirect effect through smartphone addiction as the sole mediator on the relationship between mindfulness and sleep quality, the mediation effect was not statistically significant, indirect effect = -0.014 , $CI [-0.032, 0.001]$. When considering bedtime procrastination as the sole mediator, the indirect effect through bedtime procrastination was statistically significant, indirect effect = -0.048 , $CI [-0.080, -0.019]$. When both smartphone addiction and bedtime procrastination were considered as mediators, they significantly, sequentially mediated the relationship between mindfulness and sleep quality, indirect effect = -0.015 , $CI [-0.026, -0.007]$.

The direct effect of mindfulness on sleep quality was not statistically significant in the present study ($b = -0.034$, $t = -1.150$, $p = 0.250$), fulfilling the criteria of a full mediation (Mathieu & Taylor, 2006).

4. DISCUSSION

The main findings of the current research will be covered in this section, together with its theoretical and practical implications, and limitations, and provide recommendations for future studies.

4.1. Summary of Key Findings

In the current study, it was aimed to examine how smartphone addiction and bedtime procrastination contribute to explaining the relationship between mindfulness and sleep quality. There were three pathways underlying the association between mindfulness and sleep quality: one pathway involved smartphone addiction only, the second pathway involved bedtime procrastination only, while the last one involved both smartphone addiction and bedtime procrastination as mediators. The hypotheses received partial support from the results of serial mediation analysis.

Firstly, when the covariates were taken into account, it was found that mindfulness was associated with lower levels of both smartphone addiction and bedtime procrastination. A higher level of smartphone addiction was associated with a higher level of bedtime procrastination. The findings revealed that, while bedtime procrastination was a significant predictor between mindfulness and sleep quality, smartphone addiction was not a significant predictor of the relationship between mindfulness and sleep quality, suggesting that mindfulness improves sleep quality by decreasing bedtime procrastination. Lower levels of mindfulness predicted increased smartphone addiction, which in turn was linked to greater bedtime procrastination, and consequently lower levels of sleep quality. Finally, the direct effect of mindfulness on sleep quality was not statistically significant implicating that smartphone addiction and bedtime procrastination fully mediated the relationship between mindfulness and sleep quality.

4.2. Discussion of Demographic Data

In the current study, it was found that women experience poorer sleep quality compared to men. Looking at the literature, there were many studies investigating why women may experience lower sleep quality than men. The differential effect of gender on sleep quality has been associated with menopausal status (Shaver et al., 1988), and hormonal changes during menstrual cycles (Baker & Driver, 2007; Krishnan & Collop,

2006). Another potential factor that may contribute to poorer sleep quality in women was proposed as circadian timing since it was found that, on average, women may naturally have a tendency to go to bed and wake up earlier than men (Middelkoop et al., 1996; Mong & Cusmano, 2016).

Age was found to be significantly correlated with sleep quality. The quality of sleep tends to decrease with age. The findings are parallel with previous research in the literature (Gadie et al., 2017; Madrid-Valero et al., 2017; Marquié & Foret, 1999). Decreased total sleep time with aging, waking frequently during sleep, and waking earlier than before may be associated with the effect of physiological changes in old age on sleep quality (Kim et al., 2021). Another explanation for the decreased sleep quality with age may be due to the higher prevalence of diseases (such as heart diseases, cancer, and lung diseases) that may have an impact on sleep quality with age (Kim et al., 2021; Miner & Kryger, 2017).

4.3. The Relationship Between Mindfulness and Sleep Quality

In the present study, it was hypothesized that higher levels of mindfulness would be associated with better sleep quality. The results of the study supported the hypothesis and as mindfulness increased sleep quality tended to increase too. The association between mindfulness and sleep quality in the current study is consistent with the findings reported in the existing literature (Bogusch et al., 2016; Ding et al., 2020; Howell et al., 2008; Murphy et al., 2012; Roberts & Danoff-Burg, 2010; Talley & Shelley-Tremblay, 2020; Teoh & Wong, 2023). Daytime dysfunction refers to issues that occur throughout the day as a result of poor sleep, which is a component of sleep quality (Buysse et al., 1989). Mindfulness has the potential to reduce daytime dysfunction and improve this component of sleep quality as well as the overall quality of sleep one experiences (Visser et al., 2015). For example, Visser et al. (2015) stated that mindfulness can also have an impact on a person's overall sleep quality, as it can promote falling asleep and staying asleep. Mindfulness also increases people's physical and mental awareness, and these people can more easily notice signs of fatigue or sleepiness. Parallel to this increased awareness, the tendency to regulate sleep habits in line with these signals might increase (Howell et al., 2008). Being aware of the present can allow individuals to observe physical and psychological processes without trying to control them, leading to improved relaxation and further contributing to better sleep (Talley & Shelley-Tremblay, 2020). Being more mindful of the present could help with

the problems experienced during the day caused by poor sleep, like struggling to focus during daily activities. Mindfulness contributes to psychological flexibility by accepting what is happening at the moment without judgment, thereby reducing sleep disturbances and improving overall sleep quality through the resultant increase in flexibility (Talley & Shelley-Tremblay, 2020).

4.4 The Relationship Between Smartphone Addiction and Bedtime Procrastination

Behavioral addictions, such as smartphone addiction, are related to physical factors along with social and psychological factors. Official diagnostic criteria for smartphone addiction have not yet been developed. However, it has been considered as smartphone addiction when excessive use of the device interferes with people's daily life (Demirci et al., 2015). Even though smartphone addiction is not officially accepted as an addiction disorder, compulsive and problematic patterns of use, and inability to effectively manage the use of the device define criteria of addiction (Lin et al., 2014). For individuals with high levels of smartphone addiction, regulating and controlling this compulsive use might be challenging even in bed (Zhang & Wu, 2020). Even though smartphone overuse and typical procrastination have been studied in the literature, there is very little research about smartphone addiction and bedtime procrastination. In the present study, it has been hypothesized that higher levels of smartphone addiction would be associated with higher levels of bedtime procrastination. Findings supported this hypothesis and a significant positive relationship between smartphone addiction and bedtime procrastination has been found.

4.5. The Mediating Role of Smartphone Addiction in the Relationship Between Mindfulness and Sleep Quality

In the present study, it was hypothesized that smartphone addiction will mediate the relationship between mindfulness and sleep quality. However, when considered as the sole mediator, smartphone addiction could not significantly explain the relationship between mindfulness and sleep quality. In the literature, there are not many studies investigating the effects of mindfulness on smartphone addiction (Cheng et al., 2020). In their study, Cheng et al. (2020) found that as mindfulness increases, smartphone addiction before going to sleep at night decreases. However, their study only measured smartphone addiction before sleep, and unlike the current study, the study was conducted only with university students. Kim and colleagues (2018) have stated that

mindlessness during smartphone use can have a detrimental effect on addiction to the device and this mindless engagement can lead to a cycle where it becomes challenging to break from the unhealthy habit of use. However, the measurement tools used to assess mindfulness and smartphone addiction in their study are different from those used in the current study. Liu et al. (2017) assessed mindfulness as a moderator in the relationship between mobile phone addiction and sleep quality. Participants were recruited from only one high school, which may not be generalizable to a broader population. Regan et al. (2020) suggested that mindfulness can be a protective factor against problematic phone use through boredom proneness. Studies that were conducted to evaluate smartphone addiction used diverse methods and self-report measures, which might create biases or inconsistencies among the results of different studies (Panova & Carnobell, 2018). Also, the majority of the studies that have been conducted done with college students and young adults (Ataş & Çelik, 2019; Demirci et al., 2015; Haug et al., 2015; Pera, 2020; Sohn et al., 2021; Thomée et al., 2011; Wacks & Weinstein, 2021). However, studies about older adults' smartphone usage patterns are relatively limited (Busch et al., 2021). Although smartphones are being used extensively by the elderly, it has not been studied to what extent this usage is problematic or addictive (Busch et al., 2021). In the present study the participants' ages ranged from 18 to 72 and the mean age was found to be 35.64. Elderly and young individuals differ from each other in their relationship with technology, the younger generation was born into technology and the elderly adapted what technology brought to their lives. A study conducted by Busch et al. (2021) was the first study to examine the indicators and problematic smartphone use among older adults. Their study findings revealed that due to older adults' lifestyles that differ from the younger generation, different approaches might be taken into account while examining their relationship with technology. Therefore, the normal amount of smartphone use may vary by age and usage patterns. Busch et al. (2021) further suggested that each age group requires a different definition of the amount of smartphone usage and what is considered typical or normal for one age group may not be the same for another making it challenging to compare the amount of usage between different age groups. Additionally, smartphone applications that were designed for mindfulness practices enables users to easily integrate mindfulness-related activities into their daily lives. As a result, there may be an increase as individuals use their smartphones to access these applications while cultivating mindfulness (Kim et al.,

2018). Future studies can also focus on this issue by assessing the content of mobile phone use.

4.6. The Mediating Role of Bedtime Procrastination in the Relationship Between Mindfulness and Sleep Quality

The current study proposed that bedtime procrastination would mediate the relationship between mindfulness and sleep quality. Findings indicated that mindfulness predicted lower levels of bedtime procrastination which was in turn related to increased sleep quality. Therefore, the proposed hypothesis was supported. Since going to bed is a decision that must be made at the end of the day, it can be considered different than other types of procrastination that are not dependent on any time. People may have lower levels of self-control strength toward the end of the day because they might have used their self-control resources during the day while making other decisions that might need self-control (Kroese et al., 2014). It has been stated that bedtime procrastination is a construct that is linked to self-regulation (Kroese et al., 2014). A qualitative study conducted by Nauts and colleagues (2019) classified the answers participants gave for the reasons why they procrastinate their intended bedtime. The majority of the participants indicated that they were not aware of how much time had passed since their planned bedtime. Nauts et al. (2019) classified this type of procrastination as mindless procrastination. Mindfulness helps individuals to regulate and focus their attention by strengthening their executive control of attention. As a result, mindful individuals can keep track of their planned bedtimes, shift their attention from distractions that may interfere with sleep, and focus their attention on their bedtime routines (Teoh & Wong, 2023). Based on the literature, mindfulness is also a component of self-compassion, which emphasizes avoiding excessive identification with emotions such as shame and guilt (Neff, 2003; Sirois et al., 2018). Sirois et al. (2018) found that self-compassionate individuals were less likely to procrastinate their bedtime which suggests that going to bed on time could be self-compassion practice ensuring that one gets adequate sleep. Consistent with the present study's findings, bedtime procrastination has been linked to poor sleep outcomes in previous studies (Herzog-Krzywoszanska & Krzywoszanski, 2019; Hill et al., 2022; Kroese et al., 2014; Ma et al., 2022; Teoh & Wong, 2023). When individuals go to bed later than they intended, they might create pressure on themselves to rapidly fall into sleep in order to attain sufficient sleep. However, the pressure to sleep fast can lead to stress, and as a result of this stressful state, sleep quality can decrease,

which may explain the relationship between procrastinating bedtime and reduced sleep quality (Cui et al., 2021).

4.7. The Mediating Roles of Smartphone Addiction and Bedtime Procrastination in the Relationship Between Mindfulness and Sleep Quality

As hypothesized, the findings of this study revealed that the effect of mindfulness on sleep quality was completely mediated by smartphone addiction and bedtime procrastination. In other words, mindfulness significantly predicted lower levels of smartphone addiction and bedtime procrastination. Subsequently, lower levels of bedtime procrastination predicted better sleep quality. Mindfulness refers to the awareness that arises in-the-moment without judging or trying to the experiences (Kabat-Zinn, 2003). Therefore, mindfulness has been suggested as a self-regulation process (Hölzel et al., 2011). Mindfulness practice can lessen the negative effects of smartphone addiction on sleep quality, while reducing withdrawal symptoms and also controlling the emotional discomfort that is frequently associated with smartphone addiction (Cheng et al., 2020; Liu et al., 2017). As stated before, mindfulness provides awareness of patterns of automatic thoughts, behaviors, and thoughts that might be harmful (Brown & Ryan, 2013). This heightened awareness could be helpful for individuals to take distance from themselves and gain new perspectives. Changing one's smartphone usage habits might depend on improving awareness (Kim et al., 2018). Aalbers et al. (2022) found that higher levels of smartphone usage are associated with higher levels of procrastination. It might be challenging for the individuals with higher levels of smartphone addiction to stop using the devices or regulate their distractions, such as checking social media, leading to delays in bedtime (Zhang & Wu, 2020). Based on the findings of the present study, individuals with higher levels of mindfulness are less likely to be addicted to their smartphones and procrastinate going to bed, resulting in a greater likelihood of putting off their devices before bedtime and going to bed as planned which in turn leads to greater sleep quality. Even though there were studies suggesting that mindfulness can overcome addiction (Brewer et al., 2011), there is no empirical evidence to support whether it could be a potential treatment or not (Kim et al., 2018).

4.8. Limitations of the Present Study and Directions for Future Research

Along with its theoretical and practical implications, it is important to consider a number of limitations when interpreting the findings of the present study. First, the present study was designed as a correlational study. It showed correlations among study variables, but it did not assess causality between mindfulness affects smartphone addiction, bedtime procrastination, and sleep quality. Therefore, future studies may be designed to measure impacts the of mindfulness on these variables by manipulating mindfulness with a longitudinal design. Second, the measurements used in the study were based on self-reporting. Even though self-report questionnaires offer practical and conceptual advantages, participants might respond to them biased while reporting their experiences, emotions, or behaviors (Rosenman et al., 2011). Therefore, future studies can assess both qualitative and quantitative measures while measuring these variables. Third, smartphone addiction has been conceptualized as an addiction, however there is an ongoing debate about whether it should be addressed as an addiction or not. Future studies can be conducted on contributing factors to excessive smartphone use. Fourth, as it is closely related to the research variables, the anxiety levels of the participants can be controlled in future studies. Fifth, in the current study, participants were asked whether they used any medication that could affect their sleep. Since the type of drug used may have different results, future studies may ask the participants about the type of drug they use and for what purpose they are used. Sixth, the study may have had sample bias, as individuals with sleep-related issues may have had a greater likelihood of participating in the study.

4.9. Conclusion and Clinical Implications

To conclude, the present study was conducted to expand the understanding between mindfulness and sleep quality by considering the mediating roles of smartphone addiction and bedtime procrastination. It was found that smarphone addiction and bedtime procrastination sequentially mediated the relationship between mindfulness and sleep quality. Also, results indicated that smartphone addiction alone did not significantly mediate the relationship between mindfulness and sleep quality. The present study suggests that being more mindful may reduce smartphone addiction and bedtime procrastination and in turn, lead to better sleep quality. In addition to studies that examined sleep disorders and external factors that could affect sleep quality, the present study focused on how one's behavior, their tendency to procrastinate going to bed, might play a role in their sleep quality. Mindfulness could be an effective

psychotherapy tool while addressing poor sleep quality by reducing smartphone addiction and bedtime procrastination. By integrating mindfulness intervention into psychotherapy, clinicians may be able to enhance individuals' sleep outcomes and overall well-being. Roberts and Danoff-Burg (2010) stated that mindfulness plays a positive role in both psychological and physical health-related behaviors. To sum up, for individuals to adopt healthy behaviors to attain the best possible health outcomes, the integration of mindfulness-based therapies into psychotherapy practices can be a helpful way to enhance overall health and well-being.



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Appendix A: Informed Consent Form

Sayın Katılımcı;

Bu araştırma Yeditepe Üniversitesi Klinik Psikoloji Yüksek Lisans Programı bünyesinde Dr. Öğretim Üyesi Berna Sarı danışmanlığında Klinik Psikoloji Yüksek Lisans öğrencisi Gökçe Keleş tarafından yürütülmektedir. Çalışmaya katılıp katılmama kararı tamamen size aittir. Katılmak isteyip istemediğinize karar vermeden önce araştırmanın neden yapıldığını, bilgilerinizin nasıl kullanılacağını, çalışmanın neleri içerdiğini, olası yararları ve risklerini ya da rahatsızlık verebilecek yönlerini anlamanız önemlidir. Lütfen aşağıdaki bilgileri dikkatlice okumak için zaman ayırınız. Çalışmaya katılmamakta veya çalışmadan herhangi bir zamanda ayrılmakta özgürsünüz. Çalışmaya katıldığınız için size herhangi bir ödeme yapılmayacak ya da sizden herhangi bir maddi katkı istenmeyecektir.

ÇALIŞMANIN KONUSU VE AMACI: Araştırmanın amacı uyku ve uyku sürecine ilişkisi olabilecek mekanizmaları (örneğin; telefon kullanımı, yatma saati, farkındalık) incelemektedir.

ÇALIŞMA İŞLEMLERİ: Çalışma kapsamında sizden dört adet ölçek doldurmanız ve bazı demografik bilgiler vermeniz istenecektir. Lütfen ölçeğin başındaki yönergeyi dikkatle okuyunuz ve sorulara sizi en iyi şekilde ifade eden cevabı vermeye çalışınız. Bu prosedürün yaklaşık 15 dakika sürmesi beklenmektedir.

ÇALIŞMAYA KATILMAMIN OLASI YARARLARI VE RİSKLERİ NELERDİR?

Çalışmaya katılmanız durumunda literatüre bu konu hakkında destek sağlayarak veri eklememize yardımcı olacaksınız. Çalışmanın öngörülen bir riski yoktur. Bu ölçüm araçlarını kullanan diğer çalışmalarda herhangi bir olumsuz etki rapor edilmemiştir. Ancak katılım sırasında herhangi bir rahatsızlık hissederseniz çalışmadan istediğiniz zaman ayrılabilirsiniz ya da çalışmaya hiç katılmayabilirsiniz.

KİŞİSEL BİLGİLERİM NASIL KULLANILACAK?

Çalışma dahilinde kimlik bilgileriniz toplanmayacaktır. Sağladığınız diğer veriler yalnızca araştırma dâhilinde kullanılacaktır. Elde edilecek bilgiler araştırmacılar tarafından toplu halde değerlendirilecek ve bilimsel yayımlarda rapor edilmek için kullanılacaktır.

SORU VE PROBLEMLER İÇİN BAŞVURULACAK KİŞİLER :

Çalışma hakkında daha fazla bilgi almak isterseniz araştırmacı ile iletişime geçebilirsiniz:

Çalışmaya Katılma Onayı

Bu bilgilendirilmiş olur belgesini okudum ve anladım. Bu araştırmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman çalışmayı yarıda bırakabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlar için kullanılmasını kabul ediyorum.

Appendix B: Demographic Information Form

1) Yaşınız: _____

2) Cinsiyetiniz:

- Kadın
- Erkek
- Diğer

3) Geçen ay gece vardiyasında çalıştınız mı?

- Evet
- Hayır

4) Son bir ayda uyumanızı engelleyen kişisel sorumluluklarınız var mı?

- Evet
- Hayır

5) Son bir ay içinde herhangi bir uyku bozukluğu tanısı aldınız mı?

- Evet
- Hayır

6) Son bir ay içinde uykunuzu etkileyebilecek herhangi bir ilaç kullandınız mı?

- Evet
- Hayır

7) Tanı almış bir psikolojik hastalığınız var mı? Varsa belirtiniz:

Appendix C: Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)

Lütfen her maddeye her satırda bir kutu işaretleyerek yanıt verin.	Çoğunlukla Katılmıyorum	Katılmıyorum	Katılıyorum	Çoğunlukla Katılıyorum
1- Yaptığım şeye odaklanmak benim için kolaydır.	1	2	3	4
2- Duygusal acıya tahammül edebilirim.	1	2	3	4
3- Değiştiremediğim şeyleri kabullenebiliyorum.	1	2	3	4
4- O anda nasıl hissettiğimi genelde oldukça detaylı tarif edebilirim.	1	2	3	4
5- Dikkatim kolaylıkla dağılır.	1	2	3	4
6- Düşüncelerimi ve duygularımı takip etmek benim için kolaydır.	1	2	3	4
7- Düşüncelerimi yargılamadan onların farkına varmaya çalışırım.	1	2	3	4
8- Sahip olduğum düşünce ve duyguları kabullenebiliyorum.	1	2	3	4
9- Şimdiki ana odaklanabilirim.	1	2	3	4
10- Uzun süre boyunca dikkatimi tek bir şeye verebilirim.	1	2	3	4

Appendix D: Smartphone Addiction Scale (SAS)

Her bir ifadenin sizin için ne kadar geçerli olduğunu aşağıdaki derecelendirmeyi kullanarak belirtiniz.	Kesinlikle Hayır	Hayır	Kesinlikle Hayır	Kısmen Evet	Evet	Kesinlikle Evet
1- Akıllı telefon kullanımım sebebiyle planlanmış işlerimi yetiştiremiyorum.						
2- Akıllı telefon kullanımım sebebiyle sınıfta, ödev yaparken veya çalışırken konsantre olmakta güçlük çekiyorum.	1	2	3	4	5	6
3- Aşırı akıllı telefon kullanımına bağlı baş dönmesi ya da bulanık görme yaşıyorum.	1	2	3	4	5	6
4- Akıllı telefon kullanırken bileklerimde ya da boynumun arkasında ağrı hissediyorum.	1	2	3	4	5	6
5- Aşırı akıllı telefon kullanımı sebebiyle yeterli uykumu alamıyorum ve kendimi yorgun hissediyorum.	1	2	3	4	5	6
6- Akıllı telefon kullanırken sakinleşiyor ve rahatlıyorum.	1	2	3	4	5	6
7- Akıllı telefon kullanırken kendimi keyifli ve coşkulu hissediyorum.	1	2	3	4	5	6
8- Akıllı telefon kullanırken kendimi güvende hissediyorum.	1	2	3	4	5	6
9- Akıllı telefon ile stresten kurtulmak mümkündür.	1	2	3	4	5	6
10- Akıllı telefon kullanmaktan daha eğlenceli bir şey yoktur.	1	2	3	4	5	6
11- Akıllı telefonum olmazsa hayatım bomboş olur.	1	2	3	4	5	6
12- Kendimi en çok akıllı telefon kullanırken özgür hissediyorum.	1	2	3	4	5	6
13- Akıllı telefon kullanmak hayatımdaki en eğlenceli şeydir.	1	2	3	4	5	6
14- Akıllı telefonumun olmamasına dayanamam.	1	2	3	4	5	6
15- Akıllı telefonum elimde değilken kendimi sabırsız ve sinirli hissediyorum.	1	2	3	4	5	6
16- Kullanmadığım zamanlarda bile aklımda akıllı telefonum var.	1	2	3	4	5	6
17- Günlük hayatımı büyük ölçüde etkilese bile akıllı telefonumu kullanmaktan asla vazgeçmem.	1	2	3	4	5	6
18- Akıllı telefonumla meşgul iken rahatsız edilmek beni sinirlendirir.	1	2	3	4	5	6
19- Tuvalete acilen gitmek zorunda olsam bile akıllı telefonumu yanıma alırım.	1	2	3	4	5	6
20- Akıllı telefon aracılığıyla daha fazla insanla tanışmak harika bir duygudur.	1	2	3	4	5	6
21- Akıllı telefondaki arkadaşlarımla olan ilişkilerimin gerçek yaşamdaki arkadaşlarımla olan ilişkilerimden daha samimi olduğunu düşünüyorum.	1	2	3	4	5	6
22- Akıllı telefonumu kullanmamak bir arkadaşımı kaybetmek kadar acı verici olabilir.	1	2	3	4	5	6
23- Akıllı telefonumdaki arkadaşlarımla, gerçek hayattaki arkadaşlarıma göre beni daha iyi anladıklarını düşünüyorum.	1	2	3	4	5	6
24- İnsanların Twitter ya da Facebook'taki konuşmalarını kaçırmamak için akıllı telefonumu sürekli kontrol ederim.	1	2	3	4	5	6
25- Twitter ya da Facebook gibi sosyal ağları uyanır uyanmaz kontrol ederim.	1	2	3	4	5	6
26- Akıllı telefondaki arkadaşlarımla zaman geçirmeyi gerçek yaşamdaki arkadaşlarımla ya da diğer aile bireyleriyle zaman geçirmeye tercih	1	2	3	4	5	6

ediyorum.						
27- Diğer insanlara sormaktansa akıllı telefonumdan araştırmayı tercih ederim.	1	2	3	4	5	6
28- Akıllı telefonumun bataryası tam doluyken bile bir gün gitmez.	1	2	3	4	5	6
29- Akıllı telefonumu planladığımdan daha fazla kullanıyorum.	1	2	3	4	5	6
30- Akıllı telefonumu kullanmayı bıraktıktan hemen sonra yine kullanma ihtiyacı hissediyorum.	1	2	3	4	5	6
31- Akıllı telefonumu kullanma süremi kısaltmayı defalarca denedim fakat her defasında başarısız oldum.	1	2	3	4	5	6
32- Akıllı telefon kullanma süremi kısaltmam gerektiğini hep düşünüyorum.	1	2	3	4	5	6
33- Çevremdeki insanlar akıllı telefonumu çok fazla kullandığını söylüyorlar.	1	2	3	4	5	6



Appendix E: Pittsburgh Sleep Quality Index (PSQI)

Aşağıdaki sorulara vereceğiniz cevaplar için son bir ayı göz önünde bulundurun.

Lütfen tüm soruları cevaplandırın.

1) Geçen ay geceleri genellikle ne zaman yattınız?

2) Geçen ay geceleri uykuya dalmanız genellikle ne kadar zaman (dakika) aldı?

3) Geçen ay sabahları genellikle ne zaman kalktınız?

4) Geçen ay geceleri kaç saat uyudunuz? (bu süre yatakta geçirdiğiniz süreden farklı olabilir)

5) Geçen ay aşağıdaki durumlarda belirtilen uyku problemlerini ne sıklıkla yaşadınız? (Haftada)

a) 30 dakika içinde uykuya dalamadınız

- ☐ Hiç
- ☐ 1'den az
- ☐ 1-2 kez
- ☐ 3'ten çok

b) Gece yarısı veya sabah erkenden uyandınız

- ☐ Hiç
- ☐ 1'den az
- ☐ 1-2 kez

- 3'ten çok

c) Tuvalete gittiniz

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

d) Rahat bir şekilde nefes alıp veremediniz

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

e) Aşırı derecede üşüdünüz

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

f) Aşırı derecede sıcaklık hissettiniz

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

g) Kötü rüyalar gördünüz

- Hiç
- 1'den az
- 1-2 kez

- 3'ten çok

h) Ağrı duydunuz

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

i) Diğer nedenler

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

j) Öksürdünüz veya gürültülü bir şekilde horladınız

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

6) Geçen ay uyku kalitenizi bütünü ile nasıl değerlendirirsiniz

- Çok iyi
- Oldukça iyi
- Oldukça kötü
- Çok kötü

7) Geçen ay uyumanıza yardımcı olması için ne sıklıkta (reçeteli veya reçetesiz) uyku ilacı aldınız?

- Hiç
- Haftada 1'den az

- Haftada 1-2 kez
- Haftada 3'ten çok

8) Geçen ay araba sürerken, yemek yerken veya sosyal bir aktivite esnasında ne sıklıkla uyanık kalmak için zorlandınız?

- Hiç
- Haftada 1'den az
- Haftada 1-2 kez
- Haftada 3'ten çok

9) Geçen ay bu durum işlerinizi yeteri kadar istekle yapmanızda ne derece problem oluşturdu?

- Hiç problem oluşturmadı
- Yalnızca çok az bir problem oluşturdu
- Bir dereceye kadar problem oluşturdu
- Çok büyük bir problem oluşturdu

10) Bir yatak partneriniz veya oda arkadaşınız var mı?

- Bir partneri veya oda arkadaşı yok
- Diğer odada bir partneri veya oda arkadaşı var
- Partneri aynı odada fakat aynı yatakta değil
- Partneri aynı yatakta

11) Eğer bir oda arkadaşı veya yatak partneriniz varsa son bir ayda ona aşağıdaki durumları ne sıklıkla yaşadığınızı sorun. (Haftada)

a) Gürültülü horlama

- Hiç
- 1'den az
- 1-2 kez

- 3'ten çok

b) Uykuda nefes alıp verme arasında uzun aralıklar

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

c) Uyurken bacaklarda seğirme veya sıçrama

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

d) Uyku esnasında uyumsuzluk veya şaşkınlık

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

e) Diğer huzursuzluklarınız

- Hiç
- 1'den az
- 1-2 kez
- 3'ten çok

Appendix F: Ethical Committee Approval Form



T.C.
YEDİTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ

31.10.2022

Sayı : E.50532705-302.14.01-1380
Konu : Gökçe Keleş Kurul Onayı

İLGİLİ MAKAMA

Üniversitemiz Sosyal Bilimler Enstitüsü Klinik Psikoloji Bölümü Yüksek Lisans Öğrencilerinden Gökçe Keleş'in "The Relationship Between Mindfulness and Sleep Quality: The mediating role of smartphone addiction and bedtime procrastination" başlıklı araştırmasının Beşeri Bilimler etik standartlarına uygunluğuna ilişkin Yeditepe Üniversitesi Beşeri ve Sosyal Araştırmalar Etik Kurulu Onayı ekte sunulmuştur.

Gerekli iznin verilmesi hususunu bilgilerinize arz ve rica ederim.

İmza
Prof. Dr. Fatma Yeşim EKİNCİ
Rektör a.
Rektör Yardımcısı

Ek: Etik Kurul Onayı.pdf

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