

**T.C.**  
**BAHÇEŞEHİR UNIVERSITY**  
**GRADUATE SCHOOL OF EDUCATION**  
**DEPARTMENT OF CLINICAL PSYCHOLOGY**

**INVESTIGATION OF THE RELATIONSHIP BETWEEN  
COGNITIVE DISTORTIONS AND SLEEP QUALITY IN  
ADULTS IN THE MODERATE ROLE OF SELF-COMPASSION**

**MASTER'S THESIS**

**ESEN MELTEM KAPLAN**

**İSTANBUL, 2023**

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**İSTANBUL, 2023**



**T.C.  
BAHCESEHIR UNIVERSITY  
GRADUATE SCHOOL**

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This thesis has been approved by the Graduate School which has fulfilled the necessary conditions as Master thesis.

.....

**Director of Institute**

This thesis was read by us, quality and content as a Master's thesis has been seen and accepted as sufficient.

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**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.**

Name, Surname : Esen Meltem Kaplan

Signature :



*To My Brother,  
Who is serving in the military in the East, My Family, and My Cats,*

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İstanbul 2023

Esen Meltem Kaplan

## ABSTRACT

### INVESTIGATION OF THE RELATIONSHIP BETWEEN COGNITIVE DISTORTIONS AND SLEEP QUALITY IN ADULTS IN THE MODERATE ROLE OF SELF-COMPASSION

ESEN MELTEM KAPLAN

Clinical Psychology Master's Program

Thesis Advisor: Prof. Dr. Semra ERPOLAT TASABAT

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This study examined the relationship between cognitive distortions and sleep quality under the moderator effect of self-compassion. The sample of this study includes 229 adults over the age of 18 in Turkey. 161 females (70.3%) and 68 males (29.7%) participated in the study voluntarily. The average age of the sample was 29.83 (SD = 6.9) and ranged between 18 and 58 years. The participants were expected to complete the Demographic Information Form, the Self-Compassion Scale, the Cognitive Distortions Scale, and the Pittsburgh Sleep Quality Scale. Several statistical tests have been conducted to see if there are significant relationships between self-compassion, cognitive distortions, and sleep quality. In order, these can be counted as Normality Tests, Pearson Correlation, Point Biserial Correlation, Linear Regression, One-Way ANOVA, Independent Sample T-Tests, Regression (Process Macro), and Chi-Square. According to the research results, cognitive distortions negatively affect sleep quality. In addition, increased self-compassion reduces cognitive distortions. Finally, increased self-compassion has been found to affect sleep quality positively.

**Keywords:** Self-Compassion, Cognitive Distortions, Sleep Quality

## ÖZ

# ÖZ-ŞEFKATİN MODERATÖR ROLÜNDE YETİŞKİNLERDE BİLİŞSEL ÇARPITMALAR İLE UYKU KALİTESİ ARASINDAKİ İLİŞKİNİN İNCELENMESİ

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Bu çalışmada öz-şefkatin moderatör etkisinde bilişsel çarpıtmalar ve uyku kalitesi arasındaki ilişki incelenmiştir. Bu çalışmanın örneklemini, Türkiye'deki 18 yaşını doldurmuş 229 yetişkin bireyi içermektedir. 161 kadın (70.3%) ve 68 erkek (29.7%) çalışmaya gönüllü olarak katılmıştır. Örneklemin yaş ortalaması 29.83 (SD = 6.9) olup 18 ile 58 yaş arasında değişmektedir. Katılımcıların Demografik Bilgi Formu, Öz-Şefkat Ölçeği, Bilişsel Çarpıtmalar Ölçeği ve Pittsburgh Uyku Kalitesi Ölçeği'ni doldurmaları beklenmiştir. Öz-şefkat, bilişsel çarpıtmalar ve uyku kalitesi arasında anlamlı ilişkilerin olup olmadığını görebilmek için birçok istatistiksel test yapılmıştır. Bunlar sırayla, Normallik Testi, Pearson Korelasyon, Nokta Çift Serili Korelasyon, Lineer Regresyon, Tek Yönlü ANOVA, Bağımsız Örneklem T-Testi, Regresyon (Process Macro), Ki-Kare Testleri olmak üzere sayılabilir. Araştırma sonuçlarına göre, bilişsel çarpıtmalar uyku kalitesini olumsuz yönde etkilemektedir. Ayrıca artan öz-şefkat bilişsel çarpıtmaları azaltmaktadır. Son olarak artan öz-şefkatin uyku kalitesini de olumlu yönde etkilediği bulunmuştur.

**Anahtar Kelimeler:** Öz-Şefkat, Bilişsel Çarpıtmalar, Uyku Kalitesi

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## LIST OF ABBREVIATIONS

ASPS	Advanced Sleep Phase Syndrome
BSR	Bulbar Synchronizing Region
CBT	Cognitive Behavioral Therapy
CD	Cognitive Distortions
CDS	Cognitive Distortions Scale
CFA	Confirmatory Factor Analysis
CFI	Comparative Fix Index
CRSD	Circadian Rhythm Sleep Disorders
DIF	Demographic Information Form
GABA	Gamma Amino Butyric Acid
ISWRD	Irregular sleep-wake rhythm disorder
NREM	Non-Rapid Eye Movement
NNFI	Non-Normed Fit Index
SCN	Suprachiasmatic Nucleus
SC	Self-Compassion
SCS	Self-Compassion Scale
PSQI	Pittsburgh Sleep Quality Index
SQ	Sleep Quality
RAS	Reticular Activation System
REM	Rapid Eye Movement
RHT	Retina Hypothalamic Pathway

# Chapter 1

## Introduction

This section consists of five sections. The problem statement is contained in the first section, and the purpose of the study is explained in the second section. The third part includes the fourth section explaining the study's importance with research questions and hypotheses. The definitions of the terms used in this study are given in the last part of the introduction.

Self-compassion is a concept in which we can question how well we treat ourselves from childhood to adulthood. Self-compassion is present at every moment of our lives. It is a phenomenon that should be inside us every minute. Sometimes when we go to open the refrigerator door, there are moments when we ask ourselves why I came here. At that moment, we may realize that our primary goal is to obtain fruit, while our main goal is to occupy our minds with regrets of the past or worries of the future. It may take us a few minutes to return to the here and now and reach out to pick up the fruit because we need to remember our primary purpose there. A mind free from our worries is not always possible, or we do not think about more than one thing simultaneously. But in another example, we sometimes find the glasses we have been looking for hours on our heads. Again, our mind may be thinking about problems at home at that moment or bank debts that need to be paid. We can be angry with ourselves because of these situations. Since when have I been paying off these debts? It's like I'm a person who can't do anything. While these thoughts pass through our minds, we may notice that the glasses are on our heads groping minutes later and get angry with ourselves. And you can't do that either because you are a stupid person. Self-compassion is a concept that is directly related to a person's childhood. Children who grow up with excellent and protective parents in an environment full of compassion may become individuals who treat themselves better in the future. These individuals' self-compassion also increases, and the negative thoughts directed toward them take less place in their minds. Children exposed to more negative, critical, problematic parents behave more negatively toward themselves in their adult lives. They integrate their parents' negative discourses into themselves, as if they were them, and create critical parents within them. Since the rhetoric of these adults towards them

will also be more negative, they have more negative thoughts. Some of these negative thoughts are called cognitive distortions in the literature. People who do not prefer open communication, especially in discussions, may have ideas about the possibilities of what is going through the minds of people in front of them. These thoughts occupy people's minds so much that every time they are idle during the day, they say, 'I wonder if he thinks this about me?' or 'Is that what he meant at the time?' they make hundreds of inferences, primarily negative, in the form of. Their free time can be while cooking, showering, reading a book, or just before falling asleep. These attempts to read other people's minds, often made before falling asleep, or other cognitive distortions, maybe even more. Because one of the few times people are alone with their minds is the minutes before falling asleep. Studies on sleep quality show that the amount of time spent in bed is directly related to how quickly we fall asleep. These negative thoughts that occupy our minds, especially cognitive distortions, can reduce sleep quality because people cannot sleep when they make this internal accounting in their minds. On the other hand, they do not show self-compassion to themselves while in bed before going to sleep, and they conduct these mental interrogations. Mainly, they do not criticize themselves; they question their behavior by bringing the past moments back to their minds and are angry with themselves because of this behavior. For this reason, people's self-compassion impacts their cognitive distortions and sleep quality.

Among the most fundamental reasons for choosing this topic is that it is in one's own hands how one can solve the direction of thoughts. People can change the way they look at things. Events just happen; individuals have no control over them. But it is in the hands of individuals to be able to change their perspective on the events that have taken place. The thoughts formed in the mind are nothing more than people's constructions. People themselves produce each of the thoughts. Not every thought produced has to be real. A considerable part of the thoughts produced result in a negative thought due to a negative perspective on events, which is unreal. If people can change their perspective on events, many thought errors, or cognitive distortions, can also be prevented. In this case, people do not struggle with cognitive distortions when they should give up their sleep and rest their minds.

The second important issue is the place of self-compassion in our lives. People do not give themselves the luxury of making mistakes. They always act as if they have to

be perfect themselves when others may make mistakes about something, which is acceptable. This situation also causes them to oppress themselves at different points. Individuals constantly feel themselves under great responsibility. If their families influence this, they set high standards for themselves. They always act like they have to do better. When they make the slightest mistake, they criticize themselves mercilessly. Sometimes they work by adding their nights to their days. They are always trying to live a life by being enough for someone and getting someone's approval. The self-compassion of these individuals could be much higher. They have no time for themselves. They can't even take the time to sleep. Sleeping is a waste of time. In this case, their sleep quality has already been badly affected. They also have negative thoughts in their minds that they are inadequate.

Many examples similar to these topics can be discussed. Cognitive distortions are like chewing gum, like thoughts that taste as they are chewed deep in mind, and individuals can't get rid of these thoughts somehow. This vicious cycle, which continues in a ruminative way, takes the minds of individuals captive. When the negative discourses that individuals with low self-compassion make to themselves are added to these, people's sleep quality becomes terrible. The issues on which this study is based are essential for this reason.

### **1.1 Statement of the Problem**

This study is prepared to investigate the determinant effect of cognitive distortions on self-compassion and sleep quality in adults. To answer this question, a group of adults' sleep quality is first measured concerning their self-compassion values. Afterward, it is tried to understand whether certain cognitive distortions in these adults are a predictive factor through this relationship. Emphasizing the balance and importance of self-compassion, sleep quality, and cognitive distortions are among the answers that are tried to be given. To be able to show the differences between the group with these characteristics in the research from other groups by revealing it and presenting it as a source for future studies are among the answers to this question.

## **1.2 Purpose of the Study**

This study examines the relationship between cognitive distortions and adult sleep quality in the moderator role of self-compassion.

Studies show that people with cognitive distortions have trouble falling asleep and staying asleep. These people, who dedicate their mental activities to cognitive distortions during the day, have difficulty getting rid of these thoughts when they go to bed. Also, people with more intense mental activity and more work to do during the day are less likely to devote time to cognitive distortions. This factor increases their sleep quality when they go to bed at night. Therefore, these two variables are interrelated. Adults with active and healthy lives have better sleep quality due to physical activity. Individuals with low self-esteem may leave a more limited living space for themselves under the influence of cognitive distortions. On the other hand, individuals who misbehave with themselves due to cognitive distortions and poor sleep quality emerge in the rush of life. This is where self-compassion comes into play as a coping strategy. Therefore, the aim of this study is to contribute to the examination of the relationship between cognitive distortions and sleep quality in the moderator role of self-compassion in adults.

## **1.3 Research Question and Hypothesis**

*R*<sub>1</sub>: Is there a relationship between cognitive distortions and the sleep quality of adults?

*R*<sub>2</sub>: What is the role of self-compassion in the relationship between cognitive distortions and the sleep quality of adults?

Two hypotheses are improved regarding the model.

The hypothetical model of the study is shown in Figure 1

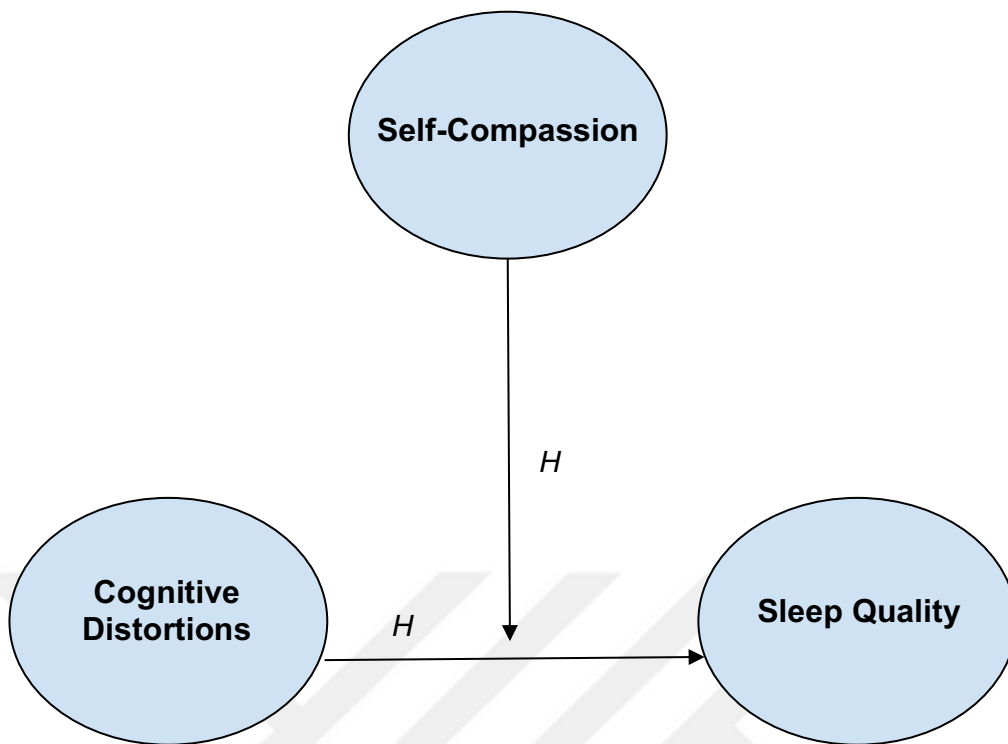


Figure 1. The Hypothetical Model of the Study

*H*<sub>1</sub>: Cognitive Distortions are negatively related to sleep quality among adults.

*H*<sub>2</sub>: The impact of cognitive distortions on sleep quality will be moderated by self-compassion.

Precisely, it is predicted that the effect of cognitive distortions on sleep quality will be stronger for adults who have lower self-compassion scores.

## 1.4 Significance of the Study

There are many methods that individuals use to cope with sleep problems in their daily lives. These methods are often associated with individuals who treat them well. At this point, the concept of self-compassion is of great importance. Individuals who care about themselves can also pay more attention to their sleep quality. Individuals who devote more time to their personal areas also pay the same attention to their minds. Individuals who deal with mental complexity during the day, in other words, individuals who frequently include cognitive distortions, continue to do so at night. Cognitive errors also appear when the mind is ready to fall asleep, as the mind is open to assessing gaps. Studies related to this have been done frequently. Just when they are about to fall asleep, the minds of individuals engage in mental rumination. At some point, this can lead individuals to self-criticism and self-blaming thoughts. Individuals who approach their essence with compassion can start to get rid of these accusations and look at themselves and others from a more positive perspective.

A study by Butz and Stahlberg found that brief self-compassion interventions reduced sleep quality by reducing repetitive self-focused negative thoughts, an important variable associated with poor sleep quality (2018).

Studies conducted in this area show that individuals' efforts to cope with the negative effects of sleep quality and factors supported by the level of self-compassion and the severity of cognitive distortions and sleep quality decrease. The importance of this study is to bring the effect of the self-compassion variable, which has the power to regulate the low sleep quality served by cognitive distortions, to the research literature. In addition, there is expected to be a study that will analyze which types of cognitive distortions affect adults more and negatively affect their sleep quality. It is expected to be a resource that will lead educators when investigating the meaning of cognitive distortions and the negative effects of sleep quality on individuals in self-compassion practices.

## **1.5 Definitions**

**1.5.1 Cognitive distortions.** According to Beck and Beck (1995), in the face of a new event or situation, individuals may be unable to evaluate their current situation realistically within the framework of new information and previous beliefs. Individuals may view these situations or events with a negative focus. Distorted thoughts or beliefs that these individuals may have been called. Within the framework of this study, the cognitive distortion levels of adults will be examined with the scores obtained from the "Cognitive Distortion Scale (CDS)".

**1.5.2 Self-compassion.** Self-compassion is the act of being non-judgmental, kind, and understanding towards oneself. It is crucial for individuals to see negative experiences as a natural part of life and to be aware of the emotions that cause their pain and distress (Neff, 2003a). Within the framework of this study, the self-compassion levels of adults will be examined with the scores obtained from the "Self-Compassion Scale".

**1.5.3 Sleep quality.** How do you feel about the daily activities of waking up? That is to say, the level of feeling of individual satisfaction that involves sleep duration, sleep efficiency, and timing after waking up (Sendir et al. 2007; Buysse 2014). Within the framework of this study, the sleep quality levels of adults will be examined with the scores obtained from the "Pittsburgh Sleep Quality Scale (PSQI)".

## **Chapter 2**

### **Literature Review**

The literature review section consists of three parts. Part one is about cognitive distortions, part two is about self-compassion, and part three is about sleep quality. Detailed information about the parts is given under the main title. Moreover, all the literature parts have been discussed, considering past and notable research.

## 2.1 Cognitive Distortions

**2.1.1 Definitions of cognitive distortions.** Individuals may erroneously evaluate the information they have acquired due to many factors. The schemas that people have and their underlying thoughts may cause the later ones to be processed incorrectly (Beck, 2001). A cognitive distortion is defined in the most general sense as an error in an individual's cognition resulting from biased or faulty information processing (Yurica & DiTomasso, 2005). These irrational beliefs are also seen as fundamental thinking errors that hinder the individual's ability to make realistic formulations and interpretations of the world, others, and the future (Freeman et al., 1990). In this situation, the person thinks but evaluates the events in an erroneous or dysfunctional way (Savaşır & Batur, 1998).

**2.1.1.1 Automatic thoughts.** Automatic thought is the first thing that comes to mind when an event or situation occurs and develops very quickly without the opportunity to think about it. There is no regular flow of thought that is decided in line with the target; they are personal thought systems (Yalçın, 2014). A person often cannot immediately notice these thoughts that come to mind at that moment and cannot be conscious of automatic thoughts. General assumptions, schemas, and past bad experiences can cause these automatic thoughts (Ardanç, 2017). In the process of cognition, the experience in our memory and the regions where that experience occurs is essential. Combining all these, our newly emerging thoughts can be shaped accordingly. As a result, automatic thoughts occur very quickly (Türkçapar, 2012). Although automatic thoughts consisting of negative thoughts are proven inconsistent many times, the individual can choose to believe these thoughts. Automatic thoughts do not have a function to end an inevitable distress; they are only negative thought structures that occur very quickly (Beck, 1990).

We can divide automatic thought structures into three.

- The illogical ones
- There is a grain of truth, but the conclusion one draws from the whole is wrong
- Thoughts that have a share of reality but are inactive (Beck, 2001).

**2.1.1.2 Intermediate beliefs.** Intermediate beliefs, unlike automatic thoughts, do not emerge suddenly. Intermediate beliefs are deep-rooted beliefs that stick to memory, although not as much as core beliefs. As with automatic thoughts, people's assumptions about situations and people and what they believe play a role in forming these beliefs. Intermediate beliefs are beliefs that can be changed. Especially with Cognitive Behavioral Therapy (CBT), ineffective thoughts can be studied (Kılınc, 2005). As an example of the intermediate belief, "I should be the hardest working person by making an opinion about myself or the people around them; if I am not hardworking, they will exclude me, and I will not be appreciated." make assumptions such as conditional sentences can be given (Karahana & Sardogan, 2004). To find the intermediate beliefs held, applications such as sentence completion can be made so the individual can continue (Beck, 2001).

**2.1.1.3 Core beliefs.** Core beliefs are the basic system of thought of the individual about himself, his environment, and his world. Individuals form their core beliefs in line with individual, environmental, and social factors from an early age. Through core beliefs, the events that the individual has experienced during childhood can cause him to remember by association and his emotions to come to the surface again (Beck, 2001).

All people have positive and negative core beliefs. Negative core beliefs are more intense in unhealthy people. For example, generalizations show themselves as such as "I am weak, I am in need" in those with a firm belief of helplessness, generalizations such as "I am not preferred, I am not wanted" in those with a firm belief of being unloved, and people with a belief of worthlessness generalizations such as "I do not deserve, I am not worthy, it would be better if I did not live." The schemes cause negative consequences in the person's life and can lead the person to a dead end (Avcı, 2016).

Core beliefs consist of thoughts that are difficult to change compared to intermediate beliefs. A judgment is formed by generalizing the assumptions made (Karahana & Sardoğan, 2004).

**2.1.1.4 Schemas.** Schemas are cognitive constructs based on how we interpret the information we have acquired from an early age. In addition to the thoughts that develop at that moment, our schemas can cause cognitive distortions (Ardanış, 2017). The information learned during the day helps to adapt to that information through schemas. Thanks to schemas, this information can be kept in memory, processed, and recalled when desired. Our schemas also enable quick decision-making in the face of an event (Savaşır & Batur, 2003).

Schemas have very rooted and non-ephemeral features related to the individual's past. CBT incorporates and works on these dysfunctional schemas. Situations in which the person does not feel valuable, do not see himself as sufficient, and have a perfectionist perspective can be given as an example (Savaşır & Batur, 2003).

**2.1.2 Cognitive triad.** The cognitive triad covers the cognitive structures of the person for himself and his future life. The first of these structures consists of negative patterns related to one's self. Negative thoughts are abundant in the individual's inner world, and he looks at the events with a pessimistic point of view. The person is more inclined to blame himself. The person in the situation expects that he will not be able to cope because he cannot look at the events positively (Ağır, 2007). While the cognitive triad creates the perception of inadequacy in the person, it also causes a decrease in self-confidence over time. The person in a pessimistic mood at the point of finding solutions to the problems he encounters gets into bigger and bigger dilemmas. This negative situation can cause a loss of belief in promising developments (Beck, 2005). The depressive perspective in the cognitive triad consists of negative thoughts of the person. A hopeless and disbelieving person does not believe he will live positive events in the future and today (Beck, 2001).

The individual's self-blaming and tendency to criticize depends on the environment. Not having a positive outlook and negative beliefs about his future life forms the cognitive triad. The person's identity, position, current life, and his/her view of his/her future life cause him/her to have a view related to his/her existing schemas. Therefore, these negative views cause a loss of motivation in human relations and daily work. Negative beliefs reinforced by schemas can lead to quick distancing and loss

from other people, questioning the purpose of their existence, and denial as a result (Elman, 2002).

**2.1.3 Cognitive behavioral therapy.** CBT school, founded by Beck, dates back to 1960. In CBT, at first, automatic thoughts are used to observe the behavior patterns in the person (Avcı, 2016). The erroneous thought patterns caused by these are examined, and it is aimed at the person to realize these erroneous thought patterns and to break this vicious circle (Terlemez, 2019). The positive development of psychological health needs to break these wrong ways of thinking and the vicious circles that the person cannot escape and always face with the same results (Corey, 2015). In the therapy process, where the client is willing and the therapeutic relationship develops the client's dysfunctional thoughts are tried to be changed, and their problems are solved (Demiray, 2018).

The individual may have some deep and irrational beliefs due to negative experiences. Rather than the event he experienced, the meaning he gave to it and how it felt in the individual is essential here. To understand all these sharp and illogical thoughts, the Socratic Questioning Technique is used in the sessions (Beck, 2001).

These thoughts, which negatively affect the person, can create minor effects in our lives and cause significant problems (Türküm, 2003). These thoughts have a vital role in our lives, as our cognitive ways of thinking, which affect ourselves, the world we live in, and our relationships with the people around us, also influence our behaviors (Gül, 2016).

**2.1.4 Cognitive distortions.** The schemas that develop from an early age can cause unrealistic cognitive distortions by being affected by these schemas, which are newly learned in the cognition process. New life events that are not understood correctly cause the formation of thought structures that lose their function (Sharf, 2014). Contrary to core beliefs, cognitive distortions do not consist of well-founded thoughts. They are more superficial and in a position to work with psychotherapy (Beck, 2001). Cognitive distortions: (All-or-Nothing Thinking, Mental Filter, Emotional Reasoning, Mind Reading, Catastrophizing, Overgeneralization, Labeling, Minimizing or

Disqualifying the Positive, Personalization, Should Statements)) in 10 different ways are grouped (Ardanç, 2017).

### **All-or-Nothing Thinking**

There are two distinct opposing parts to this way of thinking. There is an understanding that what is desired to happen is different. The person visualizes the worst scenario if things do not go perfectly as he wishes (Köroğlu, 2013). If I have not achieved very high success, my failure can be an example (Ardanç, 2017).

### **Mental Filter**

Even when many factors are influential, the person only focuses on one point and comments (Beck, 2005). Although there is evidence of this form of thought, also called selective abstraction, the person believes only the thought he or she focuses on. Even if it is unrealistic, the point of view that he believes spreads to other areas of one's life (Cengiz, 2017).

### **Emotional Reasoning**

Although there is no evidence in an event or situation, the individual can conclude with his thoughts is to arrive. Even in cases where there is evidence, the person acts according to his opinion (Ardanç, 2017). For someone who says, 'I need to talk to you,' 'It's a bad thing that I did it.' An example of this.

### **Mind Reading**

It is believing that one knows what is going on in the minds of others by guessing and interpreting their way of thinking in one's way. When expectations from others are unmet or the desired response is not received, the person automatically moves away from reality and does the mental reading (Hamamcı, 2002). Individuals may think the people around them have negative feelings and thoughts about themselves (Köroğlu, 2013).

## **Catastrophizing**

It is a way of thinking in which unrealistic thoughts predominate during an event or situation, and the person is intensely worried and brings the event to a negative conclusion with bad scenarios in his eyes. Because these people often make negative assumptions, they may be in difficult situations. Relationships of these people with other people can also be damaged, they have a negative-oriented life because they make assumptions about the institution or school they work for, and sometimes they can push people away from themselves (Ardanç, 2017).

## **Overgeneralization**

People with an overgeneralization mentality reflect a situation in general, think all situations will reach that conclusion, and act accordingly (Ardanç, 2017). For example, The woman her lover cheated on believes that all men are unfaithful and will cheat. It can be like believing that other people will do a behavior that a person around him does to him, or it can be a person's development of a belief of his own. For example, a person who has failed once says I will always fail (Boran Sarı, 2017).

## **Labeling**

The person himself or the person around him has a specific mold to stick a label by inserting it. Even when there is evidence to the contrary, the person believes the label they put with a high level of belief, and these labels often contain negative thoughts. For example, a mother who thinks she is incompetent ascribes adjectives such as I am incompetent, lacking, incompetent (Ardanç, 2017).

## **Minimizing or Disqualifying the Positive**

People often come to opposing conclusions when interpreting situations in their decision-making processes. People with this cognitive distortion tend to minimize it in a joyous event and magnify it when encountering a harmful problem (Köroğlu, 2013).

## **Personalization**

Reasons such as inadequacy, feelings of worthlessness, and lack of self-confidence in the person cause this. In a situation that ends badly, the person blames himself even in parts unrelated to him and acts as if he caused the horrible event. These people can always say, "It happened because of me" (Dökmen, 1994). When the person needs to express himself in front of the community, he is more inclined to blame himself by taking full responsibility for this event (Köroğlu, 2013).

## **Should Statements**

These individuals believe they know what others think of them (Leahy, 2004). These individuals have strict rules. They always think the best should be done; there is no room for error in anything they do. This leads to great responsibility for them. As they feel more responsible, anxiety and anxiety levels can be observed (Türkçapar, 2012).

## **2.2 Self-Compassion**

**2.2.1 Definitions of self-compassion.** According to Neff (2003a), self-compassion is 'being open to one's inner pain, not avoiding it or breaking away from it, creating a desire to alleviate one's pain, and a person heals himself with kindness. Self-compassion also involves offering a nonjudgmental understanding of one's pain, inadequacies, and failures, so one's experience can be seen as part of the larger human experience' (p. 87).

Years ago, self-esteem was used as a measure of psychological health, but in the last few years, it has been replaced by self-compassion. Psychologists have tried to bring a point of view to the literature to explain the healthy attitude toward oneself for various reasons. As an alternative point of view, self-compassion, a fundamental concept in Buddhist philosophy, can be used. Although self-compassion is relatively new to Westerners, the concept of psychology has been most fundamentally known in Western philosophical thought for centuries. Neff (2003a) stated that there are three

building block elements of self-compassion. Below, each component is indicated in detail.

**2.2.2 Self-kindness against self-judgment.** Self-compassion expands kindness and understanding towards oneself and does this in place of negative emotions such as self-judgment (Neff, 2003a). 'Self-compassion is the ability to be kind, compassionate and understanding towards yourself in times of pain.' (Neff, 2003a). What happens in self-criticism is that a person sees and blames himself as the only one responsible for all life events. In contrast to self-criticism, there is confrontation and calmness in the self-compassion approach. Self-compassion is related to forgiving actions, feelings, thoughts, and impulses, an empathetic approach, feeling tenderness, and sending warmth and patience (Neff, 2003a). 'Self-kindness includes the approval, love, happiness, and even failure one already deserves. On the contrary, judging oneself involves being an enemy and has a self-deprecating and critical structure.' (Barnard and Curry, 2011). According to Brown (1998), people become aware of their judgments. Therefore, it can be to have self-kindness, to judge oneself, and to be aware of its harmful effects.

**2.2.3 Common humanity against isolation.** Compassion involves recognizing the shared human experience. Compassion includes the mistakes, experiences, and flaws of all people, rather than focusing only on individual experience or the self.' (Neff, 2003a). Self-compassion promotes connection with others (Neff, Kirkpatrick, & Rude, 2007). From the Buddhist point of view, people are closely related to each other. Therefore, it is an illusion to see ourselves as separate from others; we are all waiting for this relationship somewhere (Brown, 1998). The nature of humanity requires accepting that we are in a relationship with other people. However, when experiencing disappointment or suffering, many people feel disconnected from others. They also think that it is only themselves who are struggling with certain inadequacies, helplessness, failures, or unworthiness (Neff, 2003a).

**2.2.4 Mindfulness against over-identification and avoidance.** "Self-compassion, unlike pain, neither suppresses difficult emotions nor requires deep thinking. When people are self-compassionate, they become aware of the experiences that cause them pain and accept them as they are in the present moment (Neff, 2003a). Awareness is

about following thoughts and emotions instead of responding to them (Kabat-Zinn, 2003). Mindful attention aims to learn now and here and experience facts intensively. Two contrasting alternatives can prevent mindfulness, called overidentification and avoidance. When over-defined, one's limitations are revealed (Gilbert and Procter, 2006; Neff and Vonk, 2009). In addition, the seriousness of failures can be magnified in people's eyes when they over-describe them. (Shapiro et al., 2007). The second opposite of mindfulness is avoidance. In the long run, avoidance intensifies negative emotions and destroys developed understanding (Germer, 2009).

**2.2.5 Effects of self-compassion.** Research has shown that self-compassion is a very important indicator of its existence in terms of psychological well-being. It has been found that self-compassion has a protective function of the emotional space (Neff, Kirkpatrick, and Rude, 2007; Gilbert, 2009; Rendon, 2006). Many research results have suggested that self-compassion helps people suffer less psychologically. In a recent meta-analysis study investigating the relationship between self-compassion and Psychopathology, a large effect size was found in two variables (MacBeth and Gumley, 2012).

Research also shows that self-compassion positively affects people's outlook on negative life events and reduces the impact on their emotional tensions. In one of his studies, Leary et al. (2007), participants were asked to provide information about the life difficulties they had encountered in the last 20 days. The study showed that individuals with high self-compassion had a more positive outlook on their problems. Self-compassionate people nurture positive emotions by making peace with negative emotions. Therefore, self-compassion is related to positive psychological emotions (Neff, 2003a).

Emotional intelligence, wisdom, life satisfaction, and social emotions are related to commitment and self-compassion (Neff, 2003a). Compassionate people are likelier to experience happiness, optimism, curiosity, creativity, enthusiasm, inspiration, and excitement (Hollis-Walker and Colosimo, 2011). Those who have high self-compassion have less fear of inadequacy than others. These people are more motivated to try again even if they fail over time (Neely, Schallert, Mohammed, Roberts, and Chen, 2009). Self-compassion also fosters behaviors that are good for health.

Self-compassion is an effective coping strategy in times of difficult emotional experiences. Some researchers have found that self-compassion is an effective way to cope with early childhood traumas (Costa & Pinto-Gouveia, 2011). In addition to its intrinsic benefits, the contribution of self-compassion to interpersonal relationships is indisputable. Crocker and Canevello (2008) investigated the relationships of college dormitories. It has been found that students with high self-compassion provide more social support to each other and have higher interpersonal trust than those without self-compassion.

## **2.3 Sleep and Sleep Quality**

In the third part of the literature, the definition of sleep and sleep quality, sleep physiology, sleep stages, factors affecting sleep quality, how sleep is regulated, sleep disorders, and the leading causes of specific sleep problems in adults are discussed.

**2.3.1 Definitions of sleep and sleep quality.** Sleep is a state of unconsciousness in which the individual remains inactive and can be awakened by external stimuli (Wamsley, 2013). In the past, sleep was thought of as a relaxation process similar to a coma. However, a versatile function characterized by a slight decrease in cortical level sensitivity is seen at the same level today (Brown et al., 2010). The main elements that affect sleep characteristics are sleep duration, total sleep time, length of each sleep period, regularity, and quality of sleep (Tasdemir & Oguzhan, 2016). The concept of sleep quality is an important research area in clinical practice and sleep-related studies, as it is in many aspects (Buysse, 2014). The reasons for this are mainly the prevalence of sleep-related complaints at all ages in the population, the fact that low sleep quality is considered in the symptoms of many diseases, and the relationship between sleep quality and physical and psychological health is affected by cognitive functions such as efficiency, memory, attention, learning and mood (Wang & Boros, 2019).

Sleep quality is defined as a person's readiness for a new day, feeling active and energetic, and qualitative and quantitative variation (Sendir et al., 2007). Among them, the most crucial aspects are defined as sleep duration, timing, sleep efficiency and continuity, depth of sleep and alertness after waking up, and individual satisfaction

based on a person's subjective assessment (Buysse, 2014) Quality sleep helps regulate many vital functions, including anabolic functions (such as growth hormone release) (Sharma & Kavvu, 2010); metabolic functions (such as temperature regulation, toxin excretion) (Eugene & Masiak, 2015) and immunological functions (Besedovsky et al., 2012).

Sleep accomplishes some of the critical functions for human life, such as energy accumulation, growth, regeneration of cells, use of vitamins, repair of the organism, protein synthesis, development of memory, programming of genetic memory, learning new information, and making them permanent, adapting to the environment and protection from hazards (Altun et al., 2012).

Sleep times begin to change with infancy. Sleep duration and deep sleep, when dominant in infancy, begin to shorten at later ages (Jawabri & Raja, 2019). Sleep duration is expected to be around 14-15 hours in newborns, 11-13 hours in children over 6 years old, 7-8 hours in adolescents, and 6-7 hours in adults (Chaput et al., 2018).

**2.3.2 Sleep physiology.** Two of the leading networks of nerves in the brain such as the Reticular Activation System (RAS), which is the primary anatomical structure responsible for alertness in the central nervous system situated in the brain stem, spinal cord, and cerebral cortex, and the Bulbar Synchronizing System (Bulbar Synchronizing Region-BSR) in the medulla regulates the sleep cycle (Colten & Altevogt, 2006). Through these systems, brain centers are regularly activated. Inhibition causes sleep, while activation causes alertness (Brown et al., 2012). RAS is a structure that becomes meaningful for stimuli such as touch, pain, hearing, and vision and influences whole-body activity, which provides a healthy continuity and consciousness of learning and memory processes (Arguinchona & Tadi, 2020). Besides having a vital role in the sleep process, RAS attach the anatomical areas like the middle part of the forebrain, the refined nucleus, the thalamus, the hypothalamus, the locus coeruleus, and tegmental activity (Garcia-Rill et al., 2016).

The function of RAS in the brainstem is to find out and convey the received stimuli into the cortex while awake. Also, alertness occurs when it is activated by stimuli from the cerebral cortex and peripheral functions (Brown et al., 2012). There are very few

stimuli coming from the cortex during sleep. Communication is set up through neurotransmitters such as dopamine, serotonin, histamine, norepinephrine, acetylcholine, and gamma amino butyric acid (GABA) (Schwartz & Roth, 2008). Serotonin secreted by the Raphe nuclei in RAS located between the mesencephalon and pons is the essential neurotransmitter that initiates sleep (Hornung, 2003). The place where this secretion process occurs is BSR in the brain. BSR activity, which controls the secretion of serotonin in the sleep cycle, increases during sleep (Cowen & Browning, 2015). Also, decreasing the arousal of the RAS in a comfortable position with eyes closed in a dark and quiet room accelerates the person's falling asleep (Hornung, 2003). In cases where the RAS is damaged, there is a reversible loss of alertness. Along with this, other systems that cause wakefulness emerge (Arguinchona & Tadi, 2020). Thereby, alertness is achieved by stimulating the cortex through reticular formation, activating the release of norepinephrine from locus coeruleus neurons in the brainstem (Samuels & Szabadi, 2008).

**2.3.3 Stages of sleep.** Sleep is a physiological process with different stages. Because normal sleep consists of two phases, namely rapid eye movement (REM) and slow eye movement-non-rapid eye movement (NREM) phases, The sleep process is not homogeneously distributed (Jawabri & Raja, 2020). The NREM function area is localized in the medulla and basal frontal cortex, while the REM function region is localized in the pons and basal frontal cortex (de Andres et al., 2011). The REM and NREM phase progress by turns overnight, and there is a reciprocal connection between these stages; while the effect of one decreases, the other becomes more powerful (Bjurstrom et al., 2017).

In REM phase creates 20-25 percent of overall sleep, cholinergic dominance, rapid eye movements, and dreaming happen, the body is relaxed, breathing is irregular, the heart beats quicker, and the person is simple to wake up (Brown et al., 2012). The first REM sleep usually follows 60-90 minutes after NREM sleep (Colten & Altevogt, 2006). The neural action during REM sleep is based on desynchronized, low wavelength, and quick activities, as in alertness (Schwartz & Roth, 2008). The ratio of REM sleep to NREM sleep varies in each period (Le-Bon, 2020).

NREM is a process of serotonergic control, including three stages, and sleep deepens as the first stage progresses, thanks to the third stage (Deboer, 2018). The third phase is a stage where it is very rough to wake a person without fast eye movements (Colten & Altevogt, 2006). When an individual falls asleep, the first three stages of the NREM phase happen first, and then REM sleep starts, and still, the person begins to sleep with the NREM1 stage (Kalat, 2007). The time from the initial point of sleep to the end of the first REM stage is indicated by a sleep period, usually between 90 and 120 minutes. In an average and healthy person's night sleep, this cycle repeats itself 3-6 times (Pal & Nanda, 2017).

During sleep, NREM1 occurs at 2-5 percent, and it is often seen during the passing from alertness to other sleep phases and from the arousal (awakening or sleep stage reduction) to sleep (Nasca & Goldberg, 2017). NREM2 forms 45-55 percent of regular sleep and begins 10-12 minutes after NREM1 (Jawabri & Raja, 2020). NREM3 forms 15-20 percent of sleep, also called slow wave sleep or deep sleep stage (Colten & Altevogt 2006). Eye movements are lessened, and muscle tone is decreased in the NREM2 and NREM3 phases (Kalat, 2007). Within these three stages, NREM forms an average of 75-80 percent and REM 20-25 percent of the sleep process (Deboer, 2018). Including all these phases, the wakeful time during a regular night's sleep is less than 5 percent of total sleep (Le Bon, 2020). In this section of sleep, it is seen that even those awakened in a minimal time state that they are well rested (Akerstedt, 2002).

**2.3.4 The elements affecting sleep quality.** The role of neurochemical elements in sleep metabolism still needs to be clarified. There is one sleep mechanism, while various internal and external factors affect the sleep cycle and quality (Meijer, 2000). The concept of sleep quality involves quantitative sides of sleep, such as sleep latency (time before falling asleep), subjective sides, such as the number of night awakenings and sleep duration, as well as the depth of sleep and the feeling of rest after sleep (Cherny et al., 2015).

The duration and quality of night sleep are affected by many elements like age, gender, genetic factors, environmental factors, lifestyle, habits such as alcohol and smoking, diseases of the individual and medications used (Sa et al., 2019). The impact of age on sleep quality happens through its direct effect on sleep duration (Meijer,

2000). While the process of sleep is most of the day in babies, the daily sleep time reduces as the age gets older and along adulthood (Tasdemir & Oguzhan, 2016). While 7-9 hours of sleep is considered normal for an adult, less than 4 hours is considered insufficient, and more than 9 hours is considered abnormal (Yilmaz et al., 2017). REM sleep is usually in the elderly; it is shorter, night awakenings become more frequent, and falling asleep is more complicated. Sleep duration may be less than 6 hours (Chaput et al., 2018).

Sleep is an active process. Gender is a factor that is considered in the assessment of sleep quality. According to studies, women sleep more than men, despite having more sleep problems (Meijer, 2000). On the other hand, while diseases cause sleep problems with their physiological and psychological effects, they also increase the severity and frequency of sleep problems (Krystal, 2012). Studies in this area have focused on examining the adverse effects of sleep symptoms of varying severity in humans. The severity of the disease is thought to increase, and hospitalization rates negatively affect sleep quality (Chaput et al., 2018).

The medication also negatively affects sleep quality due to its typical side effects, such as agitation, insomnia, and fatigue. Studies show that hypnotic drugs are used to ensure deep sleep support and temporarily improve the amount of sleep, which then frequently leads to feelings of insomnia, confusion, and lack of energy during the day (Pagel & Parnes, 2001).

It is mostly accepted that the intake of certain foods and beverages influences sleep (Dubuque et al., 2014). Such as caffeine is a stimulant, and intake of caffeine-containing beverages (coffee, tea, and cola drinks) leads to sleep problems (Lohsoonthorn et al., 2013). As confirmed by Pehlivan et al. (2019), foods containing protein make it faster to fall asleep. Pehlivan et al. (2019) show that carbohydrates also influence the level of serotonin, leading to a feeling of tranquility and comfort in human metabolism.

The physical environment that affects sleep is ventilation, temperature, smell, noise, lighting, etc. (Billings et al., 2019). External reasons such as foreign environment, noise, and poorly ventilated and crowded environments may lead to sleep disruption or often prevents individuals from sleeping at the hours they are used to (Kalat, 2007).

Simple or life-threatening fear of being dependent on others or losing power, complete independence, fear of separation, fear of the future, fear of death, different effects such as fear of losing body, organs, and limbs, serious regrets, and feelings of guilt may cause a decrease in sleep quality (Krystal, 2012). Circumstances such as tension, anxiety, and fear may block the expected relaxation of individuals at the beginning of sleep or are late sleep entry.

**2.3.5 Sleep regulation.** According to the model proposed by Borbely (1982), the sleep/wake cycle is divided into two circadian rhythm and homeostatic mechanisms. The most suitable amount of sleep and circumstances for the individual to get enough sleep sufficiently perform daily functions and activities and staying alert and fully alert represents ideal sleep throughout the day (Pal & Nanda, 2017).

Sleep insufficiency is the difference between ideal and actual sleep time (Chattu et al., 2018). Whether an individual sleeps adequately or not depends on her/his psychological and physiological needs and feelings. In ordinary circumstances, environmental elements like light and dark help synchronize an individual's sleep pattern with the average day and night cycles (Colten & Altevogt, 2006). The existence of biological rhythms that happen independently from the environment suggests that humans have an innate biological clock in their nature, which adjusts a person's sleep time and duration (Purves et al., 2001). Circadian rhythm forms a crucial part of all behaviors and physiological periods and forms part of an individual's biological clock and the periods of falling asleep and being awake (Vitaletta et al., 2001).

Circadian rhythm comprises physiological and behavioral cycles that recur over 24 hours. Lifestyles and habits are efficient on circadian rhythm (Potter et al., 2016). Cell cycles, glucose homeostasis, hormone secretion, thyroid function, the concentration of neurotransmitters, DNA replication, metabolic activities, blood

pressure, heart rate, body temperature, mood changes, and personal performance are also sections of the circadian rhythm (Purves et al., 2001).

The period for a single cycle of the rhythm is defined as the period, and the stages, such as the beginning and end of the rhythm, are called phases. Circadian rhythm refers to changes in the physiological and biological stages of the organism for around a day (Xie et al., 2019). The circadian rhythm is the most straightforward and descriptive factor that decides the sleep-wake cycle (Farhud & Aryan, 2018).

The innate clock is located in the upper chiasmatic nucleus (Suprachiasmatic Nucleus (SCN)) of the hypothalamus above the optic chiasm (Purves et al., 2001). Light is the most crucial controller of the rhythm. Other regulators involve social and physical activities (Xie et al., 2019). Light is detected by retinal ganglion cells containing light-sensitive melanopsin. The superior chiasmatic nucleus receives information from and transmits the retina hypothalamic pathway (RHT) and light stimulation signals to other brain parts. The hypothalamus transmits many synaptic pathways to the pineal gland, where the upper cervical node is located, and melatonin is released under the influence of light (Huang et al., 2011). In reply, the nerve cells in SCN are responsible for daily rhythms (circadian rhythm), which are contained in many psychological processes, such as body temperature, sleep-wake cycle, and neuroendocrine secretory processes (Farhud & Aryan, 2018).

However, exposure to light at night leads to a reduction in plasma melatonin levels. The chronobiotic impact of melatonin also has a hypnotic effect too. The neuronal stimulation in SCN is repressed by melatonin, concluding in a sleep-starting and sustaining effect (LeGates et al., 2014). Exogenous melatonin produces a sleep-inducing hypnotic effect (Goel et al., 2013). According to the light exposure and the duration of melatonin, management may be stage delayed or transposed early in the endogenous rhythm. Melatonin will shift transmission early in the evening, while the morning will delay the phase (LeGates et al., 2014). The reverse can be applied for light exposure. Exposure to intense light in the evening causes the phase to be delayed, while exposure to light in the morning causes the phase to shift earlier. Organizing phase alterations in circadian rhythm disorders may be ensured by conducting bright light and melatonin at suitable hours (Chan et al., 2012).

Various exogenous and endogenous signs help change and put in order the circadian rhythm (Huang et al., 2011). However, the latest sleep and the pressure state do not directly affect the circadian rhythm (Goel et al., 2013). This pressure continues to build up throughout the day, there is an increase in homeostatic preparation for falling asleep, and the pressure decreases as sleep occurs. The longer the person stays awake, the more sleep pressure builds up and the greater the desire to fall into homeostatic sleep (Vitaterna et al., 2001).

The internal clock of sleep homeostasis based on anatomical localization has yet to be found. Different neuronal mechanisms have been tried to explain the function of sleep homeostasis (Seifalian & Hart, 2019). An inert substance (such as the neurotransmitter adenosine) can be stored in the brain during wakefulness and broken down again during sleep (Hood & Amir 2017). Another hypothesis suggests that waking neuronal processes cause a rise in synaptic relationships in the brain. Sleep weakens these reinforcements to an energetically sustainable level, which is necessary for learning and memory (homeostatic arrangement of synapse function) (Deboer, 2018). In this sense, the RAS plays a significant role in sustaining the sleep-wake cycle. According to studies in this area, the activity of neurons during sleep is significantly reduced, while neurons that produce serotonin during wakefulness are more active in the refined nucleus. According to these studies, it has been argued that serotonin has an effect that supports wakefulness (Huang et al., 2011).

**2.3.6 Sleep disorders.** Sleep performs some crucial roles in mammals, such as energy accumulation, growth, regeneration of cells, use of vitamins, repair of the organism, protein synthesis, development of memory, programming of genetic memory, learning new information and making them permanent, adapting to the environment, and protecting them from hazards (Potter et al., 2016).

Many physiological, mental, and environmental factors reduce sleep duration and impair sleep quality. Sleep patterns and sleep quality of people vary according to different factors and general quality of life (Schulenburg, 1995). Deterioration in sleep quality causes a deterioration in the person's mood, motivation, and productivity (Brainard et al., 2015). Situations such as distress, anxiety, fear, sleeping in an unfamiliar room or environment, and psychiatric disorders (Alzheimer's, depression,

mania, psychosis, dementia, acute schizophrenia, etc.) impair sleep quality (Weaver, 2001).

There is quick development in research practices and clinical progress on sleep disorders, their pathophysiology, and effective treatment techniques. The classification organized by the American Academy of Sleep Medicine examines sleep disorders under 6 categories (Gupta et al., 2017). These are insomnias, sleep-related respiratory disorders with physiologic or pathologic abnormalities, hypersomnia disorders caused by the central nervous system, disorders of circadian rhythm caused by sleep patterns, parasomnias with abnormalities of skeletal and muscle systems, and involuntary movement-related disorders.

Although sleep disorders are classified broadly, the most common and most frequent disorder in the population is insomnia (Ghrouz et al., 2019). Insomnia is a disorder that leads to symptoms such as fatigue, concentration and memory impairment, daytime sleepiness, headache, and disruption in daytime functions. There is no rest for 3-4 days a week for over a month (Pace-Schott et al., 1994). This situation can also be defined by the inability of people to rest and not be ready for the new day because they do not sleep enough at the time intervals they need to sleep (Levenson et al., 2015). A psychological and biological factor can also trigger insomnia; even if the problem disappears, this disorder may become chronic. Insomnia causes an increase in the risk of many accidents and various diseases and adversely affects the prognosis of human life. Insomnia also has an informative and stimulating feature on certain diseases (Thorpy, 2012).

Another approach found in research that categorizes sleep disorders changes in the context of the circadian rhythm according to the classification. Circadian rhythm sleep disorders are generally grouped under seven main headings. These are:

- 1) Delayed sleep phase disorder,
- 2) Irregular sleep-wake rhythm disorder (ISWRD),
- 3) Early sleep phase syndrome,
- 4) Shift work type sleep disorder,

- 5) Free-running sleep disorder,
- 6) Jet lag-type sleep disorder,
- 7) Advanced Sleep Phase Syndrome (ASPS)

Generally, circadian rhythm sleep disorders (CRSD) define impaired sleep-wake rhythm compared to clinical conditions described by environmental and clinical conditions social conditions (Gupta et al., 2017). CRSD causes functional losses in internal and external cycles, insomnia, excessive sleepiness, or both, which cause continuous or repetitive circadian sleep disorders of the sleep-wake rhythm due to imbalances between them (Brainard et al., 2015). Functional losses cause adverse effects in social, professional, academic, or other vital areas, as well as mental and physical areas (Seifalian et al., Hart 2019).

## **Chapter 3**

### **Method**

This section is created with the research design, participants, measurement tools, and data analysis. While the first part gives information about the research design, the second part gives the participants' demographic information. In the last part, data collection instruments and data analysis are given.

#### **3.1 Research Design**

This research is designed based on the basic principle of the quantitative research method to make appropriate generalizations and estimations and to carry out causal relationships among the study variables (Hesse-Biber, 2010). As a quantitative research method, this study is completed with a survey research design.

## 3.2 Participants and Settings

This study aims to analyze the role of self-compassion in the relationship between cognitive distortions and the sleep quality of adults. Although there is no sharp limit, any individual over 18 may be considered an adult to participate in this research. The study's target population covers the examination of adults older than 18 years in Turkey within the framework of the role of self-compassion in the relationship between cognitive distortions and sleep quality.

The G-Power calculation method was used when calculating the sample size for the research. Accordingly, the minimum number of participants obtained was found to be 158. But since the snowball method was used in the research, it has been possible to reach more people.

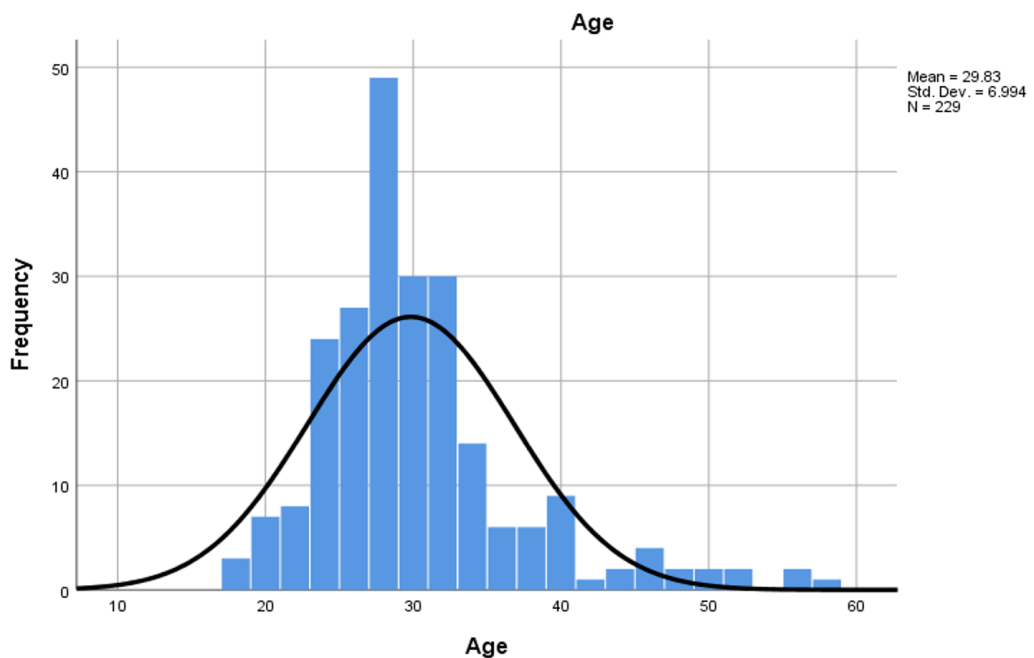
**3.2.1 Demographic characteristics of the participants.** The demographic characteristics of the participants in the study are presented in Table 1. In the final sample, of the 229 participants, 161 (70.3% percent) were female, and 68 (29.7% percent) were male. The age mean was 29.83 (SD = 6.9). It ranged between 18 and 58 years old. The average age of the participants was calculated as 29.83, as indicated in Figure 1. 140 participants (61.1%) are single, 76 (33.2 %) are married, and 5 participants of them (2.2%) are divorced. In the study, 13 participants (5.7%) have a lower income level, 46 (20.1%) participants have a lower-middle income level, 120 participants (52.4%) have a middle-income level, 47 participants (20.5%) have a high-middle income level and 3 participants (1.3%) have a high-income level. While 186 participants (81.2%) were not diagnosed with a psychological disorder by any specialist, 43 participants (18.8%) were diagnosed with a psychological disorder by a specialist. Of the participants, those diagnosed by a specialist received the most diagnoses of General Anxiety Disorder (11 participants). 38 of the participants (16.6%) live alone, 166 of the participants (72.5%) live with their family, 8 of the participants (3.5%) live with a roommate, 14 of the participants (6.1%) live with their lover, and 3 of the participants (1.3%) live in a dormitory.

Table 1

*Summary of Descriptive Statistics for SCS, CDS, and PSQI*

	Statistics					
	Age	Sex	What is your marital status?	Which of the following income levels do you think you are in?	Do you have any psychological disorders that have been diagnosed by a specialist?	Where do you live?
Mean	29.83	1.3	1.52	2.92	1.19	2.86
Median	28.00	1.00	1.00	3.00	1.00	3.00
Std. Deviation	6.994	.458	.846	.826	.391	1.027
Minimum	18	1	1	1	1	1
Maximum	58	2	5	5	2	6

**Histogram**



*Figure 1. The Average Age of the Participants*

### 3.3 Data Collection Instruments

Demographic information form (DIF), CDS, PSQI, and SCS were filled out by the 229 participants.

**3.3.1 Demographic information form.** The researcher designed the DIF. In the form prepared according to the model of the research, six items include the participants' age, gender, marital status, income status, mental health status, and residence information. These questions are designed as multiple-choice or open-ended in themselves.

**3.3.2 Cognitive distortions scale.** Developed by Covin et al. (2011), The Cognitive Distortion Scale (CDS) measures individuals in 10 different areas (All-or-Nothing Thinking, Mental Filter, Emotional Reasoning, Mind Reading, Catastrophizing, Overgeneralization, Labeling, Minimizing or Disqualifying the Positive, Personalization, Should Statements) are intended to measure their tendency to engage in cognitive distortions. In Research, after reading the proposal containing the names and brief explanations of cognitive distortions, 318 university students were expected to answer two possible scenarios. How often do participants behave similarly with the 7-point Likert scoring system they were asked what they did (Every separately for a scenario). In scoring numbers, mean 1= 'Never,' 2= 'Very rare,' 3= 'Occasionally,' 4='Sometimes', 5='Frequently', 6='Quite often', 7='Always'. While the lowest score that participants can get on the scale is 20, the highest score is 140. The Cronbach's Alpha coefficient of internal consistency of the scale was calculated as 85. by the researchers.

The internal consistency of the scale in CDC's studies was conducted on two different samples, with and without clinical Cronbach's alpha coefficients for the clinical sample .93. In contrast, for the non-clinical sample, .91 have been found (Özdel et al., 2014). Ardanıç conducted the Turkish adaptation study of CDC with 288 volunteer participants under the name of CDS (Ardanıç, 2017). The research has been prepared faithfully in its original form. Cronbach's alpha internal consistency coefficient of .88 was calculated, and it was concluded suitable for the Turkish sample (Ardanıç, 2017). A high score obtained from the scale of cognitive distortion indicates that more cognitive distortions have been made.

The Cronbach alpha internal consistency coefficient obtained from the scale within the scope of this study is calculated as .93, presented with the mean and standard deviation values in Table 2. Since the reliability values of each item were calculated as very high when the answers given by the participants in the study were examined, there was no need to make any adjustments, as seen in Table 3. While calculating the scale scoring, the total values of the answers given to each question were taken, and the averages were calculated. The values that appeared last were averaged. Since the average of the scale items is stuck in a very limited area, despite possibly affecting the reliability and normality values, the decimals values on the SPSS were drawn from 0 to 2, and fractional values were entered into the system.

Table 2

*Summary of the Cronbach's Alpha, the Mean, and the Standard Deviation Values of CDS*

Reliability Statistics		Scale Statistics	
Cronbach's Alpha	Mean	Std. Deviation	
.934	74.50	24.789	

Table 3

*Summary of Reliability Values of the Answers Given by the Participants to Each Question for the CDS*

Item-Total Statistics	
	Cronbach's Alpha if Item Deleted
The CDS_A1	.933
The CDS_A2	.931
The CDS_B1	.931

Table 3 (Continue)

*Summary of Reliability Values of the Answers Given by the Participants to Each Question for the CDS*

Item-Total Statistics	
	Cronbach's Alpha if Item Deleted
The CDS_B2	.931
The CDS_C1	.932
The CDS_C2	.932
The CDS_D1	.933
The CDS_D2	.929
The CDS_E1	.931
The CDS_E2	.929
The CDS_F1	.931
The CDS_F2	.929
The CDS_G1	.930
The CDS_G2	.929
The CDS_H1	.931
The CDS_H2	.930
The CDS_I1	.931
The CDS_I2	.930
The CDS_J1	.930
The CDS_J2	.930

**3.3.3 Pittsburgh sleep quality index.** PSQI was developed by Buysse et al. (1989). The scale was adapted into Turkish by Ağargün et al. (1996). The PSQI is a 19-item self-report scale that evaluates sleep quality in the past month. On a scale of 24 questions, 19 questions are answered in the form of a self-report, and a spouse or

roommate answers 5 questions. The 18 items scored on the scale consist of 7 components:

- a) Subjective sleep quality (overall sleep quality in the last month).
- b) Sleep latency: The duration of falling asleep at night and the trouble of being unable to fall asleep within 30 minutes in the last month and its frequency.
- c) Sleep duration: Sum of the hours slept at night last month.
- d) Habitual sleep efficiency: The average time of sleeping and waking up in the last month, the sum of sleep time at night.
- e) Sleep disturbances: Waking up in the middle of the night / early morning, getting up to take a bath, not being able to breathe freely, coughing/snoring loudly, feeling extreme cold or warmth, bad dreams, pain, and other reasons.
- f) Use of sleeping medication: The average quantity of sleeping pills and frequency of falling asleep.
- g) Daytime dysfunction: Frequently having hardly staying awake during daytime activities and the extent of prevention from routine work.

The internal consistency for PSQI in Buysse et al. (1989)'s study was  $\alpha = 0.80$ , and the test-retest reliability coefficient was  $\alpha = 0.79$ , while the internal consistency Cronbach's alpha for the version adapted version by Ulusoy et al. (1998) was  $\alpha = 0.79$  and test-retest reliability coefficient was  $\alpha = 0.79$ .

The Cronbach alpha internal consistency coefficient obtained from the scale within the scope of this study is calculated as .66, presented with the mean and standard deviation values in Table 4. When the answers given by the participants are examined, it is seen that the reliability values from the 4th component decrease the overall average. This component is a question related to the answers given by the participants about their habitual sleep activity. Some participants had difficulty distinguishing the time they spent in bed from their sleep time in the answers they gave in the survey. This may have caused it to affect the reliability score of the 4th component. If this component were deleted, the reliability value would be changed. It could be calculated as .67. However, as seen in Table 5, a high-reliability value was not found, although it is relatively reliable. When calculating the scoring of the scale, component scoring was carried out. Within the scale, 7 different component scores were calculated based on values between 0-3 points, and a total PSQI score was obtained for each participant. A total PSQI score between 0-4 indicates good sleep quality, a value within 5-21

indicates poor sleep quality and a severe deterioration in at least two components of PSQI, or a moderate deterioration in three components.

Table 4

*Summary of the Cronbach's Alpha, the Mean, and the Standard Deviation Values of PSQI*

Reliability Statistics	Scale Statistics	
Cronbach's Alpha	Mean	Std. Deviation
.663	7.10	3.456

Table 5

*Summary of Reliability Values of the Answers Given by the Participants to Each Question for the PSQI*

Item-Total Statistics	
	Cronbach's Alpha if Item Deleted
Component1	.577
Component2	.607
Component3	.664
Component4	.670←
Component5	.620
Component6	.654
Component7	.586

**3.3.4 Self-compassion scale.** SCS assessed levels of adulthood self-compassion. Initially, this scale was developed by Neff (2003b) to measure compassion toward one's self. SCS is a self-report measure with 26 items. It is a Likert-type scale with 6 subscales. The scale ranged from "1 = almost never" to "5 = almost always". The scale includes 5- an item Self- Judgment subscale, 5- an item Self- Kindness scale, 4- an item Common Humanity Subscale, 4- an item Mindfulness subscale, 4- an item isolation subscale, and a 4-item Mindfulness subscale (Neff, 2003b). Scoring high on the scale is taken as an indicator that self-compassion is high in the given dimension. The Turkish SCS version developed by Deniz et al. (2008) was used in the present study.

To test the factor structure of SCS, Confirmatory Factor Analysis (CFA) was conducted. The gathered results demonstrated a single higher-order factor of self-compassion with a Non-Normed Fit Index (NNFI) = .90 and Comparative Fix Index (CFI) = .92. Test-retest reliability was found as .93. Internal consistency of SCS was .92. Internal consistencies of subscales ranged from .75 to .81 (Neff, 2003b).

Turkish adaptation, reliability, and validity of the SCS scale were implemented by Deniz, Kesici, and Summer (2008). Because their loadings were below .30, researchers omitted the 1st and 22nd items. For 26 items, the item-total correlation changes between .029 to .646. Therefore, the ones below the .30 item-total correlation have been removed from the scale. For the scale's reliability, Cronbach Alpha internal consistency coefficient has been computed for item analysis. It was found to be .89. Also, the internal consistency coefficient is .89, and the test-retest test correlation is .83. There was a positive correlation between Turkish and English forms of SCS ( $r = .96, p < .001$ ).

The Cronbach alpha internal consistency coefficient obtained from the scale within the scope of this study is calculated as .56, presented with the mean and standard deviation values in Table 6. When the answers given by the participants are examined, it is seen that the reliability value of 13. question decreases the overall reliability average. This question has a more extended sentence structure than the others. Its content is about conveying emotions and accepting them as they are in a failed situation. Participants may need help to understand what they want to say because the problem has a more complex structure due to its nature. If this question had been

deleted from the scale, the reliability value could have been calculated as 581. However, as seen in Table 7, a high-reliability value was not found, although it is low-reliable. Participants may have needed clarification about the content of the questions, so they needed to be more consistent when giving answers. When calculating the scoring of the scale, the average of each item on the scale was taken into account. But before that, 11,12,4,8,1 and 9. scale items of inverses were calculated. An average score was created separately for each sub-dimension. Since the average of the scale items is stuck in a very limited area, despite possibly affecting the reliability and normality values, the decimals values on the SPSS were drawn from 0 to 2, and fractional values were entered into the system.

Table 6

*Summary of the Cronbach's Alpha, the Mean, and the Standard Deviation Values of SCS*

Reliability Statistics		Scale Statistics	
Cronbach's Alpha	.565	Mean	81.93
		Std. Deviation	8.9

Table 7

*Summary of Reliability Values of the Answers Given by the Participants to Each Question for the SCS*

Item-Total Statistics	
	Cronbach's Alpha if Item Deleted
The SCS_1	.576
The SCS_2	.571
The SCS_3	.555
The SCS_4	.538
The SCS_5	.572
The SCS_6	.544

Table 7 (Continue)

*Summary of Reliability Values of the Answers Given by the Participants to Each Question for the SCS*

Item-Total Statistics	
	Cronbach's Alpha if Item Deleted
The SCS_7	.564
The SCS_8	.571
The SCS_9	.549
The SCS_10	.553
The SCS_11	.542
The SCS_12	.578
The SCS_13	.581←
The SCS_14	.576
The SCS_15	.542
The SCS_16	.535
The SCS_17	.530
The SCS_18	.562
The SCS_19	.570
The SCS_20	.530
The SCS_21	.524
The SCS_22	.525
The SCS_23	.571
The SCS_24	.570
The SCS_25	.572
The SCS_26	.526

### **3.4 Data Collection Procedures**

This thesis used the survey technique to collect data from the population. For this purpose, the survey forms were supported by social media; they were sent to the target population, and the forms were answered via Google Forms by 229 people representing the specified characteristics. The content participants are expected to answer DIF, SCS, CDC, and PSQI. No invalid content was found in the participants' data. For this reason, all data were used in the study. As a result, the research sample consisted of 229 people, and the data were analyzed using SPSS 25. By the Scientific Research and Publication Ethics Committee of Bahçeşehir University E-85646034-604.02.02-60065 it has been understood that this thesis, which was examined on 27.04.2023 with its numbered document, does not contain any violation of Scientific Research and Publication Ethics (See Appendices 5).

### **3.5 Data Analysis**

The data were analyzed using SPSS 25. Normality tests of all scales were performed before starting the analyses in the study. The Pearson Correlations of all scales were examined. After that, Point Biserial Correlation was applied to measure the relationship between all variables of the situations and whether there is a psychological disorder. Linear Regression calculation was performed for all scales. T-Test was performed to determine whether there was a significant difference between gender, the presence of any psychological disorders, and the PSQI\_Score Groups. One-Way ANOVA was performed to determine whether there is a significant difference between marital status, income status, and place of residence. Then, the moderating role of self-compassion in the effect of cognitive distortions on sleep quality was tested with Regression Analysis using Process Macro. Finally, the Chi-Square Test was performed to determine whether there was a significant difference between the PSQI\_Score Groups and SC\_Score Groups.

## Chapter 4

### Results

This section involves statistical analysis that is applied to the data that have been gathered in line with the purpose of the current study. The first part consists of Normality Test Results. The following part includes the results of the Pearson Correlation, Point Biserial Correlation, and Linear Regression. The next part consists of the results of the Independent Sample T-Test and One-Way ANOVA. Another part is related to the results of the moderating role of self-compassion in the effect of cognitive distortions on sleep quality. The last part involves the results of the Chi-Square results. The Self-Compassion Score (SC\_Score) is a calculated value of the SCS by taking the averages of all scale items under appropriate conditions. The Cognitive Distortions Score (CD\_Score) is a value of CDS by taking the averages of all scale items under appropriate conditions. The Pittsburgh Sleep Quality Score (PSQI\_Score) is a value calculated by collecting all the PSQI components under appropriate conditions.

#### 4.1 Normality Test Results, Skewness, and Kurtosis Values

This section below presents the normality, skewness, and kurtosis values of three scales, SC\_Score, CD\_Score, and PSQI\_Score. According to Kolmogorov-Smirnov, the score value of the Normality test CD\_Score was normal ( $p=.200 > \alpha$ ), and the score values of the PSQI\_Score ( $p=.000 < \alpha$ ) and SC\_Score ( $p=.001 < \alpha$ ) were not normal. However, since the Skewness and Kurtosis values were included in the plus-minus 1 values for all three scores, parametric tests were applied assuming normal (See Table 8).

Table 8

*Summary of Normality Tests, Skewness and Kurtosis of SC\_Score, CD\_Score, and PSQI\_Score*

Tests of Normality				
	Kolmogorov-Smirnov <sup>a</sup>	Shapiro-Wilk	Skewness	Kurtosis
	Sig.	Sig.		
SC_Score	.001	.001	.334	.801
CD_Score	.200	.156	.054	.360
PSQI_Score	.000	.000	.575	.227

#### 4.2 Pearson Correlation Test Results

When the Pearson Correlation analysis results were examined, it was observed that the hypothesis put forward was confirmed. Accordingly, it has a positive relationship with the scores of the CD\_Score and the PSQI\_Score ( $p=.274 > \alpha$ ). Accordingly, sleep quality increases as cognitive distortions decrease in adults.

In addition, the SC\_Score and the CD\_Score also have a negative and significant relationship ( $p=-.144 < \alpha$ ). This means that adults make fewer cognitive distortions with increasing self-compassion. Finally, there is a negative and significant relationship between the SC\_Score and the PSQI\_Score ( $p=-.142 < \alpha$ ). According to this, the quality of sleep also increases with the increase of self-compassion of adults (See Table 9).

Table 9

*Summary of Pearson Correlation Test for SC\_Score, CD\_Score, and PSQI\_Score*

		Correlations		
		SC_Score	CD_Score	PSQI_Score
SC_Score	Pearson Correlation	1	-.144*	-.142*
	Sig. (2-tailed)		.029	.031
CD_Score	Pearson Correlation	-.144*	1	.274**
	Sig. (2-tailed)	.029		
PSQI_Score	Pearson Correlation	-.142*	.274**	1
	Sig. (2-tailed)	.031	.000	

### 4.3 Point Biserial Correlation Test Results

The Point Biserial Correlation test was applied below, and the hypotheses were tested. Accordingly, a negative and significant relationship was found between having a psychological disorder and CD\_Score ( $p < 0.05$ ,  $r = -.144$ ). This means that the more the state of cognitive distortion of adults increases, the less the state of having a psychological disorder decreases. In addition, a negative and significant relationship was found between having a psychological disorder and PSQI\_Score ( $p < 0.05$ ,  $r = -.142$ ). This means that as the sleep quality of adults increases, the likelihood of having a psychological disorder decreases. Finally, there was no significant relationship between having a psychological disorder and SC\_Score ( $p > 0.05$ ,  $r = -.092$ ). This, on the other hand, shows that individuals with or without a condition of having a psychological disorder with self-compassion are not in any relationship (See Table 10).

Table 10

*Summary of Point Biserial Correlation Test for SC\_Score, CD\_Score, PSQI\_Score, and the Presence of a Psychological Disorder*

		Correlations			
		Presence of a Psychological Disorder	SC_Score	CD_Score	PSQI_Score
Presence of a Psychological Disorder	Pearson Correlation	1	-.092	.199**	.316**
	Sig (2-tailed)		.165	.002	.000
SC_Score	Pearson Correlation	-.092	1	-.144*	-.142
	Sig (2-tailed)	.165		.029	.031
CD_Score	Pearson Correlation	.199**	-.144*	1	.274**
	Sig (2-tailed)	.002	.029		.000
PSQI_Score	Pearson Correlation	.316**	-.142*	.274**	1
	Sig (2-tailed)	.000	.031	.000	

#### 4.4 Linear Regression Test Results

In this section, PSQI\_Score dependent variables, SC\_Score, and CD\_Score are taken as independent variables, and the Linear Regression results are given below. The significance of the model is 29.3%(R). The argument in the model, SC\_Score, and CD\_Score, explain the PSQI\_Score variable at a rate of 7.8% (Adjusted R<sup>2</sup>) (See Table 11).

Table 11

*Summary of Linear Regression Test for SC\_Score, CD\_Score, and PSQI\_Score*

Model Summary		
R	R Square	Adjusted R Square
.293	.086	.078

*a.Predictors: (Constant), CD\_Score, SC\_Score*

H<sub>0</sub>: Model is insignificant.

H<sub>1</sub>: Model is significant.

p= 0.000 < 0.05 H<sub>0</sub> is not accepted.

The PSQI\_Score is influenced by the CD\_Score and the SC\_Score (See Table 12).

Table 12

*Summary of Linear Regression Test for SC\_Score, CD\_Score, and PSQI\_Score*

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	233.391	2	116.696	10.591	.000
Residual	2490.093	226	11.018		
Total	2723.485	228			

*a.Dependent Variable: PSQI\_Score*

*b.Predictors: (Constant), CD\_Score, SC\_Score*

According to Table 13, the linear regression model can be written as Equation (4.1).

$$y = 2.646 + 0.174CD\_Score + 0.773SC\_Score \quad (4.1)$$

H<sub>0</sub>: Constant is not significant.

H<sub>1</sub>: Constant is significant.

p=0.001 < 0.05 H<sub>0</sub> is not accepted (rejected)

H<sub>0</sub>: CD\_Score is not significant.

H<sub>1</sub>: CD\_Score is significant.

p=0.000 < 0.05 H<sub>0</sub> is not accepted (rejected)

H<sub>0</sub>: SC\_Score is not significant.

H<sub>1</sub>: SC\_Score is significant.

p=0.104 > 0.05 H<sub>0</sub> is accepted

The last model is accepted as Equation (4.2):

$$y = 2.646 + 0.174CD\_Score \quad (4.2)$$

The SC\_Score does not affect the PSQI\_Score. In other words, according to the table, the self-compassion values of adults do not significantly affect the values of sleep quality. On the other hand, the CD\_Score affects the PSQI\_Score. This means that adults' cognitive distortions significantly impact their sleep quality (See Table 13).

Table 13

*Summary of Linear Regression Test for SC\_Score, CD\_Score, and PSQI\_Score*

	Coefficients				
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	8.536	2.646		3.226	.001
CD_Score	.699	.174	.259	4.022	.000
SC_Score	-1.263	.773	-.105	-1.634	.104

*a. Dependent Variable: PSQI\_Score*

#### 4.5 Independent Sample T-Test Results

In this section, when the Independent Sample T-Test was performed, Gender was taken as women and men in 2 different categories. It was focused on whether the three variables had any significant differences in gender. When looking at the SC\_Score value, it was assumed that the variances were equal and that the variances were homogeneous ( $p=.052>\alpha$ ). At the same time,  $H_0$  has been accepted for the SC\_Score value ( $p=.268>\alpha$ ). The CD\_Score value was assumed to be equal to the variances, and the variances were found to be homogeneous ( $p=.322>\alpha$ ). At the same time,  $H_0$  is also accepted for the CD\_Score value ( $p=.448>\alpha$ ). When looking at the PSQI\_Score value, it was assumed that the variances were equal, and it was found that the variances were homogeneous ( $p=.892>\alpha$ ). Finally,  $H_0$  is also accepted for the PSQI\_Score value ( $p=.896>\alpha$ ). There is no significant difference between males and females regarding SC\_Score, CD\_Score, and PSQI\_Score. Gender does not affect SC\_Score, CD\_Score, and PSQI\_Score (See Table 14).

Table 14

*Summary of Independent Sample T-Test for Gender*

		Levene's Test For Equality of Variances			
		F	Sig.	t	Sig. (2-tailed)
SC_Score	Equal variances assumed	3.818	.052	-1.111	.268
	Equal variances not assumed			-1.005	.317
CD_Score	Equal variances assumed	.986	.322	.761	.448
	Equal variances not assumed			.796	.427
PSQI_Score	Equal variances assumed	.018	.892	.131	.896
	Equal variances not assumed			.126	.900

In this section, the presence of a psychological disorder while applying the Independent Sample T-Test has been examined in two categories: 'present' and 'absent.' It was focused on whether the three variables had significant differences in terms of psychological disorders. When looking at the SC\_Score value, it was assumed that the variances were equal, and it was found that the variances were homogeneous ( $p=.632>\alpha$ ). At the same time,  $H_0$  is accepted for the SC\_Score value ( $p=.165>\alpha$ ). The CD\_Score value was assumed to be equal to the variances, and found that the variances were homogeneous ( $p=.668>\alpha$ ). On the other hand,  $H_0$  is rejected for the CD\_Score value ( $p=.002<\alpha$ ). When looking at the PSQI\_Score value, it was assumed that the variances were equal, and it was found that the variances were homogeneous ( $p=.457>\alpha$ ). Finally,  $H_0$  is also rejected for the PSQI\_Score value ( $p=.000<\alpha$ ). There is no significant difference between the self-compassion of individuals whether they have any psychological disorders or not. On the other hand, there is a significant difference on the cognitive distortions of whether they have any psychological disorders or not. Finally, there is a significant difference between the quality of sleep of individuals whether they have any psychological disorders or not (See Table 15).

Table 15

*Summary of Independent Sample T-Test for the Presence of a Psychological Disorder*

		Levene's Test For Equality of Variances			
		F	Sig.	t	Sig. (2-tailed)
SC_Score	Equal variances assumed	.231	.632	1.393	.165
	Equal variances not assumed			1.288	.203
CD_Score	Equal variances assumed	.184	.668	-3.068	.002
	Equal variances not assumed			-2.956	.004
PSQI_Score	Equal variances assumed	.556	.457	-5.020	.000
	Equal variances not assumed			-4.511	.000

In this section, PSQI\_Score Groups were examined in two categories: 'good sleep quality' and 'bad sleep quality,' while the Independent Sample T-Test was applied. It focused on whether the three variables had significant differences in sleep quality. When looking at the SC\_Score value, it was assumed that the variances were equal, and the variances were found to be homogeneous ( $p=.053>\alpha$ ). At the same time,  $H_0$  is accepted for the SC\_Score value ( $p=.066>\alpha$ ). The CD\_Score value was assumed to be equal to the variances, and the variances were found to be homogeneous ( $p=.564>\alpha$ ). On the other hand,  $H_0$  is rejected for the CD\_Score value ( $p=.000<\alpha$ ). When looking at the PSQI\_Score value, it was assumed that the variances were not equal, and it was found that the variances were not distributed homogeneously ( $p=.000<\alpha$ ). Finally,  $H_0$  is also rejected for the PSQI\_Score value ( $p=.000<\alpha$ ). There is no significant difference between individuals having good or bad sleep quality and their self-compassion. There is no significant difference between individuals having good or bad sleep quality and their cognitive distortions. There is an significant difference between the fact that individuals have good or bad sleep quality and their sleep quality.(See Table 16).

Table 16

*Summary for Independent Sample T-Test for the PSQI\_Score Groups*

		Levene's Test For Equality of Variances			
		F	Sig.	t	Sig. (2-tailed)
SC_Score	Equal variances assumed	3.786	0.53	1.848	.066
	Equal variances not assumed			2.068	.041
CD_Score	Equal variances assumed	.334	.564	-5.192	.000
	Equal variances not assumed			-5.477	.000
PSQI_Score	Equal variances assumed			-14.580	.000
	Equal variances not assumed	31.020	.000	-14.580	.000

#### 4.6 One-Way ANOVA Test Results

In this section, while One-Way ANOVA was applied, marital status questions were examined in five categories: 'single,' 'married,' 'divorced,' 'lost a spouse,' and 'other.' It was focused on whether the three variables had significant differences in marital status. When the SC\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.457>\alpha$ ). When the CD\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.207>\alpha$ ). Finally, when the PSQI\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.106>\alpha$ ). In this case, the marital status of individuals does not have a significant difference on their SC\_Score, CD\_Score, and PSQI\_Score (See Table 17).

Table 17

*Summary of One-Way ANOVA for the Marital Status of the Groups*

		ANOVA			
		Sum of Square	Mean Square	F	Sig.
SC_Score	Between Groups	216	.072	.871	.457
	Within Groups	18.621	.083		
	Total	18.837			
CD_Score	Between Groups	7.457	2.486	1.530	.207
	Within Groups	365.492	1.624		
	Total	372.949			
PSQI_Score	Between Groups	72.810	24.270	2.060	.106
	Within Groups	2650.675	11.781		
	Total	2723.485			

In this section, while applying One-Way ANOVA, income status questions were examined in five categories 'low,' 'low-middle,' 'middle,' 'middle-high,' and 'high.' It focused on whether the three variables had significant differences in income status. When the SC\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.114>\alpha$ ). When the CD\_Score value was examined, a significant difference was found between the groups, and  $H_0$  was rejected ( $p=.005<\alpha$ ). Finally, when the PSQI\_Score value was examined, a significant difference was found between the groups again, and  $H_0$  was rejected ( $p=.030<\alpha$ ). In this case, there is no significant difference between the income status of individuals and their self-compassion. There is a significant difference between the income status of individuals and their cognitive distortions. There is a significant difference between the income status of individuals and their sleep quality (See Table 18).

Table 18

*Summary of One-Way ANOVA for Income Status of the Groups*

		ANOVA			
		Sum of Square	Mean Square	F	Sig.
SC_Score	Between Groups	.614	.154	1.888	.114
	Within Groups	18.223	.081		
	Total	18.837			
CD_Score	Between Groups	23.637	5.909	3.789	.005
	Within Groups	349.313	1.559		
	Total	372.949			
PSQI_Score	Between Groups	126.625	31.656	2.731	.030
	Within Groups	2696.859	11.593		
	Total	2723.485			

According to the results of the One-Way ANOVA test conducted with income levels for CD\_Score and PSQI\_Score variables, significant differences were found between significant groups (See Table 18). In this section, the posthoc test was conducted to determine which of the 5 different subcategories 'low,' 'low-middle,' 'middle,' 'middle-high', and 'high' marital status categories contribute significantly to these two variables. Accordingly, when looking at the income situations for the CD\_Score variable, the 'middle-high' ( $p=.019 < \alpha$ ) and 'low-middle' ( $p=.006 < \alpha$ ) groups bring significant differences. On the other hand, the value received by the 'middle-high' and 'high' groups for the PSQI\_Score variable can be called red at the limit; that is, it is very close to the alpha value ( $p=.052 > \alpha$ ). For this reason, 'low,' 'low-middle,' and 'middle-high' are considered separate groups. 'High' has been treated as a separate group (See Table 19).

Table 19

*Summary of Post Hoc Tests for Income Status of the Groups*

Post Hoc Tests				
Multiple Comparisons				
Dependent Variable		Which of the following income levels do you think you are in?	Which of the following income levels do you think you are in?	Sig.
CD_Score	Tukey HSD	Low-Middle	Middle-High	.006
CD_Score	Scheffe	Middle-High	Low-Middle	.019
PSQI_Score	Tukey HSD	Middle-High	High	.052←

In this section, while One-Way ANOVA was applied, the residence places of individuals were examined in seven categories such as 'I live alone,' 'together with relatives,' 'with my family,' 'together with my housemates', and 'together with my lover,' 'I live in a dormitory' and 'other.' It was focused on whether the three variables had significant differences in places of residence. When the SC\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.098>\alpha$ ). When the CD\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.696>\alpha$ ). When the PSQI\_Score value was examined, no significant difference was found between the groups, and  $H_0$  was accepted ( $p=.775>\alpha$ ). The people's residence does not significantly difference their SC\_Score, CD\_Score, and PSQI\_Score (See Table 20).

Table 20

*Summary of One-Way ANOVA for the Residence of Groups*

		ANOVA			
		Sum of Square	Mean Square	F	Sig
SC_Score	Between Groups	.763	.153	1.884	.098
	Within Groups	18.074	.081		
	Total	18.837			
CD_Score	Between Groups	4.998	1.000	.606	.696
	Within Groups	367.951	1.650		
	Total	372.949			
PSQI_Score	Between Groups	30.291	6.058	.502	.775
	Within Groups	2696.194	12.077		
	Total	2723.485			

#### 4.7 Results of Testing Moderating Effect of the Self-Compassion Scale

The hypothesis (Hypothesis 2) regarding whether self-compassion has a moderating role in the effect of cognitive distortions on sleep quality (SQ) was tested using the Process Macro add-on tool for SPSS. For that purpose, the simple moderation effect model number-1 was chosen in Process Macro. Before the analysis, the values of all variables were centralized. As seen in Table 21, the CD, SC, and the interactional term CD\*SC included in the model explained 0,0928 percent of the change in sleep quality. The CD does predict and has no significant effect on sleep quality ( $b = -1.88$ ,  $p > 0.01$ ). It was determined that the interactional effect (CD\*SC) of the CD and SC on SQ was not significant ( $b = 0.82$ ,  $p > 0.01$ ) (See Table 22). Based on the findings, the sloop test has been conducted, and the conditional effect was depicted graphically in Figure 4.3. According to Figure 3, participants with a score of 2.92 and below have a low SC value; participants with a score of 3.17 and below have a medium SC value; participants with a score of 3.44 and above have a high SC value. As a result of these findings, the hypothesis (Hypothesis 2) of the research was not supported. In other words, in the moderator role of SC, CD does not have a significant effect on SQ.

Table 21

*Summary of Regression Analysis for the Moderating Role of SC in the Effect of CD on SQ*

Model Summary		
R	R <sup>2</sup>	p
0.3046	0.0928	0.0001

Table 22

*Summary of Regression Analysis for the Moderating Role of SC in the Effect of CD on SQ*

Model				
	SQ			
	<i>b</i>	<i>t</i>	<i>p</i>	
Constant	18.5572	2.3135	0.0216	
CD	-1.8881	-0.9620	0.3371	
SC	-4.4264	-1.7618	0.0795	
CD.SC	0.8204	1.3231	0.1871	

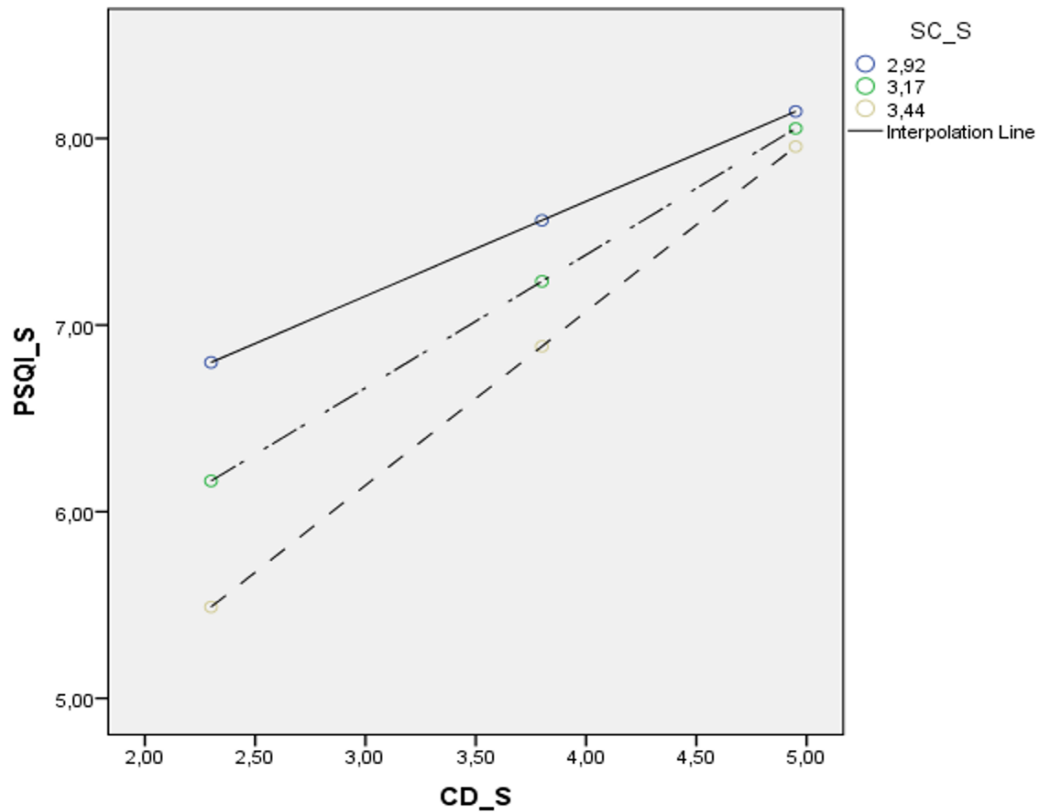


Figure 3. Moderating Role of the SC

#### 4.8 Chi-Square Test Results

In this section, in addition to the above analyses, to examine the relationship between self-compassion and sleep quality values, which are one of the main hypotheses of the thesis, it is aimed to conduct a more detailed study since no significant results have been found before. For this purpose, the Self-Compassion variable was aimed to be examined in 4 different categories (1,2,3 and 4) at a nominal level as the SC\_Score Groups. Then the PSQI\_Score Groups and Chi\_Square values were calculated (See Table 23). However, in the obtained data set, the values of the SC\_Score Groups remained within 2 values as 3 and 4. This situation has also negatively affected the results obtained (See Table 24).

Table 23

*Summary of Chi-Square for the PSQI\_Score Groups in Terms of SC\_Score Groups*

		Crosstabulation	
		SC_Score Groups	
		Low Self-Compassion	High Self-Compassion
PSQI_Score Group	Good Sleep Quality	51	8
	Poor Sleep Quality	142	28

Table 24

*Summary of Chi-Square for the PSQI\_Score Groups in Terms of SC\_Score Groups*

Chi-Square Tests		
	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test	.682	.382

*a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 9.28.*

$p = 0.682 > 0.05 = \alpha$   $H_0$  accepted.

PSQI\_Score Groups and SC\_Score Groups are independent of each other as assessed by Fisher's Exact Test (0 cells (0.0%) have an expected count less than 5 (See Table 4.13).

## Chapter 5

### Discussion and Conclusion

This section will discuss the essential findings of the current research, describe the theoretical and practical implications of the study, and clarify the limitations and recommendations of the study for future studies. This current study aimed to investigate the relationship between sleep quality and cognitive distortions under the moderator effect of self-compassion for adults between 18 and 58. However, the effects of self-compassion on cognitive distortions have been shown in various studies (e.g., Akın, 2010; Stanziano, 2019). No published empirical study has examined the relationship between cognitive distortions and sleep quality under the moderator effect of self-compassion from the point of view of adults. The aim of this study is to fill this gap in the literature to some extent. Data were collected from adults living in Turkey using the survey technique to test the research hypotheses. The final sample consisted of 229 participants, and the hypotheses were tested with Linear Regression Analyses. In addition, other statistical tests were conducted as Pearson Correlation, Independent Sample T-Test, One-Way ANOVA, and Chi-Square Test.

#### 5.1 Discussion of Findings for Impact of Cognitive Distortions and Sleep Quality

Regression analysis was performed to see if the level of cognitive distortion predicted sleep quality. The regression analysis results showed that cognitive distortions negatively affect sleep quality. These results showed that distortions with cognition also explain a significant part of the change in sleep quality scores. Also, the results showed that lower cognitive distortions were associated with better sleep quality and higher self-compassion was associated with higher sleep quality. This study's results align with the evidence showing that lower cognitive distortions are associated with better sleep quality in individuals. Some previous studies have also reported a negative relationship between cognitive distortions and sleep quality (e.g., Akın, 2010; Stanziano, 2019). For this reason, it can be said that our findings about cognitive distortions and sleep quality are consistent with these studies regarding the hypothesis we have established.

## **5.2 Discussion of Findings for Testing Moderating Effect of Self-Compassion**

To examine the effects of SC on the relationship between CD and SQ, moderation analysis was performed, and the moderating effect of SC was tested using Process Macro. Based on the result, it was found that in the moderator role of SC, CD does not have a significant effect on SQ. Although no significant results were found between the variables in the model (Table 22), the p-value was significant ( $p = 0.0001$ ) in the model summary (Table 21). This may be because the constant value ( $p = 0.0216$ ) in the model has a significant value at the limit. This study, to the best of our knowledge, is the first attempt to explore the moderating role of SC on the relationships between CD and SQ in the related literature. However, some studies have reported that SC can be an eliminating factor in relationships between psychological constructs. For instance, a recent study by Barczak and Eklund (2018) reported that self-compassion moderated the relationships between performance and subsequent coping and motivation. Because of that, the present study is vital in adding to the literature examining the impact of CD on SQ.

In conclusion, longitudinal studies with a more robust method, such as randomized controlled trials, are needed to evaluate further the causality and directionality of these relationships among cognitive distortions and sleep quality moderated by self-compassion.

## **5.3 Conclusion**

The aim of the study is to investigate the moderate role of self-compassion in the relationship between cognitive distortions and the sleep quality of adults living between the ages of 18 and 58 in Turkey. The following results were reached in this study.

- a) A statistically significant positive relationship was found between CD and SQ.
- b) A statistically significant negative relationship was found between SC and CD.
- c) A statistically significant negative relationship was found between SC and SQ.
- ç) SC values of adults do not significantly affect SQ values.

- d) CD values of adults significantly impact their SQ values.
- e) There is no significant difference between males and females regarding SC\_Score, CD\_Score, and PSQI\_Score. Gender does not affect SC\_Score, CD\_Score, and PSQI\_Score.
- f) There is no significant difference between the SC values and whether individuals have any psychological disorders or not. On the other hand, there is a significant difference between CD values and whether individuals have any psychological disorders or not. Finally, there is a significant difference between the SQ values and whether individuals have any psychological disorders or not.
- g) There is no significant difference between individuals with good or poor sleep quality and SC values. On the other hand, there is a significant difference between individuals with excellent or poor SQ values and CD values.
- h) There is no significant difference between the marital status of individuals and SC\_Score, CD\_Score and PSQI\_Score.
- i) There is no significant difference between the income status of individuals and their SC, CD, and SQ values.
- j) From the point of view of the CD\_Score, the 'medium-high' income group and the 'low-medium' income groups have significant differences.
- k) There is no significant difference between the people's residence and their SC\_Score, CD\_Score and PSQI\_Score.
- l) In the moderator role of SC, CD does not have a significant effect on SQ.
- m) PSQI\_Score Groups and SC\_Score Groups are independent of each other.

In conclusion, the most striking detail of the research is that the relationship between CD and SQ is included in significant relationships in many different variations (See items a, e, h). This is also of great importance in terms of the meaning of the study. There are similar studies in the literature that the human mind is affected in such a way that when it repeats a negative thought too much, it can negatively affect SQ (Thomsen et al., 2003). On the other hand, significant results have yet to be reached regarding investigating the relationship between CD and SQ on the moderator effect of SC, which is the primary purpose of this study (See item m).

## 5.4 Limitations and Recommendations

There should be careful consideration of certain limitations on the result. One of the first issues to be addressed is the number of samples. 229 people living in Turkey participated in the study. The limited number of people may be one of the aspects of this study that needs to be improved. If data could have been collected from more people over a longer period of time, the study could have been more comprehensive. Time limitation has been a big problem. Another issue is that participants can be included, except those in Turkey. This may be recommended for subsequent studies. In the study, rate differences are observed between women (70.3%) and men (29.7%). The imbalance between the sexes may have negatively affected the research findings. The fact that social media was used as a source here and the snowball method was preferred may have caused this gender imbalance. In future studies, different research methods (such as randomized controlled trial design) may be preferred as they will be more valid and reliable.

Another area for improvement is the limitations experienced with the data set. Several issues related to the participants' responses, especially on the Self-Compassion Scale, attracted attention. When the answers given were analyzed, they should be decomposed on 4 different categorical values, while the entire accumulation was collected in the numbers 3 and 4. This has also caused the results to be negatively affected. The conclusion to be drawn from this is that the participants may not have understood what the questions meant due to the difficulty of the scale and may have chosen the answers that seemed optimistic to them in general. It was discussed in the analysis section that the 13.SCS question, which negatively affects the Cronbach Alpha score, has a longer and more complex structure than the other questions. In subsequent studies, providing more detailed preliminary information about the scale may be necessary for participants to know about the scale before starting the study.

There needs to be an unbalanced distribution between income levels in demographic information. In particular, the fact that there are only 3 people in the 'high' (1.3%) income distribution may have negatively affected the results obtained. This may have emerged as a risk factor, especially in One-Way ANOVA results. The

results may have been meaningless because the income distribution between the groups was uneven after the posthoc. In the available data, it is seen that there is the largest population in the 'middle' (52.3%) income group. In future studies, it may be essential to prefer research methods that recruit similar numbers of participants from all parts of society.

Another area for improvement is the possibility that the meaning confusion experienced by the participants about the content of the questions in the answers they gave on the SQS affected the results. On the SQS, 4. the component's questions about 'time spent in bed' and 'sleep duration' were not distinguished by the participants. Since the participants calculated and wrote down the 'time spent in bed' by including the 'sleep duration', the results were meaningless. However, the 'time spent in bed' can also be awake. For this reason, the difference between these two cases should be emphasized to the participants in the following studies in an essential way so that similar misunderstandings do not happen again.

Last but not least, there are few studies in the literature about the chosen research topic. This has caused severe research difficulties, especially in the literature review. A detailed study was conducted with limited data. This study is a rare example of composition within this framework in which more than one variable is created together. It is expected to be an essential source of inspiration for subsequent studies. Although no meaningful conclusion has been reached on the second hypothesis, the results obtained in the whole study are at a level that can significantly contribute to the literature.

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