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# Predictive Effect of Social Cognitive Skills on Social Anxiety

## *Sosyal Biliş Becerilerinin Sosyal Kaygı Üzerindeki Yordayıcı Etkisi*

Nesibe Olgun Kaval[1], Haluk Arkar[2]

[1]Karadeniz Technical University, Trabzon, Turkey
[2]Ege University, İzmir, Turkey

**ABSTRACT**

The main purpose of this study is to examine the relationship between social anxiety and social cognition skills (emotion identification/discrimination, theory of mind, attribution bias, social functioning) and to investigate the predictive power of social cognition skills on social anxiety. In the study, it was also investigated whether social anxiety, social cognition skills and depression scores differed according to gender, age, reported diagnosis status and anxiety level. The sample of the study consisted of a total of 385 participants between the ages of 18-60. The research data were collected from the participants online using the Liebowitz Social Anxiety Scale, the Facial Emotion Identification and Facial Emotion Discrimination Tests, Reading the Mind in the Eyes Test, the Internal, Personal and Situational Attributes Scale, the Social Functioning Scale, the Beck Depression Inventory, and the Sociodemographic Information Form. It was determined that there was a negative relationship between social anxiety and emotion recognition, emotion discrimination and mind reading, and a positive relationship with externalization bias and depression. It was found that depression, emotion recognition and discrimination, mind reading, and antecedent social activities scale scores significantly predicted social anxiety. These variables explain 52% of the total variance related to social anxiety. In addition, when the depression effect was controlled, it was seen that social cognition skills explained 32% of the variance related to social anxiety. It was determined that the deterioration in social cognition skills and depression scores were associated with an increase in social anxiety. According to the results obtained from the research, suggestions were made to prevent social anxiety. It is suggested that it would be beneficial to include activities to develop social cognition skills, which are important for individuals' interpersonal communication, within intervention programs.

**Keywords:** Social anxiety, Social cognition, Emotion recognition, Theory of mind, Social functioning

**ÖZ**

Bu çalışmanın temel amacı sosyal kaygı ile sosyal biliş becerileri (duygu tanıma/ayırt etme, zihin kuramı, atıf yanlılığı, sosyal işlevsellik) arasındaki ilişkiyi incelemek ve sosyal biliş becerilerinin sosyal kaygıyı yordama gücünü araştırmaktır. Çalışmada ayrıca sosyal kaygı, sosyal biliş becerileri ve depresyon puanlarının cinsiyet, yaş, bildirilen tanı durumu ve sosyal kaygı düzeyine göre farklılaşıp farklılaşmadığı araştırılmıştır. Çalışmanın örneklemini, 18-60 yaşları arasında bulunan toplam 385 kişi oluşturmuştur. Araştırma verileri çevrimiçi olarak Liebowitz Sosyal Anksiyete Ölçeği, Yüzde Dışavuran Duyguların Tanınması ve Ayırt Edilmesi Testi, Gözlerden Zihin Okuma Testi, İçsel, Kişisel ve Durumsal Atıflar Ölçeği, Sosyal İşlevsellik Ölçeği, Beck Depresyon Envanteri ve Sosyodemografik Bilgi Formu kullanılarak katılımcılardan toplanmıştır. Sosyal kaygı ile duygu tanıma, duygu ayırt etme ve gözlerden zihin okuma arasında negatif, dışsallaştırma yanlılığı ve depresyon ile ise pozitif yönde anlamlı ilişki olduğu belirlenmiştir. Depresyon, duygu tanıma ve ayırt etme, gözlerden zihin okuma ve öncül sosyal etkinlikler ölçek puanlarının sosyal kaygıyı anlamlı düzeyde yordadığı bulunmuştur. Bu değişkenler sosyal kaygıya ilişkin toplam varyansın %52'sini açıklamaktadır. Ayrıca, depresyon etkisi kontrol edildiğinde sosyal biliş becerilerinin sosyal kaygıya ilişkin varyansın %32'sini açıkladığı görülmüştür. Sosyal biliş becerilerindeki bozulmanın ve depresyon puanlarının sosyal kaygının artışıyla ilişkili olduğu belirlenmiştir. Araştırmadan elde edilen sonuçlara göre, sosyal kaygıyı önlemeye yönelik önerilerde bulunulmuştur. Müdahale programları içerisinde bireylerin kişilerarası iletişimi için önemli olan sosyal biliş becerilerini geliştirmeye yönelik etkinliklere yer verilmesinin yararlı olacağı önerilmektedir.

**Anahtar sözcükler:** Sosyal kaygı, Sosyal biliş, Duygu tanıma, Zihin okuma, Sosyal işlevsellik

**Address for Correspondence:** Nesibe Olgun Kaval, Karadeniz Technical University, Faculty of Letters, Department of Psychology, Trabzon, Turkey
**E-mail:** nesibe.olgun@gmail.com **Received:** 26.08.2022 **Accepted:** 02.11.2022
**ORCID ID:** 0000-0002-3591-9397

## Introduction

Social phobia, also known as a social anxiety disorder (SAD), is defined as the state of experiencing fear and anxiety that the person is scrutinized and negatively evaluated by other people without any evidence in situations that require social interaction and performance or that they are criticized and humiliated (Clark and Wells. 1995, American Psychiatric Association 2013, McEvoy et al. 2018). According to DSM-5 (APA 2013), social anxiety is given as "Toplumsal Kaygı Bozukluğu" in our country. Although many people frequently experience the experiences of anxiety and fear about social situations as a part of human nature (Berksun 2003), people with social anxiety experience these negative experiences more severely, widely, and for a long time (Beidel and Turner 2007). Although social anxiety disorder reduces the quality of life, negatively affects functionality, and causes economic difficulties, it is a mental disorder that is difficult to understand and diagnose (Acarturk et al. 2008). It has been reported that social anxiety behaviors in early developmental stages are defined by families and experts as the feeling and behavior of "shyness" and cause the social anxiety problem to become chronic and spread to living spaces (Bandelow and Michaelis 2015, McEvoy et al. 2018).

It is known that the onset of the social anxiety problem is in adolescence between the ages of 8 and 15. In this period, while girls have higher rates than boys in terms of experiencing social anxiety problems, it is seen that the gender gap closes in adulthood. It is known that prognosis, age of onset, and chronicity do not differ between genders in adults with SAD or SAD symptoms (APA 2013, Asher et al. 2017). According to the results of the epidemiological study of mood disorders (NCS-R; National Comorbidity Survey Replication), the 12-month prevalence rate of SAD was 8.2% in the sample aged 13-17. It was observed that the rates varied between 7.4-13% between the ages of 18-64 (Kessler et al. 2012). According to a comprehensive study conducted in our country, 11.4% of university students participating in the study were found to have SAD (Kartal-Yağız et al. 2016). Although it is seen so frequently and is the second most common anxiety disorder, it is known that seeking treatment is low in the first years of the onset of the disorder (Bunting et al. 2012). According to APA (2000), this seeking treatment rate is reported to be 1.1%.

It is known that SAD is seen together with many different mental disorders (Stallard 2010, McEvoy et al. 2018, Kara 2019), but it has been found that the most common comorbid disorder is depression, whose comorbidity rate is 50.2% (Beesdo et al. 2007). According to APA (2013), depression is defined by a person's depressed mood, decreased energy and fatigue, unexplained sadness, hopelessness, and feelings of worthlessness. People experience a loss of interest and pleasure in activities they enjoy, neuropsychological deficits (disruption of skills such as attention and memory), and a decrease in psychomotor skills. In addition, depression causes loss in social and occupational functionality (APA 2013).

Different theoretical explanations for the etiological causes of social anxiety disorder have been made by researchers. According to the explanation made by Clark and Wells (1995), which is frequently used in the literature, the activation of negative evaluations of people in the social environments they enter causes them to experience social anxiety with the attributions they create as a result of negative social experiences from the past. This experience is continued in every new social experience. These people have a high sensitivity to perceived threats to social situations and expect to encounter negative consequences such as "incompetent" and negative evaluation and rejection. Hypothetically, the expectation and perception of threat automatically activate the "anxiety program" in these people. Therefore, the person's attention to his inner life (symptoms of physiological anxiety) and the people around him increases. The increase in attention level evaluates internal cues and external information that increases due to anxiety as imaginary rather than "realistic". To reduce the anxiety experienced, the person develops avoidance or safety behaviors against the social environments that he sees as a threat. This situation, which occurs at an early age, causes individuals to stay away from environments where they can develop their social skills. As a result of the inhibition of social interaction, a vicious circle is experienced that also prevents the development of skills required in interpersonal relations (Sutterby et al. 2012). Social cognition skills help to understand the feelings, thoughts, behaviors, and intentions of others and enable them to read and interpret social cues correctly (Green et al, 2005).

Social cognition (SC) skills are considered and studied as the cause or result of many mental problems that have problems in social communication skills. SC examines in detail the cognitive processes that affect and are affected by the relationship in social interaction, what he feels and thinks, how the judgments and behaviors formed in this process affect both himself and others, and the inferences/meanings that the person makes by focusing on his thoughts and feelings about himself and others. It includes all of the skills acquired (Fiske and Taylor 2017). SC is the skill that the person is expected to acquire/develop from a very early age. It is known that social cognition skills emerge in the early stages of life (infancy) and continue to develop towards late adolescence (Dumontheil et al. 2010). In social interaction, people use verbal and non-verbal social cues. SC skills need to be acquired to interpret the cues in this interaction appropriately and to develop appropriate response skills (Fiske and Taylor 2017). SC represents the process of processing social information in its simplest form.

Although SC studies focused on disorders such as autism spectrum disorder and schizophrenia in the first years, the effects of lack of social cognitive skills on different disorders such as personality disorders and anxiety disorders were also examined over time (Plana et al. 2014, Bora and Pantelis 2016a, Bora and Pantelis 2016b). SAD is seen as a mood disorder in which there is a deterioration in SC skills, and interpersonal communication and social functionality are significantly impaired (Cook et al. 2004). In a study supported by the International Institute

of Mental Health (NIMH), it was determined that social cognition skills were classified and consisted of five sub-areas (emotion identification/discrimination, theory of mind, social perception, social knowledge, and attribution bias) (Green et al. 2008, Yıldırım and Alptekin 2012). *The emotion identification/discrimination process* (EI/D) is the ability to perceive and identificate the other person's emotion based on stimuli containing emotional information such as facial expression and tone of voice (Mayer et al. 1999, Green et al. 2008). There are six universally accepted basic emotions: happiness, sadness, anger, fear, surprise, and disgust (Schmidt and Cohn 2001). The ability to correctly understand the others' feelings and respond appropriately is one of the criteria for successful social relations (Henry et al. 2006, Henry et al. 2015). According to studies examining gender differences, it is known that women focus more on emotion processing in social relationships (McClure 2000, Baron-Cohen 2010) and have more brain structure activities (Gur and Gur 2022).

*Theory of mind (ToM)* is defined as a person's modeling of the mental states of others, attributing mental states to them, understanding and predicting other people's knowledge, intentions, feelings, beliefs, and wishes, and trying to explain and predict others' behavior (Kinderman and Bentall 1996, Stone et al. 1998, Gallagher et al. 2000, Gallagher and Frith 2003, Harrington et al. 2005, Tirapu-Ustárroz et al. 2007). *Social perception* is the ability of a person to comprehend the roles of the other person in the social environment and the social situation and to make inferences about the situation by using verbal and non-verbal cues in complex social situations (Corrigan et al. 1992, Fiske 1992). *Social knowledge* is defined as being aware of the roles, rules, and goals that regulate social situations and interactions (Corrigan et al. 1992). The person's acquisition of situation-specific social knowledge enables him to realize what other people expect from him. In addition, raising awareness of the appropriate response is seen as the first step and prerequisite for social communication and competence (Bellack et al. 1994). *Attribution styles* enable a person to make positive or negative causal explanations about his own and others' behaviors in situations he encounters (Zullow et al. 1988).

Deficiency in SC skills causes impairments in social communication and social functioning. For successful social interaction and communication, individuals need to understand how others feel and that others might have different beliefs and minds than themselves, which shapes their behavior in this way (Youmans 2004). When the literature is examined, SAD which has the most social difficulties among anxiety disorders is known as a psychiatric disorder in which social cognitive skills are deficient (Plana et al. 2014). There are not enough studies examining the relationship between SAD and social cognition skills. In addition, existing studies in the literature do not comprehensively address all SC skills (Franklin et al. 2005, Jacobs et al. 2008, Rosmarin et al. 2009, Arrais et al. 2010, Tibi-Elhanany and Shamay-Tsoory 2011, Hezel and McNally 2014, Lenton-Brym et al. 2018, Pepper et al. 2018).

It is important to have the ability to accurately understand other people's intentions, and thoughts and to realize feelings in determining the threat that may be encountered in social situations (Buhlmann et al. 2015). The fear and anxiety of individuals with SAD in the sense of being evaluated by others prevent them from correctly evaluating ambiguous social cues, understanding the mental states of others, and their ability to make inferences. As a result, there is a cycle in which anxiety levels increase (Tibi-Elhanany and Shamay-Tsoory 2011, Hezel and McNally 2014). In addition, fear, anxiety, or avoidance in social situations causes clinically significant distress and a decrease in social functioning skills in social, occupational, and other important areas of functioning (APA 2013). According to the results of the research in the literature, the empathy and ToM skills of the individuals with SAD or those with SAD symptoms were found to be significantly higher in terms of empathy and ToM skills than the healthy individuals without a psychiatric disorder, those with obsessive-compulsive disorder (OCD) and body dysmorphic disorder (BDD). They were found to have poor performance (Buhlmann et al. 2015). According to studies on attribution bias, individuals with SAD or showing symptoms of SAD are compared to healthy individuals without a psychiatric disorder (Stopa and Clark 2000, Franklin et al. 2005, Rosmarin et al. 2009) and panic disorder (Rosmarin et al. 2009). They were found to be more attribution biased in social situations they encountered than individuals with other anxiety disorders (Stopa and Clark 2000).

In conclusion, it has been reported that social cognition skills are effective on the symptoms of individuals with social anxiety and may even be considered as a specific symptom in individuals with this disorder, according to a study conducted with individuals with a diagnosis of SAD (Küçükparlak et al. 2021). Although SC skills include many dimensions, in most studies in the literature, only some sub-fields have been included to gain knowledge about SC skills. When the studies in Turkey are examined, it has been determined that there is a similar picture, but there are no SC studies on other dimensions except ToM (Yılmaz 2016, Uğurpala 2018, Vural 2018, Küçükparlak et al. 2021, Öztürk et al. 2020) and ER/D (Bayraktutan 2014, Ermiş and Kantarcı 2016, Oğuzhanoğlu et al. 2019). For this reason, such studies gain importance, especially in Turkey, to include more detailed studies of SC, to better understand the initiator and maintainer effects of SC on anxiety disorders such as SAD, and to contribute to etiological explanations. It is thought that this study will contribute significantly to the literature to understand the risk factors and protective factors of SAD, which starts at an early age, seeks late treatment and is a chronic mental disorder, and can develop more appropriate and evidence-based psychotherapy methods/techniques specific to the problem in treatment or preventive interventions. It is thought that social cognition skills have an important role in the social anxiety symptoms experienced by individuals. On the other hand, it is important to control the effect of depression (Beesdo et al. 2007), which is known to be most common as comorbidity, on individuals with social anxiety, and to reveal the effect of SC skills alone. In addition, in this study, the effect of SC on social anxiety

was examined more comprehensively by including all the skills of SC (emotion identification and discrimination, theory of mind, attribution bias, and social functionality). For this purpose, this research was carried out considering the needs in the literature and the fact that SC skills can be an important predictor of social anxiety. In this context, answers to the following questions were sought.

1. Is there a significant relationship between emotion identification and discrimination, mind reading, attribution bias sub-dimensions, social functionality sub-dimensions, social anxiety, and depression?

2. When the depression effect is controlled, do the sub-dimensions of emotion identification and discrimination, mind reading, attribution bias, and social functionality predict social anxiety?

3. Is there a significant difference in emotion identification and discrimination, mind reading, attribution bias sub-dimensions, social functionality sub-dimensions, social anxiety and depression scores according to gender, age, reported diagnostic status, and social anxiety level?

## Method

### Procedure

The study was carried out after obtaining the necessary ethical permission approval (Date: 29.03.2019-Number of Meetings/ Decisions: E.101940-85553214-050.06.04) from Ege University Scientific Research Publication Ethics Committee. Study data were collected on the internet via Google Forms. While the questionnaire-type written scales (LSAS, SFS, IPSAQ, BDI) were arranged as one scale on each page, the tests in which visual measurements were taken were arranged as one visual question on each page. Visual tests (FEI, FED, RMET) were applied in such a way that participants were exposed to a visual stimulus on a page so as not to affect their perceptions, as suggested by the scale authors and the article. The data were collected between January-May 2020 by reaching the participants through the research announcement social media accounts and Ege University student and staff e-mails. The voluntary participation was ensured by using the "Informed Consent Form", which included the purpose of the study. After the consent form was accepted by the participants, scales containing written and visual items were presented to the participants. It has been arranged so that no items are left blank through the Google Form platform. It took approximately 30-35 minutes for the participants to complete the 264-item study measures.

### Participants

The sample of this study consists of individuals between the ages of eighteen (18) and fifty-eight (58) who are assumed to have symptoms of social anxiety and to have problems with social cognition skills. In the study announcement, it was stated that individuals between the ages of 18-65 and at least secondary school graduates (at least eight years of education) could participate, and a sampling suitable for the research was tried to be reached by including the expression "due to social fear/ anxiety/worry; individuals who have difficulty in understanding/ making sense of people's feelings, thoughts, intentions and behaviors, and evaluating the events they experience from a different perspective". 385 people participated in the study. Of the participants, 268 (69.6%) were female, 117 (30.4%) were male, and 198 (51.4%) were university students. The mean age of the participants in the research group was 26.96 (SD=7.46). The information about the educational level, employment status, and reported diagnostic status of the participants is given in Table 1. Seventeen (4.4%) of the participants with a psychiatric diagnosis reported their secondary diagnoses as depression, ADHD, social anxiety, panic attacks, and bipolar.

In the study, the sample size was evaluated by performing power analysis with G*Power 3.1 for multiple linear regression (Faul et al. 2009). The program suggested 178 participants at a 95% confidence interval and 5% significance level, and an effect size of 0.15. Considering the possibility of data loss and additional analysis, a larger sample size (385 participants) was reached during the data collection process.

### Data Collection Tools

A socio-demographic information form was applied to determine the socio-demographic characteristics of the people participating in the study, such as age, gender, educational level, and occupational knowledge.

### Liebowitz Social Anxiety Scale (LSAS)

The scale developed by Heimberg et al. (1999) was adapted into Turkish by Soykan et al. (2003). LSAS, which was developed to assess the level of anxiety and avoidance symptoms experienced in various social and performance-requiring situations, has 24 items in two sub-dimensions, social anxiety and avoidance. The scale without the reversed item is scored in a 4-point Likert-type manner. The scores that can be obtained from each subscale are between 0 and 72, while the total scale score is between 0 and 144. A high score on the scale indicates severe social anxiety and avoidance. The Cronbach's alpha internal consistency coefficients for the sub-dimensions ranged from .81 to .92. In the validity and reliability study, the cut-off scores of the scale were determined as 25 for each sub-dimension and 50 for the total scale score (Soykan et al. 2003). The cut-off score of the scale was used to determine the social anxiety levels in the different analyses of this study. While individuals with a score below 50 in LSAS are defined as individuals with low social anxiety, Individuals with a score of 50 or higher on the scale are defined as individuals with high social anxiety. In this study, Cronbach's alpha values for the sub-dimensions of the scale were found to be .91 and .90, and Cronbach's alpha values for the whole scale were found to be .95.

### The Facial Emotion Identification and Discrimination Tests (FEI-FED)

Black and white photographs of Ekman and Friesen and Izard (1971) are used in the test developed by Kerr and Neale in 1993 to

measure the identification and discrimination of facial emotions. The FEI includes 19 black and white face photographs that show six main emotions (happiness, sadness, anger, fear, disgust, and surprise). The highest score that can be obtained from the test is 19. In the FED, 30 black-and-white photograph pairs containing six main emotions (happiness, sadness, anger, fear, disgust, and surprise) are scored as "same" or "different" effects. The highest score that can be obtained from the test is 30. The test-retest reliability coefficient of the tests for which validity and reliability studies were conducted in Turkish culture by Erol et al. (2009) was .90 for FEI and .70 for FED in the patient group. It was found to be .84 for FEI and .93 for FED in the control group. The Kuder–Richardson 20 internal consistency coefficients of the scales in this study were found to be .48 for the FEI and .56 for the FED.

### Reading the Mind in the Eyes Test (RMET)

The scale, developed by Baron-Cohen et al. (2001), aims to measure theory of mind skills such as making inferences about the mental state of people by putting themselves in someone else's shoes and being able to understand (the other person) emotionally. A test is applied in the form of 36 photographs containing the eye and surrounding area of individuals and 4 emotion options (one target emotion and three distracting emotions) for each image (Baron-Cohen et al. 2001). The test is evaluated by adding the number of correct answers, and high test scores indicate that individuals have good social cognition and theory of mind skills. The Kuder–Richardson 20 reliability value of the Turkish version with 32 photographs was found to be .72 as a result of the removal of 4 photographs with low internal consistency values of the scale, whose validity and reliability studies in Turkish culture were conducted by Yıldırım et al. (2011). In this study, the Kuder–Richardson 20 reliability value of the scale was found to be .58.

### Internal, Personal, and Situational Attribution Scale (IPSAQ)

This scale is developed by Kinderman and Bentall (1996), the IPSAQ was created to measure whether the attribution of the

**Table 1. Participant Socio-Demographics and Medical Characteristics**

| Tanımlayıcı Özellikler | Groups | Frequency (n) | Percentile (%) |
|---|---|---|---|
| Gender | Female | 268 | 69.6 |
| | Male | 117 | 30.4 |
| Age | Mean of Age (SD) | 26.96 (M) | 7.46 (SD) |
| | 18-25 age | 224 | 58.2 |
| | 25-40 age | 137 | 35.6 |
| | 41-60 age | 24 | 6.2 |
| Education Level | High | 48 | 12.5 |
| | Undergraduate | 198 | 51.4 |
| | Graduate | 89 | 23.2 |
| | Master Graduate | 48 | 12.5 |
| Working Status | Working | 144 | 37.4 |
| | Not Working | 58 | 15.1 |
| | Undergraduate* | 198 | 51.4 |
| Reported Diagnostic Status | Yes | 132 | 34.2 |
| | No | 253 | 65.8 |
| Reported Diagnosis | GAD | 50 | 13 |
| | Depression | 40 | 10.4 |
| | SAD | 11 | 2.9 |
| | ADHD | 8 | 2.1 |
| | OCD | 7 | 1.8 |
| | PD | 7 | 1.8 |
| | General Mental Disorders | 3 | .8 |
| | Bulimia | 2 | .5 |
| | Dissociative Amnesia | 2 | .5 |
| | PTSD | 1 | .3 |
| | Bipolar | 1 | .3 |

ADHD: Attention Deficit Hyperactivity Disorder, OCD: Obsessive Compulsive Disorder, PD: Panic Disorder, SAD: Social Anxiety Disorder, PTSD: Post Traumatic Stress Disorder, GAD: Generalized Anxiety Disorder.
Note: For all socio-demographic variables except age, the number (n) and frequencies (f) of the participants in that group are given. M: Mean, SD: Standard Deviation.
*15 students and working people are included in the undergraduates of 198.

event is to themselves, the person, or the situation itself, in the face of positive and negative events that individuals encounter. The scale consists of 32 hypothetical social situations, of which 16 are positive and 16 are negative events. According to the results of the scale, all attributions are grouped as 'internal attribution' if the interpretation is due to the event itself, as 'external-personal attribution' if the interpretation is due to the other person, or as 'external-situational attribution' if it is interpreted only as an event required by the current situation. Six sub-measurement scores are formed by adding the number of internal, personal, and situational attributions selected for both positive and negative items. Although the scale was used for the first time in our country by Taş (2011) in patients with schizophrenia, information about the scale was not included (Tas et al. 2012).

Three cognitive bias scores are obtained by making different calculations with the six measurements obtained from the IPSAQ (Kinderman and Bentall 1996, Berry et al. 2015). These are Externalization Bias (EB), Negative Personalization Bias (NPB), and Positive Personalization Bias (PPB). The TF score means that individuals attribute more positive results to themselves and fewer negative consequences to themselves. NPB score expresses the tendency to attribute negative events to others rather than situational factors. NPB score greater than 0.5 indicates that individuals explain the consequences of adverse events by blaming other people rather than the situation (Kinderman and Bentall 1996). The third sub-dimension, PPB, refers to the tendency to attribute the results of positive events to others rather than the situation (Berry et al. 2015). Kuder–Richardson 20 internal consistency coefficients for the six sub-dimensions of the scale range from .61 to .76 and show that it has sufficient reliability levels (Kinderman and Bentall 1996). In this study, Kuder–Richardson 20 values for six sub-dimensions were found to vary between .59 and .74.

### Social Functioning Scale (SFS)

The scale is developed by Birchwood et al. and adapted into Turkish by Erakay (2001), the scale aims to determine the social functionality levels of individuals in different areas (Birchwood et al. 1990). Social withdrawal (SW) (3 items), interpersonal behavior (IPB) (4 items), pro-social activities (PSA) (22 items), recreation (R) (15 questions), independence competence (IC) (13 items), independence performance (IP) (13 items), and employment/occupation (2 items) in which social skills are evaluated in the scale contains seven sections. The score that can be obtained for each question in the sub-dimensions ranges from '0' to '3'. There are only two items in the employment-occupation sub-domain, and this sub-dimension was not evaluated since most of the research sample consisted of students. The increase in the scores obtained from the scale indicates that the level of social functionality has changed in a good way. The Cronbach alpha internal consistency coefficient for the reliability of the scale was reported as .81 (Erakay 2001). In this study, Cronbach's alpha internal consistency coefficient of the scale was found to be .89.

### Beck Depression Inventory (BDI)

The scale developed by Beck et al. (1961) was adapted into Turkish by Hisli (1989). The scale was developed to evaluate the emotional, motivational, somatic, and cognitive symptoms of depression. The scale, in which people choose the most appropriate item for how they feel in the last week, consists of

**Table 2. Correlation Coefficients**

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. FEI | - | | | | | | | | | | | | | |
| 2. FED | .33** | - | | | | | | | | | | | | |
| 3.RMET | .46** | .22** | - | | | | | | | | | | | |
| 4. EB | .27** | .04 | .26** | - | | | | | | | | | | |
| 5.PPB | -.03 | -.07 | -.11* | .02 | - | | | | | | | | | |
| 6.NPB | .04 | .01 | -.10* | -.02 | .19** | - | | | | | | | | |
| 7. SW | .09 | .09 | .09 | -.05 | .01 | -.00 | - | | | | | | | |
| 8. IPB | .04 | -.05 | .15** | .04 | -.05 | -.03 | -.20** | - | | | | | | |
| 9.PSA | -.01 | -.06 | .10* | .06 | -.06 | -.08 | -.06 | .24** | - | | | | | |
| 10. R | -.06 | .00 | .00 | .09 | -.06 | .01 | -.20** | .28** | .48** | - | | | | |
| 11. IC | .16** | .13** | .13* | .06 | -.07 | -.03 | .01 | .06 | .12* | .24** | - | | | |
| 12. IP | .06 | .08 | .09 | .18** | .01 | -.13* | .03 | .01 | .25** | .34** | .55** | - | | |
| 13. BDI | -.15** | -.08 | -.22** | -.26** | .06 | .08 | .12* | -.14** | -.15** | -.13** | -.20** | -.12* | - | |
| 14.LSAS | -.40** | -.32** | -.57** | -.28** | .12* | .06 | -.06 | -.15** | -.19** | -.12* | -12* | -.14** | .44** | - |

*p<.05; **p<.01
BDI: Beck Depression Inventory, IP: Independence Performance, IC: Independence Competence, R: Recreation, EB: Externalizing Bias, RMET: Reading the Mind in the Eyes Test, IPB: Interpersonal Behaviour, LSAS: Liebowitz Social Anxiety Scales, NPB: Negative Personalization Bias, PSA: Pro-Social Activities, PPB: Positive Personalization Bias, SW: Social Withdrawal, FED: Facial Emotion Discrimination Test, FEI: Facial Emotion Identification Test.

21 items. Scale items are scored between 0 and 3, and the total test score is 63. The increase in the scale scores also shows an increase in the level of depression. The reliability of the scale was evaluated with Cronbach's alpha obtained by item analysis and the correlation coefficient analyzed by the halving technique, which were found to be .80 and .74, respectively (Hisli, 1989). In this study, Cronbach's alpha internal consistency coefficient of the scale was found to be .91.

### Statistical Analysis

IBM SPSS 25 package program was used in the statistical analysis of the data. After examining the normal distribution of the research data (the skewness and kurtosis values are between -1 and +1) and the assumptions regarding the statistical analysis, it was seen that they had properties suitable for the analysis (Field 2013, Meyers et al. 2013). Afterward, for the regression analysis, first of all, the Pearson correlation coefficients of the variables in this study and the relationships between the variables were examined. In this analysis, FEI, FED, and RMET, three subscale scores of IPSAQ, six subscale scores of SFS, the total score of LSAS, and the total score of BDI were included. Next, a hierarchical regression analysis was conducted to investigate the predictors of social anxiety and to see the effect of SC on social anxiety when the effect of depression score was controlled for. In the first step, analysis was performed with depression scores to control the effect on age, gender, reported diagnostic status, and social anxiety. The reported diagnostic status of the participants was defined in the data set as a categorical variable as diagnosed and undiagnosed individuals, and was included in the analysis in this way. In the next steps, considering the developmental order of social cognition skills, the variables measuring these skills were included in the analysis, respectively. In the second step, the variable of identification and discrimination of emotions (FEI, FED), which is seen as the first developmentally acquired social cognition skill, was included. In the third step, the RMET total score, which measures the ability to read minds from the eyes, which is an advanced emotion identification skill, was included in the analysis. In the next step, the sub-dimensions of the attribution bias scale (IPSAQ) that reveal the perspective of oneself, others, and the world are included. In the last step, the SFS subscales measuring individuals' current social functionality levels were included. In addition to the analysis, comparative analyzes between groups were performed by applying t-test and one-way analysis of variance (ANOVA) tests in terms of gender, age, education level, employment status, reported diagnostic status, and social anxiety levels of the individuals on the terms of FEI, FED, RMET, in the three subscales of IPSAQ, SFS subscales, and BDI scale scores.

## Results

The two-way relationships between the variables in this study were examined by calculating the Pearson correlation coefficients for each variable (see Table 2). Variables with a correlation coefficient of .20 and above were reported, and the relationships between the sub-dimensions of the same scale were not included. A positive correlation was found between emotion identification score and reading the mind in the eyes test (r=.46, p<.01) and externalizing bias (r=.27, p<.01). A negative correlation was found between emotion identification score and social anxiety score (r= -.40, p<.01). It was observed that there was a positive correlation between the emotion discrimination score and mind reading from the eyes (r=.22, p<.01). There was a negative correlation between emotion discrimination score and social anxiety score (r= -.32, p<.01). There was a positive correlation between the reading the mind in the eyes test and externalizing bias (r=.26, p<.01). A negative correlation was found between depression (r= -.22, p<.01) and social anxiety (r= -.57, p<.01). There were negative correlations between externalizing bias and depression (r= -.26, p<.01) and social anxiety (r= -.28, p<.01). A positive correlation was found between depression and social anxiety (r=.44, p<.01). It was determined that there were low and medium-level correlations between the variables.

Factors related to the anxiety levels of the participants and their social cognition skills were examined by regression analysis (see Table 3). This analysis was carried out by hierarchically including the variables in the regression analysis in five steps. In the first step, age, gender, reported diagnostic status, and depression (BDI) were included in the analysis. In the second step, emotions identification (FEI) and discrimination (FED) variables were included. In the third and fourth steps, reading the mind in the eyes test (RMET) score and, the sub-dimensions of the attribution bias scale (IPSAQ) were included, respectively. In the last step, the SFS sub-dimensions measuring individuals' current social functionality levels were included in the analysis.

According to the results of this hierarchical regression analysis performed to determine the factors associated with social anxiety levels, it was found that the depression score which is one of the first variables included in the equation predicted social anxiety [$\Delta R^2$ = .19, $\beta$ = .41, t(380) = 8.50, p<.001] and it was found to explain 20% of the total variance [Fchange(4, 380) = 23.67, p<.001]. However, variables of age, gender, and reported diagnostic status did not significantly predict social anxiety. In the second step, emotion identification and discrimination variables were found to predict social anxiety [$\Delta$R2 = .15, $\beta$ = -.30 and $\beta$ = -.18, t(378) = 11.15, p<.001] and the explained variance increased to 35%. [Fchange(2, 378) = 44.55, p<.001]. In the third step, reading the mind in the eyes test was found to predict social anxiety [$\Delta R^2$ = .14, $\beta$ = -.43, t (377) = 15.32, p<.001] and the explained variance increased to 49% [Fchange(1, 377) = 98.87, p<.001]. In the next step of the analysis, the three sub-dimensions of attribution bias, externalizing bias, negative personalization bias, and positive personalization bias, were included in the analysis; however, it was observed that these variables did not predict social anxiety statistically significantly (p>.05). In the last step, sub-dimensions evaluating the level of social functionality were included, and only the pro-social activities sub-dimension was found to predict social anxiety [$\Delta R^2$ = .02, $\beta$ = -.11, t (368) = 12.92, p<.001]. The explained variance was 52%. [Fchange(3, 369) = 3.80, p<.01]. Social withdrawal, interpersonal behaviour, recreation, independence competence and performance sub-

dimensions were found to not predict social anxiety statistically (p>.05).

In the analysis, regardless of the effect of depression, it was found that the strongest predictor of social anxiety among SC skills was emotion identification and discrimination skills. When the predictive effect of depression scores was controlled, it was seen that social cognition skills explained 32% of the total variance regarding social anxiety. These findings of the regression analysis indicate that when the depression effect is controlled, individuals with low skills in emotion identification and discrimination, reading the mind in the eyes, and pro-social activities report more social anxiety.

The difference analyses of social cognition skills, depression and social anxiety scores according to gender, age, reported diagnostic status, and social anxiety levels of the individuals participating in the study are given in Table 4. According to the results of the analysis, it was found that the mean scores of the reading the mind in the eyes test [$\wp$(M)=20.61] of individuals reporting that they were diagnosed with a psychiatric disorder, were statistically significantly lower than those of individuals reporting that they were not diagnosed with a psychiatric disorder ($\wp$=21.44) (t=-2.078; p<0.05). In addition, it was found that the depression ($\wp$=21.14) and social anxiety scores ($\wp$=64.92) of the individuals with reported diagnostic status were statistically significantly higher than the depression ($\wp$=15.46) and social anxiety scores ($\wp$=55.56) of the individuals with not reported diagnostic status (t=5.012, p<0.001; t=3.663, p<0.001, respectively).

In the difference analyses performed according to the social anxiety levels, the emotion identification ($\wp$=13.27) and emotion discrimination scores ($\wp$=26.53) of the individuals with low social anxiety levels were compared to the emotion identification ($\wp$=10.89) and emotion discrimination scores ($\wp$=24.14) of the individuals with high social anxiety levels was found to be significantly higher (t=9.577, p<0.001; t=9.326, p<0.001, respectively). The reading the mind in the eyes ($\wp$=23.62) and externalizing bias scores ($\wp$=3.91) of individuals with low social anxiety levels compared to the reading the mind in the eyes ($\wp$=20.12) and externalizing bias scores ($\wp$=1.32) of individuals with high social anxiety levels were significantly higher (t=9.201, p<0.001; t=4.907, p<0.001, respectively).

Social withdrawal ($\wp$=7.59), pro-social activities ($\wp$=19.71), independence competence ($\wp$=34.09) and independence performance ($\wp$=30.16) scores of individuals with low social anxiety levels were found to be significantly higher than

**Table 3. Hierarchical regression analysis of factors associated with social anxiety**

| Independent Variable | df | $F_{change}$ | t | $\Delta R^2$ | $R^2$ | β |
|---|---|---|---|---|---|---|
| Step 1 | | | | | | |
| Age | 4, 380 | 23.67*** | 8.50*** | .19 | .20 | -.17 |
| Gender | | | | | | -.03 |
| Diagnostic Status | | | | | | .08 |
| BDI | | | | | | .41*** |
| Step 2 | | | | | | |
| FEI | 2, 378 | 44.55*** | 11.15*** | .15 | .35 | -.30*** |
| FED | | | | | | -.18*** |
| Step 3 | | | | | | |
| RMET | 1, 377 | 98.87*** | 15.32*** | .14 | .49 | -.43*** |
| Step 4 | | | | | | |
| EB | 3, 374 | 1.62 | 3.97*** | - | .49 | -.06 |
| NPB | | | | | | .06 |
| PPB | | | | | | -.00 |
| Step 5 | | | | | | |
| SW | 6, 368 | 3.41** | 12.92*** | .02 | .52 | -.07 |
| IPB | | | | | | -.03 |
| PSA | | | | | | -.11*** |
| R | | | | | | -.03 |
| IC | | | | | | .07 |
| IP | | | | | | -.05 |

Dependent Variable: LSAS; *p<.05, **p<.01, ***p<.001
BDI: Beck Depression Inventory, IP: Independence Performance, IC: Independence Competence, R: Recreation, EB: Externalizing Bias, RMET: Reading the Mind in the Eyes Test, IPB: Interpersonal Behaviour, LSAS: Liebowitz Social Anxiety Scales, NPB: Negative Personalization Bias, PSA: Pro-Social Activities, PPB: Positive Personalization Bias, SW: Social Withdrawal, FED: Facial Emotion Discrimination Test, FEI: Facial Emotion Identification Test.

| **Table 4. Difference analyses of social cognition skills, depression and social anxiety scores according to descriptive features** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Demographic Characteristics** | **n** | **FEI** | **FED** | **RMET** | **EB** | **NPB** | **PPB** | **SW** |
| | | **M±SD** | **M±SD** | **M±SD** | **M±SD** | **M±SD** | **M±SD** | **M±SD** |
| **N=385** | | 11.59±2.48 | 24.85±2.53 | 21.16±3.77 | 2.09±4.88 | .67±.20 | .60±.25 | 6.96±2.28 |
| Gender | | | | | | | | |
| Female | 268 | 11.77±2.37 | 24.82±2.51 | 21.25±3.74 | 2.34±4.50 | .66±.19 | .61±.25 | 7.10±2.13 |
| Male | 117 | 11.19±2.69 | 24.91±2.59 | 20.93±3.83 | 1.50±5.62 | .70±.21 | .59±.25 | 6.63±2.56 |
| t (383) = | | 2.121* | -.290 | .772 | 1.548 | -1.789 | .423 | 1.861 |
| **Age** | | | | | | | | |
| 18-25 age | 224 | 11.65±2.29 | 24.80±2.45 | 21.71±3.58 | 2.12±4.67 | .67±.19 | .59±.25 | 7.21±2.14 |
| 25-40 age | 137 | 11.31±2.75 | 24.90±2.64 | 20.47±3.87 | 1.74±5.26 | .65±.20 | .61±.26 | 6.65±2.47 |
| 41-60 age | 24 | 12.71±2.33 | 25±2.81 | 19.87±4.06 | 3.71±4.38 | .77±.21 | .69±.25 | 6.40±2.19 |
| F = | | 3.433* | .104 | 6.220** | 1.691 | 3.840* | 1.533 | 3.425* |
| Post Hoc = | | 2<3* | | 1>3*, 1>2* | | 1<3*, 2<3* | | |
| **Reported Diagnostic Status** | | | | | | | | |
| Yes | 132 | 11.47±2.72 | 24.56±2.65 | 20.61±2.84 | 1.45±5.01 | .66±.22 | .59±.25 | 6.99±2.30 |
| No | 253 | 11.66±2.35 | 25±2.46 | 21.44±3.70 | 2.41±4.78 | .67±.18 | .61±.25 | 6.94±2.27 |
| t (383) = | | -.699 | -1.620 | -2.078* | -1.840 | -.790 | -.792 | .188 |
| **Social Anxiety Level** | | | | | | | | |
| Low LSAS | 114 | 13.27±2.45 | 26.53±2.07 | 23.62±3.36 | 3.91±3.90 | .64±.19 | .61±.24 | 7.59±1.62 |
| High LSAS | 271 | 10.89±2.13 | 24.14±2.37 | 20.12±3.43 | 1.32±5.05 | .68±.20 | .60±.25 | 6.69±2.46 |
| t (383) = | | 9.577*** | 9.326*** | 9.201*** | 4.907*** | -1.564 | .373 | 3.568*** |
| **Demographic Characteristics** | **n** | **IPB** | **PSA** | **R** | **IC** | **IP** | **BDI** | **LSAS** |
| | | **M±SD** | **M±SD** | **M±SD** | **M±SD** | **M±SD** | **M±SD** | **M±SD** |
| **N=385** | | 5.12±1.41 | 18.05±10.89 | 17.79±6.60 | 33.10±5.06 | 28.78±7.70 | 14.41±10.87 | 58.77±24.19 |
| **Gender** | | | | | | | | |
| Female | 268 | 5.14±1.44 | 18.66±10.71 | 18.07±6.52 | 33.52±4.80 | 29.35±7.38 | 18.47±10.38 | 60.32±24.09 |
| Male | 117 | 5.09±1.35 | 16.68±11.22 | 17.15±6.78 | 32.15±5.53 | 27.47±8.26 | 14.97±11.60 | 55.22±24.14 |
| t (383) = | | .281 | 1.646 | 1.254 | 2.449* | 2.212* | 2.931* | 1.909 (p=.057) |
| **Age** | | | | | | | | |
| 18-25 age | 224 | 5.11±1.42 | 19.52±10.60 | 17.74±6.64 | 33.32±4.83 | 29.25±7.23 | 17.70±10.58 | 59.58±23.59 |
| 25-40 age | 137 | 5.18±1.38 | 16.09±10.83 | 17.71±6.39 | 32.74±5.16 | 27.79±8.29 | 17.14±11.26 | 57.47±23.74 |
| 41-60 age | 24 | 4.96±1.57 | 15.58±12.07 | 18.75±7.63 | 33.12±6.57 | 30±8.10 | 16.21±11.60 | 58.71±31.99 |
| F = | | .298 | 4.990** | .269 | .551 | 1.865 | .268 | .322 |
| Post Hoc = | | | 1>2* | | | | | |
| **Reported Diagnostic Status** | | | | | | | | |
| Yes | 132 | 5.03±1.39 | 16.70±10.18 | 17.23±6.90 | 33.19±4.92 | 29.11±6.44 | 21.14±10.24 | 64.92±23.07 |
| No | 253 | 5.17±1.42 | 18.76±11.20 | 18.09±6.44 | 33.06±5.15 | 28.60±8.28 | 15.46±10.70 | 55.56±24.18 |
| t (383) = | | -.948 | -1.762 | -1.213 | .239 | .620 | 5.012*** | 3.663*** |
| **Social Anxiety Level** | | | | | | | | |
| Low LSAS | 114 | 5.11±1.27 | 19.71±10.60 | 18.09±6.04 | 34.09±4.58 | 30.16±6.32 | 12.98±8.70 | 31.19±12.06 |
| High LSAS | 271 | 5.13±1.47 | 17.36±10.95 | 17.67±6.83 | 32.69±5.20 | 28.20±8.15 | 19.27±11.16 | 70.37±17.75 |
| t (383) = | | -.096 | 1.942 (p=0.050) | .569 | 2.490* | 2.297* | -5.365*** | -21.558*** |

*p<.05, **p<.01, ***p<.001
BDI: Beck Depression Inventory, IP: Independence Performance, IC: Independence Competence, R: Recreation, EB: Externalizing Bias, RMET: Reading the Mind in the Eyes Test, IPB: Interpersonal Behaviour, LSAS: Liebowitz Social Anxiety Scales, NPB: Negative Personalization Bias, PSA: Pro-Social Activities, PPB: Positive Personalization Bias, SW: Social Withdrawal, FED: Facial Emotion Discrimination Test, FEI: Facial Emotion Identification Test.
Note: M=Mean Values (♀), SD=Standard Deviation.

social withdrawal ($\wp$=6.69), pro-social activities ($\wp$=17.36), independence competence ($\wp$=32.69) and independence performance scores ($\wp$=28.20) of the individuals with high social anxiety levels (t= 3,568, p<0.001; t=1.942, p=0.050; t=2.490, p<0.05; t=2.297, p<0.05, respectively). Depression scores of individuals with high social anxiety levels ($\wp$=70.37) were found to be significantly higher than depression scores ($\wp$=31.19) of individuals with low social anxiety levels (t= -21.558; p<0.001).

## Discussion

According to the findings of this study, it is seen that there are significant relationships between emotion identification and discrimination, reading the mind in the eyes, attribution bias sub-dimensions, social functionality sub-dimensions, social anxiety, and depression. When the depression effect is controlled, the pro-social activities from the sub-dimensions of emotion identification and discrimination, reading the mind in the eyes, and social functionality significantly predict social anxiety. Demographic variables such as gender, age, and reported diagnostic status were not found to be effective on social anxiety.

According to sociodemographic variables, social anxiety, social cognition skills (emotion identification, emotion discrimination, reading the mind in the eyes, externalization bias, negative personalization bias, positive personalization bias, social withdrawal, interpersonal behavior, pro-social activities, recreation, independence competence, independence performance) and whether depression differs or not, statistical analyses show that emotion identification, independence competence, independence performance, and depression scores are higher in women than in men. The fact that women's emotion identification scores were high in this study is an expected finding that is consistent with the relevant literature (Thayer and Johnsen 2000, Scherer and Scherer 2011, Gur and Gur 2022). This finding can be explained by the results of the research on the excess of activities in the brain structure in emotion processing (Gur and Gur, 2022) and Baron-Cohen's theory (McClure 2000, Baron-Cohen 2010) that women focus more on the emotional aspects of social cognition in their social relationships.

According to Arrais et al. (2010), women's desire for social approval is seen as a reason why they pay more attention to facial emotions in communication than men. In this study, the finding that women got high scores from some subscales in the social functioning scale was not supported by a particularly relevant study in the literature, but it is thought that some self-care items (dishwashing, laundry, etc.) in the items of the scales may have had affected the results. In addition, the finding of women in this study reporting higher depression scores is consistent with the literature in the literature (APA 2013, Altemus et al. 2014, Albert 2015).

Considering the gender ratios of the individuals participating in the study, it is noteworthy that the ratio of women is higher than that of men. When the literature is examined, it is seen that the participation rate of women is higher in most of the social anxiety studies (Chu et al. 2022, Folz et al. 2022, Lyvers et al. 2022). Although it is known that there is no gender difference in adulthood due to the nature of social anxiety (APA 2013), the high rate of women in this study can be explained by the fact that women are more willing to participate in scientific studies. The regression analysis results of this study show that gender does not predict social anxiety. The majority of the study participants were university students, and in some of the studies on people with social anxiety problems, it was found that most of the participants were university students (Carlbring et al. 2018, Chen et al. 2020). It is thought that the fact that the sample included in the studies is mostly university students may result in less impairment in the social functionality of the participants (Plana et al. 2014).

Facial expression processing skill, which is the first of the social cognition skills, provides information about positive and negative evaluations of other individuals and becomes an important source of interpersonal information and communication (Arrais et al. 2010). At the same time, deficiencies in emotion identification and discrimination skills negatively affect the communication skills of individuals with SAD (Valença et al. 2005). Despite studies in the literature (Straube et al. 2004, Phan et al. 2006, Yoon et al. 2007), it was found that there was no difference in emotion identification and discrimination social cognition skills of individuals with social anxiety problems compared to those without social anxiety. There are also studies (Campbell et al. 2009, Garner et al. 2009, Arrais et al. 2010) showing that social anxiety has low emotion identification and discrimination skills. The results of this study support the conclusion that people with social anxiety have low emotion identification and discrimination skills. According to the results of the analysis, when the depression effect was controlled, it was seen that emotion identification and discrimination were the strongest predictors of social anxiety among the SC skills (see Table 3). The inverse relationship between social anxiety and emotion identification and discrimination skills in the literature was also supported by the results of this study (Jacobs et al. 2008, Plana et al. 2014). Excessive attention to negative evaluation and criticism in feared social situations causes the person to not evaluate the situation normally and to focus excessively on negative clues in himself (Leber et al. 2009). The increased attention and threat perception towards emotional cues of individuals with social anxiety cause them to misread emotions (more intense and more threatening) based on these cues (Straube et al. 2004, Garner et al. 2009, Tibi-Elhanany and Shamay-Tsoory 2011), which causes them to have difficulties in developing their social communication skills (Levitan and Nardi 2009).

While it is seen that there is a deterioration in theory of mind skills, which is another social cognition skill, in individuals with social anxiety, the findings of its negative relationship with social anxiety are also supported by the results of this study (Hezel and McNally 2014, Lenton-Brym et al. 2018, Ballespi et al. 2019, Alvi et al. 2020, Pequet and Warnell 2021). It can be said that this situation is the result of the person with social anxiety misinterpreting the feelings, thoughts, and intentions of other people (Clark and Wells 1995, Rapee and Heimberg,

1997). According to the results of the analysis, the theory of mind scores (RMET) was found to be the second social cognition skill that predicts social anxiety the most. In this study, it is also noteworthy that, unlike the results of Lenton-Brym et al.'s (2018) study, individuals with high social anxiety levels have more deterioration in the theory of mind skills than individuals with low social anxiety levels. It is known that individuals with high levels of social anxiety show more bias in interpreting social messages from others and cues in social situations (Lenton-Brym et al. 2018, Stopa and Clark 2000). In addition, it is thought that depression accompanied by depressive symptoms may also affect negative interpretation bias and affect social cognition skills (Washburn et al. 2016). In this context, when the hierarchical regression analysis results are examined, it is seen that the theory of mind skill has an important power in determining the level of social anxiety, even independent from the effect of depression.

In this study, it was determined that reading the mind in the eyes predicted social anxiety negatively. This finding indicates that the probability of social anxiety is stronger in individuals with low reading the mind in the eyes skills. According to Sharp et al. (2011), deterioration in the theory of mind skills, which includes understanding the feelings, thoughts, and intentions of others, is seen as a result of participants' attributing their biased beliefs and intentions to others. Since the RMET scale contains only information about the eye area, individuals with social anxiety may have a greater sense of threat and anxiety, causing them to avoid these threatening faces more and make mistakes (Mathews and MacLeod 2005). According to the study of Hezel and McNally (2014), it is known that individuals with social anxiety have negative interpretation biases and tend to make inferences based on their own emotions (Todd et al. 2015, Lenton-Brym et al. 2018). Based on this information, it is concluded that reading the mind in the eyes is closely related to social anxiety.

Relationships between ToM and many developmental (e.g., autism) and mental disorders (e.g., schizophrenia, personality disorders) have been revealed in psychopathology studies. Although its relationship with other disorders (e.g., PTSD, anxiety) has not yet been clarified, increasing evidence is obtained from studies (Brüne 2001, Brüne and Brüne-Cohrs 2006, Zeppegno et al. 2014, Di Girolamo et al. 2021). As seen in this study, the effect of the theory of mind on psychopathology within the dimensions of social cognition reveals strong and significant statistical results in line with the studies in the literature (see Table 3). The results of this study are also supported by the results of studies on social anxiety and the theory of mind in Turkey (Vural 2018, Öztürk et al. 2020, Küçükparlak et al. 2021).

It is known that attribution bias, another social cognition skill, is an important factor determining the behavior of individuals, and this relationship has also been demonstrated by existing models on social anxiety (Crick and Dodge 1994, Stopa and Clark 2000). Peters et al. (2011) proved the effect of attribution styles on mood in their study, which they examined using an experimental research method. According to the analysis results of this study, when depression scores were controlled, it was seen that the sub-dimensions of attribution bias did not predict social anxiety. However, according to the difference analyses carried out, it was observed that individuals with high social anxiety levels also had high EB scores. Considering the correlation results between depression score and EB scores in this study, the results of difference analyses and the information in the literature, it is thought that controlling the depression score may be effective in the emergence of results regarding the attribution bias sub-dimensions not predicting social anxiety. According to the literature, there is information that depressive symptoms are associated with negative interpretation bias (Voncken et al. 2007, Hindash and Amir 2012) and that both negative interpretation bias and social cognition skills are negatively affected in individuals with social anxiety accompanied by depressive symptoms (Washburn et al. 2016). This interpretation bias causes individuals to focus more on themselves to reduce their fear and anxiety (over-attention to internal cues and negative self-image) and prevents the correct processing of social cues (Clark and McManus 2002, Tibi-Elhanany and Shamay-Tsoory 2011, Buhlmann et al. 2015). It is known that individuals with social anxiety have a more negative view of themselves (Hofmann 2007, Moscovitch et al. 2009, Heimberg et al. 2010, Goldin et al. 2013). The knowledge in the literature that individuals with social anxiety showed more negative interpretation bias is supported by the results of the difference analysis of this study.

Social functionality sub-dimensions as an SC variable significantly predicted social anxiety, albeit at a low rate, although the effect of depression was controlled in the hierarchical regression analysis (see Table 3). Disruptions in social cognition skills not only negatively affect individuals' interpersonal communication; but also impair their social functionality (Cook et al. 2004, Vierck and Joyce 2015, Ronchi et al. 2020, Rosello et al. 2020). It is thought that the social functionality scale cannot measure the social functionality levels of individuals with social anxiety at the desired level since it is a measurement tool at the level of interpersonal relations and necessary life skills in more severe psychiatric disorders (such as schizophrenia). Negative correlation between some social functionality sub-dimensions (IPB, PSA, R, IC, IP) and social anxiety in this study, the negative predictive power of PSA on social anxiety, and the fact that individuals with low and high social anxiety show significant differences in SW, PSA, IC, and IP scores supports the results of relevant studies in the literature (Cook et al. 2004, Vierck and Joyce 2015, Ronchi et al. 2020, Rosello et al. 2020).

When the reported diagnostic status by the participants was examined, other anxiety disorders and depression were reported as the most common disorders, along with social anxiety, in line with the studies in the literature (Boettcher et al. 2012, Chen et al. 2020). In particular, depression, as the most common psychiatric disorder (Beesdo et al. 2007), negatively affects the prognosis and treatment process of social anxiety. The finding in this study that there is a positive relationship between social anxiety and depression and the power of depression to predict social anxiety indicates that one of the most distinctive features of depression in the literature is the deterioration of people's

social and interpersonal relationships and reduced knowledge of social communication (Gotlib and Whiffen, 1989; Nezlek et al. 2000). According to the review studies of Plana et al. (2014), it was revealed that depression is associated with deterioration in social cognition skills. The negative correlation finding between depression and social cognition skills in this study supports this information in the literature.

As a result, it is seen that there is a negative relationship between social anxiety and social cognition skills, and the deterioration in these skills significantly predicts social anxiety independently of the effect of depression. The findings of the study are also supported by studies in the literature (Jacobs et al. 2008, Turan 2018, Alvi et al. 2020). It is known that social cognition skills are acquired developmentally. These skills enable people to predict social cues, feelings, thoughts, and behaviors of others and themselves, and to evaluate the situation appropriately and more accurately. As stated in the theories explaining social anxiety, socially anxious individuals' fear and anxiety they develop against negative evaluation and criticism in social environments cause them to evaluate their social cues and individual symptoms more negatively and incorrectly. In this study, the correlation between social anxiety and deterioration in social cognition skills and the fact that social cognition has the power to predict social anxiety negatively can be explained in this way. The results obtained regarding the role of social cognition skills in social anxiety support the results of studies in the literature. It is thought that examining the predictive power of social anxiety skills of all social cognition skills in this study will make significant contributions to the literature. These findings suggest that interventions for social cognition skills may be a preventive or curative factor in the onset or maintenance factors of social anxiety.

In this study, it is thought that the most important feature of the study is to include measurements of all sub-dimensions of social cognition skills and to deal with the concept of social cognition comprehensively. According to the G-power analysis, which was conducted to determine the number of participants before the study, 178 people were considered sufficient, while a higher number of participants was reached in this study. Since social anxiety is a mental disorder that is difficult to detect by its nature and seeks less treatment, the high number of voluntary participants in the study can be considered another strength of the study. Considering the attention to social assessment and social anxiety characteristics of this sample group, the online data collection process can be seen as a limitation. However, the conditions of this study were decided by evaluating the characteristics of the participants and considering the information in the literature that socially anxious individuals are sensitive to evaluation and that they find online participation more reliable in terms of reducing social desirability anxiety and prefer it (Newman 2004, Andersson 2014). To minimize the limitations that may arise from online data collection, measurements were carried out on data collection platforms (Google Form) provided via the internet, which allows participants to minimize their contact with the researcher, and evaluations were made with standard measurement tools.

This study has some limitations. One of these limitations can be seen as the fact that the data collection process coincides with the beginning of the Covid-19 pandemic process. In general, since this extraordinary situation causes an increase in the anxiety levels of individuals, it makes us think that the social anxiety scores of the participants were also affected by the current pandemic process. On the other hand, being able to reach the participants online can be seen as an advantage. The number of measurement tools or items can be considered another limitation. Although the high number of women among the participants and the inability to reach a balanced distribution between genders are seen as limitations, it is remarkable that gender does not have a predictive effect on social anxiety in the results of the regression analysis.

The study sample's lack of a clinical diagnostic group and only a group with self-report scales and social anxiety can be seen as one of the limitations of the study; however, according to a recent study in Turkey (Küçükparlak et al. 2021), LSAS-anxiety ($\wp$=59.43, SD= ±11) and RMET ($\wp$=20.68, SD= ±4.34) scores in a study on the theory of mind skills of individuals diagnosed with SAD and the mean scores in this study (LSAS, $\wp$=58.77, SD= ±24.19; RMET, $\wp$=21.16, SD= ±3.77) were found to be similar. This situation reveals both the high representativeness of the participants for SPD regarding the results of the study and the supporting nature of the results of this study in the literature. This situation can be considered a strong aspect of the study.

The fact that the participants in the study were not measured for any different mental problems other than their social anxiety and depression scores may have caused different psychiatric diagnoses that could negatively affect these skills to be overlooked. It can be seen as a limitation that different measurement tools that can evaluate the theory of mind or high-level skills of SC or measurements in face-to-face laboratory conditions and measures that evaluate interpersonal communication skills for relationships are not used. It is thought that additional measurements are needed to evaluate these structures more comprehensively.

## Conclusion

Despite its limitations, this study is one of the rare studies examining the relationship between social cognition skills and social anxiety disorder in the literature abroad and in Turkey. It is considered important that this study not only sheds light on future studies on identifying the predictors of social anxiety; but also presents an up-to-date perspective on the etiological features of SAD and preventive interventions.

Based on the results of this study, it is thought that methods to improve social cognition skills will be beneficial in the treatment of SAD. It is considered important to develop skills such as emotion identification and discrimination, understanding and predicting the emotions, thoughts, behaviors, and intentions of other individuals, especially in interpersonal relationships. In addition, changing the perspectives of individuals with social anxiety about misinterpreting their own bodily, internal

processes, and social cues is of great importance in preventing the existing problem. Interventions such as Cognitive Behavioral Therapy (CBT), Cognitive Bias Intervention and Cognitive Remediation Training (Yıldırım and Alptekin 2012, Buhlmann et al. 2015) seem to be effective in attribution bias and theory of mind problems. In addition to interventions such as group therapies and social skills training to reduce social anxiety and increase social functionality, Social Cognition and Interaction Training (Yıldırım and Alptekin 2012, Kurtz and Richardson 2012) can be recommended to improve social cognition skills.

Due to the early age of onset, interventions to increase parental awareness, prevention, detection, and interventions for children and adolescents gain importance. Considering the developmental characteristics of SC, interventions to improve social cognition skills and interpersonal relationships are thought to be very important, especially for children and adolescents. Thus, it comes to mind that it can be preventive for social anxiety and mental disorders related to SC in adulthood.

When the literature is examined, it has been seen that intervention programs for the development of social cognition skills in Turkey and evidence-based studies for these programs are scarce (Taş 2011). It is also determined that applications are not sufficient, especially for anxiety disorders (Olgun-Kaval, 2021). It is thought that future studies in which gender ratios are balanced, the clinical sample is included, and higher-level measurement tools are used in a performance-based and interactive way for social cognition skills will contribute to the literature. In addition, it is suggested that it would be beneficial to develop performance-based measurement tools in the field of social cognition, especially for Turkey, to create therapies and interventions to improve social cognition skills for psychological problems related to social cognition and to carry out necessary experimental and statistical research on them.

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