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ORIGINAL ARTICLE

Cognitive distortions in patients with social anxiety disorder: Comparison of a clinical group and healthy controls

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Abstract
Background and objective: Based on the cognitive model of social anxiety disorder (SAD), individuals who are anxious in social environments have some dysfunctional thoughts and beliefs regarding themselves and ways of others to judge their behaviors. A fundamental component of cognitive behavioral therapy is about noticing and changing cognitive distortions. The aims of our study were to analyze the differences in cognitive distortions between patients with SAD and a healthy control group, and examine the relationship between cognitive distortions and levels of anxiety and depression in patients with SAD.
Methods: One hundred two individuals from two samples, non-clinical and clinical with SAD, were included. Patients were evaluated using a socio-demographic data form, the Liebowitz Social Anxiety Scale, Cognitive Distortions Scale (CDS), State-Trait Anxiety Inventory, and Beck Depression Inventory after a diagnostic interview.
Results: There were significant differences between the patient and control group in terms of total CDS; most cognitive distortions were significantly higher in the patient group compared with the controls. The correlations between social anxiety, state and trait anxiety levels, depressive symptoms, and cognitive distortions were analyzed and significant correlations were found between the scales with a range of 0.316–0.676.
Conclusions: Patients with SAD had more cognitive distortions compared with the healthy controls. The comorbid depressive symptoms in SAD had effects on 'mental filter,

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overgeneralization and personalization' in social situations, and there was no specific cognitive distortion without depression. Cognitive distortions in these patients were more related to depression and trait anxiety levels than the severity of social anxiety.

Introduction

Social anxiety disorder (SAD) is a psychological condition of marked fear or anxiety about one or more social situations in which the individual is exposed to possible assessment by others.[1]

In SAD, a condition characterized by physical, cognitive, and behavioral indications, individuals have an unrealistic level of anxiety about being evaluated by others in most or some social situations such as public speaking, public eating, and using public restrooms. A significant level of impairment of functionality occurs in social, academic and psychological areas. Social anxiety starts at early stages of life and quickly becomes chronic. It may create significant issues for the individual unless treatment is not provided.[2,3] In explaining social anxiety, the cognitive behavioral model is one of the most widely accepted models.[4–7]

Cognitive models of anxiety disorders act in reference to central characteristics such as cognitive schema or beliefs that bring individuals closer to processing information with prejudice, direct all attention toward threats, and approach ambiguous stimuli with catastrophic misinterpretation.[8,9] In changing environments, different clinical pictures may arise as a result of dysfunctional beliefs and cognitive distortions.[8,9] Based on the cognitive model of SAD, the core of social anxiety appears to be a strong desire to convey a particular favorable impression of oneself to others and marked insecurity about one's ability to do so.[4] Individuals who have high social anxiety have some dysfunctional thoughts and beliefs regarding their own behaviors and others' ways of judging those behaviors.[10] This way of interpretation causes cognitive mistakes by systematically interpreting the individual's experiences and distorting the interpretations.[10] Distorted automatic thoughts (I'm blushing, they think badly of me, they don't like me, I look foolish), underlying non-adaptive assumptions (if my speaking is not perfect and fluent, they will think badly about me), and maladaptive core beliefs (I am inferior, I am uninteresting, I am boring, I am a weak person, I am a failure) are stages from the more superficial to deeper levels, upon which the cognitive model focuses.[4,5]

Cognitive distortions as defined by Beck et al. are cognitive constructs that arise when information processing is ineffective or wrong, led by important beliefs or schemas of the individual.[11,12] Prominent cognitive distortions are: mind reading, catastrophizing, all-or-nothing thinking, emotional reasoning, labeling, mental filter, overgeneralization, personalization, 'should' statements, minimizing or disqualifying the positive, and arbitrary inference.[13]

Initial studies on cognitive distortions mostly focused on depression and reported that cognitive distortions were seen more in individuals with depression than healthy individuals.[14,15] Beck stated that 7 cognitive distortions were distinctive in individuals with depression, and Burns extended those into 10 in later studies.[12,13] Findings of studies made in connection to anxiety disorders are limited. For example, whereas one study found that mind reading and underestimation of the coping ability were predictive for anxiety,[16] this finding was not reproduced in later studies. In another study in young patients with anxiety, catastrophizing, overgeneralization and mental filter cognitive distortions were found higher than both clinical (individuals with an externalizing disorder) and control groups.[17] Another study found that overgeneralization was the strongest independent predictor of anxiety.[18] Additionally, it was reported that individuals with anxiety disorders made more cognitive distortions than healthy individuals.[8] However, information as to which cognitive distortions are specific in anxiety disorders is limited in the literature. Many relevant studies have examined the relationship between social anxiety and closely-related constructs, including automatic thoughts and beliefs/schemas.[19–22] Maladaptive beliefs have been shown to have significant positive associations with measures of social anxiety symptoms.[21,22] However, there are a limited number of studies in the literature on cognitive distortions in SAD. A study on nonclinical undergraduate students found that cognitive distortions were significantly associated with social anxiety scores.[23] However, some studies found that patients with social anxiety were more likely to catastrophize for negative events than other patients with anxiety.[24] In another study on children, more cognitive distortion was reported in the social anxiety group in comparison with the control group.[25] Alden et al. also emphasized that social anxiety was related to negative interpretation likelihood.[26]

In the treatment of SAD, cognitive behavior therapy (CBT) is based generally on determining the connections among emotion, behavior, and thoughts, and replacing dysfunctional ways of interpretation with more realistic and functional ones.[27] One of the fundamental components of CBT is about noticing and changing cognitive distortions.[28] The aim of CBT in SAD is to change cognitive distortions and dysfunctional behavior.[29] In the cognitive area, which is the most important point for interference in the treatment process of patients with SAD, determining the frequently seen dysfunctional cognitive distortions would contribute to the treatment process. Understanding SAD in terms of cognitive distortions and determining cognitive areas that may be important areas of interference in these patients may help to make the treatment process easier.

In this context, the aims of our study were to examine the differences in cognitive distortions between patients with SAD and a healthy control group, examine the relationship between cognitive distortions in patients with SAD and

levels of anxiety, and examine whether comorbid depressive symptoms in SAD had an effect on cognitive distortions. The hypotheses of the study were that cognitive distortions would be seen more frequently in the SAD group than the control group, there was a positive relationship between the severity of social anxiety symptoms and cognitive distortions, severity of depressive sypmtoms had an effect on cognitive distortions, and there were cognitive distortions specific to SAD.

Material and method

Sample

One hundred two individuals from two samples, nonclinical controls and clinical patients who had been diagnosed as having SAD. The clinical group comprised 51 patients with a primary diagnosis of SAD who presented to the Department of Psychiatry outpatient unit of Ankara Diskapi Y.B. Teaching and Research Hospital (University of Health Science). The patients' diagnoses were confirmed using the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) structural clinical interview between February and June, 2015. The nonclinical control group constituted 51 individuals from various professions (e.g., medical school students, nursing students, clinical and undergraduate psychology students, and social workers) working as interns at Ankara Diskapi Y. B. Teaching and Research Hospital. All participants received group CBT or pharmacotherapy for treatment.

As a diagnostic tool, the structured clinical interview for DSM-IV-TR axis I disorders, the structured clinical interview for DSM-IV axis I disorders (SCID-I) was used. The participants were fully informed and their consent was obtained. Ethics board approval was granted by the Clinical Studies Ethics Board of Dışkapı Yıldırım Beyazıt Teaching and Research Hospital.

Criteria for participation in the study were determined as being aged between 18 and 65 years, being sufficiently literate to be able to complete the scales, and accepting participation in the study. The exclusion criteria were as follows: having neurologic disorders or mental retardation, and having a history of schizophrenia, bipolar disorder, psychotic disorder, and substance use disorder based on DSM-IV-TR diagnosis criteria.

Assessment tools

Sociodemographic data form

The authors prepared this data form to gather relevant information pertaining to the patient groups' sociodemographic and clinical characteristics of the disorder. Using this form, we probed the participants' age, sex, level of education, family information, alcohol-substance use, previous or current psychiatric treatments, and other demographic information.

The structured clinical interview for DSM-IV axis I disorders (SCID-I)

This is a structured clinical interview form developed by First et al. to diagnose DSM-IV axis I disorders. The validity and reliability for the Turkish test were established by Ozkurkçükigil et al.[30,31]

Liebowitz Social Anxiety Scale (LSAS)

The LSAS was developed by Liebowitz for the assessment and rating of fear and avoidance levels that individuals have in situations of social interaction and social performance.[32] The LSAS is a 24-item, 4-point Likert-type scale that measures fear and avoidance of social situations over the past week. A total score is calculated by summing all the fear and avoidance ratings. The validity and reliability for the Turkish test were established by Soykan et al.[33]

The Cognitive Distortions Scale (CDS)

This is a 20-item self-report, Likert-type scale developed by Covin et al. in 2011 to measure 10 cognitive distortions (mind reading, catastrophizing, all-or-nothing thinking, emotional reasoning, labeling, mental filter, overgeneralization, personalization, 'should' statements, minimizing or disqualifying the positive) using a 7-point scale (1 = never, 7 = all the time).[34] Each cognitive distortion is rated in two domains: interpersonal (IP) and personal achievement (PA). In the original study, the CDS emerged as a one-factor (unitary) scale with good internal consistency (Chronbach's $\alpha = 0.85$). The Turkish version of the CDS has been shown to be valid and reliable with very good internal consistency between individuals with and without depression (Chronbach's α 0.91 and 0.93, respectively).[35]

The State-Trait Anxiety Inventory (STAI)

This scale was developed by Spielberger et al.[36] The STAI consists of two subscales, each composed of 20-items that measure state and trait anxiety. The Turkish version of the STAI has been demonstrated to be valid and reliable (Chronbach's $\alpha = 0.94$).[37]

The Beck Depression Inventory-II (BDI)

This is a 21-item scale developed and updated by Beck et al.[38] that measures emotional, cognitive, somatic, and motivational symptoms. In the Turkish version of this test, a score of 17 is considered the cut-off point for validity and reliability.[39]

Statistical analysis

All the obtained data were coded numerically and analyzed using Statistical Program for Social Sciences 15.0 for Windows software (SPSS 15.0). Variance homogeneity of the groups was analyzed using Levene's test. Student's *t*-test and one-way ANOVA were used to compare the groups. For comparing the means of the patient and control group's scales, effect size was calculated. Additionally, in order to understand the relationship between variables, Pearson's correlation test was used. We performed a partial correlation analysis to exclude the effect of depressive symptoms. The level of significance was accepted as 0.05. Bonferroni correction was made in order to prevent type I errors in multiple comparisons. The *p* value was accepted as 0.0025 while comparing the items of the CDS because the scale consisted of 20 items.

Results

The groups comprised 51 patients with SAD (33 males, 18 females), and 51 age- and sex-matched control subjects ($n = 51$, 33 males, 18 females). The participants of the patient and control groups were similar in terms of age, sex, and education. The mean age of the patient group was 26.18 ± 7.73 years, and the mean age for the control group was 25.53 ± 5.26 years ($t = 0.494$; $p = 0.622$). The mean duration of education was 10.8 ± 3.4 years for the patient group and 11.7 ± 5.7 years for the control group ($t = 0.293$; $p = 0.770$).

Twenty-five (49%) participants in the patient group were previously diagnosed as having SAD, whereas 26 (51%) were diagnosed for the first time. Forty-three (84.3%) of the patient group had at least one axis-I diagnosis. The most frequent SCID-I diagnosis was simple phobia ($n = 25$, 49%), followed by dysthymia ($n = 19$, 37.2%), depression ($n = 12$, 23.5%), obsessive compulsive disorder ($n = 5$, 9.8%), generalized anxiety disorder ($n = 1$, 2%), and panic disorder ($n = 1$, 2%), respectively.

When the scale scores related to SAD severity in the patient group were calculated, the mean total scores of the LSAS, fear subscale, and avoidance subscale were 123.19 ± 27.14, 62.02 ± 13.15, and 61.18 ± 14.56, respectively.

The patient and control groups were compared in terms of depression, state and trait anxiety levels, and cognitive distortions; statistically significant differences were detected in all mean scores of scales (Table 1).

Although there were significant differences between the patient and control group in terms of total CDS, and total social and personal situation scores, only some subscores had significant differences (Table 2).

Table 1 Comparison of the patient and control groups in terms of mean scores of BDI, STAI, and CDS.

Measure	Patient groups		Control groups		*t* values	*p* values	Effect size (*d*)
	Mean	SD	Mean	SD			
Beck Depression Inventory	23.66	10.97	4.86	4.07	11.46	0.001*	2.27
STAI-State Anxiety	48.53	12.73	41.80	8.76	3.10	0.003*	0.61
STAI-Trait Anxiety	54.75	10.41	45.59	6.83	5.25	0.001*	1.04
CDS-Total	83.43	25.17	58.45	23.22	5.20	0.001*	1.03
Cognitive Distortion Scale-IP	42.00	13.05	29.41	11.58	5.15	0.001*	1.02
Cognitive Distortion Scale-PA	41.43	12.79	29.04	11.99	5.04	0.001*	0.99

STAI = State Trait Anxiety Inventory, CDS = Cognitive Distortions Scale, IP = Interpersonal subscale of CDS, PA = Personal Achievement subscale of CDS.

* Statistically significant differences between the two groups at the level of $p < 0.05$.

Table 2 Comparison of the patient and control groups in terms of cognitive distortions.

		Patient groups		Control groups		*t* values	*p* values
		Mean	SD	Mean	SD		
Mind reading	IP	4.57	1.84	3.67	1.52	2.70	0.008
	PA	4.49	1.87	3.69	1.52	2.38	0.019
Catastrophizing	IP	3.86	1.77	2.82	1.51	3.19	**0.002****
	PA	4.35	1.83	2.94	1.49	4.27	**0.001****
All-or-nothing thinking	IP	3.96	1.95	2.63	1.57	3.80	**0.001****
	PA	3.84	1.93	2.90	1.85	2.51	0.014
Emotional reasoning	IP	4.59	1.82	3.33	1.72	3.57	**0.001****
	PA	4.31	1.88	2.69	1.46	4.87	**0.001****
Labeling	IP	4.49	1.93	2.69	1.45	5.33	**0.001****
	PA	4.37	1.91	2.67	1.49	5.03	**0.001****
Mental filter	IP	4.10	1.86	3.10	1.63	2.89	0.005
	PA	3.92	1.81	2.90	1.55	3.05	0.003
Overgeneralization	IP	4.25	1.85	2.92	1.61	3.87	**0.001****
	PA	4.18	1.91	2.84	1.60	3.81	**0.001****
'Should' statements	IP	4.16	1.88	2.88	1.49	3.79	**0.001****
	PA	3.78	1.78	2.72	1.52	3.22	**0.002****
Personalization	IP	4.10	1.82	2.59	1.59	4.45	**0.001****
	PA	4.14	1.78	2.74	1.62	4.13	**0.001****
Minimizing or disqualifying the positive	IP	3.92	2.04	2.78	1.71	3.05	0.003
	PA	3.96	2.07	2.94	1.70	2.71	0.008

CDS = Cognitive Distortions Scale, IP = Interpersonal subscale of CDS, PA = Personal Achievement subscale of CDS.

** Bold values indicate statistically significant at the level of $p < 0.0025$.

Table 3 Cognitive distortions of patients with and without depression or dysthymia.

		Patients with and without comorbid depression or dysthymia				*t* values	*p* values
		With		Without			
		Mean	SD	Mean	SD		
CDS-Total		92.90	23.44	69.90	21.46	3.58	**0.001****
CDS-Interpersonal		46.73	12.21	35.24	11.32	3.45	**0.001****
CDS-Personal Achievement		46.17	11.96	34.67	10.94	3.55	**0.001****
Mind reading	IP	4.97	1.87	4.00	1.67	1.89	0.064
	PA	4.73	1.87	4.14	1.85	1.11	0.271
Catastrophizing	IP	4.17	1.84	3.43	1.60	1.48	0.144
	PA	4.93	1.76	3.52	1.63	2.94	0.006
All-or-nothing Thinking	IP	4.33	2.09	3.43	1.63	1.73	0.103
	PA	4.27	2.02	3.24	1.67	1.98	0.061
Emotional Reasoning	IP	5.00	1.88	4.00	1.61	2.03	0.053
	PA	4.87	1.87	3.52	1.63	2.72	0.011
Labeling	IP	5.07	1.80	3.67	1.85	2.70	0.009
	PA	4.90	1.86	3.62	1.75	2.50	0.017
Mental filter	IP	4.77	1.77	3.14	1.56	3.45	**0.001****
	PA	4.37	1.71	3.29	1.79	2.17	0.037
Overgeneralization	IP	4.93	1.82	3.29	1.45	3.58	**0.001****
	PA	4.67	2.02	3.48	1.54	2.38	0.027
'Should' statements	IP	4.57	2.05	3.57	1.47	2.02	0.062
	PA	4.17	1.95	3.24	1.37	1.99	0.066
Personalization	IP	4.57	1.72	3.43	1.80	2.28	0.027
	PA	4.77	1.68	3.24	1.55	3.35	**0.002****
Minimizing or disqualifying the positive	IP	4.37	2.14	3.29	1.74	1.91	0.062
	PA	4.37	2.17	3.38	1.80	1.76	0.094

CDS = Cognitive Distortions Scale, IP = Interpersonal subscale of CDS, PA = Personal Achievement subscale of CDS *t* tests were performed using Bonferroni correction.

** Bold values indicate statistically significant at the level of $p < 0.0025$.

When the patient group was divided into two groups as those with and without comorbidities of depression or dysthymia because the initial studies on cognitive distortions mostly focused on symptoms of depression, 31 (60.2%) had depression or dysthymia, and 20 (39.2%) did not. When the groups' CDS total, CDS personal achievement subscale, and CDS interpersonal subscale scores were compared, statistically significant differences were found between the groups with and without comorbidities (Table 3).

When the cognitive distortions of the SAD group with depression or dysthymia and the control group were compared, the groups were significantly different in terms of CDS total ($p = 0.001$), CDS personal achievement ($p = 0.002$), and CDS Interpersonal ($p = 0.001$) subscores in every item except mind reading (PA) ($p = 0.006$), all-or-nothing thinking (PA) ($p = 0.003$), minimizing or disqualifying the positive (PA) cognitive distortions ($p = 0.003$). When the SAD group without depression/dysthymia and the control group were compared, no statistically significant differences were found in any sub-items.

The correlations were analyzed between social anxiety severity (LSAS), state and trait anxiety levels (STAI), depressive symptoms (BDI), and cognitive distortions (CDS), and significant correlations were found between the scales with a range of 0.316–0.676 (Table 4).

However, we performed a partial correlation analysis control for the depressive symptoms effect. When the partial correlation analysis was controlled for the depressive symptom severity (BDI), significant correlations were found between all CDS scores and STAI-Trait, and correlations between cognitive distortion severity and social anxiety symptom severity disappeared ($p < 0.001$) (Table 5)

When the correlations between the CDS and social anxiety, state and trait anxiety levels, and depressive symptom levels were calculated in the SAD group without depression, there was a correlation between CDS and STAI state ($r = 0.479$), STAI-Trait ($r = 0.520$), and BDI ($r = 0.601$), but there was no correlation with LSAS and subscales.

Discussion

In the present study, we aimed to investigate cognitive distortions in SAD. We compared a SAD group with a control group consisting of healthy individuals in terms of BDI, STAI, and CDS scores. Additionally, in order to investigate the relationship between cognitive distortions, anxiety, and depressive symptoms, we compared groups with and without depression/dysthymia comorbidities in terms of CDS subscores.

Table 4 Correlations of the CDS of patients with BDI, LSAS, and STAI.

Measure	BDI	LSAS Total	LSAS Fear Scores	LSAS Avoidance Scores	STAI-Trait Anxiety	STAI-State Anxiety
Cognitive Distortion Scale-Total	0.634**	0.405*	0.460**	0.339*	0.676**	0.420*
Cognitive Distortion Scale-IP	0.614**	0.380*	0.435**	0.316*	0.659**	0.392*
Cognitive Distortion Scale-PA	0.621**	0.408*	0.462**	0.345*	0.657**	0.426*

BDI: Beck Depression Inventory, LSAS: Liebowitz Social Anxiety Scale, STAI = State-Trait Anxiety Inventory, IP = Interpersonal subscale of CDS, PA = Personal Achievement subscale of CDS.
* Statistically significant at the level of $p < 0.05$.
** Statistically significant at the level of $p < 0.001$.

Table 5 Partial correlations of CDS of patients with LSAS and STAI (controlling for BDI).

Control for	Measure	LSAS Total	LSAS Fear Scores	LSAS Avoidance Scores	STAI-Trait Anxiety	STAI-State Anxiety
BDI	Cognitive Distortion Scale-Total	0.250	0.275	0.219	0.488**	0.300*
	Cognitive Distortion Scale-IP	0.221	0.246	0.192	0.470**	0.265
	Cognitive Distortion Scale-PA	0.258	0.281	0.229	0.464**	0.309*

BDI: Beck Depression Inventory, LSAS: Liebowitz Social Anxiety Scale, STAI = State-Trait Anxiety Inventory, IP = Interpersonal subscale of CDS, PA = Personal Achievement subscale of CDS.
* Statistically significant at the level of $p < 0.05$.
** Statistically significant at the level of $p < 0.001$.

When the SAD and control groups were compared in terms of depression, and state and trait anxiety levels, all three scale scores were noticeably higher in the patient group. Additionally, in our sample, the mean LSAS fear subscore, avoidance subscore, and total score were found as 62.02, 61.18, and 123.19, respectively. Our sample was similar to those in the literature in terms of social anxiety levels.[40] The high scores of depression and anxiety in these cases might have been caused by comorbidities of depression and other anxiety disorders. Comorbidity rates may be seen as high as 90% in the literature.[40] The rates of comorbidity in our study were similar to studies in the literature that included patients with SAD, except for a higher dysthymia rate.[40]

CDS total scores, interpersonal and personal achievement subscores, emotional reasoning (PA, IP), labeling (PA, IP), overgeneralization (PA, IP), personalization (PA, IP), catastrophizing (PA, IP), all-or-nothing thinking (IP), 'should' statements (PA, IP), and cognitive distortions were found significantly higher in the patient group than the control group. Initial studies on cognitive distortions mostly focused on depression and reported that cognitive distortions were seen more in individuals with depression than in healthy individuals.[14,15] The depression scores were high and closely correlated with CDS scores; the patient group was analyzed again in two sub-groups, those with and without depression. One of the reasons why it is not possible to clearly distinguish between cognitive distortions specific to depression and those specific to social anxiety is that both conditions simultaneously exist in clinical settings. To exclude this issue in our study, we compared the patient group as the comorbid depression or dysthymia group, and the group without this comorbidity. The CDS total score, interpersonal and personal achievement scores, mental filter (IP), overgeneralization (IP), and personalization (PA) cognitive distortion scores were significantly higher for the group with comorbidities. These results show that patients with SAD and depression use cognitive distortions of 'mental filter, overgeneralization, and personalization' more frequently in social situations than other patients with SAD. Although previous studies found some cognitive distortions such as 'overgeneralization' more related to the magnitude of depressive symptoms,[16] it may be expressed that 'mental filter, overgeneralization and personalization' cognitive distortions were clinically prominent in the group with both social anxiety and depression. There is information on various cognitive distortions in studies with patients who had depression and anxiety comorbidities. For example, although some studies considered personalization without selective abstraction (mental filter) and mind reading an indicator of depression, it is not considered as an indicator of anxiety.[25–41] In a study by Weems et al., selective abstraction (mental filter) was found as a stronger indicator of depression than anxiety.[42] In another study, selective abstraction and overgeneralization were indicators of depression.[16]

Moreover, in order to determine cognitive distortions specific to SAD without depression, the patient group without comorbidities was compared with the control group. When the SAD group without depression/dysthymia comorbidities and the control group were compared, no statistically significant differences were found in any item scores. When the results were investigated in detail, it was found that they were all higher than those in the control group, but the differences were not statistically significant. All-or-nothing thinking (PA), emotional reasoning (IP), and labeling (IP, PA) scores were noticeably different, but a statistical significance was not found. This situation may have resulted from the small size of the sample. Furthermore, the absence of a correlation in the SAD group between CDS and LSAS score, and the existing correlations with depression and STAI scores made us think that the differences in scores were more related to trait anxiety and depressive symptom levels, rather than social anxiety. Also, when the partial correlation analysis was controlled for the depressive symptom effects (BDI), significant correlations were found between all CDS

scores and STAI-Trait. These results showed that cognitive distortions generally occur more frequently in patients with SAD than in the healthy population, but no cognitive distortion item is specific to SAD. No previous studies have been conducted to determine cognitive distortions specific to SAD; however, studies have reported that more cognitive distortion occurs in patients with SAD compared with control groups.[25]

When the relationship between cognitive distortions total/subscale scores and scores of social anxiety, state and trait anxiety, and depression were investigated in the patient group with SAD, although there was a varying relationship with all scale scores, depression ($r = 0.634$) and trait anxiety ($r = 0.676$) had stronger relationships. These data show us that more attention should be paid to the relationship between cognitive distortions and levels of depressive symptoms and trait anxiety. Ozdel et al. also found that cognitive distortions were highly correlated with trait anxiety levels.[35] While general anxiety may be observed in social anxiety, there is not enough information in the literature regarding this issue.[18] In light of these data, high trait anxiety levels may be related with cognitive distortions. Studies examining depressive symptoms and cognitive distortions also reported that cognitive distortions were more frequent in individuals with depression than in healthy individuals.[14,15] However, recent studies suggested that most cognitive distortions were not related to depression only.[34–43] In the studies by Covin et al. and Özdel et al., it was reported that cognitive distortions might be related to trait anxiety in a stronger fashion, in addition to depression.[34,35] These data are in agreement with our findings. From a different point of view, the higher correlation results between cognitive distortions and depression/trait anxiety might be related to some other underlying constructs, such as personality traits and transdiagnostic constructs of cognitive distortions.

Some limitations of this study necessitate caution while interpreting these results. First, because the study is cross-sectional, the obtained data cannot be interpreted as causation. Additionally, the small size of the study sample reduces the statistical power of the results. Another limitation is that cognitive distortions and other variables were evaluated using self-reporting scales. Moreover, as the sample consisted of patients who sought help for SAD, our findings cannot be generalized to all individuals with SAD. It will be useful to confirm and improve these findings with prospective studies with wider samples and pure social anxiety.

In conclusion, patients with SAD had more cognitive distortions compared with healthy controls. Cognitive distortions in these patients were more related to depression and trait anxiety levels. Comorbid depressive symptoms in SAD had effects on 'mental filter, overgeneralization, and personalization' in social situations, and there was no cognitive distortion without depression that was specific to SAD.

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Conflict of interest

The authors have no conflict of interest to declare.

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