Relationships Between Theory of Mind (ToM) and Attachment Properties in Adolescent with Social Anxiety Disorder

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ABSTRACT

Introduction: Studies have suggested that attachment styles are associated with social anxiety disorder (SAD). Recent studies found that individuals with a diagnosis of SAD were significantly impaired relative to healthy controls on tasks of theory of mind (ToM). We aimed to investigate the association of ToM and attachment styles in adolescents diagnosed with SAD in this study.

Methods: Drug-naïve 42 adolescents diagnosed with SAD and aged between 12 to 18, without psychiatric comorbidity were enrolled in the patient group. Forty-two adolescents in the same age range without any psychiatric disorders were matched as the healthy control group. The diagnosis was made by experienced clinicians using the Kiddie and Young Adult Schedule for Affective Disorders and Schizophrenia Present and Lifetime Version and diagnostic criteria of Diagnostic and Statistical Manual of Mental Disorders Fifth Edition. The severity of SAD symptoms was evaluated with the Social Anxiety Scale for Adolescents. ToM was

evaluated with Reading the Mind in the Eyes task and faces test. Parent and Peer Attachment Inventory was used for assessing attachment properties.

Results: Adolescents with SAD compared to healthy control groups have more difficulties both in Reading the Mind in the Eyes task and faces test. We found a statistically significant decrease in peer and parent attachment scores when compared with SAD and healthy controls ($p < 0.05$). A negative correlation between the severity of SAD and both ToM tasks and attachment has been found.

Conclusions: The results of this study indicate that ToM deficits and insecure attachment style may play an important role in the etiology and treatment of SAD in adolescents.

Keywords: Social anxiety disorder, theory of mind, adolescent, attachment

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INTRODUCTION

The defining feature of social anxiety disorder (SAD) is the constant and overwhelming fear of being negatively judged when exposed to unfamiliar people in social or performance situations and of possible rejection by others. The person feels great anxiety at the possibility of being embarrassed or humiliated (1). SAD is one of the most common mental disorders according to epidemiological surveys, with the prevalence ranging from 5% to 13% in children and adolescents (2). Due to the National Comorbidity Survey Replication-Adolescent (NCSR-A), the prevalence of SAD is 8.6% in children between ages 13–18 years and these rates are similar in adults (3).

Emotional dysregulation plays an important role in the pathophysiology of SAD (4). Attachment theory, which is also described as emotion regulation theory has been examined in the etiology of SAD. Relationships with primary caregivers are found in the center of SAD development (5). It was found that overprotective, neglectful and less caring properties are related to SAD (5).

Recent study reported that a great part of wellbeing in adolescents depends on attachment, while studies with clinical samples have shown that individuals diagnosed with SAD are also insecurely attached (6,7). Eng et al. (2001) have also reported that insecure attachment in individuals with SAD was associated with greater severity of SAD symptoms and functional impairment and lower quality of life (6). In a study using the adult attachment scale, it was found that social anxiety was disorder negatively associated with the secure attachment style and positively associated with avoidant and anxious styles. In addition, social anxiety was associated with preoccupied and fearful attachment styles (7). Therefore, it seems important to investigate the relationship between attachment styles and social anxiety in a clinical sample.

As an underlying social-cognitive mechanism, the role of mentalization in the etiology of SAD needs to be better understood. The theory of mind (ToM), which can be defined as the capability of accurately attributing an individual's mental state, beliefs, intentions and desires, is very

important in adequate social and interpersonal functioning (8). SAD is a severe clinical psychiatric condition that causes social and interpersonal dysfunction and few studies have examined ToM deficits in SAD. Deficits in detecting and understanding others' mental states (i.e. ToM) may affect interpreting social situations in SAD (9). Additionally, studies with SAD have shown individuals with SAD assign emotions and intentions to others with unsuitable styles in their relations (10). The current study was the first study that evaluated the relation between ToM and SAD in adolescents diagnosed with SAD.

We aimed to investigate the association of ToM and attachment styles in adolescents diagnosed with SAD in adolescents.

METHODS

This cross-sectional study was designed as a two-centered, single-disciplinary study that included a control group.

Participants

Participants were chosen from among adolescents aged 12–18 presenting at the child psychiatry outpatient clinic of a public hospital and a research and training hospital between October 2017 and May 2018. The SAD study group included forty-two adolescents with no history of drug use, who were capable of completing the self-administered questionnaires and who had been diagnosed with SAD in accord with the criteria of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), edited by the American Psychiatric Association, and the Kiddie and Young Adult Schedule for Affective Disorders and Schizophrenia Present and Lifetime Version (K-SADS-PL). The healthy control group consisted of 42 adolescents of similar age and gender with no history of psychiatric disorder or chronic disease who had presented to different outpatient clinics of the same hospitals and who had agreed to participate in the study. The control adolescents had no diagnosis of mental retardation and were evaluated as having clinically normal intelligence. They were assessed as being free of psychiatric disorders via the K-SADS-PL.

Approval for the study was obtained from the İzmir Katip Çelebi University Clinical Trials Ethics Committee (IRB approval date and number: 09.13.2017-203). All mothers and adolescent participants provided their written as well as verbal consent. Comorbidities of children in the SAD group were detected using K-SADS-PL and cases without any psychiatric disorders were included in the study. Adolescents with drug abuse, bipolar disorder, obsessive compulsive disorder, psychotic symptoms or major central nervous system disorders such as epilepsy were excluded from the SAD study group.

Children and their mothers were examined by the same child psychiatrist. A total of 87 children presenting to two clinics with SAD symptoms between October 2017 and May 2018 were assessed for the SAD group. Children without a SAD diagnosis ($n=14$) and without consent to participate in the study ($n=6$) were excluded from the study and 67 adolescents with SAD were assessed. A comorbid psychiatric disorder was detected in 20 of the 67 adolescents diagnosed with SAD: major depressive disorder ($n=16$), bipolar spectrum disorder ($n=1$), obsessive compulsive disorder ($n=2$) and post-traumatic stress disorder ($n=1$). Therefore, 17 adolescents having comorbid psychiatric disorders other than SAD were excluded from the study. Five adolescents having missing data were also excluded from the study. Forty-two drug-naïve adolescents diagnosed with SAD aged 12 to 18 without psychiatric comorbidity were enrolled in the patient group (Figure 1) (11). The control group consisted of 42 healthy adolescents within the same age range.

Figure 1. Study flow chart.

Measures

The Turkish version of the Social Anxiety Scale for Adolescents was administered to all participants (12). The ToM was appraised by Reading the Mind in the Eyes task and Faces test. The Inventory of Parent and Peer Attachment (IPPA) was used for assessing attachment properties. A specialist in child and adolescent psychiatry administered the K-SADS-PL. All respondents filled out versions of the questionnaire forms by hand following a set order (first, the socio-demographic checklist, then the SAS-A and finally, the IPPA).

Sociodemographic Data Form: A clinician completed this form in which information was compiled on the socio-demographic characteristics of the adolescents and their parents. The questions included the age, gender, socioeconomic level, academic status and peer relationships of the child as well as the age, educational and marital status, and occupation of the parents.

Schedule for Affective Disorders and Schizophrenia for School Age Children Present and Life-time Version (KIDDIE-SADS-PL): The present and lifetime psychopathology of children and adolescents aged 6–18 can be examined via this semi-structured interview form developed by Kaufman et al. (13). Gökler et al. prepared the K-SADS-PL Turkish translation and reliability and validity study (14).

The Turkish version of the Inventory of Parent and Attachment (IPPA)-Brief form: The Turkish version of this questionnaire was prepared by Günaydin et al. (15) from the original form by Armsden and Greenberg (16). It is used to assess adolescent perceptions of the affective and cognitive dimension (positive and negative) of the relationships with mother, father, and close friends, and the extent to which they serve as bases of psychological support according to the attachment theory. It includes a total of 24 questions (12 about parents and 12 about peers). A high score indicates a high secure attachment level.

The Social Anxiety Scale for Adolescents (SAS-A): This measurement has 22 items and consists of three subscales, items rated on a five-point Likert-type scale (12) (1=never, 2=rarely, 3=sometimes, 4=often, 5=always).

Fear of Negative Evaluation, General Social Avoidance and Distress and Social Avoidance and Distress in New Situations are the subscales. Higher scores indicate higher social anxiety level. The validity and reliability of the scale have previously been confirmed by Aydın and Tekinsav-Sütçü (2007) in Turkey (SAS-A; Cronbach's alpha: 0.88) (17).

Reading the mind from the Eyes test: This test (revised in 2001) was developed to assess the perception of emotions (18). It contains 36 pictures depicting only the eye region of individual faces. A Turkish study was performed to confirm its reliability and validity (19). Two items were excluded on the Turkish version because of a low reliability coefficient, and consequently, the Turkish version used for this study contained 34 items and one praxis item. One of the four options presented for each picture is correct and the other three serve as distractors. The participants were instructed by the administrator of the test to "Mark the item that best explains what the individual thinks or feels for each pair of eyes." At the same time, the participants were also given a dictionary in which they could find the expressions used in the questions along with words having similar meanings. The number of correct answers was compiled for the scoring, with higher scores signifying greater social cognition and ToM abilities. The Cronbach's alpha reliability coefficient for this test was estimated as 0.93.

Faces Test: This test was developed to identify emotions in faces. Ekman defined six universal facial expressions: joy, fear, confusion, sadness, anger and disgust. The test evaluates emotion recognition disorder. There is no time limit for viewing the photos. Each correct answer is scored as "1", while a wrong answer is considered as "0". The answers given by the participants are marked on the answer sheet (20).

Statistical Analysis

Statistical analysis of the data for this study was carried out using the Statistical Package for the Social Sciences (SPSS 18.0) software. Number values and percentages were used in the evaluation of some study and control group socio-demographic and clinical categorical variables. The classified categorical variables were compared using the cross tab chi-square test. First, the Kolmogorov Smirnov method was used for the evaluation of data distribution. If the data distribution was found to be normal, the parametric t-test was used to evaluate paired groups. Correlation between continuous variables was determined using Pearson's correlation analysis. However, the number was inadequate when comparing SAD subgroups and, as they were found to be incompatible with normal distribution, independent double groups were compared via the Mann Whitney U test and triple groups via the Kruskal Wallis test. We performed a linear regression analysis to take into account the correlations between predictors and see what comes out as a significant predictor after accounting for socio-demographic variables and other socio-cognitive skills. P-value was accepted as <0.05.

RESULTS

Sociodemographic Characteristics

No statistically significant difference was found between the two groups in terms of the age and gender of the children and the maternal age, educational level, and marital status. The children's academic success was evaluated according to their latest term school grade reports, whereas peer relationship was measured based on the children's statements. A difference was detected between the groups in terms of academic success and peer relationships ($p < 0.001$, $p < 0.001$, respectively,) (Table 1).

Clinical Characteristics

The adolescents with SAD attained statistically significant lower peer and parent attachment scores ($p < 0.001$ for all scales) than the healthy

Table 1. Sociodemographic features of SAB and control group

	SAD (n: 42)	Control (n: 42)	p	X ² /t
Age* (mean ± SD)	14.28±1.01	14.38±1.39	0.722	0.357
Gender** n (%)				
Female	30	28	0.407	0.223
Male	12	14		
Maternal age* (mean ± SD)	38.80±2.51	40.69±3.61	0.072	0.771
Maternal education**				
<8 years	23	26	0.576	2.891
>8years	19	16		
Maternal working status n (%)				
Housewife	25	24	0.185	4.827
Working	17	18		
Marital status				
Married	33	32	0.732	6.952
Divorced	9	10		
School success** n (%)				
Good	22	26	0.009	13.533
Moderate	6	14		
Bad	14	2		
Peer relation** n (%)				
Good	28	41	<0.001	13.716
Bad	14	1		

*evaluated by parametric t test.

**evaluated by chi-square test.

controls. According to the SAS-A results, compared to the control group, the SAD group received statistically significant higher total scores and higher scores in Fear of Negative Evaluation, General Social Avoidance and Distress and Social Avoidance and Distress in New Situations ($p < 0.001$ each) (Table 2).

The adolescents diagnosed with SAD had more difficulties in both the Reading the Mind in the Eyes and the Faces Tests ($p < 0.001$ in each of them).

Adolescents diagnosed with SAD have more difficulties in both Reading the Mind in the Eyes task and Faces test ($p < 0.001$ in each of them).

Correlations among ToM tests, social anxiety level and attachment were shown in Table 3.

We performed linear regression analysis via two steps according to that at the main point our dependent variable was social anxiety scale for adolescents in both steps. Firstly, we considered that age, gender, IPPA-Brief form parent and peer attachment scores, eyes task, faces test were independent variables besides that we added these variables as the first bloc of variables. As can be seen in table 4, faces test and peer attachment subscores in the IPPA predict social anxiety scale for adolescents' scores. After this analysis we included group variable as the second bloc and did analysis again, we determined that faces test, peer attachment score in the IPPA and group predict social anxiety scale for adolescents' scores. After the addition of the group (SAD vs. control) in the second step, the diagnostic group remained as the predictor. The regression result was shown in Table 4.

Table 2. Comparison of inventory of parent and peer attachment, theory of mind deficits between SAD and control groups

	SAD	Control	p	t
Parent attachment	33.71±3.78	39.85±4.66	<0.001	-6.627
Peer attachment	33.85±3.84	42.73±5.71	<0.001	-7.889
Fear of Negative Evaluation	24.23±4.24	8.95±1.39	<0.001	22.158
General Social Avoidance and Distress	17.16±2.84	6.97±1.56	<0.001	20.374
Social Avoidance and Distress in New Situations	21.23±4.20	7.73±1.45	<0.001	19.687
Total score	62.64±10.39	23.66±2.58	<0.001	23.585
Reading the Mind in the Eyes task	20.19±2.08	21.85±3.42	<0.001	-2.693
Faces test	13.92±1.33	16.52±1.81	<0.001	-7.481

SAD, social anxiety disorder.
Parametric t test was used.

Table 3. Correlations of SAS-A, theory of mind scores, attachment scores

Correlations	SAS-A total score	Reading mind	Faces test	Parent Attachment	Peer Attachment
SAS-A total score	r: 1	r=-0.736** p<0.001	r=-0.608** p<0.001	r=-0.745** p<0.001	r=-0.735** p<0.001
Reading mind in the Eyes task	r=-0.736** p<0.001	r: 1	r=0.839** p<0.001	r=0.698** p<0.001	r=0.691** p<0.001
Faces test	r=-0.608** p<0.001	r=0.839** p<0.001	r: 1	r=0.561** p<0.001	r=0.546** p<0.001
Parent attachment	r=-0.745** p<0.001	r=0.698** p<0.001	r=0.561** p<0.001	r: 1	r=0.947** p<0.001
Peer attachment	r=-0.735** p<0.001	r=0.691** p<0.001	r=0.546** p<0.001	r=0.947** p<0.001	r: 1

SAS-A, Social Anxiety Scale for adolescents.
Pearson correlation was used.

Table 4. Variables except for group related to social anxiety scale for adolescents in linear regression analysis (n=84)

Variable	B	SEB	β
Faces test	4.396	0.992	0.429**
Peer attachment	1.137	0.176	0.347**

*R²=0.684; F (1.82)=12.861, p<0.001

**p<0.001

DISCUSSION

The study results indicate that insecure attachment and ToM problems were associated with SAD. The peer attachment and difficulties in recognizing emotions in faces especially were more predictive for SAD development. The current results are consistent with the studies which hypothesized that SAD sufferers were significantly less successful in interpreting the subtle social expressions of face and eyes than were healthy controls (21). In the study of Samson et al. (2012), increased social anxiety levels were related to difficulties in understanding cartoons (22). Similar to our study, one recent study has determined that non-depressed participants who were socially anxious gave a worse performance than non-anxious participants on one ToM decoding measurement (23). Hezel & McNally (2014) investigated ToM impairments in SAD. They compared 40 socially anxious and 40 non-socially-anxious participants

in terms of two ToM tasks: the RME test including decoding ToM and the MASC including ToM reasoning. They found that participants with SAD performed worse on both ToM tasks than did non-socially-anxious participants, and those with SAD were more likely to attribute more intense emotions and greater meaning to what others were thinking and feeling relative to non-socially-anxious participants. Specifically, individuals with SAD were significantly less accurate than controls at decoding the subtle mental states portrayed by photographs of eyes in the Reading the Mind in the Eyes task, particularly if the eyes depicted mental states of a negative valence (10). As far as we are aware, our study is among the few that evaluated relationships between ToM and SAD in adolescence. The results may be affected by stage of adolescence (early vs. mid vs. late), presentation of static vs. dynamic stimuli, comorbidity, and treatment and further studies may be needed to evaluate those factors.

In the current study we also found similar results; adolescents with SAD had more difficulties in decoding the other's mental states. This situation also requires respondents to put themselves into the minds of others (24). The decoding ToM is associated with affective empathy that develops earlier than cognitive empathy. The amygdala, hypothalamus and orbitofrontal cortex have all been linked to the affective empathy, along with emotional processing, all of which are closely related to the mother-child attachment. Early attachment difficulties were identified in SAD (25). Many past studies in the literature have consistently associated insecure adult attachment with social anxiety (6,7). Dysfunctional parental behavior, such as overcontrol and indifference, which may be an

indicator of insecure attachment, was significantly greater in those with SAD. Gajwani et al. (2013) obtained similar results with a group of high-risk SAD patients (26). Eighty percent of the group was identified as being insecurely attached, which was linked to high social anxiety levels. In the current study, adolescents diagnosed with SAD were insecurely attached, meaning positively correlated with the severity of SAD, which means positively correlated with difficulties in ToM tasks. Relationship difficulties in the social arena constitute very remarkable issues for adolescent mental health (27). A secure attachment with parents early in life, and later with peers throughout childhood, adolescence and adulthood, is a necessary characteristic of social relationships which plays a significant role in SAD during the adolescent period (28). Compatible with these results, in the present study, peer attachment was found to be associated more with SAD development than with other variables.

ToM skills and attachment bonds begin developing during childhood. Indications of an association between ToM and attachment were reported by Meins et al. (1998). They showed that securely attached children exhibited superior ToM compared to children who had insecure attachments (29). Lastly, childhood trauma, possibly representing insecure attachment, has been related to poorer adult ToM (30). As with our study, these studies also demonstrate that attachment and ToM may be associated with each other.

Nevertheless, these studies are significant in suggesting deficiencies in the ToM decoding and reasoning foundational social cognitive skills. This may be the basis for the pronounced social and interpersonal deficiency seen in those individuals with SAD.

Limitations

We have to consider several limitations in this study. One of them is the overrepresentations of female participants. Different forms of attachment, such as anxiety and ambivalent attachment, could be evaluated. Follow-ups of the adolescents diagnosed with SAD could have examined the effects of their treatment. The study should have included more replications and more continuous and representative sampling with a greater number of participants. The lack of blinding resulted because a single child psychiatrist carried out all the evaluations of the children and their mothers. Objective tests could have been used to assess their mental capabilities. This study used the adolescents' pre-treatment data; however, changes could have been evaluated during and post-treatment. The peer attachment assessed by the IPPA-short form may have affected the regression results because of the greater difficulty in peer relationships in adolescents already diagnosed with SAD.

A better understanding of factors that are associated with the increase of SAD symptoms may be essential for future prevention and intervention efforts in adolescence.

Place where the work was developed: The work was developed in two-centers. They were İzmir Katip Çelebi University Child and Adolescent Psychiatry Department, Bolu Abant İzzet Baysal University Child and Adolescent Psychiatry Department

Ethics Committee Approval: Approval for the study was obtained from the İzmir Katip Çelebi University Clinical Trials Ethics Committee (IRB approval date and number: 09.13.2017-203).

Informed Consent: Informed consent was obtained from all participants.

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