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Testing an Integrated Model of Social Anxiety Disorder Based on Influencing Factors: Biological, Familial, Cognitive, Behavioral, Emotional, and Social in Female Students

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A B S T R A C T

Objective: Social anxiety is characterized by the fear of being observed and judged by others in social situations.

Methods and Materials: The present study aimed to investigate the relationships among early maladaptive schemas, behavioral inhibition, and social anxiety, considering the mediating role of social situation evaluation, safety behaviors, emotion regulation, social beliefs and thoughts, and self-related beliefs. This descriptive study was of a correlational type. The statistical population included all female medical students at Jundishapur University of Medical Sciences in Ahvaz. The research sample consisted of 483 female students who were selected through convenience sampling. The research instruments included the Social Phobia Inventory, the Early Maladaptive Schemas Questionnaire, the Social Situations Evaluation Scale, the Safety Behaviors Questionnaire, the Emotion Regulation Questionnaire, the Social Beliefs and Thoughts Scale, the Self-Related Beliefs Scale, and the Behavioral Inhibition Questionnaire.

Findings: Data were analyzed using Pearson correlation and structural equation modeling. Fit indices indicated that the hypothetical model of the study had a good fit with the data (CFI = 0.96, IFI = 0.96, RMSEA = 0.07). The results showed that except for emotion regulation, all mediator variables affect social anxiety disorder (SAD).

Conclusion: Given the role of the factors proposed in the research model, it can be utilized in designing interventions for SAD among female medical students.

Keywords: *Social anxiety, social situation evaluation, safety behaviors.*

1. Introduction

Social Anxiety Disorder (SAD) is a disruptive psychological disorder in which individuals experience persistent fear of social evaluation or embarrassment in social situations, leading to avoidance of these situations (Karlsson et al., 2016; Leichsenring & Leweke, 2017; Leigh & Clark, 2018). In terms of prevalence, social anxiety is one of the three most common psychiatric disorders and the second most common anxiety disorder over a lifetime (Karlsson et al., 2016). Recent epidemiological studies have shown that the lifetime prevalence of social anxiety in the general population ranges from 3% to 13% (American Psychiatric Association, 2022). Gender differences in the prevalence of this disorder often indicate that social anxiety is more common among women (Leigh & Clark, 2018). Prominent psychological models that have examined the maintaining factors of SAD have identified key behavioral and cognitive factors responsible for the ongoing experience of anxiety in socially anxious individuals (Heimberg et al., 2010; Hofmann, 2007). These models have initiated extensive research that has contributed to the development of effective treatment protocols for SAD (Heimberg et al., 2010). Despite these models' efforts to describe the maintaining factors of SAD, they do not specifically identify the underlying causes of the disorder or how the causal factors compare to the maintaining factors in the development of the disorder. Several models have proposed causal factors independent of maintaining models for SAD (Rapee & Spence, 2004). Recent models have identified social, psychological, and biological factors that increase the risk of developing SAD. However, these models have not uniquely identified the origins of maintaining factors of this disorder nor have they addressed the links between causal and maintaining factors, although efforts have been made to integrate causal and maintaining factors of SAD (Higa-McMillan & Ebesutani, 2011; Spence & Rapee, 2016). Currently, in the research literature on SAD, a better understanding of the interaction between causal and maintaining factors of this disorder has emerged (Nikolić, 2020; Wong & Rapee, 2016). Therefore, to gain a better understanding of the causal and maintaining factors of SAD, it is essential to conduct a field study that can comprehensively examine the role of biological, familial, behavioral, cognitive, emotional, and social factors.

Temperament is a pathway through which genetic factors may influence the emergence of psychological problems. Behavioral inhibition is a specific dimension of temperament that has a strong impact on the development of SAD (Spence & Rapee, 2016). Recent brain imaging studies have found high sensitivity and structural differences in the amygdala and its related circuitry in adults with a history of behavioral inhibition, similar to the amygdala structure in individuals with SAD (Fox et al., 2021), suggesting that behavioral inhibition and SAD share a common biological basis.

In addition, adverse educational and life experiences for inherently vulnerable individuals lead to the formation of maladaptive schemas and distorted beliefs about themselves and others (Khosravani et al., 2016). Through social experiences, young individuals come to believe that they are defective, ignorant, unattractive, and have little ability to control the outcomes of social situations (Calvete et al., 2013). Spence and Rapee (2016) suggest that early maladaptive schemas, particularly in the domains of disconnection and rejection and vigilance, cause individuals to be sensitive to social situations and expectations, leading them to evaluate their behavior in a shameful or humiliating manner and to think that others respond and judge them negatively or that others describe the outcomes of their performance as terrible. These factors play a role in the experience of anxiety (Spence & Rapee, 2016).

Cognitive-behavioral models by Wong and Rapee (2016) and Spence and Rapee (2016) suggest that the emergence of SAD occurs in the context of the individual's presence in social situations and their evaluations of these situations. Socially anxious individuals tend to have distorted perceptions of social events, leading to increased anxiety and distress when faced with social situations (Spence & Rapee, 2016; Wong & Rapee, 2016). Many studies in this field confirm that these individuals interpret neutral social situations negatively and catastrophize challenging social situations (Brühl et al., 2014). Recent research has particularly shown that individuals with severe social anxiety disorder systematically discount positive events (Wong & Rapee, 2016).

Another factor that contributes to the persistence of SAD is the use of safety behaviors. Socially anxious individuals use safety behaviors to reduce the likelihood of negative evaluation and to prevent feared outcomes (Evans et al., 2021). Although SAD is related to avoidance of social and performance situations, few individuals with this disorder completely isolate themselves from social life. By choice or necessity, individuals with social anxiety disorder enter social situations but feel the need to engage in subtle avoidance strategies (safety behaviors) to make these

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situations tolerable and prevent feared outcomes. When feared outcomes do not occur, individuals mistakenly conclude that the absence of these outcomes is due to their use of safety behaviors (Gray et al., 2019), which reinforces the use of safety behaviors. Plasencia, Alden, and Taylor (2011) found that socially anxious individuals use safety behaviors such as complete avoidance of situations before or during challenging social events to avoid confronting their fear (Plasencia et al., 2011).

Cognitive models of social anxiety (Heimberg et al., 2010) suggest that in social situations, individuals with SAD develop false beliefs about themselves and how they are evaluated by others. These negative self-beliefs (NSB) lead to negative emotional reactivity (fear and physiological discomfort), maladaptive behaviors (social avoidance), and emotional disturbances, which in turn contribute to the maintenance and persistence of anxiety. Negative self-beliefs are conceptualized as representations of the self that actively filter and bias new information (Dixon et al., 2020).

One of the factors implicated in anxiety disorders is the inability to regulate emotions (Goodman et al., 2021). Emotion regulation refers to personal efforts to influence the quality and dynamics of positive and negative emotions (Jazaieri et al., 2014). According to Dryman and Heimberg (2018), emotional dysregulation may induce a sense of lack of control over the situation, activating the individual's core beliefs about incompetence, which either renders the individual passive in social situations or leads them to engage in maladaptive strategies to cope with these situations (Dryman & Heimberg, 2018).

Moreover, social thoughts and beliefs are among the socio-cognitive factors implicated in SAD that have received attention in recent years (Gros et al., 2012). As stated in the model by Spence and Rapee (2016), social factors and their correlates play a role in the maintenance of SAD within theoretical frameworks (Spence & Rapee, 2016). According to Blay et al. (2021), individuals with SAD attribute widespread feelings of inferiority to themselves in social comparisons. They perceive others as threatening and dominant, leading to negative self-focus and the maintenance of SAD symptoms (Blay et al., 2021).

Given the prevalence of SAD and its impact on the academic efficiency of students, particularly medical students, and considering that various factors play a role in the development and maintenance of SAD, the present study aims to examine the contribution of behavioral inhibition and early maladaptive schemas (mistrust-abuse, defectiveness-shame, social isolation, and strict standards) and their interactive effects with variables of social situation evaluation, safety behaviors, social beliefs and thoughts, and self-related beliefs in explaining the variance of social anxiety.

2. Methods and Materials

2.1. Study Design and Participants

This study is fundamental in terms of its objective and descriptive in nature, employing a correlational design. The statistical population included all female students at Jundishapur University of Medical Sciences in Ahvaz who were enrolled during the 2020-2021 academic year. Considering the number of paths (23 paths), the number of exogenous variable variances (5 variables), and the number of error variances within the model (6 errors), a total of 34 parameters were calculated. Therefore, with 15 participants per parameter, the sample size was determined to be 510 participants.

The sampling method and implementation procedure were as follows: initially, the questions were designed electronically. Given that this research was conducted during the COVID-19 pandemic and students were not available in person, virtual resources were utilized. Students in each major who were members of study groups were invited to participate with informed consent. The link to the online questionnaire was shared in their study groups, and individually sent to them via email, WhatsApp, and Instagram. Inclusion criteria were informed consent to participate in the study and being enrolled at Jundishapur University of Medical Sciences in Ahvaz. Exclusion criteria included the presence of a psychological disorder other than social anxiety and incomplete responses to the questionnaires. Based on these criteria, 483 questionnaires were selected for analysis.

2.2. Measures

2.2.1. Social Phobia

This inventory was developed by Connor, Davidson, Churchill, Sherwood, Weisler, and Foa (2000) to assess social anxiety symptoms. It contains 17 questions across three subscales that measure key symptoms of social anxiety: fear (6 questions), avoidance (7 questions), and physiological discomfort in social situations (4 questions). Reliability coefficients using Cronbach's alpha, Spearman-Brown, and test-retest methods were 0.97, 0.97, and 0.82, respectively ($p<0.001$) (Hassanvand Amouzadeh, 2016).

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2.2.2. *Behavioral Inhibition System/Behavioral Activation System Scale (BIS/BAS)*

Developed by Carver and White (1994), this scale assesses the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS). The BIS comprises 7 items, and the BAS comprises 13 items, scored on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree) (Mohammadi, 2008).

2.2.3. *Adult Social Situations Evaluation*

This 37-item scale, developed by Gould, Grimalmets, Siberlit, Edelstein, and Smith (2012), uses a 4-point Likert scale. It assesses two dimensions: a) anxiety experienced in social situations and b) avoidance of social situations. The reliability of this scale in the current study was calculated using Cronbach's alpha, yielding a value of 0.91 (Jazaieri et al., 2014).

2.2.4. *Early Maladaptive Schemas*

Young's Schema Questionnaire-Short Form (YSQ-SF3) includes 75 items that assess 15 early maladaptive schemas on a 5-point Likert scale (1 = completely untrue to 6 = completely true). These schemas represent emotional needs (Ghiasi et al., 2011; Khosravani et al., 2016).

2.2.5. *Self-Beliefs Related to Social Anxiety*

This 15-item scale, developed by Wong and Moulds (2011), measures the strongest self-beliefs in social situations. In Iran, Adelipoor, Javadi, and Kareshki (2015) assessed its construct validity (confirmatory factor analysis) and criterion validity with the Social Anxiety Questionnaire (JSAQ) and the Social Phobia Inventory (SPIN) (Adelipoor et al., 2016).

2.2.6. *Social Thoughts and Beliefs*

Mini Social Thoughts and Beliefs Scale (mini-STABS), initially developed by Fergus, Valentiner, Kim, and Stephenson (2009), this scale includes 21 items and two subscales: a) social comparison and b) social inadequacy. The reliability of this tool in the current study was calculated using Cronbach's alpha, yielding a value of 0.78 (Dixon et al., 2020; Stein et al., 2019).

2.2.7. *Social Phobia Safety*

Social Phobia Safety Behaviors Scale (SPSBS), created by Pinto-Gouveia, Cunha, and Salvador (2003), this 17-item scale is scored on a 4-point Likert scale (never, sometimes, often, almost always). The Cronbach's alpha coefficient was reported to be 0.74 (Bahrami et al., 2012).

2.2.8. *Emotion Regulation*

Developed by John and Gross (2003), this 10-item questionnaire is scored on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). It includes two subscales: reappraisal (6 items) and suppression (4 items). The creators estimated its reliability using the test-retest method, yielding a coefficient of 0.69 (Jazaieri et al., 2014).

2.3. *Data analysis*

Data were analyzed using correlation methods and structural equation modeling with AMOS software. The bootstrap method with AMOS software was used to analyze mediating relationships.

3. Findings and Results

The total sample of the study consisted of 483 participants with a mean age of 23.83 ± 5.18 years. The sample distribution by field of study included 137 medical students (28.4%), 39 dental students (8.1%), 88 nursing students (18.2%), 81 midwifery students (16.8%), and 138 students from other medical fields (28.6%). In the following section, the mean, standard deviation, and correlation matrix of the research variables are calculated. The results of the mean and standard deviation of the variables are shown in Table 1.

Table 1

Mean and Standard Deviation of Research Variables

Variable	Mean	Standard Deviation
Social Anxiety	16.14	11.21
Behavioral Inhibition	19.99	2.74
Mistrust/Abuse	10.33	4.64
Defectiveness/Shame	13.64	5.51
Social Isolation	7.66	3.18

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Strict Standards	19.77	5.89
Social Situation Evaluation	60.01	26.76
Safety Behaviors	33.94	7.56
Emotion Regulation	44.27	7.4
Social Beliefs and Thoughts	17.51	5.56
Self-Related Beliefs	47.52	29.07

The results of Table 1 show that the mean social anxiety is 16.14 with a standard deviation of 11.21, the mean behavioral inhibition is 19.99 with a standard deviation of 2.74, the mean mistrust/abuse is 10.33 with a standard deviation of 4.64, the mean defectiveness/shame is 13.64 with a standard deviation of 5.51, the mean social isolation is 7.66 with a standard deviation of 3.18, the mean safety behaviors is 33.94 with a standard deviation of 7.56, the mean emotion regulation is 44.27 with a standard deviation of 7.4, the mean social beliefs and thoughts is 17.51 with a standard deviation of 5.56, and the mean self-related beliefs is 47.52 with a standard deviation of 29.07. The results related to Pearson's correlation between the research variables are shown in Table 2.

Table 2

Pearson Correlation Coefficients Between Research Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
Behavioral Inhibition	1	0.29*	0.25*	0.20*	0.38*	0.31*	0.14*	0.26*	0.30*	0.30*	0.35*
Mistrust/Abuse		1	0.56*	0.45*	0.35*	0.06	0.16*	0.32*	0.38*	0.42*	0.45*
Defectiveness/Shame			1	0.63*	0.40*	0.55*	0.10	0.48*	0.47*	0.55*	0.52*
Social Isolation				1	0.24*	0.51*	-0.01	0.52*	0.48*	0.56*	0.64*
Strict Standards					1	0.30*	0.14	0.25*	0.32*	0.36*	0.34*
Safety Behaviors						1	0.20*	0.61*	0.59*	0.67*	0.55*
Emotion Regulation							1	0.07*	0.13	0.06	0.01
Social Beliefs/Thoughts								1	0.61*	0.50*	0.58*
Social Situation Eval.									1	0.71*	0.51*
Social Anxiety										1	0.65*
Self-Related Beliefs											1

*p<0.0001

The results of Table 2 indicate that all Pearson correlation coefficients between the research variables are significant ($p < .0001$), with the strongest correlation being between social situation evaluation and social anxiety ($r = 0.71$), and the weakest correlation being between social isolation and emotion regulation, which is inversely related ($r = -0.01$).

Structural equation modeling with the maximum likelihood method was used to test the model. Initially, the underlying assumptions of structural equation modeling were examined, and after screening the initial data (such as outlier analysis), the main assumptions of structural equation modeling, namely univariate and multivariate normality, were evaluated as appropriate. It is noteworthy that the initial model did not have a satisfactory fit. To improve the model fit, two modifications were made, adding error terms between variables with high correlation coefficients. The model fit indices were then recalculated, resulting in a satisfactory fit. The fit indices after modification included: relative chi-square ($\chi 2/df = 3.74$), goodness of fit index (GFI = 0.93), adjusted goodness of fit index (AGFI = 0.90), Bentler-Bonett normed fit index (NFI = 0.95), comparative fit index (CFI = 0.96), incremental fit index (IFI = 0.96), and root mean square error of approximation (RMSEA = 0.07), indicating that the modified model has a good fit.

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Table 3

Direct Effect Parameters Between Research Variables in the Final Model for Female Students

Variable	B	P
Behavioral Inhibition → Social Situation Eval.	0.17	0.0001
Mistrust/Abuse → Social Situation Eval.	0.07	0.032
Defectiveness/Shame → Social Situation Eval.	0.23	0.0001
Social Isolation → Social Situation Eval.	0.49	0.0001
Strict Standards → Social Situation Eval.	0.06	0.037
Social Situation Eval. → Safety Behaviors	0.75	0.0001
Social Situation Eval. → Emotion Regulation	0.10	0.012
Social Situation Eval. → Social Beliefs/Thoughts	0.77	0.0001
Social Situation Eval. → Self-Related Beliefs	0.85	0.0001
Behavioral Inhibition → SAD	0.78	0.0001
Mistrust/Abuse → SAD	0.10	0.037
Defectiveness/Shame → SAD	0.30	0.0001
Social Isolation → SAD	0.47	0.0001
Strict Standards → SAD	0.13	0.005
Safety Behaviors → SAD	-0.16	0.005
Emotion Regulation → SAD	-0.01	0.35
Social Beliefs/Thoughts → SAD	0.002	0.05
Self-Related Beliefs → SAD	-0.17	0.05
Social Situation Eval. → Social Anxiety	0.72	0.0001
Social Situation Eval. → Avoidance of Social Situation	0.69	0.0001
SAD → Fear	0.92	0.0001
SAD → Avoidance	0.90	0.0001
SAD → Physiological Discomfort	0.76	0.0001
Self-Related Beliefs → High Standards	0.83	0.0001
Self-Related Beliefs → Conditional Beliefs	0.93	0.0001
Self-Related Beliefs → Unconditional Beliefs	0.56	0.0001

According to the path analysis results in Table 3, all direct paths except for emotion regulation to SAD are significant ($p < .0001$ and $p < .05$). Additionally, the paths from self-related beliefs in SAD to conditional beliefs, SAD to fear, and SAD to avoidance have the highest structural coefficients of 0.92, 0.92, and 0.90, respectively ($p < .0001$).

Table 4

Bootstrap Results for Mediating Paths in the Sample

Variable	B	Lower Bound	Upper Bound	P
Behavioral Inhibition → Social Situation Eval. → Safety Behaviors → Social Anxiety	0.027	-0.063	-0.006	-0.024
Mistrust/Abuse → Social Situation Eval. → Safety Behaviors → Social Anxiety	0.007	-0.022	-0.001	-0.032
Defectiveness/Shame → Social Situation Eval. → Safety Behaviors → Social Anxiety	0.018	-0.041	-0.004	-0.023
Social Isolation → Social Situation Eval. → Safety Behaviors → Social Anxiety	0.065	-0.137	-0.014	-0.029
Strict Standards → Social Situation Eval. → Safety Behaviors → Social Anxiety	0.005	-0.015	-0.001	-0.046
Behavioral Inhibition → Social Situation Eval. → Emotion Regulation → Social Anxiety	0.000	-0.001	0.002	0.472
Mistrust/Abuse → Social Situation Eval. → Emotion Regulation → Social Anxiety	0.000	0.000	0.001	0.375
Defectiveness/Shame → Social Situation Eval. → Emotion Regulation → Social Anxiety	0.000	0.000	0.000	0.481
Social Isolation → Social Situation Eval. → Emotion Regulation → Social Anxiety	0.010	-0.063	0.056	0.525
Strict Standards → Social Situation Eval. → Emotion Regulation → Social Anxiety	0.000	0.000	0.000	0.367
Behavioral Inhibition → Social Situation Eval. → Social Beliefs/Thoughts → Social Anxiety	0.094	-0.023	-0.021	-0.044
Mistrust/Abuse → Social Situation Eval. → Social Beliefs/Thoughts → Social Anxiety	0.081	-0.024	-0.011	-0.028
Defectiveness/Shame → Social Situation Eval. → Social Beliefs/Thoughts → Social Anxiety	0.013	-0.025	0.018	0.035
Social Isolation → Social Situation Eval. → Social Beliefs/Thoughts → Social Anxiety	0.042	-0.096	-0.063	-0.043
Strict Standards → Social Situation Eval. → Social Beliefs/Thoughts → Social Anxiety	0.011	-0.033	-0.017	-0.039
Behavioral Inhibition → Social Situation Eval. → Self-Related Beliefs in SAD → Social Anxiety	0.032	-0.103	-0.006	-0.048
Mistrust/Abuse → Social Situation Eval. → Self-Related Beliefs in SAD → Social Anxiety	0.008	-0.039	-0.001	-0.05
Defectiveness/Shame → Social Situation Eval. → Self-Related Beliefs in SAD → Social Anxiety	0.021	-0.072	-0.004	-0.047
Social Isolation → Social Situation Eval. → Self-Related Beliefs in SAD → Social Anxiety	0.078	-0.263	-0.016	-0.05
Strict Standards → Social Situation Eval. → Self-Related Beliefs in SAD → Social Anxiety	0.006	-0.027	-0.001	-0.049

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As shown in Table 4, early maladaptive schemas and behavioral inhibition, as predictor variables, both directly and indirectly through mediating variables of social situation evaluation, safety behaviors, and self-related beliefs in SAD, affect the social anxiety of female students ($p < .05$). However, emotion regulation as a mediating variable does not have a significant effect between predictor variables and social anxiety ($p > .05$).

4. Discussion and Conclusion

The aim of the present study was to investigate the mediating role of social situation evaluation, safety behaviors, emotion regulation, social beliefs and thoughts, and self-related beliefs with early maladaptive schemas and behavioral inhibition in students of Jundishapur University of Medical Sciences. The results of this study showed that all research variables had a positive and significant relationship with SAD, with the only weak and negative relationship being between social isolation and emotion regulation. These findings are consistent with the theoretical foundations of Spence and Rapee's cognitive-behavioral model (2016) and the research findings of Nikolic (2020) (Nikolić, 2020; Spence & Rapee, 2016). In explaining these results, it can be said that behavioral inhibition and maladaptive schemas are influenced by hereditary and environmental factors affecting SAD. According to Rapee and Spence's model (2016), behavioral inhibition as a prominent temperament feature, when combined with inappropriate parenting patterns, has a strong impact on the development of SAD (Rapee & Spence, 2004). Therefore, individuals prone to behavioral inhibition who face chronic traumatic experiences in their living environment develop maladaptive and dysfunctional schemas, leading to distorted beliefs about themselves and their environment (Khosravani et al., 2016), which results in the emergence of SAD symptoms in childhood and adolescence, such as heightened sensitivity to new visual and auditory stimuli and unfamiliar people, and avoidance of social situations in adulthood (Ito et al., 2019).

The present study also showed that safety behaviors are related to SAD symptoms. This finding is in line with the prior research results (Evans et al., 2021). In explaining this finding, it can be said that, according to cognitive-behavioral models (Gray et al., 2019; Rapee & Spence, 2004), socially anxious individuals exhibit safety behaviors which, although aimed at preventing negative outcomes, often cause individuals to attribute their social success to safety behaviors rather than their own skills. As a result, these behaviors help maintain threat expectations even in the absence of actual negative experiences. Perhaps more importantly, safety behaviors often shape poor social performance, thereby reducing the likelihood of successful social outcomes.

Another result of the present study was the positive and significant relationship between social anxiety and emotion regulation, which is consistent with the prior findings (Goodman et al., 2021). In explaining these findings, it can be noted that emotions help individuals achieve their goals in various situations, and emotion regulation, through controlling and managing unpleasant and distressing emotions, is beneficial in social and functional activities (Jazaieri et al., 2014). Emotion regulation in socially anxious individuals is usually not successful because negative emotions make individuals try to avoid the situation where the emotion occurred. Therefore, when individuals with SAD are chronically unable to regulate their emotions, their performance in social situations is seriously challenged, affecting the quality of their emotional-behavioral and emotional-cognitive responses, including behavioral, physiological, and cognitive aspects (Dixon et al., 2020).

Furthermore, the present study showed that socio-cognitive processes have significant relationships with SAD symptoms. These cognitive processes in the present study include self-related beliefs (recognizing internal physical signals and negative cognitions indicating threats from social situation evaluation) and social beliefs and thoughts (recognizing negative evaluations and judgments of others) (Bögels et al., 2014). In explaining this recent finding, it can be said that these beliefs, conceptualized as self-representations, actively filter and misinterpret new information, thus activating negative orientations toward memories of social performance, which maintains dysfunctional beliefs about social situations (Schmitz et al., 2011; Wong & Rapee, 2016).

As mentioned in the results section, the initial model of the study did not have a good fit with the data; hence, after model modification, it was found that the modified model had an acceptable fit with the data. Specifically, early maladaptive schemas and behavioral inhibition as distal factors affected social anxiety symptoms both directly and indirectly through the mediating variables of social situation evaluation, safety behaviors, social beliefs and thoughts, and self-related beliefs (with the exception of direct and indirect paths from predictor variables to SAD through emotion regulation, which were not significant). These findings are

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consistent with the results of prior studies (Spence & Rapee, 2016; Wong & Rapee, 2016). In explaining this finding, it can be said that among the most effective factors in the development of social anxiety are genetic factors (behavioral inhibition) and schemas that form within the context of parenting processes and family patterns (Khosravani et al., 2016). These factors, as underlying causes of social anxiety, trigger a series of cognitive-behavioral reactions when individuals are present in social situations, affecting social anxiety symptoms through direct and indirect effects. These effects are conceptualized in Spence and Rapee's model (2016) as a comprehensive theoretical model for SAD, which aligns with the results of the present study (Spence & Rapee, 2016).

In this study, the variables of behavioral inhibition and early maladaptive schemas (mistrust/abuse, defectiveness/shame, social isolation, and strict standards) did not find direct and indirect effects on social anxiety through the mediating variables of social situation evaluation and emotion regulation. This finding is consistent with the results of prior studies (Heimberg et al., 2010; Nikolić, 2020), but not with some other results (Goodman et al., 2021). To explain these results, it can be said that when an individual is present in social situations, cognitive processing takes precedence over emotional processes. Ellis's rational-emotive-behavioral approach (Malkinson, 2010) states that anxiety disorders result from irrational and illogical thinking in interpreting environmental situations. In this regard, Timulak et al. (2018) have shown that cognitive-behavioral therapeutic effects on SAD are more effective than other therapeutic approaches targeting the emotional aspects of this disorder (Timulak et al., 2018). Therefore, variables such as safety behaviors, social beliefs and thoughts, and beliefs encompassing the cognitive-behavioral aspects of maintaining factors of SAD guide the direct and indirect effects of predictor variables on SAD.

5. Limitations & Suggestions

One of the limitations of the present study was the focus on a sample of female students from a single medical university, which challenges the generalization of results to the entire student population of medical universities. Additionally, the relatively large number of questions and questionnaires may have fatigued the participants, especially since the implementation was in a virtual space, which exacerbates fatigue and reduces the accuracy of responses. It is recommended that this study be conducted on a broader range of universities and both genders to enable the comparison of results across different groups.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

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