

## The role of cognitive flexibility and cognitive emotion regulation in predicting social anxiety in university students

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Fereshteh Shabani<sup>1\*</sup>; Elnaz Nourafkan<sup>2</sup>

1. Department of Counseling, Faculty of Education and Psychology, University of Shahid beheshti, Tehran, Iran. **Corresponding Author:** [fereshteshabanii@gmail.com](mailto:fereshteshabanii@gmail.com)

2. Department of Psychology, Faculty of Education and Psychology, Imam Khomeini International University, Qazvin, Iran.

### Abstract

**Aim:** Social anxiety disorder is a common problem in the field of mental health, one of its characteristic features is the fear of negative and positive evaluation by others. The purpose of this study was to investigate the role of cognitive flexibility and cognitive emotion regulation in predicting social anxiety of university students.

**Method:** The research population included all female students from bachelor's degree to doctorate studying in Shahid Beheshti University, and 250 of these students responded to the online questionnaire related to the research. The method of the current research was correlation and multiple regression analysis, and in order to collect data from three cognitive flexibility questionnaires by Dennis et al. (2010), the questionnaire of cognitive emotion regulation strategies of Garnefsky and Kraaij (2006) and the Leibowitz LSAS social anxiety scale (1987) used.

**Results:** The obtained results showed that the correlation of cognitive flexibility and cognitive emotion regulation with students' social anxiety was significant (0.05). The current study emphasizes that students who have poor emotional flexibility in social and functional situations and use only one method to solve a problem, and on the other hand, due to the high tension of that situation, have limited access to cognitive regulation of emotions.

**Conclusions:** Finally, these factors can predict social anxiety in them. The results of this finding can be used by psychologists, counselors and other people who are in contact with students to help improve the symptoms of social anxiety in them by using treatments focused on these concepts.

**Keywords:** Cognitive flexibility, Cognitive emotion regulation, Social anxiety, Students.



## Introduction

Social anxiety is characterized by a person's experience of negative emotions such as worries, nervousness, and intense fear of being evaluated by others and behavior associated with embarrassment (Wei et al., 2024; Donaldson et al., 2024). The experience of social anxiety, like many psychological phenomena, is placed in a chain of severity and is common in adults with a 12-month prevalence of 8.2% (Zhang et al., 2023). In Iran, epidemiological studies conducted in 2011 and 2018 reported a 12-month prevalence of social anxiety disorder of 3.2% (Hajebi et al., 2018; Sharifi et al., 2015). A controversial issue in the research literature is whether gender has a statistically significant effect on the level of social anxiety or not. In some studies, it has been determined that the average social anxiety scores of women are higher than men (Tolan and Kara, 2023). People with social anxiety disorder both their academic and occupational performance and social interactions are affected, which has a high coexistence with psychiatric disorders including depression and other clinical disorders such as substance abuse (Vente, Majdandzic, Bogels, 2022; Piercy et al, 2020). Many researches, such as (Hayatipoor et. all 2024; Jefferies & Ungar; 2020; Acquah et. all 2016; Mineka, Watson & Clark, 2013; Ranata et. All 2009; Van Ameringen, Mancini, & Farvolden, 2003; Whisman, Sheldon, & Goering; 2000) show that the effect of social anxiety is widespread and affects performance in various areas of life in the female population and reduces general mood and well-being. Women experiencing social anxiety are more likely to be victims of bullying and are at greater risk of dropping out of school. In addition to weak social connection, the probability of marriage and the desire to have children is low among them. In the workplace, the number of absences is high and their performance is poor. They also have poor perceived intimacy of relationships with peers, poor social support, and rigid schemas regarding themselves and the world around them. Therefore, understanding and revealing the symptoms of social anxiety disorder is considered essential (Ito et al., 2019).

Cognitive emotion regulation refers to a conscious and cognitive way of managing the reception of emotionally provoking stimuli (Garnefsky and Kraaij, 2006; 2007; Garnefsky, Kraaij and Spinhoven, 2001) and is considered one of the effective factors on social anxiety (Sackle-Pammer et al, 2019). Cognitive emotion regulation strategies are divided into two categories: adaptive strategies (acceptance, refocusing on planning, positive refocusing, positive perspective taking and reevaluation) and maladaptive strategies (self-blame, blaming others, rumination or focusing on thoughts and catastrophizing). It is obvious that cognitive emotion regulation strategies are effective in people's ability to manage and not be under pressure and emotional control in dealing with threatening and stressful events. Defects in the use of emotion regulation strategies may form the basis of various types of psychological damage, including anxiety (Kring and Sloan, 2009). Individual differences in the way of emotional regulation are different and some methods of emotional regulation may work better in people. Garnefsky et al. (2004), showed that men and women reported different dependence in the use of rumination, positive refocusing, and catastrophizing. Unlike their healthy peers, people with social anxiety disorder believe that their emotions are almost uncontrollable (Goodman et al., 2021). People with social anxiety disorder who believe they cannot

regulate and manage their emotions experience higher levels of anxiety, stress and negative emotions (Daniel et al., 2020).

According to research literature, one of the key variables related to social anxiety is cognitive flexibility. Cognitive flexibility refers to a person's ability to avoid focusing on only one solution to solve a problem (Fazli, Ehteshamzadeh and Hashemi; 2015) and also includes the ability to adjust beliefs and behaviors to better adapt to the new environment (Zhu and Deng, 2023). In addition, cognitive flexibility is a person's assessment of the controllability of the situation, which changes in different situations (Sultani et al., 2012). This is why people with high levels of cognitive flexibility also have a high capacity to adapt to unfamiliar situations and change their cognition (Martin and Anderson, 1998). The reasoning of the cognitive model of social anxiety based on pathology is that social anxiety is influenced by people's levels of cognitive distortion, ineffective beliefs and negative automatic thoughts (Smith et al., 2006). According to this model, people with high levels of social anxiety have thoughts Inefficiency is that others judge them. Also, according to this model, cognitive inflexibility is considered a risk factor for creating social anxiety. Because people with low cognitive flexibility have a weaker ability to pay attention to alternative thoughts and change their thoughts (Tolan and Kara, 2023).

According to the research literature, the increasing prevalence of mental disorders and related cases, including social anxiety, which is more common in females, and considering the role of emotional flexibility and cognitive regulation of emotions in a wide range of psychological issues, especially anxiety disorders that can affect performance academic, family and personal impact of students negatively. Therefore, it is important to address the factors influencing and predicting social anxiety in the population of girls and women students and take a step to improve the psychological, academic and social status of this group. Therefore, the general assumption of the current research is: cognitive flexibility and cognitive regulation of emotion are related to social anxiety.

## Methods

The present research method is descriptive and correlational. The statistical population of the present study included all female students of Shahid Beheshti University of Tehran from bachelor's degree to doctorate in 2023. A number of 250 students were selected through convenience sampling due to easy access to the student population of Shahid Beheshti university and answered the questionnaires online. The questionnaires were designed virtually and the link was sent to the students (in Telegram). Before starting to answer, the subjects were told that their information is completely confidential and that the results will be used only for research purposes, and also refrain from mentioning their names. Criteria for entry into the research: 1) Bachelor's to Ph.D. student of Shahid Beheshti University 2) Voluntary participation in the research and the criteria for exit was 1) not studying at the bachelor's level to Ph.D. level of Shahid Beheshti University 2) withdrawing from the research for any reason. Finally, after data collection, Pearson



correlation analysis and simultaneous multiple regression analysis were used for statistical analysis in SPSS version 25 software

**The cognitive flexibility inventory Dennis & et al 2010:** This questionnaire was designed and compiled by Dennis et al. (2010) in order to measure cognitive flexibility and has 20 questions. This questionnaire has been validated in Iran by Kohandani and Abu al-Maali al-Husseini (2016) and one of the questions (item no. 20) has been removed from its Persian version due to its low factor load. The cognitive flexibility questionnaire has 19 questions and 2 components, including perception of controllability and problem-solving processing, and based on the Likert spectrum with questions such as (before finding the cause of other people's behavior, I check various information that may not be available) It measures cognitive flexibility. The score range of this questionnaire will be between 19 and 133. The higher the score obtained from this questionnaire, the higher the level of cognitive flexibility and vice versa. In the project of Kohandani and Abu Al-Maali al-Husseini (2016), the validity of content, form and criteria of this questionnaire have been evaluated. The Cronbach's alpha coefficient calculated in the research of Kohandani and Abu al-Maali al-Husseini (2016) for this questionnaire was estimated to be above 0.7. Cronbach's alpha coefficient of Cognitive flexibility in this research was estimated 0/636.

**Cognitive Emotion Regulation Questionnaire -18 (CERQ-18):** Cognitive emotion regulation strategies questionnaire was designed and developed by Garnefsky and Kraaij (2006) in order to measure cognitive emotion regulation strategies. This questionnaire has 18 questions and two incompatible and compatible strategies and 9 components of self-blame, rumination, catastrophizing, blaming others, positive refocusing, refocusing on planning, parenting, positive re-evaluation, perspective-taking and based on the spectrum Likert with questions like (The teacher and students in the class ask me to explain how to solve problems). It measures cognitive emotion regulation strategies. The minimum and maximum score in each subscale is 2 and 10, respectively, and a high score indicates more use of these metacognitive strategies. The score range of this questionnaire will be between 18 and 90. The higher the score obtained from this questionnaire, the higher the use of these metacognitive strategies and vice versa. In Aghaei's research (2015), the content, form and criterion validity of this questionnaire have been evaluated. Also, Cronbach's alpha coefficient calculated in Aghaei's research (2015) for this questionnaire was estimated to be above 0.7. Cronbach's alpha coefficient of the Cognitive emotion regulation in this research was estimated 0/736.

**Leibovitz Social Anxiety Scale LSAS (1987):** This scale is the first clinical tool that assesses a wide range of social situations that are difficult for people with social anxiety disorder to encounter. This short questionnaire was developed in 1987 by Michael Leibovitz, a psychiatrist and researcher at Columbia University and the New York State Psychiatric Institute. His purpose in preparing this questionnaire was to examine a wide range of interactions and social situations that cause fear for the patient, in order to help diagnose and treat social anxiety disorder. This self-assessment questionnaire for people

over 18 years old has 24 statements and two subscales of performance anxiety (13 statements) and social situations (11 statements). Each item is rated separately for fear (0 to 3, not at all, little, moderate, severe) and avoidance behavior (0 to 3, never, rarely, often, always) (Becker et al., 2002). Therefore, this test gives a general social anxiety score and scores on the four scales of performance phobia, performance avoidance, social phobia and social avoidance. The complete implementation of this questionnaire takes about 30 minutes. Performance anxiety subscale includes: 1, 2, 3, 4, 6, 8, 9, 13, 14, 16, 17, 20, 21 and social situations anxiety subscale includes: 5, 7, 10, 11, 12, 15, 18, 19, 22, 23, 24. The maximum performance anxiety score is 78 and the maximum social situation anxiety score is 66. The maximum overall score is 144. According to the sum of these two subscales, one can understand the level of social anxiety of a person. The overall alpha coefficient is equal to 0.95, the alpha coefficient of the performance anxiety subscale is 0.82, and the alpha coefficient of the social anxiety subscale is 0.91. To check the convergent validity, this test was compared with the social interaction anxiety scale (Matik and Clark, 2007). The correlations ranged from 0.40 to 0.77. The observed correlations for the social anxiety scale were lower and ranged from 0.31 to 0.72 (Matik and Clark, 2007). The score of anxious subjects was higher than non-anxious subjects in this scale. In the study of Atari Fard and his colleagues in the Iranian sample, it shows that the retest reliability of LSAS-SR and its subscales is in the range of  $r=0.84$  to  $0.76$  and their internal consistency (Cronbach's alpha) is also in the range of  $0.73$  to  $0.76$ . 93 0/ Reported and convergent validity of LSAS-SR with other social anxiety scales, including Social Interaction Anxiety Scale (SIAS), Social Anxiety Scale (SPS), Social Anxiety Questionnaire (SPIN), Fear of Negative Evaluation Scale (BFNE) and Frequency scale of avoidance Delicate and intelligent (SAFE) is also acceptable ( $r = 0.94$  to  $0.46$ ) (Fared Perfume and Associates, 2011). Cronbach's alpha coefficient of the Social Anxiety in this research was estimated  $0/946$ .

## Results

The participants of this research include 250 women. Table 1 shows the demographic information of the study sample.

**Table 1.** Frequency distribution of women's demographic information

| Variables | Subgroups | Frequency | Percent |
|-----------|-----------|-----------|---------|
| Age       | 18-23     | 51        | 20/4    |
|           | 24-29     | 78        | 31/2    |
|           | 30-35     | 50        | 20      |
|           | 36-40     | 36        | 14/4    |
|           | 41-50     | 26        | 10/4    |
|           | >50       | 9         | 3/6     |
|           | Bachelor  | 103       | 41/2    |

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|           |         |     |      |
|-----------|---------|-----|------|
| Education | Masters | 112 | 44/8 |
|           | PhD     | 35  | 14   |

Table 1 shows Frequency distribution of women's demographic information(age, education...)

**Table 2.** Mean, standard deviation, maximum and minimum of research variables

| Statistical indicators        |       |       |     |     |               |
|-------------------------------|-------|-------|-----|-----|---------------|
|                               | M     | SD    | Max | Min | P<br>K-S Test |
| Variables                     |       |       |     |     |               |
| Social Anxiety                | 60/95 | 27/48 | 142 | 5   | 0/266         |
| Performance anxiety           | 30/92 | 14/25 | 77  | 4   | 0/549         |
| Social situation anxiety      | 30/03 | 14/16 | 66  | 0   | 0/393         |
| Cognitive flexibility         | 94/48 | 9/48  | 122 | 60  | 0/465         |
| Problem solving processing    | 70/46 | 10/99 | 91  | 18  | 0/023         |
| Perception of controllability | 23/54 | 8/25  | 42  | 7   | 0/008         |
| Cognitive emotion regulation  | 54/33 | 11/62 | 89  | 19  | 0/512         |
| Incompatible strategies       | 23/94 | 5/93  | 40  | 8   | 0/572         |
| dysfunctional strategies      | 30/38 | 6/98  | 49  | 11  | 0/403         |

Note. \*  $p < 0/05$ ; \*\*  $p < 0/01$ .  $n = 250$

Table 2 shows the mean, standard deviation, minimum, maximum value and Smirnov Cronbach test for normality. As can be seen, the significance level obtained in Smirnov Cronbach test in the research variables for the main variables is higher than the alpha value of 0.05. Therefore, it can be said that the distribution of the investigated variables in the statistical sample has a normal distribution and the research hypotheses can be tested through parametric tests.

**Table 3.** Correlation matrix between research variables

| Variable                         | 1         | 2         | 3          | 4       | 5 |
|----------------------------------|-----------|-----------|------------|---------|---|
| 1.Social anxiety                 | 1         |           |            |         |   |
| 2. Problem solving processing    | **-/0335  | 1         |            |         |   |
| 3. Perception of controllability | **0/438   | ***-0/534 | 1          |         |   |
| 4. Incompatible strategies       | **-/0/769 | ***0/363  | ***-/0/469 | 1       |   |
| 5.dysfunctional strategies       | **-/0/592 | ***0/248  | **/0293    | **/0617 | 1 |

The results of the Pearson correlation analysis in Table 3 showed that there is a significant negative relationship between social anxiety and the dimension of problem-solving processing, and a significant positive relationship with the perception dimension of controllability, and also a significant negative relationship between social anxiety and the dimensions of cognitive emotion regulation.

**Table4.** Multiple regression analysis predicting social anxiety through Cognitive emotion regulation and cognitive flexibility

| Source of change | SS        | df  | MS       | F      | P     | R     | (R2)  | (R2) adjustment | standard error |
|------------------|-----------|-----|----------|--------|-------|-------|-------|-----------------|----------------|
| regression       | 119352/06 | 2   | 59676/03 | 214/56 | 000/0 | 0/797 | 0/635 | 0/632           | 16/67          |
| residual         | 68696/25  | 247 | 278/12   |        |       |       |       |                 |                |
| Total            | 188048/32 | 249 |          |        |       |       |       |                 |                |

Considering the significance of the correlation between the studied variables, simultaneous multiple regression analysis was used to predict the social anxiety variable



through cognitive regulation of emotion and cognitive flexibility, and the results are shown in Tables 4 and 5. According to Table 4, simultaneous regression analysis showed that cognitive regulation of emotion and cognitive flexibility significantly predict social anxiety variable with a value of  $F=214.56$  at  $p=0.000$  level. Multiple correlation between variables was 0.797. The regression model showed that 63.2% of the variance of the social anxiety variable can be explained through predictor variables.

**Table5.**Standard and non-standard coefficients of variables predicting social anxiety

| predictor variables          | Non-standard coefficient | standard error | Standard coefficient | t      | p     |
|------------------------------|--------------------------|----------------|----------------------|--------|-------|
| Constant                     | 225/36                   | 10/84          | ---                  | 20/78  | 0/000 |
| Cognitive flexibility        | 1/03                     | 0/14           | -/035                | -7/12  | 0/000 |
| Cognitive emotion regulation | 1/22                     | 0/11           | -/051                | -10/34 | 0/000 |

Table 5 shows the prediction coefficients related to the variables. According to the results, the regression model has a constant value with a non-standard coefficient ( $B=225.36$ ) and the standard coefficient of cognitive flexibility ( $B=-0.35$ ) at the level of  $p=0.000$ , cognitive regulation of emotion ( $B=-0.51$ ) is significant at  $p=0.000$  level.

## Discussion

In this study, the role of emotional flexibility and cognitive emotion regulation in predicting social anxiety of female university students was investigated. The results showed that there is a significant negative relationship between social anxiety and the dimension of problem-solving processing and a significant positive relationship with the perception dimension of controllability. This result states that as people's level of cognitive flexibility decreases, their social anxiety increases. The results of this finding were in line with Tolan and Kara (2023), Zhu and Deng (2023), Çiftçi (2019), Fazeli et al. (2015), Martin and Anderson (1998). Therefore, the assumption of the research that cognitive flexibility is related to social anxiety was confirmed. In explaining this finding, it can be said that the low level of cognitive flexibility of students and the presence of disorders in the process of problem solving can predict social anxiety, especially in unfamiliar situations. Students with high level of social anxiety avoid performing in social environment because they are afraid of failure. This form of dysfunctional thinking causes a person to perceive their environment as dangerous and to avoid social situations because they think they have no control over their environment. Living with an undiagnosed or untreated social anxiety disorder can lead to significant economic consequences for individuals and society, including impaired social relationships, reduced ability to work, and loss of productivity. Social anxiety seems to increase in students with low cognitive flexibility because they have less ability to deal with negative dysfunctional thoughts and analyze and replace them with positive thoughts, and probably prefer self-blame to other-

blame, catastrophizing or ruminating. Greater awareness of social anxiety and its impact across different domains of functioning may help more university students to recognise the difficulties they experience.

Also, the correlation between social anxiety and the dimensions of cognitive emotion regulation was negative and significant. That is, a decrease in a person's ability to cognitively regulate emotions is associated with an increase in a person's social anxiety. The results of this finding were in line with the researches of Daniel et al. (2020), Goodman et al. (2021), Sakel-Pammer et al (2019), Sepahvand & Moradi (2012), Werner et al. (2011), Rodenbaugh (2008). Therefore, the assumption of the research that cognitive emotion regulation is related to social anxiety was confirmed. In explaining this finding, it can be said that students' inability to use compatible emotions in different situations increases their social anxiety. Because it seems that limited access to effective cognitive emotion regulation strategies is associated with increased tension and anxiety in a social situation, including fear of others' judgment. In addition, the high fear and avoidance of socially anxious students from social and functional situations may not allow them to access compatible strategies of cognitive emotion regulation. In other words, perhaps these people do not give themselves much opportunity to access adaptive cognitive regulation strategies due to their high avoidance of social situations. It seems that people who suffer from some kind of psychopathology have a defect in one or more emotion regulation strategies (Kring, 2001) and in the conditions of social anxiety, they are more involved in the social situation itself and worry about the evaluation and judgment of others about themselves and how are their performance and due to moving away from paying attention to their emotions, they are less likely to use adaptive cognitive emotion regulation strategies including acceptance, positive re-evaluation, etc.

## Conclusion

The current research emphasizes that students who are in social and functional situations that require interaction and doing something, if they have weak emotional flexibility and use only one method to solve a problem, and on the other hand, due to the high tension of that situation, access are limited to the cognitive regulation of emotion, finally these factors can predict social anxiety in them. Because they are constantly afraid of being seen and judged. As a result, they prefer to stay away from social situations and live in isolation and away from society, which affects their academic and career progress. In general, the current research showed: cognitive flexibility and cognitive regulation of emotion can predict social anxiety in female students. The results of this finding can be used by psychologists, counselors and other people who are in contact with students to help improve the symptoms of social anxiety in them by using treatments focused on these concepts. It is suggested that in future researches, the role of other effective factors in the formation of students' social anxiety should be investigated more widely even in the male population. Further investigation is needed to account for the potentially culturally nuanced relationship between sex and social anxiety. Longitudinal research is required to establish whether social anxiety leads individuals to struggle with school, university and work, whether struggling in these areas provokes social anxiety, or whether there is a more dynamic relationship. Therefore, there is still a need to conduct more



research, especially longitudinally in different ethnicities, economic status, etc., according to cultural and social aspects through theoretical studies and other similar researches. It is also important to develop and increase awareness of appropriate services and supports for students so that they feel relaxed and comfortable at important stages of their personal and professional lives. In this case, public health initiatives are needed to raise awareness of social anxiety, the challenges associated with it, and the means to combat it.

In terms of limitations of the research, it can be mentioned that the measurement tool is self-reported, which limited the possibility of in-depth and comprehensive investigation of the research objectives. Also, the present study was only investigated in the female population, so it is necessary to be cautious in generalizing the results. In addition, data collection was done online and the opportunity to form a proper relationship between the researchers and the participants was limited.

### Disclosure Statements

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### ORCID

<https://orcid.org/0000-0002-5163-5909>

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