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Developing a Model of Social Anxiety in Students Based on Maladaptive Cognitive Emotion Regulation Strategies with the Mediating Role of Negative Self-Talk

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ABSTRACT

The present study aimed to develop a model of social anxiety in students based on maladaptive cognitive emotion regulation strategies, examining the mediating role of negative self-talk. This descriptive-correlational study (using structural equation modeling) employed an applied research approach. The statistical population consisted of high school students (second period) in Ardabil during the 2023–2024 academic year. Using a cluster random sampling method, 251 students (119 boys and 132 girls) were selected. The data were collected through the Social Phobia Inventory (SPIN), the Cognitive Emotion Regulation Questionnaire (CERQ), and the Calvete Self-Talk Inventory (STI). Data analysis was conducted using SPSS-27 and AMOS-24 software. In this study, maladaptive emotion regulation strategies had a positive and significant effect on negative self-talk ($\beta = 0.804$, $p < 0.001$). Negative self-talk also significantly predicted social anxiety ($\beta = 0.527$, $p < 0.001$), and maladaptive emotion regulation strategies showed a direct and significant effect on social anxiety ($\beta = 0.528$, $p < 0.001$). The bootstrapping results further confirmed the significant mediating role of negative self-talk in this relationship ($\beta = 0.381$, $P<0.02$). The findings highlight the importance of psychological interventions aimed at reducing maladaptive emotion regulation strategies and negative self-talk. Educational programs based on emotion regulation and cognitive restructuring may effectively reduce students' social anxiety.

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Introduction

Social anxiety is one of the most common mental health problems among students and can lead to decreased academic performance, social withdrawal, and other psychological difficulties (Hatami Nejad, Noroozi Homayoon, et al., 2025). This disorder is characterized by an intense fear of social situations and a persistent concern about negative evaluation by others (Sadri Damirchi, Noroozi Homayoon, & Hatami Nejad, 2025a). During adolescence, social anxiety tends to intensify due to developmental and social pressures (Ritz et al., 2024). In Iran, studies have shown a notable prevalence of social anxiety among high school students, underscoring the need to examine its underlying factors. Maladaptive cognitive patterns and experiences may contribute significantly to the onset and persistence of this disorder (Zhao et al., 2024). Social anxiety is defined as an intense and persistent fear of social situations in which an individual may be exposed to judgment or negative evaluation(Salari et al., 2024). According to the cognitive-behavioral model of Clark and Wells (1995), social anxiety results from excessive self-focus, negative predictions about social interactions, and cognitive distortions (Lei et al., 2024). Rapee and Heimberg's (1997) theory similarly emphasizes the role of negative expectations and sensitivity to social evaluation (Rapee et al., 2024). Among students, this disorder is often exacerbated by academic, social, and identity-related pressures typical of adolescence, which can lead to avoidance of social interactions, low self-esteem, and poor academic performance(Brzozowski & Philip Crossey, 2024). Cognitive factors such as negative self-talk and maladaptive emotion regulation strategies play a central role in maintaining and intensifying this disorder.

Maladaptive cognitive emotion regulation strategies refer to dysfunctional cognitive processes for managing emotions, such as self-blame, other-blame, rumination, and catastrophizing(Hatami Nejad, Sadeghi, et al., 2025). According to Garnefski and Kraaij (2007), these strategies tend to intensify rather than alleviate negative emotions(Noroozi Homayoon, Akhavi Samarein, et al., 2025; Noroozi Homayoon, Sadeghi, et al., 2024; Noroozi Homayoon, Sadri Damirchi, et al., 2025; Sadri Damirchi, Noroozi Homayoon, & Hatami Nejad, 2025b). By increasing focus on negative thoughts and reducing psychological flexibility, such strategies contribute to psychological problems including social anxiety(Noroozi Homayoon, Hatami Nejad, et al., 2024). In students, the impact of these maladaptive strategies can be particularly harmful due to developmental and social pressures(Sadri Damirchi, Noroozi Homayoon, Gohari, et al., 2025). Investigating these variables within the context of social anxiety can help identify the cognitive mechanisms involved in this disorder. The findings indicated that maladaptive cognitive emotion regulation strategies are directly and positively associated with social anxiety (Hayatipoor et al., 2024; Wang et al., 2024; Zsido et al., 2021).

Negative self-talk refers to internal, self-critical dialogue characterized by negative thoughts and emotions often associated with anxiety and depression(Brady et al., 2025). According to Calvete et al. (2005), negative self-talk like loneliness stems from maladaptive cognitive patterns and exacerbates social anxiety by reinforcing the fear of negative evaluation and diminishing self-confidence(Calvete & Cardeñoso, 2002; Sadri Damirchi et al., 2024). These internal dialogues may mediate the relationship between maladaptive emotion regulation strategies and social anxiety(Xie & Wang, 2025). The results also showed that negative self-talk is directly and positively associated with social anxiety (Borrajo et al., 2024; Singh & Gautam, 2025; Wheeler et al., 2024). Among students, due to developmental sensitivities, negative self-talk can lead to social withdrawal and poor academic functioning. The growing prevalence of social anxiety among Iranian high school students and the lack of comprehensive domestic studies on the roles of maladaptive cognitive emotion regulation and negative self-talk highlight the necessity of this research (Almasi et al., 2022). The absence of culturally adapted models to explain this phenomenon represents a significant research gap. This study

aims to propose an integrative model to enhance understanding of the underlying mechanisms of social anxiety. In addition, the emergence of artificial intelligence (AI)–based analytical tools has provided new opportunities for examining complex psychological constructs with greater precision and cultural sensitivity (Sadri Damirchi, Abbasi, et al., 2025). The findings of this study can guide the development of effective psychological interventions, such as educational programs focusing on emotion regulation and reducing negative self-talk, and can inform educational and mental health policies, particularly in promoting early interventions and the integration of AI-assisted approaches to mitigate the adverse effects of social anxiety.

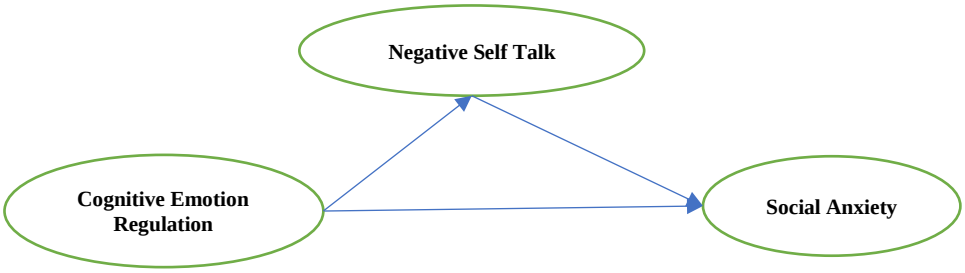

Figure 1. Conceptual Model of the Study

Method

The present study employed a descriptive-correlational design (using structural equation modeling) and was fundamental in nature. In the correlation model, the exogenous variable was *maladaptive cognitive emotion regulation strategies*, the mediating variable was *negative self-talk*, and the endogenous variable was *social anxiety*. The statistical population included all high school students (second period) in Ardabil City during the 2023–2024 academic year. According to the Hair (2015) principle for sample size estimation—considering 10 to 20 participants per observed variable and an additional 10% for potential attrition—the required sample size was determined. Ultimately, 251 students (119 boys and 132 girls) were selected as the study sample. Sampling was conducted using a multistage cluster random method. From among the educational districts of Ardabil, District 1 was randomly selected. Subsequently, ten schools (five boys' and five girls' schools) were randomly chosen from this district, and from each school, two classes from grades 10, 11, and 12 were randomly selected to participate in the study. Inclusion criteria included: being a high school student (grades 10–12), providing informed consent, being aged 16–18 years, having no psychiatric disorders, and responding honestly to the questionnaires. Exclusion criteria were: incomplete questionnaires, unwillingness to participate, not being enrolled as a student, having psychiatric disorders, taking psychiatric medication, and being older than 18 years. Before data collection, participants were informed about the purpose and procedure of the study, confidentiality of their information, their voluntary participation, and their right to withdraw at any time. Questionnaires were then distributed among students. They were assured that their responses would be analyzed anonymously and collectively, in compliance with ethical research principles. At the descriptive level, the mean and standard deviation were used to assess the variables. At the inferential level, relationships between variables were analyzed using Pearson's correlation coefficients and structural equation modeling (SEM). Data analysis was performed using SPSS version 27 and AMOS version 24.

Instruments

Cognitive Social Anxiety Inventory (SPIN)

The Social Phobia Inventory (SPIN) consists of 17 items and was developed by Connor et al. (2000). It includes three subscales: fear, social avoidance, and physiological discomfort (Rai et al., 2022). Each item is scored on a Likert scale from 0 to 4: 0 = *Not at all*, 1 = *A little*, 2 =

somewhat, 3 = *Much*, 4 = *Very much*. A cutoff score of 19 or higher indicates the presence of social anxiety (Rizkia et al., 2024). Connor et al. (2000) reported the inventory's reliability in clinical samples, with Cronbach's alpha ranging from 0.78 to 0.89, and an overall alpha of 0.94. In Iran, the inventory has been translated and standardized (Hatami Nejad, Noroozi Homayoon, et al., 2025). Its convergent validity has been confirmed, with significant correlations ($r = 0.70$, $p < 0.01$) with the General Health Questionnaire (GHQ-28) (Hassanzadeh et al., 1394). Reliability analyses in Iranian samples reported Cronbach's alpha coefficients of 0.94 for the total scale, 0.94 for fear, 0.93 for avoidance, and 0.94 for physiological discomfort. Test-retest correlations over a two-week interval were 0.96 for fear, 0.94 for avoidance, and 0.96 for physiological discomfort, indicating strong reliability and validity in the Iranian population. In international studies, SPIN reliability has been reported as 0.90 (Nay et al., 2022) and 0.94 (Obadji & Vomaallo, 2022). In the present study, Cronbach's alpha was used to assess reliability, yielding an overall alpha of 0.74 for the items.

Cognitive Emotion Regulation Questionnaire (CERQ-18)

This 18-item questionnaire was developed by (Garnefski et al., 2001) to assess emotional regulation strategies. The tool includes two subscales for adaptive strategies (5 subscales) and maladaptive strategies (4 subscales). The subscales include self-blame (items 1 and 2), acceptance (items 3 and 4), rumination (items 5 and 6), positive refocusing (items 7 and 8), planning (items 9 and 10), positive reappraisal (items 11 and 12), perspective taking (items 13 and 14), catastrophizing (items 15 and 16), and other-blame (items 17 and 18). Scores for adaptive strategies are obtained by summing the scores from the subscales of perspective taking, positive refocusing, positive reappraisal, acceptance, and planning, while scores for maladaptive strategies are obtained by summing the scores from the subscales of self-blame, other-blame, rumination, and catastrophizing. The questionnaire is scored on a 5-point Likert scale ranging from never (1) to always (5), with higher scores indicating better emotional regulation. The developers reported overall reliability coefficients of 0.87, with subscale reliabilities ranging from 0.73 to 0.88. In the study by (Ballabrera et al., 2024), Cronbach's alpha for the adaptive strategies subscale was 0.84, and for the maladaptive strategies subscale, it was 0.76. In this study, the Cronbach's alpha for this tool was 0.88. In Iran, in the study conducted by Hosseini Abrishami et al. (2022), the reliability coefficient of the questionnaire, measured by Cronbach's alpha, ranged from 0.75 to 0.83 (Hosseini Abrishami et al., 2022).

Inner Self-Talk Questionnaire: Callot Self-Talk Inventory (STI)

The Callot Self-Talk Inventory (STI), developed by Calvete et al. (2005), is a self-report tool comprising 52 items designed to assess positive and negative self-talk in adults. The instrument includes two scales: Positive Self-Talk and Negative Self-Talk. Reported Cronbach's alpha coefficients are 0.90 for the negative self-talk scale and 0.80 for the positive self-talk scale. In terms of convergent validity, significant correlations have been found between the STI scores and measures of depression, anxiety, and stress (Calvete et al., 2005). To complete the questionnaire, participants are first asked to imagine specific situations and then rate each item on a four-point Likert scale. Calvete et al. (2005) indicated that in clinical populations, negative self-talk scores are typically above 60. The validity and reliability of the STI in Iran have been confirmed by Javahimajidi (2018) and Alavi et al. (2013). Alavi et al. (2013) reported Cronbach's alpha of 0.81 for the negative self-talk scale and 0.72 for the positive self-talk scale. Additionally, negative self-talk was found to have a significant positive correlation with depression and anxiety.

Results

In the present study, the sample consisted of 251 high school students. of these, 119 students (47.4%) were boys and 132 students (52.6%) were girls. Regarding grade levels, 81 students (32.3%) were in the

10th grade, 85 students (33.9%) were in the 11th grade, and 85 students (33.9%) were in the 12th grade. The participants' ages ranged from 16 to 18 years, with a mean age of 16.70 years (SD = 2.89).

Table 1. Descriptive Statistics of the Study Variables

Variable	Mean	SD	Skewness	Kurtosis
Fear	23.38	3.16	-0.551	-0.205
Social Avoidance	26.20	2.996	-0.048	-0.464
Physical Discomfort	5.11	2.089	-0.383	-0.690
Self-Blame	14.73	3.516	-0.134	1.008
Blaming Others	15.51	3.36	-0.288	-0.797
Rumination	14.92	3.307	-0.152	-0.791
Catastrophizing	14.82	3.415	-0.238	-0.710
Maladaptive Strategies	92.33	7.019	-0.709	1.911
Social Anxiety	54.70	6.675	-0.151	-0.524
Cognitive Emotion Dysregulation	60.03	11.583	-0.163	-0.871

Table 1 presents the means and standard deviations of the study variables. The subsequent columns report the skewness and kurtosis indices, which are used to assess the normality of the data. As observed, the skewness and kurtosis values of the observed variables range between -2 and +2, indicating that the distributions of the variables are approximately normal and suitable for structural equation modeling (SEM) analysis. Prior to data analysis, the assumptions of SEM were examined. Accordingly, the normality of the variables was assessed using the Kolmogorov–Smirnov test, and the results indicated that the study variables were normally distributed ($p > 0.05$).

The basis for SEM analysis is the sample correlation matrix, which is presented in Table 2.

Table 2. Correlation Coefficients of the Research Variables

Variable	1	2	3	4	5	6	7	8	9	10
Fear	1									
Maladaptive Emotion Regulation	.65**	1								
Physiological Distress	.34**	.36**	1							
Self-Blame	.68**	.64**	.26**	1						
Blaming Others	.72**	.66**	.27**	.72**	1					
Rumination	.67**	.69**	.31**	.74**	.78**	1				
Catastrophizing	.43**	.46**	.22**	.47**	.55**	.56**	1			
Negative Self-Talk	.80**	.72**	.43**	.67**	.70**	.72**	.47**	1		
Social Anxiety	.87**	.87**	.64**	.69**	.72**	.72**	.48**	.84**	1	
Emotion Regulation	.73**	.73**	.31**	.84**	.90**	.90**	.76**	.75**	.77**	1

*** P< 0.01*

The results of Table 2 indicate that all research variables are significantly correlated with each other. To examine the assumption of no autocorrelation in the residuals, the Durbin–Watson statistic was computed, yielding a value of 1.90. Since this value falls within the acceptable range of 1.5 to 2.5, the assumption of no autocorrelation is considered satisfied. Additionally, multicollinearity for the exogenous variables was assessed using the tolerance and variance inflation factor (VIF). The results indicated that the assumption of no multicollinearity was met, as tolerance values for all variables were close to 1 and VIF values were below the critical threshold of 2.

Table 3. Fit indices of the research model

Fit Index	Acceptable Range	Calculated Value	Fit Status
χ^2 / df (CMIN/DF)	< 3	1.746	Accepted
RMSEA	0.05 – 0.08	0.055	Accepted
PCLOSE	> 0.05	0.037	Accepted
TLI	> 0.90	0.985	Accepted
RFI	> 0.90	0.965	Accepted
IFI	> 0.90	0.961	Accepted
NFI	> 0.90	0.979	Accepted
CFI	> 0.90	0.973	Accepted

As shown in Table 3, all fit indices meet the recommended criteria (Hu & Bentler, 1999), indicating that the research model has a good fit.

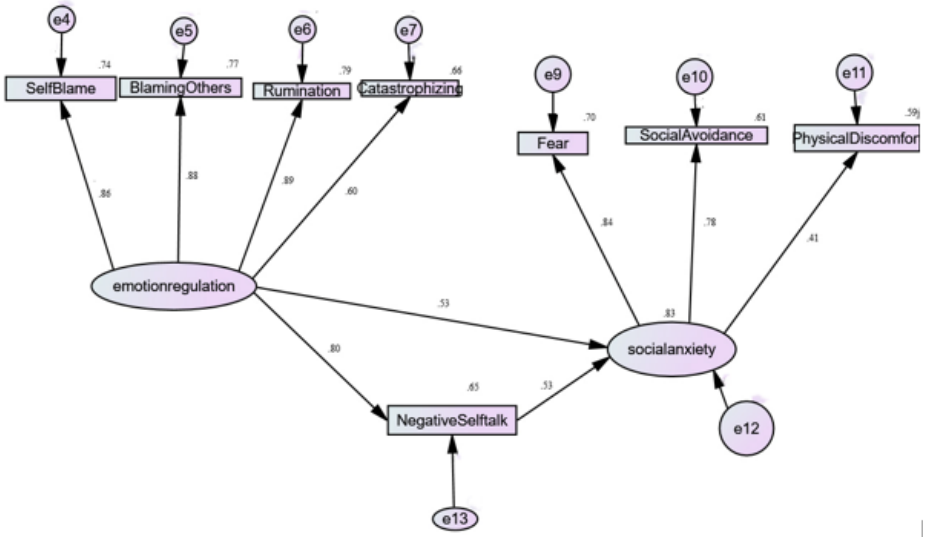

Figure 2. Final Research Model

Table 4. Standardized and Unstandardized Regression Weights of the Study Variables

Dependent Variable	Independent Variable	Unstandardized Estimate (B)	Standardized Estimate (β)	Standard Error (S.E.)	C.R.	p-value	Status
Negative Self-Talk	Emotion Regulation	1.917	0.804	0.122	15.743	***	Accepted
Social Anxiety	Negative Self-Talk	0.199	0.527	0.023	8.486	***	Accepted
Social Anxiety	Emotion Regulation	0.474	0.528	0.060	7.854	***	Accepted

****p<0.01*

As observed in Table 4, the path coefficients representing the effects of the study variables are significant at the 0.05 level.

Table 5. Bootstrapping Results for the Indirect Effect in the Research Model

Indirect Path	Indirect Effect	Lower Bound	Upper Bound	Significance Level
Emotion Regulation → Negative Self-Talk → Social Anxiety	0.381**	0.260	0.503	0.02

Note: ***p < 0.05*

Interpretation: The results of the bootstrapping analysis indicate that negative self-talk significantly mediates the relationship between maladaptive emotion regulation strategies and social anxiety. The 95% confidence interval for the indirect effect (0.260 to 0.503) does not include zero, confirming the significance of the mediation effect.

Discussion and Conclusion

The findings indicated that maladaptive cognitive emotion regulation strategies are directly and positively associated with social anxiety ($\beta = 0.42$, $p < 0.01$). This result is consistent with the studies of Hayatipoor et al. (2024), Wang et al. (2024) and Zsido et al. (2021). In explaining this finding, maladaptive strategies such as self-blame, other-blame, rumination, and catastrophizing increase focus on negative thoughts and emotions, thereby exacerbating social anxiety. According to Garnefski (2007), these strategies amplify negative emotions rather than reducing them and decrease psychological flexibility. In students, this process is intensified due to developmental and social pressures, such as fear of peer judgment and academic expectations. Self-blame creates feelings of guilt and incompetence, reducing self-confidence, which, according to the Clark and Wells model (1995), is a key factor in social anxiety. Rumination reinforces anxiety cycles through persistent focus on negative thoughts. Catastrophizing magnifies potential social consequences, increasing fear of social situations. These strategies, by reducing coping ability, reinforce avoidant behaviors, leading to social isolation and decreased academic performance. During adolescence, sensitivity to social evaluation amplifies these effects. The lack of adaptive emotion regulation skills, such as reappraisal, perpetuates this cycle. Cognitive-behavioral interventions (CBT) can reduce social anxiety by teaching adaptive strategies, such as cognitive restructuring, tailored to the developmental and social characteristics of students. These findings emphasize the importance of identifying and modifying maladaptive strategies to prevent social anxiety.

The results also showed that negative self-talk is directly and positively associated with social anxiety ($\beta = 0.37$, $p < 0.01$), in line with the findings of Borrajo et al. (2024), Wheeler et al. (2024) and Singh and Gautam (2025). Negative self-talk, as critical internal dialogue, intensifies social anxiety by reinforcing fear of negative evaluation and reducing self-confidence. According to Callot (2005), negative self-talk strengthens anxiety cycles through focus on social failures and anticipation of negative outcomes. In students, these thoughts are exacerbated by peer pressure and social expectations. Examples of such self-talk include statements like "I cannot speak in public" or "Everyone is judging me," which lead to avoidant behaviors. Raphi and Himberg (1997) show that these self-statements increase sensitivity to social evaluation. During adolescence, when social identity formation is critical, negative self-talk can result in social isolation and decreased self-esteem. Lack of cognitive skills to manage these thoughts sustains the anxiety cycle. Cognitive restructuring interventions that replace negative self-talk with positive statements can reduce anxiety and should be adapted to students' developmental and social needs. These findings highlight the key role of negative self-talk in exacerbating social anxiety.

Furthermore, negative self-talk played a significant mediating role in the relationship between maladaptive cognitive emotion regulation strategies and social anxiety ($\beta = 0.31$, $p < 0.01$). This aligns with the studies of Borrajo et al. (2024), Wheeler et al. (2024) and Singh and Gautam (2025). Maladaptive strategies, such as self-blame and rumination, create negative cognitive patterns that lead to negative self-talk, which in turn exacerbates social anxiety.

According to Garnefski (2007), these strategies promote focus on negative emotions, laying the groundwork for critical self-talk. For example, self-blame may lead to self-statements such as "I always fail," increasing fear of judgment. Rumination reinforces these negative self-talk patterns. Clark and Wells (1995) demonstrate that these statements heighten sensitivity to social evaluation and intensify avoidant behaviors. In students, social and academic pressures amplify this process. Negative self-talk thus acts as a mediating mechanism, transmitting the effects of maladaptive strategies to social anxiety. Cognitive-behavioral and mindfulness interventions can reduce these self-talk patterns and teach adaptive strategies, thereby decreasing anxiety. Interventions should be tailored to the developmental needs of students. These findings underscore the importance of targeted interventions to reduce negative self-talk. Limitations of this study include: first, the use of cluster random sampling focused on a single educational district in Ardabil may limit the generalizability of the findings; second, focusing on students aged 16–18 restricts examination of broader age differences; third, self-report instruments may be influenced by biases such as shame or lack of honesty, particularly given the sensitivity of social anxiety; fourth, not accounting for subcultural and socio-economic diversity may overlook environmental influences; and fifth, the absence of longitudinal data prevents assessment of long-term changes in social anxiety. Research Recommendations: Future studies should use broader random sampling across multiple regions to increase generalizability. Including both genders and a wider age range can clarify developmental and gender differences. Mixed-method approaches, such as in-depth interviews, can provide a deeper understanding of students' experiences. The role of subcultures and socio-economic factors should be examined. Longitudinal studies are recommended to evaluate long-term changes and the effectiveness of interventions. Practical Recommendations: Implement school-based programs focused on emotion regulation and cognitive restructuring. Establish specialized counseling centers providing safe spaces for students with social anxiety. Conduct parent and teacher workshops to raise awareness of social anxiety signs and coping strategies for early identification. Develop group programs to enhance social skills and reduce negative self-talk. Policy initiatives should integrate mental health services into the educational system, collaborate with local organizations, and establish crisis helplines to improve access and intervention effectiveness.

Declarations

Author Contributions

All authors contributed actively to the conception, design, and execution of the research.

Data Availability Statement

The datasets generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

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Ethical considerations

This study was conducted in accordance with ethical standards for research involving human participants and was approved by the Ethics Committee of the University of Mohaghegh

Ardabili (Ethics Code: IR.UMA.REC.1403.079). All participants were fully informed about the purpose and procedures of the study and provided informed consent prior to participation. Participation was voluntary, confidentiality was assured, and participants were free to withdraw from the study at any time without any consequences. All data were collected anonymously and used solely for research purposes.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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