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Examination of the Relationships among Psychological Symptoms, Alexithymia and Emotional Regulation: Mediating Role of Emotion Regulation

Yıldız Bilge[1], Yusuf Bilge[2], Ekin Emiral[3], Betül Nesibe Özkars[3]

[1]PhD, University of Health Sciences, Clinical Psychology Division, Istanbul, Turkey

[2]PhD, Istanbul Sabahattin Zaim University, Department of Psychology, Istanbul, Turkey

[3]PhD Candidate, University of Health Sciences, Clinical Psychology Division, Istanbul, Turkey

Corresponding Author: Yıldız Bilge, Mekteb-i Tıbbiye-i Şahane (Haydarpaşa) Külliyesi Selimiye Mah. Tıbbiye Cad. No:38, 34668 Üsküdar, İstanbul

Phone: +90 216 418 96 16

Fax: +90 216 418 96 20

E-mail: yildiz.bilge@sbu.edu.tr

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ABSTRACT

Objectives: The current study aims to explore (1) the relationship among alexithymia, emotional regulation, and various psychological symptoms factors; (2) the mediating role of emotion regulation strategies in the relationship among alexithymia and psychological symptoms; and (3) whether individuals with alexithymia high and low scores differ in psychological symptoms and emotional regulation.

Method: In this study that consists of 319 university students reached through convenience sampling method, a cross sectional non-experimental design is used. A demographic information form, the Toronto Alexithymia Scale (TAS-20), Brief Symptom Inventory (BSI) and Emotion Regulation Scale (ER) were used for data collection.

Results: TAS-20 Scores were moderately positively correlated with all factors of BSI and the BSI-General Severity Index (GSI) and the ER-suppression subscale while negatively correlated with the ER- cognitive reappraisal factor. Further analysis showed that ER-suppression subscale mediated the relationship between alexithymia and the BSI-GSI while ER-cognitive reappraisal subscale did not mediate it. Finally, a series of Mann-Whitney U tests indicated that individuals with high levels of alexithymia differed from those with low levels in all study variables.

Conclusion: The results show that ER-suppression subscale has a mediating role between alexithymia and psychological symptoms as well as that alexithymia and emotional regulation are effective factors for predicting psychological symptoms. Finally, the findings imply that emotion regulation is associated with alexithymia and psychological symptoms and contribute to the development these factors.

Key words: alexithymia, psychological symptoms, emotion regulation

ÖZ

Psikolojik Belirtiler, Aleksitimi ve Duygu Düzenleme Arasındaki İlişkilerin İncelenmesi: Duygu Düzenlemenin Aracı Rolü

Amaç: Bu çalışmada; (1) aleksitimi, duygu düzenleme ve çeşitli psikolojik belirtiler arasındaki ilişkinin (2) aleksitimi ve psikolojik belirtiler arasındaki ilişkide duygu düzenleme stratejilerinin aracı rolünün; ve (3) aleksitimi puanı yüksek ve düşük olan bireylerin psikolojik belirtiler ve duygu düzenleme açısından farklılaşıp farklılaşmadığının incelenmesi amaçlanmıştır.

Yöntem: Örneklem grubu 319 üniversite öğrencisinden oluşan bu çalışmada deneysel olmayan kesitsel bir tasarım kullanılmıştır. Veri toplama araçları olarak demografik bilgi formu, Toronto Aleksitimi Ölçeği (TAS-20), Kısa Semptom Envanteri (KSE) ve Duygu Düzenleme Ölçeği (DDÖ) kullanılmıştır.

Bulgular: TAS-20 skorları, KSE alt faktörleri, KSE-belirti ciddiyeti indeksi ve DDÖ-baskılama alt ölçeği ile pozitif korelasyon, DDÖ-yeniden değerlendirme alt ölçeğiyle negatif korelasyon göstermiştir. İleri analizler DDÖ-yeniden değerlendirme alt ölçeğinin aleksitimi ve belirti ciddiyeti indeksi arasındaki ilişkide aracı bir rolünün bulunmadığı, DDÖ-baskılama alt ölçeğinin bu ilişkide aracı bir rol üstlendiği tespit edilmiştir. Mann-Whitney U testine göre ise aleksitimi puanı yüksek olan bireylerin tüm değişkenler için aleksitimi puanı düşük olan bireylerden anlamlı düzeyde farklı olduğu saptanmıştır.

Sonuç: Sonuçlar, DDÖ-baskılama alt ölçeğinin aleksitimi ve psikolojik belirtiler arasındaki ilişkide aracı bir role sahip olduğunu göstermiştir. Ayrıca aleksitimi ve duygu düzenlemenin psikolojik belirtileri yordama açısından etkili faktörler olduğu tespit edilmiştir. Son olarak, bulgular duygu düzenlemenin aleksitimi ve psikolojik belirtilerle ilişkili olduğunu ve bu faktörlerin gelişimine katkıda bulunduğunu ifade etmektedir.

Anahtar sözcükler: aleksitimi, psikolojik belirtiler, duygu düzenleme

INTRODUCTION

Alexithymia, meaning "no words for moods",[1] was first conceptualized by Sifneos.[2] He developed the term based on common features observed in patients with various psychosomatic complaints, such as limited emotional functioning, constricted imaginary worlds, and difficulty in finding the correct words to express their feelings. Individuals with alexithymia have difficulties in either being aware of their emotions or in expressing them: their imaginary worlds, internal experiences, and feelings are very limited; therefore, they can only recur emotions from behaviors and what is happening in their surroundings.[3] Four basic features fully define the concept of alexithymia: 1) difficulty in defining feelings and separating emotions from physical senses; 2) difficulty in describing feelings to others; 3) narrowed imagination processes that can be seen from limitations in fantasies; and 4) externally oriented thinking style.[4]

Various etiological explanations have been developed for alexithymia, including neurophysiological,[5,6] developmental,[7,8] and psychoanalytic[9,10] ones. However, one of the most important suggestions is that alexithymia is caused by a deficit in cognitive processing and emotion regulation.[11] Thus, although emotions usually help people make sense of their environment, their current situation, and events within these factors, they can also harm people if they are not regulated in terms of intensity, relevance, type, or duration.[12] It has been suggested that alexithymia is a reflection of both problems related to cognitive processing and emotion regulation that the disorders resulted from which can be evaluated as emotion regulation disorders.[13,14] Furthermore, evidence showing individuals with alexithymia having a disposition against negative emotions and a tendency to suppress emotional expression premediate mentioned emotion regulation problems.[15]

On the other hand, emotion regulation can be handled as a process that involve both extrinsic and intrinsic components that are in charge of self-monitoring, evaluation, and modification of emotional reactions which are critical for the success of an individual's goals.[16] Gross[12] suggests that the most used emotion regulation strategies are cognitive reappraisal and suppression. Cognitive reappraisal is an emotion regulation strategy that focuses on past experience whereas suppression is response oriented. Suppression occurs when an emotion is almost uncovered and will be an important determinant in the emotional response.[12] Some differences between those who use cognitive reappraisal and suppression as emotional regulation strategies have been explored:[17] individuals who use cognitive reappraisal can change both their behavior and their feelings whereas those who use suppression often mislead others in their environment with false cues related to their identities, cope by hiding their real feelings in stressful situations, and are unclear about what they are feeling.

Moreover, emotion regulation and adaptation to new experiences is a developmentally important task.[18] Especially the maintenance of emotions and their adaptation to an emotional experience are important skills that must be acquired in childhood.[19] Thus, the problems in acquisition of the emotion regulation may resulted in other problems like alexithymia or psychological symptomatology. Indeed, there are many studies examining the relationship between alexithymia and emotion regulation. Some suggest that the use of healthy emotion regulation skills weaken as alexithymia levels increase[20,21] pointing a negative relationship between emotion regulation and alexithymia. It is argued that individuals with alexithymia use suppression more frequently than cognitive reappraisal.[22] There are studies in which emotion regulation and alexithymia were discussed together in the relationship with psychopathology.[23-25] For example, findings of the only study on this subject in Turkey show that emotion regulation and alexithymia have predictive roles in the pathological gambling. According to this study, as emotional dysregulation decreases, the relationship between alexithymia and pathological gambling weakens.[26] Moreover, there are many studies handle alexithymia and emotion regulation's relationship with psychopathology separately. For example, as alexithymia increases, there are increases in depression level,[27,28] anxiety,[29,30] psychopathological symptoms,[31] dissociation,[32,33] and post-traumatic stress symptoms.[34] Alexithymia also contributes to over-reporting, a phenomenon that can be seen in post-traumatic stress disorder.[35] In addition, high levels of alexithymia compared to control groups have been observed in patients with eating disorders,[36,37] patients with somatization,[38,39] patients with panic disorder in the remission period,[40,41] and substance abuse patients both before and after detoxification.[42] A six-year longitudinal study indicates that externally oriented thinking, a subfactor of alexithymia, is a permanent feature of patients with obsessive-compulsive disorder.[43] Finally, the quality of life of individuals with alexithymia is much lower than that of normal controls.[44]

Similar to the alexithymia, emotion regulation problems can also lead to psychological symptoms. One meta-analysis found that long-term use of maladaptive emotion regulation strategies (e.g. suppression) is associated with more symptoms of depression and anxiety.[45] Similarly, a meta-analysis of functional magnetic resonance imaging (fMRI) cognitive reappraisal studies[46] found that brain activation of patients with mood-related psychological disorders displays a different pattern from the control group, revealing that such patients use a different approach while processing negative emotions. Lastly, patients with depression show reduced use of cognitive reappraisal and increased use of suppression as their depression severity increases.[47]

As the literature reviewed above indicates, while numerous studies have investigated the relationship between alexithymia and psychological symptoms and/or the relationship between alexithymia and emotional regulation, considerably fewer studies have explored the relationship between alexithymia, emotional regulation, and psychological symptoms.[23-26] Yet, in our country, as in many countries, there has been increasing interest in examining the relationship between alexithymia and psychological symptoms in recent years.[26,31,41,48] Thus, this study examines the nature of the relationship between alexithymia, emotion regulation and psychopathology, and the following hypotheses aimed to contribute to the determination of the role of emotion regulation in the formation of alexithymia and psychological symptoms:

(1) The correlation among alexithymia, emotional regulation, and various psychological symptoms;

(2) The mediating role of emotion regulation strategies in the relationship between alexithymia and the BSI-GSI;

(3) Whether individuals with high and low alexithymia scores differ in psychological symptoms and emotional regulation.

In addition, it is aimed to contribute to the literature by increasing the adequacy of studies conducted on this subject in our country.

METHOD

Participants

Convenience sampling was employed in this study to obtain a sample of 319 emerging adults, of whom 35% were male and 65% female, with an age range between 18 and 29 years (M = 21.40; SD=1.80). Data was firstly collected from 362 people and after outliers were excluded left 319 people. Participants were students from various universities (University of Health Sciences, Sabahattin Zaim University, Bogazici University, Yildiz Technical University). Most participants were studying at either undergraduate (96%) or graduate

(1%) level while the remainder (3%) had completed their undergraduate level education. The sample mostly had average socio-economic status (SES) (74%), with a minority (5%) of low SES participants.

Measures

Demographic Information Form: This form consisted of questions about the participants' age, gender, education, and socio-economic situation (rated by the participants based on the self-reported economic status of the family -low, middle, high).

Toronto Alexithymia Scale (TAS-20): This scale of 20 Likert-type items was developed by Bagby, Parker, and Taylor[49] and adapted into Turkish by Güleç et al..[48] Apart from providing a total score, it measures three factors, namely difficulty identifying feeling, difficulty describing feelings, and externally oriented thinking. Higher scores indicate higher alexithymia. In accordance with the aims of the present study, the total TAS-20 score was used for the analysis. Bagby et al.[49] reported an internal consistency coefficient of .81 while the internal consistency coefficient of the Turkish version was .78.[48]

Brief Symptom Inventory (BSI): This scale of 53 Likert-type items was developed by Derogatis and Melisaratos[50] and adapted into Turkish by Şahin et al..[51] Higher scores indicate higher intensity of symptoms. This scale was developed with the use of 53 items of the Symptom Check List (SCL-90), which best represent and measure nine basic factors: somatization, obsession compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid thoughts, psychoticism. There are three global indices: The General Severity Index (GSI), the Positive Symptom Distress (PSDI), and the Positive Symptom Total (PST). Norm studies of the original inventory using 1,002 patients with a non-psychiatric disease, 719 normal individuals, and 313 patients with psychiatric conditions reported reliability coefficients ranging between .71 and .85. In the Turkish version, the internal consistency coefficient was .94 for the total score and ranged between .70 and .80 for the subscales.[51] In this study, nine basic factors and general severity index scores, one of three global indices, were used.

Emotion Regulation Scale (ER): This scale of 10 Likert-type items was developed by Gross and John[17] and adapted into Turkish by Ulaşan-Özgüle.[52] The scale measures two types of emotion regulation strategies: cognitive reappraisal and suppression. The internal consistency coefficient of the scale ranged between .75 and .82 for cognitive reappraisal and .68 and .76 for suppression[17] while Ulaşan-Özgüle[52] reported internal consistency coefficients of .78 for cognitive reappraisal and .64 for suppression in the Turkish version.

Procedure and Data Analysis

After obtaining ethical approval from Sabahattin Zaim University's ethics committee (Istanbul, Turkey), data were collected via paper and pencil method in Fall 2017-2018. Participants were provided with a booklet containing the self-evaluation measures along with an introduction about the study's purpose and an informed consent form. Participants agreed that they had voluntarily participated in the study after being informed that they were free to leave the study at any point if they felt uncomfortable for any reason. Data analysis was conducted using IBM SPSS version 22 statistical analysis program and the Process macro add-in by Hayes.[53]

To meet the assumptions of univariate parametric analysis, statistical measures of normality, missing values, and outliers were examined. Univariate outliers were detected with the help of Skewness and Kurtosis values. After calculating the Z-scores, outlier values were excluded from further analysis while missing values were detected and corrected using the series mean method. Multivariate outliers were detected using the Mahalanobis distance and outliers were excluded from the further analysis.

The data were also screened for the normality assumptions of parametric data analysis. For the normal distribution check, both Kolmogorov-Smirnov and Shapiro-Wilk tests were used, and their results were significant ($p < .05$). However, despite these significant values, the normal Q-Q plots were reasonably normal (the data points were mainly located close to the diagonal lines) so the data were considered appropriate for parametric tests in line with the suggestions of Meyers et al..[54] In all steps, alpha levels lower than .05 were evaluated as significant.

Internal consistency coefficients for the Toronto Alexithymia Scale, Brief Symptom Inventory and Emotion Regulation Scale (cognitive reappraisal/suppression) were good, with alpha values of .78, .95, and .82/.73, respectively.

RESULTS

Relationship between Alexithymia, Emotion Regulation, and Psychological Symptoms

Pearson Product Moment Correlation Coefficient Analysis was applied to analyze the bivariate relationships among the study variables (see Table 1). Toronto Alexithymia Scale (TAS-20) Scores were moderately positively correlated with all subscales of Brief Symptom

Table 1. Correlations, Means, and Standard Deviations of Variables

	$\bar{X} \pm SD$	1	2	3	4	5	6	7	8	9	10	11	12
1	49.98±9.27												
2	4.08±3.94	.44**											
3	7.33±4.29	.55**	.55**										
4	4.24±2.97	.43**	.44**	.64**									
5	6.15±4.47	.50**	.53**	.66**	.72**								
6	4.39±3.71	.51**	.67**	.64**	.65**	.73**							
7	4.50±3.89	.48**	.52**	.51**	.55**	.57**	.65**						
8	2.68±2.76	.46**	.54**	.51**	.56**	.52**	.58**	.53**					
9	5.19±3.83	.47**	.44**	.61**	.68**	.66**	.62**	.56**	.62**				
10	3.46±2.99	.45**	.49**	.59**	.57**	.71**	.63**	.49**	.58**	.67**			
11	0.86±0.54	.60**	.73**	.81**	.80**	.86**	.86**	.75**	.73**	.81**	.79**		
12	22.22±5.73	-.15**	-.08	.00	-.01	-.15**	-.09	-.10	-.05	.03	.00	-.06	
13	13.90±4.31	.31**	.20**	.29**	.23**	.22**	.22**	.17**	.24**	.25**	.26**	.29**	.21**

1. Toronto Alexithymia Scale, 2. Brief Symptom Inventory-Somatization Subscale, 3. Brief Symptom Inventory -Obsession Compulsion Subscale, 4. Brief Symptom Inventory-Interpersonal Sensitivity Subscale, 5. Brief Symptom Inventory-Depression Subscale, 6. Brief Symptom Inventory-Anxiety Subscale, 7. Brief Symptom Inventory-Hostility Subscale, 8. Brief Symptom Inventory-Phobic Anxiety Subscale, 9. Brief Symptom Inventory-Paranoid Thinking Subscale, 10. Brief Symptom Inventory-Psychoticism Subscale, 11. Brief Symptom Inventory-General Severity Index, 12. Emotion Regulation Scale-Reappraisal Subscale, 13. Emotion Regulation Scale-Suppression Subscale.

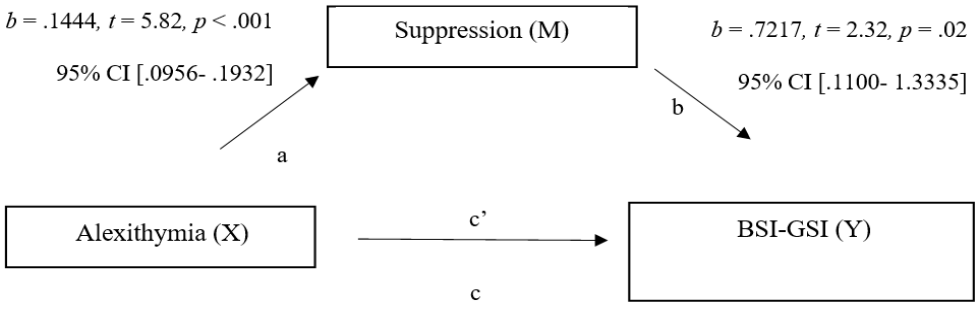
** Correlation is significant at the .01 level (2-tailed); * Correlation is significant at the .05 level (2-tailed).

Inventory (BSI) -namely, somatization (r = .44, p < .01), obsession compulsion (r = .55, p < .01), interpersonal sensitivity (r = .43, p < .01), depression (r = .50, p < .01), anxiety (r = .51, p < .01), hostility (r = .48, p < .01), phobic anxiety (r = .46, p < .01), paranoid thinking (r = .47, p < .01), and psychoticism (r = .45, p < .01), subscales-, general severity index (r = .60, p < .01), and Emotion Regulation Scale's suppression subscale (r = .31, p < .01). Additionally, TAS-20 was weakly negatively correlated with the Emotion Regulation Scale's cognitive reappraisal subscale (r =-.15, p <.01). Furthermore, the Emotion Regulation Scale's suppression subscale was weakly positively correlated with somatization (r = .20, p < .01), obsession compulsion (r = .29, p < .01), interpersonal sensitivity (r = .23, p < .01), depression (r = .22, p < .01), anxiety (r = .22, p < .01), hostility (r = .17, p < .01), phobic anxiety (r = .24, p < .01), paranoid thinking (r = .25, p < .01), and psychoticism (r = .26, p < .01), subscales-, general severity index (r = .29, p < .01).

Mediation of Emotion Regulation (suppression) in the relationship between Alexithymia and BSI-GSI

In order to examine the mediator role of emotion regulation strategies, the Process macro by Hayes[53] was employed instead of Baron and Kenny's mediation model, following the suggestion of Hayes.[55] Two simple mediation analyses,[53] were conducted using the PROCESS macro add-on for SPSS program model 4 on the relationship between alexithymia levels and the BSI-GSI with the mediation of the two different emotion regulation strategies. ER- cognitive reappraisal subscale did not mediate the relationship between alexithymia and the BSI-GSI. However, as explained in detail below, ER-suppression subscale partially mediated the relationship between alexithymia and the GSI (see Figure 1).

Figure 1.
ER-suppression strategy as a mediator of the relationship between alexithymia and BSI-GSI.



The confidence interval for the indirect effect is a bias corrected and accelerated bootstrapped confidence interval based on 1,000 samples.

Alexithymia predicted participants' BSI-GSI (b = 1.8493, t = 13.37, p < .001, 95% CI [1.4607, 2.0293]), explaining 36% of the variance. In addition, BSI-GSI was predicted by the ER-suppression emotion regulation strategy (b = .7217, t = 2.32, p = .02, 95% CI [.1100, 1.3335]) with an explained variance of 8%. Alexithymia also predicted ER-suppression (b = .1444, t = 5.82, p< .001, 95% CI [.0956, .1932]), explaining 10 % of the variance. Finally, the mediation effect of ER-suppression significantly decreased alexithymia's ability to predict GSI (b = 1.7450, t = 12.08, p < .001, 95% CI [1.4607, 2.0293]), explaining 37 % of the variance in BSI-GSI. The indirect effect of alexithymia on psychological symptoms was .1402, and different from zero by a bias-corrected bootstrap confidence interval [0.0071 to 0.2206] (κ^2 = .043, 95% CI [.0092, .0830]) based on 1,000 bootstrap samples. This indirect effect shows that two cases with the same alexithymia levels are estimated to differ by .1402 units on the BSI-GSI because of the effect of alexithymia on ER-suppression, which in turn affects psychological symptoms.

Group Differences

An independent samples t-test was applied to determine the significance of the differences caused by demographic variables, namely, gender and socio-economic status on alexithymia, subscales of Brief Symptom Inventory (somatization, obsession compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid thinking, psychoticism, and general severity index), and subscales of Emotion Regulation Scale (reappraisal and suppression). However, no differences were found between any categories of gender (male/ female) and socio-economic status (low/ middle/ high) on mentioned variables.

To compare individuals with high and low alexithymia, two groups were created based on mean alexithymia scores and standard deviations as it is done in the study of Batıgün and Büyükşahin.[31] The group of individuals with high alexithymia (N = 47) was defined as those with TAS-20 scores one standard deviation above the mean ($\bar{X}$ + SD = 49.98 + 9.27) while the low alexithymia group (N = 55) had scores one standard deviation below the mean ($\bar{X}$ - SD = 49.98 - 9.27). Since neither group met the assumptions of parametric analysis, non-parametric Mann-Whitney U tests were used. These tests indicated that scores for somatization [(Mdn_{high} = 5.69; Mdn_{low} = 1), U= 403.5, p < .001, r = .60], obsession and compulsion [(Mdn_{high} = 11.69; Mdn_{low} = 4), U = 269, p < .001, r = .68], interpersonal sensitivity [(Mdn_{high} = 6; Mdn_{low} = 2), U = 397.5, p < .001, r = .60], depression [(Mdn_{high} = 9; Mdn_{low} = 2), U = 281.5, p < .001, r = .67], anxiety [(Mdn_{high} = 6; Mdn_{low} = 1), U = 384, p < .001, r = .61], hostility [(Mdn_{high} = 6; Mdn_{low} = 1), U = 390.5, p < .001, r = .61], phobic anxiety [(Mdn_{high} = 4; Mdn_{low} = 0), U = 378, p < .001, r = .63], paranoid thinking [(Mdn_{high} = 8; Mdn_{low} = 3), U = 434, p < .001, r = .57], psychoticism [(Mdn_{high} = 5;Mdn_{low} = 1), U = 408, p < .001, r = .59], and BSI-GSI [(Mdn_{high} = 64; Mdn_{low} = 20), U = 179, p < .001, r = .74] were greater for individuals with higher alexithymia than for those with lower levels. Furthermore, while individuals with high alexithymia scored higher to ER-suppression levels [(Mdn_{high} = 16; Mdn_{low} = 11), U = 654, p < .001, r = .43], individuals with lower alexithymia scored lower to ER-cognitive reappraisal [(Mdn_{high} = 20; Mdn_{low} = 23), U = 899, p = .008, r = .26] levels.

DISCUSSION

The current study investigated (1) the correlational relationship between alexithymia, emotional regulation, and various psychological symptoms factors; (2) the mediating role of emotion regulation strategies in the relationship between alexithymia and BSI-GSI; and (3) whether individuals with high and low scores of alexithymia differ in psychological symptoms and emotional regulation and other demographic factors (age, gender, education level, and socio-economic status).

The study's findings show that, as alexithymia increases, BSI-GSI scores and specific psychological symptoms factors — namely somatization, obsession compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid thinking, and psychoticism — increase. Our findings are in line with previous research[31,56,57] that found strong correlational relationships between alexithymia and psychological symptoms.

Furthermore, we found that, as alexithymia increases, the use of the emotion regulation strategy of cognitive reappraisal decreases while the use of suppression increases. These results also agree with both Chen et al.[22] and Laloyaux et al.,[58] who reported that, as alexithymia becomes more severe, suppression increases while cognitive reappraisal decreases. Our findings indicate that the cognitive emotion regulation strategy is a healthier means of emotion regulation, given that suppression is correlated with psychological symptoms. Our suggestion is also supported by a meta-analytic study,[59] which found a strong relationship between the use of suppression and psychological problems or stress. Besides, Gross and John[17] suggested that individuals' use of suppression often misleads others in the environment through false cues related to their identities. They also argued that using suppression offers a coping strategy in stressful situations through helping individuals hide their real feelings, and that suppression may act as a facilitator to manage the situation when individuals are unclear about what they are feeling.[17] Thus, there is an inevitable relationship between suppression, psychological symptoms, and alexithymia.[23-26]

Turning to the mediating role of emotion regulation strategies in the relationship between alexithymia and BSI-GSI, our findings indicated that cognitive reappraisal did not mediate the relationship between alexithymia and the BSI-GSI whereas suppression partially mediated it. Hence, alexithymia predicted participants' BSI-GSI scores. Many studies have shown that alexithymia is an important risk factor in the development of psychopathologies.[60] In the present study, BSI-GSI was also predicted by the use of suppression strategy, which is supported by previous findings in the literature.[45,46] Therefore, it can be argued that both alexithymia and suppression are important in the evaluation of psychological symptoms and should be considered carefully.

We found that alexithymia predicted suppression and the mediation effect of suppression significantly decreased alexithymia's ability to predict BSI-GSI, explaining a large amount (37%) of variance in BSI-GSI scores. In contrast, to our knowledge, previous studies have commonly employed correlative methods[61] with little research on how psychopathology can be predicted by alexithymia and/or emotion regulation. We therefore studied how alexithymia and emotional regulation together predict psychological symptoms in order to determine the overlapping aspects of these two concepts (especially the suppression component of emotion regulation and the inability to express emotions in alexithymia). Whether alexithymia is involved in the formation of psychological disorders or develops subsequently as a defense has not yet been determined.[62] However, many studies have already found a relationship between them.[27,29,30,63,64] Already, especially in comparative studies,[38-41] the higher alexithymia levels reported in patient groups than control groups provide important evidence of causal relationships between these factors. Therefore, it can be claimed that alexithymia as a personality trait is a risk factor for the formation of psychopathologies, which can be seen in both normal and patient groups. Thus, our results suggest that alexithymia (as a more determining factor) and emotional regulation are effective elements in psychopathology formation.

On the other hand, the mediation model in this study indicates that individuals with the same alexithymia levels differ in psychological symptoms based on their suppression levels. That is, the more they use more suppression, the more their levels of psychological symptoms seem to decrease. Thus, although suppression might be evaluated as an unhealthy strategy of emotion regulation,[59] our findings suggest that it might act like a buffer to some degree as an individual's alexithymia increases in the face of psychological symptoms. However, the same is not true for cognitive reappraisal. Thus, it can be argued that, since an increase in alexithymia resulted in less use of cognitive reappraisal, this may not be enough to function as a buffer as it is in suppression. Therefore, when coupled with alexithymia, suppression may provide a coping strategy for individuals to decreases their psychological symptoms, thereby acting like a facilitator for managing the situation when they are unclear about what they are feeling, as Gross and John argue.[17]

Thirdly, the present study investigated the role of demographic variables (gender and socio-economic status) but found no differences in alexithymia, emotion regulation, and components of psychological symptoms in relation to these variables. Similar findings have been reported for gender.[31,66]

When we compared individuals with high alexithymia and low alexithymia in terms of their BSI scores, there was a significant difference between the two groups, which suggests an important link between alexithymia and psychopathology. To our knowledge, previous studies were usually structured as a comparison of the effects of high and low psychopathology severity on alexithymia rather than high and low alexithymia scores. Even though only a few studies can be found, as mentioned before, similar findings were reported by Batıgün and Büyükşahin.[31] However, other studies show that individuals with both high and low alexithymia scores are more physiologically responsive to stressors.[67] The current study's model, which emphasizes the mediating role of emotion regulation in the relationship between alexithymia and psychological symptoms, makes it possible to argue that these differentiations between individuals with high and low alexithymia reflect accompanying deficits in emotion regulation, which in turn result in psychopathology. It is important to note that the results obtained here may make it possible to talk about a causal relationship between emotion regulation, alexithymia, and psychopathology. Especially when we consider alexithymia as a causal factor in psychopathology, it may be useful to plan specific individualized therapeutic interventions for patients with high alexithymia features. Similarly, interventions to increase emotion regulation skills may contribute to the treatment of psychopathology. Further, prior to therapeutic interventions, clients can be evaluated on various scales with respect to these variables. In this way, changes after intervention can also be monitored. In summary, determining the emotion regulation and alexithymia levels of individuals in both diagnosis and treatment processes of psychopathology can provide more effective and beneficial results.

In addition, the role of emotion regulation as one of the underlying factors of both alexithymia and psychopathology would be understood with studies like ours, as well as the emerging practical value for the clinical settings in favor of the development of the necessary skills for the problem of deterioration in emotion regulation that contribute to psychopathology. Besides, the growing empirical discussion would enable both clinicians and theoreticians to detect alexithymia in early ages. It is thought that the longitudinal studies, especially in children and adolescents, will have a significant impact on the developmental course of emotion regulation and alexithymia on psychopathology.

The most important limitation of this study is the fact that it has been worked with a nonclinical sample. A study of both the clinical group and the control group will provide us more insight into the

hypotheses we are trying to investigate. Moreover, the limitation that our study was not carried out in an experimental pattern was the second important one. Empirical studies with clinical samples on emotion regulation and alexithymia can increase our knowledge of both psychopathology and treatment. Similar studies using scales where psychopathology is evaluated more comprehensively may provide us more information about the quantity and quality of the relationship between these three variables.

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