

Alexithymia as a mediator in the relationship of posttraumatic stress with anxiety during the COVID-19 pandemic

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Keywords

COVID-19 pandemic,
PTSS, anxiety,
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Anahtar kelimeler

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aleksitimi

Abstract

There has been an increase in the levels of many psychological problems including anxiety and post-traumatic stress disorder (PTSD), during the COVID-19 pandemic. Alexithymia can be considered an important psychological problem. However, it may be difficult to differentiate between post-traumatic stress symptoms (PTSS), anxiety symptoms, and alexithymia because they share symptoms like avoidance. To develop psychological interventions, it will be useful to determine the extent to which alexithymia influences PTSS and anxiety. This study examined alexithymia as a mediator in the relationship of PTSS with anxiety during the COVID-19 pandemic in Türkiye. The sample consisted of 417 male and female adults aged between 18 to 68. Pearson's product moment correlation coefficients and structural equation modeling were computed to examine the relationships. Data were gathered through the Demographic Information Form, Post-Traumatic Stress Disorder Checklist, Beck Anxiety Inventory, and Toronto Alexithymia Inventory. Findings showed that PTSS was related to alexithymia and anxiety, and alexithymia was associated with anxiety. Moreover, alexithymia had a partial mediator effect in the relationship between PTSS and anxiety. The findings highlight the importance of mental health professionals considering alexithymia when evaluating and planning treatment for individuals with PTSS and anxiety.

Öz

COVID-19 Pandemisinde travma sonrası stres ile kaygı arasındaki ilişkide aleksitiminin aracı rolü

COVID-19 pandemisinde, kaygı ve travma sonrası stres bozukluğunu da içeren birçok psikolojik sorunun düzeyinde artış olmuştur. Aleksitimi önemli bir psikolojik sorun olarak değerlendirilebilir. Bununla birlikte, kaçınma gibi semptomları paylaştıkları için travma sonrası stres belirtileri, anksiyete belirtileri ve aleksitimi arasında ayırım yapmak zor olabilir. Psikolojik müdahalelerin geliştirilebilmesi için aleksitiminin travma sonrası stres belirtileri ve anksiyete belirtilerini ne ölçüde etkilediğinin belirlenmesi yararlı olacaktır. Bu çalışma, Türkiye'de COVID-19 pandemisinde travma sonrası stres belirtilerinin anksiyete ile ilişkisinde aleksitiminin aracı etkisini incelemiştir. Örneklem, yaşları 18 ile 68 arasında değişen 417 erkek ve kadın yetişkinden oluşmuştur. İlişkileri incelemek için Pearson moment korelasyon katsayıları ve yapısal eşitlik modellemesi yapılmıştır. Veriler Demografik Bilgi Formu, Travma Sonrası Stres Bozukluğu Kontrol Listesi, Beck Anksiyete Envanteri ve Toronto Aleksitimi Envanteri kullanılarak toplanmıştır. Bulgular, travma sonrası stres belirtilerinin aleksitimi ve anksiyete belirtileriyle, aleksitiminin ise anksiyete belirtileriyle anlamlı düzeyde ilişkili olduğunu göstermiştir. Ayrıca aleksitiminin, travma sonrası stres belirtileri ile kaygı ilişkisinde kısmi aracılık etkisine sahip olduğu bulunmuştur. Bulgular, ruh sağlığı uzmanlarının travma sonrası stres belirtileri ve kaygı belirtileri gösteren bireyleri değerlendirirken ve tedaviyi planlarken aleksitimiye dikkate almalarının önemine işaret etmektedir.

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The SARS-CoV-2 (COVID-19) virus was seen in China in December 2019 before becoming a global pandemic that affected the whole world. Studies have shown that, along with the physical and social impacts of the pandemic, the global nature of the crisis negatively affected people's emotional well-being (Reger et al., 2020).

Two relevant psychological problems concern anxiety and post-traumatic stress disorder (PTSD) (Sun et al., 2021). According to Cognitive Theory, anxiety refers to dysfunctionality in sensory feelings and the perception of environmental reality, as well as a state of mental confusion. In this context, difficulties in cognitive processes include difficulties in remembering memories, perceiving the causes of events and focusing, and the presence of involuntary thoughts. Conceptual difficulties consist of cognitive distortions, beliefs about not being able to cope with problems, and concerns about dying or being harmed by others. Emotional difficulties include irritability, feeling constantly afraid or uneasy, and increased alertness to environmental threats (Beck et al., 1985). Benevolence and meaningfulness of the world and self-worth characterize people's three basic assumptions on the basis of which people appraise new events (Janoff-Bulman, 1989). The new events consistent with these assumptions facilitate adaptive processes, whereas those that are not consistent with these assumptions disrupt the core beliefs, which in turn lead to PTSD (Janoff-Bulman, 1992).

Cognitive Appraisal Theory argues that PTSD may be more affected by trauma because the individual's belief and perception of the world as a positive place is contradictory to the traumatic experience (Janoff-Bulman & Frieze, 1983). The Information Processing Model states that memory develops the fear network and stimuli related to the traumatic events are surrounded by new information. With the activation of the stimuli that trigger the fear network, new information reaches consciousness and causes unwanted thoughts (Foa & Kozak, 1986).

There has been an increase in the levels of many psychological problems, including anxiety and PTSD, during the pandemic (Brooks et al., 2020; Shevlin et al., 2020); suicide rates have also increased (Banerjee et al., 2021; Sher, 2020). Additionally, studies have shown that PTSD, anxiety, and various other psychological problems were related to one another (Passavanti et al., 2021; Wang et al., 2020). Studies also suggest that there is a relationship between perceived difficulty in defining emotional states, in other words, between alexithymia and post-traumatic stress symptoms (PTSS) (Frewen et al., 2008).

Alexithymia can also be considered an important psychological problem during the pandemic. Alexithymia refers to difficulties in identifying, understanding, and describing emotions in oneself or others (Nemiah & Sifneos, 1970). Studies indicate that early maladaptive schemas mediate the relationship between the

levels of early childhood trauma and alexithymia (Feyzioğlu et al., 2023). During the process of socialization, schemas are formed because of repeated general thought patterns developed by the characteristics of the environment in which people grew up, their cultural experiences, and learning (Beck, 1995). Therefore, alexithymic characteristics can be explained based on cognitive distortions such as labeling, blaming, and overgeneralization, which in turn lead to emotions and behavioral patterns (Beck, 2001; Darrow & Follette, 2014).

Studies have shown the experience of high rates of alexithymia during the pandemic (Tang et al., 2020). Moreover, according to literature, people with alexithymic characteristics experience more anxiety due to high perceived stress levels (Li et al., 2022). Indeed, alexithymia has been related to psychological problems including PTSD, depressive, and anxiety symptoms during the pandemic (Merlo et al., 2021; Osimo et al., 2021).

It may be difficult to differentiate between post-traumatic stress symptoms (PTSS) and alexithymia because they share symptoms like avoidance (Park et al., 2015). That is, individuals who show characteristics of alexithymia tend to avoid situations causing anxiety. Moreover, many studies suggest that alexithymic characteristics exist in both psychosomatic disorders and psychological disorders such as anxiety disorders (Berardis et al., 2008). Furthermore, sensitivity to anxiety and alexithymia (Zahradnik et al., 2009) can be both present in people with PTSS. Similarly, studies have shown that alexithymic characteristics can be present in the face of physical illness. For example, an earlier study by Fukunishi et al. (1994) showed that there was a relationship between alexithymia and defense mechanisms among patients who experienced myocardial infarction. Those with acute myocardial infarction reported higher levels of alexithymia than those with old myocardial infarction. Findings suggested that alexithymia may be evident when patients use adaptive coping strategies in order to minimize the perceived severity of threats. These findings suggest that identification of anxiety symptoms is quite difficult. Therefore, in order to develop psychological interventions, it will be useful to determine the extent to which alexithymia influences PTSS and anxiety symptoms.

Although a few studies have examined the relationships between PTSS, anxiety symptoms, and alexithymia, there appears to be a significant gap in understanding how these structures interact, especially during the COVID-19 pandemic (Osimo et al., 2021). Existing literature suggests that it is difficult to distinguish between PTSD, anxiety symptoms, and alexithymia because avoidance behaviors are common features of PTSD, anxiety and alexithymia. However, there is insufficient research explaining to what extent alexithymia affects the emergence and severity of PTSD and anxiety symptoms in times of crisis, such as

Table 1. Demographic Characteristics

Demographic Characteristics		<i>n</i>	%
Sex	Female	324	77.7
	Male	93	22.3
Marital Status	Single	301	72.2
	Married	116	27.8
Employment status	Unemployed	218	52.3
	Employed	199	47.7
Children	No	330	79.1
	Yes	87	20.9
Debt status	No	165	39.6
	Yes	252	60.4
Psychological / Psychiatric Support	No	371	89
	Yes	46	11
COVID-19 diagnosis	No	313	75.1
	Yes	104	24.9
Diagnosis of COVID-19 in Acquaintances/Relatives	No	61	14.6
	Yes	356	85.4
Job loss in the COVID-19 pandemic	No	375	89.9
	Yes	42	10.1
Fear of job loss in the COVID-19 pandemic	No	303	72.7
	Yes	114	27.3
Educational Status	Associate degree and below	57	13.7
	Bachelor's Degree	161	38.6
	Post-graduate Degree	199	47.7
Monthly Income	0-4250 TL	259	62.1
	4250-9999 TL	108	25.9
	10000 TL and above	50	12
Number of People Living at Home	1-2	121	29
	3-4	209	50.1
	5 and more	87	20.9
Responsibility in meeting the family's needs	Not responsible	206	49.4
	Responsible	104	24.9
	Partially responsible	107	25.7

pandemics. The present study aimed to fill this gap by examining alexithymia symptoms as a potential mediator in the relationship between PTSS and anxiety symptoms during the pandemic. Additionally, the present study aimed to contribute to the field of mental health by examining the mediating role of alexithymia in the relationship between PTSS and anxiety symptoms, which has not been extensively investigated in previous studies. As a result, it was envisaged that the present study would extend the literature by investigating the mediating role of alexithymia symptoms in the relationship between PTSS and anxiety. At the same time, it was also foreseen that the present study's findings would have implications for future research and clinical interventions aiming at further understanding mental health problems precipitated by global crises.

Thus, the present study examined the mediating role of alexithymia in the relationship between PTSS and anxiety symptoms during the pandemic. Hypotheses included: H1: there is a significant relationship between PTSS and anxiety; H2: there is a significant relationship between PTSS and alexithymia; H3: there is a significant relationship between anxiety and alexithymia; H4: there is a mediator effect of alexithymia in the relationship between PTSS and anxiety.

METHODS

Participants

The sample consisted of 417 male and female adults aged between 18 to 68. Criteria for inclusion in the present study were being 18 years of age or older, residing in Türkiye, and having cognitive abilities to fill in the scales. Exclusion criteria were being under the age of 18, residing outside Türkiye, lacking the cognitive abilities to understand the items on the scales, and the presence of a condition preventing participation. The minimum sample size was calculated as 160 with the G*Power 3.1.9.4 package program ($f^2 = 0.15$, α probability = .05, $F = 2.00$).

77.7% of the participants were women; 72.2% were single; 47.7% held graduate degrees; 52.3% were unemployed; 75.1% did not have COVID-19 disease; 85.4% had relatives who had COVID-19 disease. Table 1 presents the sample's demographic characteristics.

Before data collection, ethical approval was sought from the Ethics Committee of Istanbul Arel University (decision dated 29 April 2022 and numbered 2022/8). Participants gave their consent through the Informed Consent Form before filling out the scales via Google

Forms. The link was sent to the participants via various platforms (such as WhatsApp and Facebook).

Measures

The study used the Demographic Information Form, the Posttraumatic Stress Disorder Checklist (PCL-5; Weathers et al., 2013), the Toronto Alexithymia Scale (TAS; Taylor et al., 1985) and the Beck Anxiety Inventory (BAI; Beck et al., 1988).

A Demographic Information Form was developed by the present authors and included questions related to demographics and COVID-19 characteristics.

Posttraumatic Stress Disorder Checklist (PCL-5) The PCL-5, which was used to measure the levels of PTSD, was adapted by Boysan et al. (2017). It consisted of 20 items measuring DSM-5-based symptoms of PTSD and 4 subscales: re-experiencing, avoidance, changes in cognitions and mood, and hyperarousal. The adaptation study showed that the scale had good reliability in that composite reliability coefficients of re-experiencing were .79–.92, avoidance were .73–.91, changes in cognitions and mood were .85–.90 and hyperarousal were .81–.88 and two-week test-retest intra-correlation coefficients were .70, .64, .78, and .76, respectively. Moreover, the total and subscale scales were strongly associated with other measures of trauma-related symptoms, providing support for the construct validity of the scale. The scale is rated on a 5-point Likert-type rating ranging from 0 (none at all) to 4 (extremely high). The internal consistency coefficient in the present study was calculated as .96.

Beck Anxiety Inventory (BAI) The BAI, which was adapted into Turkish by Ulusoy et al. (1998), was used to measure the levels of anxiety. The scale consisted of 21 items pertaining to two subscales: psychological symptoms (panic and anxiety sub-dimension) and somatic symptoms. However, a total score is obtained, indicating symptoms ranging from mild to severe. The scale is rated on a 4-point Likert-type scale ranging from not at all/0 to severely/3. The adaptation study showed that the scores on this scale were associated with the scores on a number of scales, including Beck Depression Inventory, the Hopelessness Scale, and the Automatic Thought Questionnaire. The internal consistency coefficient was calculated as .93. The item-total correlations ranged from .45 to .72. The internal consistency coefficient for the present study was calculated as .94.

Toronto Alexithymia Scale (TAS) TAS-20, which measured symptoms of alexithymia, was also adapted into Turkish by Güleç et al. (2009). The scale had three subscales: difficulty in recognizing emotions, difficulty in expressing emotions, and extreme extroverted thinking. Items are rated on a five-point Likert-type scale ranging from 1 = strongly disagree to 5 =

strongly agree. The internal consistency coefficient for the total scale was .78, and for the three subscales .80, .57, and .63, respectively. The internal consistency coefficient for the present study was calculated as .83.

Statistical Analysis

Mean, standard deviation, median, kurtosis, and skewness were calculated. Pearson's product moment correlation coefficients and structural equation modeling were computed to examine relationships. In the evaluation of the structural model, goodness of fit values were considered. The values < 5 for Chi-square/df, $< .10$ for RMSEA, and $\geq .90$ for CFI, IFI, NFI, and GFI were considered as cut-off points for goodness-of-fit values, respectively (Kline, 1998; Schumacker & Lomax, 2004). IBM SPSS 24 and LISREL 8.8 package programs were used for statistical analyses. A level of .05 was considered statistically significant.

Procedure

The data were collected online through the Google Forms platform from participants. After signing the Informed Consent Form in electronic format, the participants answered the survey questions online. Participants completed the data collection tools in approximately 15 to 20 minutes. The present study was approved by the ethics committee of Istanbul Arel University (Date 29.04.2022; Approval number 2022/08).

RESULTS

Descriptive statistics are given in Table 2. The kurtosis and skewness values indicated that the distribution of the data was within the normal limits. Multicollinearity checks indicated that the correlation coefficients between none of the variables were above .90. These findings suggested that the data were suitable for parametric statistical analyses.

In the present study, a structural model was tested. In the model, since BAI had a one-dimensional structure, three parcels obtained from the scale were included in the model as observed variables of the latent variable "Anxiety", the subdomains "Alexithymia" of TAS, and the latent variable "PTSS" subdomains of PCL-5. Table 3 presents correlation coefficients between observed variables in the structural model.

A two-phase approach was adopted in testing the model. During the testing of the measurement model, correlation coefficients between latent variables were found to be significant (Table 4). The highest correlation coefficient was between anxiety and PTSS ($r = .72, p < .01$), while the lowest correlation coefficient was between alexithymia and PTSD ($r = .51, p < .01$). These findings provided support for the 1st, 2nd, and 3rd hypotheses.

During the testing of the model, the goodness of fit values were also found to be within the acceptable le-

Table 2. Descriptive Statistics

	Mean	SD	Skewness	Kurtosis
Beck Anxiety Inventory Total Score	19.92	14.46	.64	-.38
The Toronto Alexithymia Scale Total Score	52.30	12.95	.55	-.02
Difficulty in expressing emotions	14.85	5.19	.56	-.08
Extreme extroverted thinking	20.92	4.04	.12	.09
Post-traumatic Stress Disorder Checklist Total Score	42.72	20.70	-.07	-.75
Re-experiencing	11.24	5.50	-.16	-.80
Avoidance	4.36	2.52	-.07	-1.14
Changes in cognitions and mood	14.79	7.89	-.11	-.88
Hyperarousal	12.33	6.63	.03	-.90

Table 3. Relationships Between Variables

Variables	1	2	3	4	5	6	7	8	9
Anxiety Parcel 1	-								
Anxiety Parcel 2	.87**	-							
Anxiety Parcel 3	.81**	.80**	-						
Difficulty in recognizing emotions	.53**	.53**	.48**	-					
Difficulty in expressing emotions	.42**	.44**	.40**	.79**	-				
Extreme extroverted thinking	.09	.07	.11*	.26**	.31**	-			
Re-experiencing	.62**	.63**	.56**	.42**	.38**	.06	-		
Avoidance	.56**	.58**	.51**	.40**	.39**	.07	.78**	-	
Changes in cognitions and mood	.60**	.62**	.53**	.46**	.44**	.06	.78**	.78**	-
Hyperarousal	.61**	.60**	.52**	.46**	.41**	.04	.75**	.70**	.83**

Note 1. * $p < .05$, ** $p < .01$. **Note 2.** Beck Anxiety Inventory (BAI): Anxiety Parcel 1 (ANXP1), Anxiety Parcel 2 (ANXP2), Anxiety Parcel 3 (ANXP3). Toronto Alexithymia Scale Sub-factors (TAS-20): Difficulty in Recognizing Emotions = Difficulty Describing Feelings (DDF), Difficulty in Expressing Emotions = Difficulty Identifying Feelings (DIF), Excessive Extroverted Thinking (EET). Post Traumatic Stress Checklist Scale Sub-factors (PCL-5): Re-Experiencing (REE), Avoidance (AVO), Changes in Cognitions and Mood = Negative Alterations in Cognitions and Mood (NAC), Hyperarousal (HYA).

Table 4. Correlations of the Latent Variables in the Structural Model

Latent Variable	1	2	3
Alexithymia	-		
Anxiety	.57*	-	
Post-traumatic Stress Symptoms	.51*	.72*	-

Note. * $p < .01$.

vels as follows $\chi^2/df(89.48/32) = 2.80, p = .001$, NNFI = .99; CFI = 0.99; IFI = .99; GFI = .96; RMSEA = .066 (confidence interval for RMSEA = .050–.082; See Figure 1). The standardized path coefficients are given in Figure 2.

Findings showed that PTSS had a significant predictive effect on alexithymia ($\beta = .51, p < .05$) and anxiety levels ($\beta = .58, p < .05$); Alexithymia ($\beta = .27, p < .05$) had a significant predictive effect on anxiety. PTSS and alexithymia together explained approximately 57% of the variance in anxiety. Therefore, alexithymia partially mediated the relationship of PTSS with anxiety, providing support for Hypothesis 4.

DISCUSSION

The present study examined the relationship of PTSS with anxiety and the mediating role of alexithymia in

this relationship during the COVID-19 pandemic in Türkiye.

The relationship between PTSS, anxiety, and alexithymia symptoms

Findings showed that there was a significant positive relationship between PTSS and anxiety symptoms. This finding supported Hypothesis 1 and is consistent with previous findings obtained during the pandemic (Passavanti et al., 2021; Wang et al., 2020). This finding suggests that the anxiety experienced during the pandemic may lay the grounds for the development of PTSS. PTSS are defined as normal emotional reactions to abnormal situations in the face of unexpected events (Pitman et al., 2012). Anxiety, on the other hand, refers to reactions such as uneasiness and fear in the face of unexpected situations and anticipation of un-

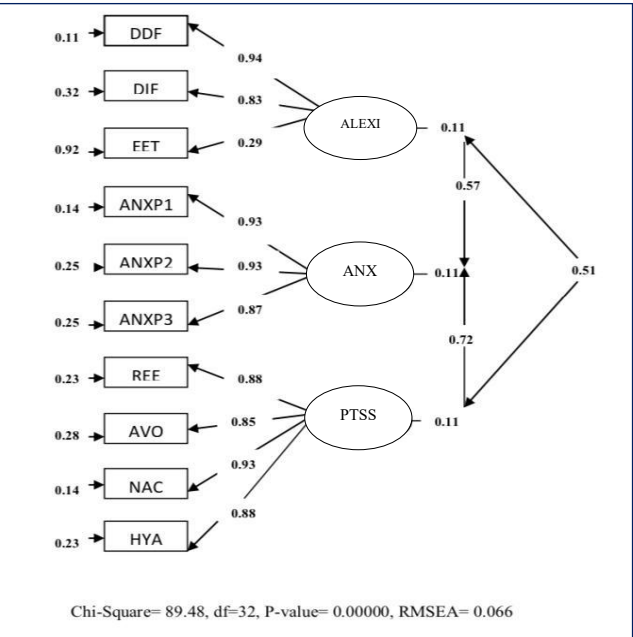


Figure 1. Standardized Path Coefficients of the Measurement Model. *Note.* Alexithymia, Difficulty Describing Feelings (DDF), Difficulty Identifying Feelings (DIF), Excessive Extroverted Thinking (EET). Anxiety, Anxiety Parcel 1 (ANXP1), Anxiety Parcel 2 (ANXP2), Anxiety Parcel 3 (ANXP3). Post-Traumatic Stress Symptoms (PTSS), Re-Experiencing (REE), Avoidance (AVO), Negative Alterations in Cognitions and Mood (NAC), Hyperarousal (HYA).

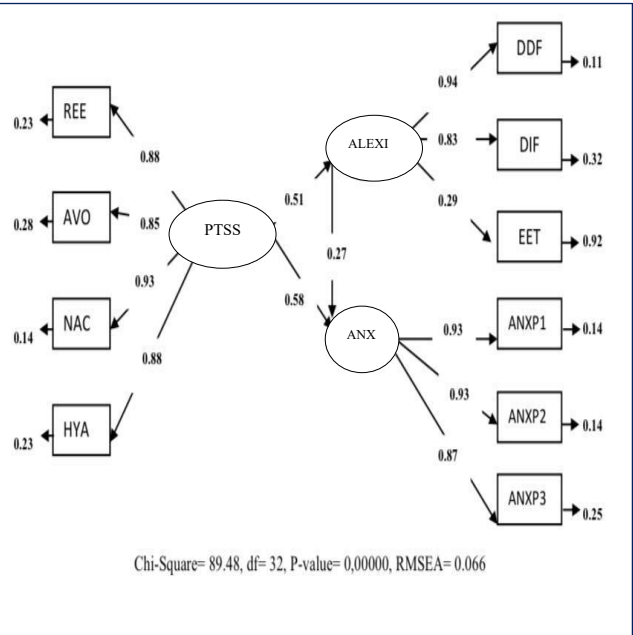


Figure 2. Standardized Path Coefficients for the Model. *Note.* Alexithymia, Difficulty Describing Feelings (DDF), Difficulty Identifying Feelings (DIF), Excessive Extroverted Thinking (EET). Anxiety, Anxiety Parcel 1 (ANXP1), Anxiety Parcel 2 (ANXP2), Anxiety Parcel 3 (ANXP3). Post-Traumatic Stress Symptoms (PTSS), Re-Experiencing (REE), Avoidance (AVO), Negative Alterations in Cognitions and Mood (NAC), Hyperarousal (HYA).

certain situations in the future (Öhman, 2008). PTSS can be developed in relation to many psychological problems, but it can be more closely related to anxiety, and accordingly, these symptoms can get first deve-

loped as a fear and anxiety reaction to stress, either during or after a traumatic experience (Charney et al., 1987). That is, in addition to emotional difficulties such as irritability, feeling uneasy, anxiety is characterized by difficulties in cognitive processes such as the presence of involuntary thoughts and conceptual difficulties such as cognitive distortions (Beck et al., 1985). Traumatic events, which tend to be inconsistent with basic assumptions including the benevolence and meaningfulness of the world and self-worth (Janoff-Bulman, 1988), disrupt these core beliefs, leading to maladaptive processes (i.e., the development of PTSS). The same may have occurred during the pandemic.

Moreover, findings showed that there was a significant positive association between PTSS and alexithymia. This finding provided support for Hypothesis 2 and is consistent with previous findings obtained during the pandemic (Edwards, 2019; Obeid et al., 2020) and previous empirical and review studies undertaken in other contexts (Berardis et al., 2008). The relationship of alexithymia with PTSS can be explained in different ways. Firstly, individuals with alexithymic characteristics cope with traumatic situations by reflecting on their experiences physically and physiologically rather than through verbal and symbolic thought (Sutherland, 2011). Secondly, alexithymia-related difficulties also increase PTSS (Edwards, 2019). Related to this argument, among university students, a study (Parker et al., 1998) found that alexithymia was strongly associated with an immature defensive style. This study also showed that students with alexithymia scored high on emotion-focused coping and distraction as an avoidant coping method and low on problem-focused coping. Alexithymia can occur as a result of traumas that occurred in early childhood, and hence people experience difficulties in understanding and expressing emotions (Taylor & Bagby, 2000). That is, alexithymic characteristics can be explained based on cognitive distortions developed because of traumas (Beck, 1995), which in turn shatter basic assumptions (Janoff-Bulman, 1989). Additionally, alexithymia may make the treatment of psychological trauma difficult (Panayiotou & Constantinou, 2017). Accordingly, alexithymia may prevent accommodation to the stimulus that reminds the traumatic event and the stabilization of fear, thus making recovery difficult (Panayiotou & Constantinou, 2017).

Previous findings have indicated that alexithymia is associated with PTSS including avoidance, reexperiencing, hyperarousal, and negative changes in emotions and cognitions (McCaslin et al., 2006). It can be argued that one of the PTSS, negative changes in emotions, may develop as a result of emotional exhaustion due to increased hyperarousal reactions (Litz, 1992). In addition, suppressed emotional reactions related to stimuli that remind the traumatic event can trigger hyperarousal (Gross & Levenson, 1993). In this context, it can also be argued that since individuals with alexithymia lack awareness of their emotions, hyperarousal, as one of the PTSS, may be closely related to difficulty in perceiving emotions, which is a symptom

of alexithymia (Aker et al., 2022). Findings showed that anxiety and alexithymia were significantly and positively associated with each other, supporting Hypothesis 3. This is consistent with previous findings obtained during the pandemic (Damerdjı et al., 2022; Obeid et al., 2020; Osimo et al., 2021). The containment and social isolation of the pandemic can exacerbate emotional stagnation and introversion, and the fact that individuals with alexithymia try to cope with anxiety through emotional avoidance may explain the relationship of alexithymia with anxiety (Damerdjı et al., 2022). Anxiety is characterized by emotional difficulties including irritability, feeling frightened or uneasy, and increased alertness to environmental threats (Beck et al., 1985). The difficulty in expressing and understanding emotions seen in alexithymia may promote avoidance in interpersonal relationships and prevent understanding of anxiety and PTSS. Furthermore, individuals with alexithymia may not only avoid PTSS and the severe emotions caused by anxiety but also may develop maladaptive coping strategies (Motan & Gençöz, 2007). Therefore, individuals with alexithymia experience an increase in their alexithymic characteristics as their anxiety and stress levels increase.

The mediating effect of alexithymia in the relationship between PTSS and anxiety

Findings showed that alexithymia had a partial mediating effect in the relationship between PTSS and anxiety. This finding supported Hypothesis 4. That is, when PTSS predicts alexithymic symptoms, and this in turn leads to anxiety symptoms. This finding indicates that during the pandemic, as a source of PTSS, alexithymia inhibits the process by which individuals become aware of psychological problems, including anxiety. That is, high alexithymia laid the grounds for the experience of high anxiety in the pandemic. This finding emphasizes alexithymia as a maladaptive coping strategy during the pandemic.

A small number of studies examined the mediating effect of alexithymia on psychological problems during the pandemic. For example, the significant mediating effect of alexithymia in the relationship of perceived stress with change in depressive and anxiety symptoms has been demonstrated (Li et al., 2022). Another study (Karaca Dinç et al., 2021) showed that the relationship of childhood trauma with psychological disorders in adulthood was mediated by sensitivity in sensory processing and alexithymia. A case study suggested that untreated alexithymia might exacerbate trauma and lead to the development of PTSS and symptoms of depression (Ogłodek, 2022). However, to the knowledge of the present authors, there is no other study among the general population that showed the mediating role of alexithymia in the relationship between PTSS and anxiety.

Alexithymia has been associated with repetitive traumatic experiences and sensitization to stress in the nervous system due to the processing of emotions and cognitive deficits (Kim et al., 2020; Zorzella et al.,

2020). Moreover, it has been argued that avoidance behavior in PTSD may be associated with alexithymic characteristics (Hogeveen & Grafman, 2021; Panayiotou et al., 2021) and that people with both PTSD and alexithymia exhibit difficulties in emotion regulation (Fang et al., 2020; Nadeau, 2021). Avoidance behavior in response to stress is associated with re-experiencing, which is an important symptom of PTSD, whereas individuals with alexithymia have deficiencies in cognitive processing and emotion regulation. Accordingly, previous traumatic experiences may increase the development of alexithymia (Ogłodek, 2022).

Strengths and limitations

During the pandemic, only a few studies focused on alexithymia. Although the present study provides valuable insights, it has a number of limitations. First, the present study was cross-sectional. The same associations/effects can be investigated by adopting a longitudinal approach. Second, the data were collected online, and therefore, the participation in the present study depended on the accessibility to technological devices. The collection of the data online may have restricted detailed interaction with the participants. Future studies need to collect data by other means ensuring a higher participation rate without such restrictions. Third, the present findings were obtained by using a sample consisting of 417 adults living in Türkiye. Cultural differences in the expression and perception of emotions and differences in societal responses to crises may influence the observed associations between PTSS, anxiety, and alexithymia. Therefore, these relationships need to be examined in a larger sample representing various cultures or countries. Fourth, a large majority of the sample consisted of female participants and of those who had at least a university degree. Therefore, the present findings need to be interpreted with caution in light of these limitations.

To the best of our knowledge, this is the first study undertaken among the general population that examined the mediator role of alexithymia in the relationship of PTSS with anxiety during the pandemic. Findings showed that PTSS, anxiety and alexithymia were related to one another. There was a relationship between PTSS and anxiety or alexithymia, there was also a relationship between anxiety and alexithymia. In addition, alexithymia played a mediating role in the relationship between PTSS and anxiety.

The present study investigated the mediating role of alexithymia in the relationship between PTSS and anxiety by conducting mediation analysis as well as correlation analyses. This analytical approach provides insights into the underlying mechanisms driving the observed relationships and thus deepens our understanding of the psychological processes involved. However, the fact that the present study was conducted during the COVID-19 pandemic adds further relevance and timeliness to the findings. By examining psychological responses to a major global crisis, the

present study addresses a pressing public health issue and provides information that may inform mental health support strategies during and after the pandemic. Additionally, the present study has a direct impact on mental health services by highlighting the potential role of alexithymia, which indicates anxiety in individuals with PTSS. These practical implications can guide the development of specific targeted interventions aimed at addressing alexithymia as well as trauma-related problems and anxiety.

Conclusion, implications, and future directions

The present findings provide valuable information about the relationships between PTSS, anxiety, and alexithymia during the COVID-19 pandemic in Türkiye. The present findings revealed relationships between PTSS, anxiety, and alexithymia. It also revealed that alexithymia had a partial mediating effect in the relationship between PTSS and anxiety. These findings emphasize the importance of alexithymia as a potential factor affecting anxiety in individuals experiencing trauma-related distress.

Based on these findings, future psychological interventions offered in difficult times such as the COVID-19 pandemic, need to take into account the mediating role of alexithymia if the aim is to reduce PTSS and symptoms of anxiety. That is, these interventions need to help individuals with alexithymia to be aware of and express their feelings. Therefore, mental health professionals should consider incorporating assessments of alexithymia into their clinical evaluations and developing interventions that address both trauma-related distress and difficulties in emotion regulation. Future studies also need to examine the impact of these interventions.

Present findings have important implications for future studies. The identification of alexithymia as a partial mediator in the relationship between PTSS and anxiety highlights the importance of addressing difficulties in emotion regulation in psychological interventions during times of crisis, such as pandemics. Interventions aiming at improving awareness of emotions and emotion regulation skills may be especially beneficial for individuals experiencing coexisting PTSS, anxiety, and alexithymia. However, present findings point to the need for culturally sensitive approaches to psychological support across diverse populations.

Psychological interventions, such as emotion-focused or mindfulness-based therapies, may be particularly useful in reducing anxiety symptoms in individuals with PTSS by targeting alexithymia. Interventions targeting alexithymia can be incorporated into existing mental health support programs to improve outcomes for individuals experiencing PTSD and anxiety. Additionally, the findings highlight the importance of individual differences in emotional processing when designing and implementing interventions to reduce anxiety. By recognizing the role of alexithymia in the experience of anxiety among individuals with PTSS, health care administrators can

prioritize economic fundraising for the development and implementation of interventions that address both trauma-related distress and emotion regulation difficulties. Future studies may explore the effectiveness of interventions targeting alexithymia in reducing anxiety. Longitudinal research designs can also provide insight into the dynamics of these relationships over time. Developing and adapting individual-specific interventions, taking into account individual differences, may lead to more targeted and effective treatment outcomes. Preventive interventions aimed at building emotion regulation skills and resilience may help prevent the onset of long-term psychological problems in at-risk groups.

DECLARATIONS

Ethics Committee Approval The study was approved by the ethics committee of Istanbul Arel University, (Date 29.04.2022; Approval number 2022/08).

Conflicts of interest/Competing interests There is no conflict of interest.

Informed consent Informed consent was obtained from all participants included in the study.

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Data Sharing/Availability Data is available upon reasonable request.

Authors' Contributions All authors contributed to the conceptualization and design of the study. AAS gathered data and conducted data analysis. All authors contributed to the interpretation of the findings and the writing of the manuscript.

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