Received: 12 March 2021 | Accepted: 8 February 2022

DOI: 10.1002/pchj.536

ORIGINAL ARTICLE

PsyCh Journal

Anxiety and theory of mind: A moderated mediation model of mindfulness and gender

Gülşah Balaban[1] | **Mustafa Bilici**[2]

[1]Department of Psychology, Istanbul Sabahattin Zaim University, Istanbul, Turkey

[2]Department of Psychology, Marmara University, Istanbul, Turkey

Correspondence
Gülşah Balaban, Halkalı Avenue, Department of Psychology, Istanbul Sabahattin Zaim University, 34303, Küçükçekmece, Istanbul, Turkey
Email: sahquant@gmail.com

Abstract

This study aimed to examine the relationship between gender, anxiety, mindfulness, and theory of mind (ToM). It was also aimed to investigate the mediating role of mindfulness in the relationship between anxiety and ToM. Additionally, the moderating role of gender in the relevant relationships was examined. The sample consisted of 323 people, including 260 (80.5%) females and 63 (19.5%) males, aged between 18-62 years. Data were collected by the Reading the Mind in the Eyes Test, the State-Trait Anxiety Inventory II, and the Mindful Attention Awareness Scale. It was found that ToM and anxiety levels were statistically significantly higher in women than men. In the regression analysis, it was detected that mindfulness predicts the 7% variance in ToM. The second predictor of ToM was found as anxiety, and both predictors explained the 9% variance in ToM. In the mediating analysis, it was found that mindfulness has a mediating role in the relationship between anxiety and ToM. In the moderated mediation analysis, it was determined that the pathway between anxiety and ToM was moderated by gender; the moderating role of gender also was found between mindfulness and ToM. In light of these findings, experimental future studies can be suggested with clinical samples for a better understanding of the relationships between gender, anxiety, mindfulness, and ToM.

KEYWORDS
anxiety, gender, mindfulness, theory of mind

INTRODUCTION

Understanding the thoughts, emotions, and behaviors of others is defined as the theory of mind (ToM; Premack & Woodruff, 1978). First, ToM was developed for describing the behaviors of chimpanzees (Premack & Woodruff, 1978) and then became widely accepted for other areas such as explaining the ability of ToM in children (Wang, 2015). Especially the social relationship deficits seen in autism spectrum disorders (ASDs) are evaluated within the scope of ToM (Kimhi, 2014). In addition to ASDs, there also are studies in the literature in which relations between ToM and externalizing disorders (Sharp, 2008), somatoform disorders (Subic-Wrana et al., 2010), schizophrenia (Bora, 2009; Harrington et al., 2005), and borderline traits (Németh et al., 2018) have been shown. These findings support the idea that people with a low level of ToM have difficulties in understanding others' emotions and intentions. As a result, these people cannot easily adapt to complicated social situations. Emotional and social cues which are received from others help individuals to interpret others' goals and intentions. In this regard, emotion recognition becomes a key point in ToM for adaptation to social life.

Emotion recognition is one of the main components of ToM and can be defined as the ability to notice hidden intentions which indicate the emotional states of others. These cues can be grasped from the faces, behaviors, or verbal expressions of others. In the literature, there are different tools to evaluate ToM via emotion recognition (Baron-Cohen et al., 2001; Ihnen et al., 1998; Kee et al., 1998; Tottenham et al., 2009). These tools, such as the "Facial Emotion Identification Task" (FEIT; Ihnen et al., 1998; Kee et al., 1998), the "Facial Expressions of Emotion Stimuli and Tests" (FEEST; Young et al., 2002), the "NimStim Face Stimulus Set" (NFSS; Tottenham et al., 2009), and the "Reading the Mind in the Eyes" test (RMIE; Baron-Cohen et al., 2001), typically include facial photographs. When these tools are examined, it can be seen that only six emotion words are being used to describe the facial expressions in FEIT (happy, angry, afraid, sad, surprised, ashamed) and in FEEST (happiness, surprise, fear, sadness, disgust, anger), and eight expressions of emotions are being used

in NFSS (happy, sad, angry, fearful, surprised, disgusted, neutral, calm). However, in the RMIE test, there are 94 words to describe the facial expressions. In this regard, the RMIE test is one of the most widely used tools in the literature (Pestana et al., 2018), and it was also used in our study to evaluate ToM via emotion recognition.

The difficulties in emotion recognition have an important role in the development of anxiety. The relationship between ToM and anxiety can be thought of as double-edged (Lenton-Brym et al., 2018). Because of excessive focus on negative thoughts in anxiety disorders, ToM ability is inhibited (Öztürk et al., 2020; Washburn et al., 2016). In addition, deficiencies in ToM cause an increase in anxiety (Kimhi, 2014; Lei & Ventola, 2018). It was shown that in individuals with social anxiety disorder, excessive and uncontrollable anxiety causes a hyperactivation in focusing on negative thoughts of others (Hezel & McNally, 2014; Nikolić et al., 2019). However, being focused on negative thoughts with a high level of anxiety pushes the individual away from the real states of the present and inhibits ToM. This leads to being unaware of things in the environment and affects consciousness, which can be defined as the basis of mindfulness.

Mindfulness has its origins in Buddhism and is related to a state of mind which is elaborated by mindfulness meditation (Husgafvel, 2016). Although its roots go back to spiritual traditions, mindfulness has been defined over the years from different perspectives in psychology (Bishop et al., 2004). Mindfulness is defined as being aware of both internal and external stimuli in the present time in general (Brown et al., 2007). Kabat-Zinn (2003) described mindfulness as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (p. 145). This awareness refers to being aware of instant physical sensations, emotional states, thoughts, and perceptions (Grossman et al., 2004). As mindfulness-based interventions have been used in applied psychology, the operational definition of mindfulness has expanded. According to the latest conceptualizations, it is defined as being aware of momentary experience with acceptance (Germer et al., 2005). These definitions show that mindfulness has a multidimensional structure.

With regard to the theoretical background and the recent definitions of mindfulness, two main components were accepted as the basis of mindfulness: (a) attention to and awareness of momently experience and (b) accepting and experiencing the present state nonjudgmentally. Actually, awareness and attention are vital functions in almost every part of life. However, in mindfulness, these terms are used as increased attention to and increased awareness of present state or momently experience.

In the literature, several tools have been developed for the purpose of assessing mindfulness, such as the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004), the Revised Cognitive Affective Mindfulness Scale (CAMS-R; Feldman et al., 2007), the Five-Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2008), the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006), and the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). When these tools are examined, it can be seen that the MAAS and the FMI are unidimensional scales. In multidimensional scales (KIMS, CAMS-R, FFMQ), the components of mindfulness, such as attention, awareness, acceptance, present-focus, and nonjudging, are evaluated. However, nonjudgment and acceptance are interrelated constructs, and because of this interrelation, some researchers have claimed that it is better to assess mindfulness unidimensionally (Walach et al., 2006). Thus, in our study, the MAAS was used to assess mindfulness. In the MAAS, mindfulness is assessed via the enhanced attention to and awareness of present states and experiences. These present states refer to being conscious of internal and external experiences such as thoughts, emotions, and physical sensations.

In the literature, there are studies in which supportive findings are found for the fact that being conscious of thoughts, emotions, and physical sensations in the present time reduces anxiety (Rodrigues et al., 2017). Freudenthaler et al. (2017) showed that mindfulness has effects on anxiety via the emotion regulation process. Furthermore, in the studies, it was shown that individuals with high levels of anxiety avoid experiencing emotions, thoughts, and sensations in the present time (Szkodny & Newman, 2013). However, this behavior reinforces the experience of anxiety much more (Roemer et al., 2005). In recent years, as mindfulness-based therapeutic interventions on anxiety symptoms have been increased, it was shown that mindfulness has a positive correlation with low levels of anxiety (Fumero et al., 2020).

In line with the literature, it can be seen that mindfulness has a positive effect on improving the cognitive skills related to ToM. Several studies have shown a positive correlation between ToM and mindfulness (Cheang et al., 2019). In addition, in many studies, the relations between anxiety, mindfulness, and ToM have been investigated (Hofmann et al., 2010); however, no study was found that examined the mediating role of mindfulness in the relation between anxiety and ToM. The mediating role is related to a mechanism that has an effect on the relationship between two variables. In mediation analysis, the causal effect of the mediator is investigated by focusing on "how" this effect can occur. In light of the findings in the literature, it can be claimed that mindfulness is a mechanism that could have a mediation role in the relationship between anxiety and ToM (Baron-Cohen & Hammer, 1997). The increase or decrease in attention to and awareness of thoughts, emotions, and sensations could affect this relationship.

Some studies have shown that anxiety disorders are seen more in women than in men (Asher & Aderka, 2018; Bilge & Bilge, 2017; Jalnapurkar et al., 2018). In a study in which an intervention program was applied for anxiety, it was found that gender has a moderating role on anxiety (Grubbs et al., 2015). For ToM, there are also supportive findings showing that gender has a moderating role. For example, Martins et al. (2019) found a statistically significant difference between girls and boys in terms of their ToM abilities.

However, there have been conflicting results about the role of gender in mindfulness (Alispahic & Hasanbegovic-Anic, 2017; De la Fuente-Anuncibay et al., 2020). For example, in a mindfulness training intervention program, it was determined that female meditators had higher improvement than did the control group (Kang et al., 2018). However, other studies have found no moderation role of gender in mindfulness (De la Fuente-Anuncibay et al., 2020; van der Gucht et al., 2017). Therefore, there is an insufficient explanation about the role of gender in the relationship between these variables (Baron-Cohen & Hammer, 1997; De la Fuente-Anuncibay et al., 2020). Studies examining the role of gender on anxiety, mindfulness, and ToM are usually done by comparing the means of women and men (Baron-Cohen & Hammer, 1997; Kaviani & Hatami, 2016). By these methods, however, the comparison based on gender could be performed only for a single variable. By applying the moderated mediation analysis, the potential influence of anxiety on ToM and on mindfulness as well as the potential influence of mindfulness on ToM could be examined and explained more specifically according to gender. In addition, by moderated mediation analysis, the role of gender in the relationship between anxiety and ToM via mindfulness can be investigated. In this regard, it can be said that one of the originalities of our study is examining the role of gender in the relationships between anxiety, ToM, and mindfulness simultaneously instead of examining this role separately.

In line with these findings, this study aimed to investigate the moderated mediation model of mindfulness and gender on the relationship between anxiety and ToM. In accordance with this purpose, four hypotheses were tested:

H1 *The scores of anxiety, ToM, and mindfulness would be differentiated according to gender. Specifically, the scores of anxiety, ToM, and mindfulness would be higher in women as compared to men.*

H2 *There would be correlations between anxiety, ToM, and mindfulness. Specifically, there would be a negative correlation between anxiety and ToM* (H2a), *there would be a negative correlation between anxiety and mindfulness* (H2b), *and there would be a positive correlation between mindfulness and ToM* (H2c).

H3 *Anxiety and mindfulness would be predictors for ToM. Specifically, higher mindfulness would predict higher ToM* (H3a), *and higher anxiety would predict lower ToM* (H3b).

H4 *Mindfulness and gender would have a moderated mediation role in the relationship between anxiety and ToM. In other words, mindfulness would mediate the effect of anxiety on ToM, and gender would moderate the direct and indirect relationships between anxiety and ToM via mindfulness.*

METHOD

Participants

The sample consisted of 323 participants, 260 (80.5%) females, 63 (19.5%) males, 18–62 years of age ($M = 32.25$, $SD = 9.94$). One hundred twenty-two participants (37.8%) were single, 189 (58.5%) were married, 9 (2.8%) were divorced, and 3 (0.9%) participants' partners were decedent. In addition, 75 participants (23.2%) were primary-school graduates, 52 (16.1%) were high-school graduates, and 196 (60.7%) were university graduates. Thirteen participants (4.00%) stated that they were getting psychological or psychiatric help. To the question of whether they needed psychological or psychiatric help, 137 (42.4%) participants answered "yes."

Measurements

Demographic information form

A demographic information form was attached on the first page of the online form, which included participants' gender, age, marital status, and educational status as well as whether the participant is getting psychological or psychiatric help and whether they need psychological or psychiatric help.

RMIE Test

The RMIE Test was developed by Baron-Cohen et al. (2001), and its Turkish adaptation was carried out by Yıldırım et al. (2011). In the original test, there are 36 questions; however, in the Turkish version, four items were eliminated because of not meeting sufficiently in the reliability study. As a result, the Turkish version consisted of 32 questions. In the test, there is one picture and four options. In the application of the test, participants were asked to mark the emotion that they felt from the eyes in the pictures. In the original study of the test, between the Reading the Mind in the Eyes Test (RMIE) and the WAIS-R (Wechsler, 1939), no correlation was found, $r = .09$, $p = .6$; a negative correlation, $r = -.53$, $p = .004$, was determined between the RMIE and the Autism Spectrum Quotient (Baron-Cohen et al., 2001). In addition, positive correlations were detected between the RMIE and the social skills category, $r = .27$, $p = .015$, and the communication category, $r = .25$, $p = .027$. In the Turkish adaptation study, the Cronbach α coefficient was .71; the retest coefficient was .65.

State-Trait Anxiety Inventory (STAI)

The STAI was developed by Spielberger et al. (1970), and a Turkish adaptation of the inventory was carried out by Öner and Le Compte (1983). In the original study, internal consistency coefficients were found between .86 and .95; test–retest

reliability coefficients were detected between .65 and .75. The correlations between the STAI-II (Spielberger et al., 1970) and Taylor's (1953) Manifest Anxiety Scale ranged from .79 to .83. In the Turkish version, reliability coefficients were between .71 and .86; the internal consistency coefficient was detected between .94 and .96. In the validity analysis, the correlation scores between the STAI-II (Spielberger et al., 1970) and the other measures of anxiety were between .52 and .80. The inventory is a 4-point Likert scale and consisted of two parts as trait and state. In this study, only the trait part of the inventory was used, which has 20 items. On the scale, the points between 20 and 39 are evaluated as a low level of anxiety, between 40 and 59 are evaluated as a medium level, and between 60 and 80 are evaluated as a high level.

MAAS

The MAAS was developed by Brown and Ryan (2003). Its Turkish adaptation study was done by Özyeşil et al. (2011). The scale is a 6-point Likert scale and has 15 items. The increase in points indicates a higher level of mindfulness. In the original study, the reliability coefficient was .82; the retest coefficient was .81. In the convergent validity of the original study, negative correlations were found between the MAAS and the NEO Personality Inventory-Neuroticism (Costa & McCrae, 1992), ranging from −.29 to −.56; a negative correlation between the MAAS and the Beck Depression Inventory (Beckham & Leber, 1985), $r = -.42$, $p < .001$, also was detected. A positive correlation, $r = .50$, $p < .001$, was determined between the MAAS and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). In the study of the Turkish version, the Cronbach α coefficient was .80, and the correlation coefficient of test–retest was determined as .83. In the study of convergent validity, a positive correlation, $r = .48$, $p < .001$, was found between the MAAS and the Self Compassion Scale (Neff, 2003). Negative correlations were detected between the MAAS and the subscales of Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995): Depression subscale: $r = -.52$, $p < .001$; Anxiety subscale, $r = -.51$, $p < .001$; Stress subscale, $r = -.47$, $p < .001$.

Procedure

Data were collected by the convenience sampling method from distinct cities in Turkey between January 5, 2021 and February 5, 2021. Because of the Covid-19 pandemic, data were collected by online data-collection tools via Google Forms. In this study, data collection was completely voluntary. The sample size was determined by statistical power analysis with a .05 significance level and testing power of 80 by using the G*power 3.1 program (Erdfelder et al., 1996) based on the statistical analysis of *t* test, correlation, and regression. As a result of the analysis, it was detected that a sample size including 134 participants was sufficient for the study. Approval for this study was received from the Ethics Committee of Istanbul Sabahattin Zaim University (Approval No. 2020/12). In the study, the informed consent form was attached to the first page of the online form, and the participants were incorporated voluntarily; they were informed that they were free to withdraw at any time. The application of the scales took approximately 10 min. Before the statistical analysis, the normality and homogeneity tests were performed. As a result, it was found that the data had a normal distribution. The independent samples *t* test was used to determine if the variables were differentiated according to gender. For the purpose of detecting the correlation between the variables, Pearson product–moment correlation analysis was applied. For the regression analysis, multivariate linear regression analysis was applied with the stepwise method. For the analysis, SPSS Version 25 was used. For mediation analysis, "Model 4" and for moderated mediation analysis "Model 59" was applied using PROCESS Version 3.5 (Hayes, 2018). The mediation analysis was done to better understand the effect of anxiety (*X*) on ToM (*Y*) and also how mindfulness (*M*) operates this effect. In the moderated mediation analysis, gender (*W*) (i.e., women or men) effects were investigated. The bootstrapping method with 5,000 samples and 95% confidence intervals was conducted. If the 95% confidence interval does not include zero, it is accepted that the effects are significant. In order to determine the moderated mediation effect of gender and mindfulness on the relationship between anxiety and ToM, low and high levels of variables were determined according to 1 *SD* below the mean and 1 *SD* above the mean. In the mediation analysis, it is aimed to investigate "how" the independent variable (*X*) influences the dependent variable (*Y*) via an intervening variable called mediator (*M*), however in the moderation analysis the goal is to investigate the conditions of the relationship between *X* and *Y* depending on the presence of a third variable called moderator (*W*) which influences the size and magnitude of the causal effect of *X* on *Y* (Hayes, 2018). In our study, ToM (*Y*) is the dependent variable, anxiety (*X*) is the independent variable, and mindfulness (*M*) is the mediator between anxiety and ToM; gender (*W*) is the moderator in the relationship between these variables. The proposed and statistical moderated mediation model is given in Figure 1.

RESULTS

Gender

To determine whether the variables in the study differentiate for gender, the independent samples *t* test was used (H1). It was found that the scores of ToM, $t(321) = 2.55$, $p = .01$, and anxiety, $t(321) = 2.03$, $p = .04$, were statistically significantly higher in women (ToM $M = 23.58$, $SD = 3.18$; anxiety $M = 46.00$; $SD = 4.88$), than men (ToM $M = 22.41$, $SD = 3.60$; anxiety $M = 44.59$, $SD = 5.21$). However, no statistically significant difference was found in the scores of mindfulness, $t(321) = -.92$, $p = .36$, between women ($M = 63.21$, $SD = 10.22$) and men ($M = 64.51$, $SD = 9.63$).

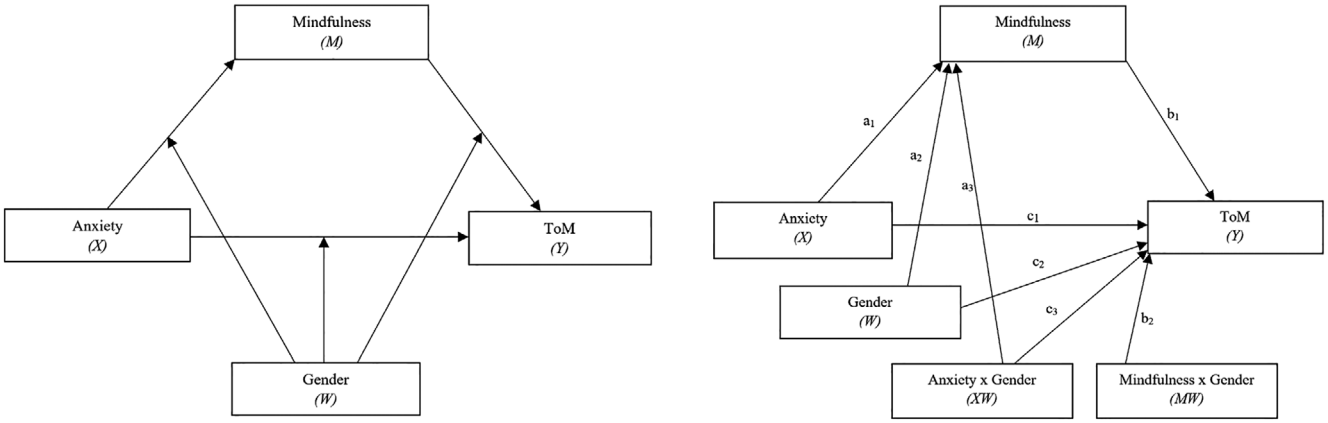

FIGURE 1 The proposed and statistical moderated mediation model. ToM, theory of mind

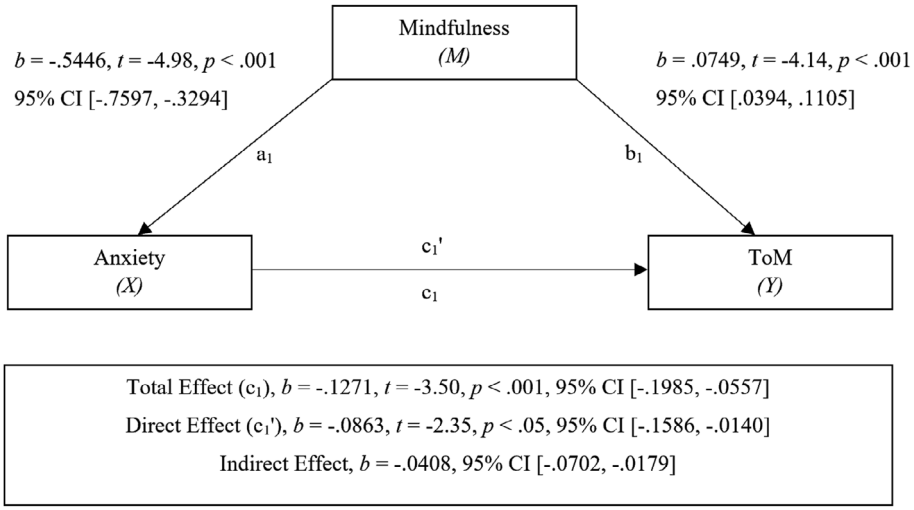

FIGURE 2 The results related to mediating role of mindfulness in the relationship between anxiety and theory of mind (ToM)

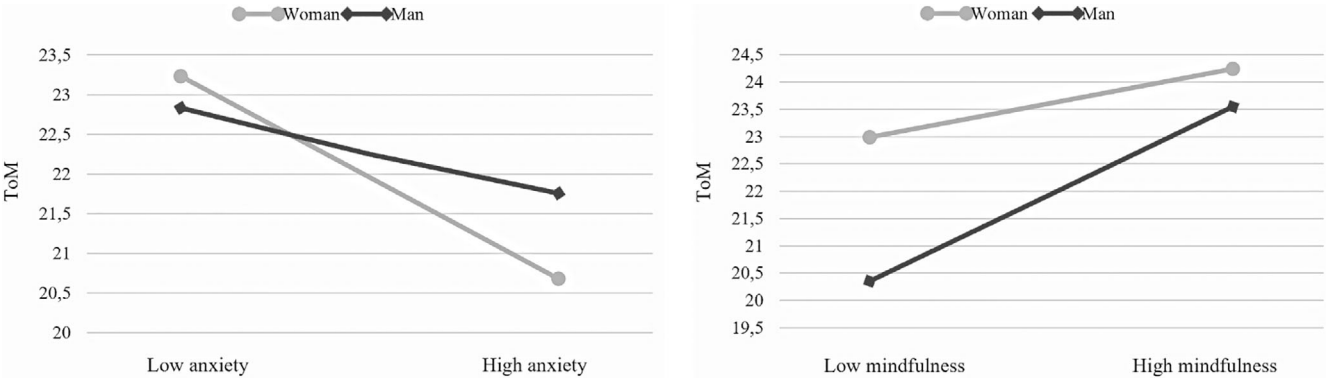

FIGURE 3 The moderating role of gender in the relationships between anxiety and theory of mind (ToM), and between mindfulness and ToM as a result of the moderated mediation analysis. It is graphed as two levels for anxiety and mindfulness: 1 *SD* above the mean and 1 *SD* below the mean

TABLE 1 Results of the moderated mediation analysis

Dependent variable			*B*	*SE*	*t*	95% CI LL	95% CI UL	*F*	R^2	*p*
ToM	Constant	i_y	23.29	.17	135.50	22.95	23.63	–	–	<.001
	Anxiety	c_1	−.10	.04	−2.69	−0.17	−0.03	–	–	.008
	Mindfulness	b_1	.08	.02	4.58	0.05	0.12	–	–	<.001
	Gender	c_2	−1.66	.44	−3.77	−2.53	−0.79	–	–	<.001
	Anxiety × Gender	c_3	−.20	.09	−2.31	−0.37	−0.03	5.32	.01	.021
	Mindfulness × Gender	b_2	.10	.05	2.12	0.01	0.19	4.50	.01	.035
MF	Constant	i_m	.08	.55	0.15	−0.99	1.16	–	–	<.001
	Anxiety	a_1	−.55	.11	−4.97	−0.76	−0.33	–	–	<.001
	Gender	a_2	.86	1.40	0.61	−1.89	3.60	–	–	.541
	Anxiety × Gender	a_3	.38	.27	1.42	−0.15	0.91	2.02	.01	.157

Abbreviations: CI, confidence interval; LL, lower limit; UL, upper limit.

Correlation analysis

In the study, to determine the correlations between the variables, Pearson product–moment correlation analysis was applied (H2). As the result of analysis, between the anxiety ($M = 45.72$, $SD = 4.97$) and ToM ($M = 23.36$, $SD = 3.30$), $r = -.20$, $p = .001$ (H2a) and also between anxiety and mindfulness ($M = 63.46$, $SD = 10.11$), $r = -.27$, $p < .001$ (H2b), statistically significant negative correlations were found. In addition, a statistically significant positive correlation was detected between ToM and mindfulness, $r = .27$, $p < .001$ (H2c).

Regression analysis

To determine the predictors of ToM and their level of prediction, multivariate linear regression analysis was applied with the stepwise method (H3). As the result of analysis, the variable which predicts ToM the most was mindfulness, $B = .09$, $SE = .02$. It was detected that mindfulness statistically significantly predicted 7% variance in ToM, $\Delta R^2 = .07$, $F(1, 321) = 24.20$, $p < .001$ (H3a). The second predictor of ToM was anxiety, $B = -.09$, $SE = .04$ (H3b). Both predictors explained a 9% variance in ToM, $\Delta R^2 = .09$, $F(1, 322) = 15.02$, $p < .001$.

Moderated mediation analysis

To determine the mediating role of mindfulness in the relationship between ToM and anxiety and also to determine the moderated mediation effect of mindfulness and gender in the relationship between anxiety and ToM (i.e., if gender would moderate the direct and indirect relationships between anxiety and ToM via mindfulness), the PROCESS Version 3.5 (Hayes, 2018) was used (H4).

It was found that mindfulness had a mediating role in the relationship between ToM and anxiety (Figure 2). In addition, in the moderated mediation analysis, it was determined that gender had a moderating role in the relations between anxiety and ToM as well as between mindfulness and ToM (Figure 3). In the moderated mediation analysis, no moderating role of gender was found in the relationship between mindfulness and anxiety (Table 1).

DISCUSSION

This study was carried out to investigate the relations between gender, ToM, anxiety, and mindfulness. for this purpose, first, an independent samples *t* test was applied to determine whether the means of these variables in the study were differentiated according to gender. It was found that the means of ToM and anxiety were statistically significantly higher in women than men. In the literature, studies have supported these same findings (Asher & Aderka, 2018; Bilge & Bilge, 2017; Jalnapurkar et al., 2018), and also that women's ToM ability is better than that of men (Baron-Cohen & Hammer, 1997). Results related to mindfulness show that there is no statistically significant difference between the scores of women and men. This result is in concurrence with the studies in which the moderation role of gender is tested and no statistically significant difference was found (de la fuente-anuncibay et al., 2020; Kaviani & Hatami, 2016). As a result, H1 is partially confirmed.

In the correlation analysis, it was determined that anxiety had a negative correlation with both ToM and mindfulness. Thus, H2a and H2b were confirmed. These findings show that with an increase in anxiety, the ability of ToM and the level of mindfulness decrease. While anxious individuals focus on negative thoughts of others about themselves, their level of anxiety increases, and then they struggle to regulate their negative emotions and move further away from the present (Brown et al., 2007). Many studies have provided evidence for the negative correlation between mindfulness and anxiety (Hofmann et al., 2010), consistent with our results. In addition, because of focusing on only negative emotions, anxious individuals

overlook others' emotions and their real intentions (Washburn et al., 2016). In this sense, it can be said that our results are in concurrence with the studies which found a negative relationship between ToM and anxiety (Öztürk et al., 2020). In the correlation analysis, H2c also was confirmed; a positive relationship between mindfulness and ToM was found. In the literature, it has been stated that mindfulness has a positive effect on cognitive flexibility and cognitive abilities (Moore & Malinowski, 2009), which are also related to ToM. Kaviani and Hatami (2016) found that a high level of mindfulness was correlated with increased ToM. In addition, in another study (Nejati et al., 2012), it has been indicated that mindfulness and ToM were the predictors of social cognitive function.

In this study, for determining the prediction level of mindfulness and anxiety on ToM, stepwise regression analysis was applied. As a result, it was seen that mindfulness predicts ToM the most, and also that anxiety predicts ToM. According to the result of the regression analysis, therefore, H3a and H3b are both confirmed. However, in our study, the explained variance of ToM was found to be low. This result could be connected to the sample size; with a larger sample, the explained variance can be found as higher. The low explained variance also can be related to sample features; in our study, no clinical sample was included. In addition to these potential reasons for the low level of variances explained, it is known that in self-report scales there is a probability that participants may give answers which are socially desired (Podsakoff et al., 2003); because of this, these measurement tools may not reflect the original features of the relationships between the variables. In this regard, using self-report questionnaires may be another reason for this weak association. According to the results of the regression analysis, it can be said that paying attention to the situation and being aware of the moment, which are the main components of mindfulness, are the predictors of an increase in ToM. Getting far away from the present usually leads to desensitization to others' emotions and thoughts. Therefore, staying in the moment makes the perception of others' intentions easier (Kaviani & Hatami, 2016). The results of the study performed by Tan et al. (2014) support these findings that mindfulness training intervention helps individuals improve their ToM ability. In addition to mindfulness, anxiety is also a predictor for ToM. In the literature, it has been shown that an increase in anxiety inhibits cognitive skills (Kertz et al., 2016). This inhibition is closely associated with ToM (Moreau et al., 2015); therefore, it can be said that increased anxiety affects the ToM abilities negatively via cognitive functions.

As a result of the analysis related to H4, it was found that mindfulness has a mediating role between anxiety and ToM. This mediation can be explained via emotion regulation and cognitive skills. In this sense, it can be said that in this mediation model, one edge is related to emotion regulation regarding anxiety whereas the other edge is related to cognitive skills regarding ToM. Campos et al. (2019) found that mindfulness has an enhancing effect on social cognition domains such as ToM, empathy, and prosocial behaviors. Many studies have provided evidence for the benefits of mindfulness on cognitive functions and cognitive flexibility (e.g., Moore & Malinowski, 2009). However, anxiety has a negative correlation with mindfulness and the mindfulness skills are inhibited as a result of increased sensitivity and intolerance to stress due to anxiety (Kertz et al., 2016). Attention distraction is the most used method to regulate increased negative emotions (Gross, 2015). This attention distraction usually leads to cognitive impairments and also to ToM deficits (Moreau et al., 2015). The results in our study provide evidence for the mediating role of mindfulness in the relationship between anxiety and ToM and are consistent with other studies (Campos et al., 2019; Moore & Malinowski, 2009; Moreau et al., 2015).

In the moderated mediation analysis, it also was found that gender has a moderating role in the direct and indirect relationships between anxiety and ToM via mindfulness. According to the results, an increase in anxiety is related to a statistically significant decrease in ToM in women as compared to men. In addition, a decrease in mindfulness has a statistically significant correlation with a decrease in ToM in men than in women. Some studies have shown that anxiety is higher in women than in men (Asher & Aderka, 2018; Bilge & Bilge, 2017; Jalnapurkar et al., 2018) and also that ToM ability is higher in women as compared to men (Baron-Cohen & Hammer, 1997). The moderating role of gender on ToM was also shown in a study in which imaging systems were used (Adenzato et al., 2017). In addition, results of the study by Martins et al. (2019) have shown a statistically significant difference between girls and boys in ToM. With reference to these studies (Asher & Aderka, 2018; Baron-Cohen & Hammer, 1997; Bilge & Bilge, 2017; Jalnapurkar et al., 2018), it can be said that ToM ability could be affected differentially by anxiety and by mindfulness due to gender, which is consistent with our results. According to our study, whereas in men increased anxiety caused a decrease in ToM, ToM abilities decreased significantly more in women due to the high levels of anxiety as compared to men. This result could be evaluated via the difference in the biological systems of women and men. It is known that hormonal activity is greater in women than men (Uhart et al., 2006), which could be connected to increased anxiety (van Veen et al., 2009). Contrary to the result related to anxiety, according to the moderated mediation analysis regarding mindfulness, it was determined that there is a statistically significant increase in ToM abilities in men as compared to women. In the moderated mediation analysis, no moderating role of gender was found in the relationship between anxiety and mindfulness. This finding is congruent with the studies by De la Fuente-Anuncibay et al. (2020) and Kaviani and Hatami (2016), in which no statistically significant differences were found according to gender in mindfulness scores. According to the results of the moderated mediation analysis, H4 is partially confirmed.

To summarize, our findings show a moderated mediation effect of mindfulness and gender in the relationship between anxiety and ToM. Specifically, it was found that gender has a moderating role in the relationship between ToM and anxiety and also between ToM and mindfulness. In our study, one limitation was the lack of a clinical sample. In the study, only a

community sample was included, and most of the participants were healthy people who had not received any psychological or psychiatric help. Therefore, for a better understanding of how anxiety and mindfulness interact to affect ToM ability, future studies could include the clinical samples. Especially in individuals with generalized anxiety disorder, unimpaired emotion recognition is commonly seen (Plana et al., 2014). In addition, it is known that anxiety disorders are one of the most common psychological disorders seen in ASDs (Hofvander et al., 2009). Spek et al. (2013) found that mindfulness-based therapy had an effect in reducing the level of anxiety and depression in adults with ASDs. In this regard, studies including individuals with ASDs may help to better understand the interaction of mindfulness and anxiety on ToM. According to our results, it can be said that mindfulness and the ability of ToM could be increased by a decrease in the level of anxiety. Another limitation of our study is that it is a correlational study. Experimental studies can be suggested for better determining the roles of mindfulness, anxiety, and gender on the cognitive functions related to ToM. Studies have found that mindfulness-based therapies have an effect in reducing anxiety and in increasing the level of ToM (e.g., Spek et al., 2013). In our study, mindfulness was evaluated via one dimension of it; however, it has a complicated construct. This also can be considered as a limitation in our study. Specifically, further studies which enable us to assess other components of mindfulness are suggested. Studying mindfulness as a multidimensional structure would allow the role of acceptance and experience the present state nonjudgmentally in the relationship between anxiety and ToM. In our study, the data were collected on an online platform due to the Covid-19 pandemic by self-report scales, which also can be seen as a limitation. In self-report scales, the participants may have an attitude to answer the questions which are socially desired (Podsakoff et al., 2003), and this potential risk may prevent seeing the original features of the variables measured in the study. In addition, the limited number of male participants is another limitation in this study because there are differences in hormonal activity related to anxiety in women and men due to biological systems (Uhart et al., 2006; van Veen et al., 2009). Therefore, further studies in which the number of females and males are balanced are recommended.

ACKNOWLEDGMENTS

We would like to thank Seyyide Şifa Göktaş for her help in data collection.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

ETHICS STATEMENT

Ethics committee approval for this study was received from the Ethics Committee of Istanbul Sabahattin Zaim University (Approval Date: December 31, 2020; Approval Number: 2020/12). In the study, the informed consent form was attached to the first page of the online form and the participants were incorporated voluntarily, and they were informed that they were free to withdraw at any time.

ORCID

Gülşah Balaban https://orcid.org/0000-0002-2412-4249
Mustafa Bilici https://orcid.org/0000-0002-7303-0396

REFERENCES

Adenzato, M., Brambilla, M., Manenti, R., De Lucia, L., Trojano, L., Garofalo, S., & Enrici, I. (2017). Gender differences in cognitive theory of mind revealed by transcranial direct current stimulation on medial prefrontal cortex. *Scientific Reports*, *7*(1), 1–9. https://doi.org/10.1038/srep41219

Alispahic, S., & Hasanbegovic-Anic, E. (2017). Mindfulness: Age and gender differences on a Bosnian sample. *Psychological Thought*, *10*(1), 155–166. https://doi.org/10.5964/psyct.v10i1.224

Asher, M., & Aderka, I. M. (2018). Gender differences in social anxiety disorder. *Journal of Clinical Psychology*, *74*(10), 1730–1741. https://doi.org/10.1002/jclp.22624

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, *11*(3), 191–206. https://doi.org/10.1177/1073191104268029

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & JMG, W. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, *15*(3), 329–342. https://doi.org/10.1177/1073191107313003

Baron-Cohen, S., & Hammer, J. (1997). Is autism an extreme form of the male brain? *Advances in Infancy Research*, *11*, 193–217.

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the Mind in the Eyes" Test revised version: A study with normal adults, and adults with Asperger's syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry*, *42*(2), 241–251. https://doi.org/10.1017/S0021963001006643

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-Spectrum quotient (AQ): Evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders*, *31*(1), 5–17. https://doi.org/10.1023/A:1005653411471

Beckham, E. E., & Leber, W. R. (1985). *Handbook of depression: Treatment, assessment, and research*. The Dorsey Press.

Bilge, Y., & Bilge, Y. (2017). The examination of the relationship between gender and socio-economic level factors with psychological disorders in adolescents in Turkey. *Global Journal of Psychology Research: New Trends and Issues*, *7*(2), 100–110. https://doi.org/10.18844/gjpr.v7i2.2576

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*(3), 230–241. https://doi.org/10.1093/clipsy.bph077

Bora, E. (2009). Theory of mind in schizophrenia spectrum disorders. *Turkish Journal of Psychiatry*, *20*(3), 269–281.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822–848. https://doi.org/10.1037/0022-3514.84.4.822

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, *18*(4), 211–237. https://doi.org/10.1080/10478400701598298

Campos, D., Modrego-Alarcón, M., López-Del-Hoyo, Y., González-Panzano, M., Van Gordon, W., Shonin, E., Navarro-Gil, M., & Garcia-Campayo, J. (2019). Exploring the role of meditation and dispositional

mindfulness on social cognition domains: A controlled study. *Frontiers in Psychology*, *10*, 809. https://doi.org/10.3389/fpsyg.2019.00809

Cheang, R., Gillions, A., & Sparkes, E. (2019). Do mindfulness-based interventions increase empathy and compassion in children and adolescents: A systematic review. *Journal of Child and Family Studies*, *28*(7), 1765–1779. https://doi.org/10.1007/s10826-019-01413-9

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO-PI-R) and NEO five-factor inventory (NEO-FFI): Professional manual*. Psychological Assessment Resources.

De la Fuente-Anuncibay, R., González-Barbadillo, Á., Ortega-Sánchez, D., & Pizarro-Ruiz, J. P. (2020). Mindfulness and empathy: Mediating factors and gender differences in a Spanish sample. *Frontiers in Psychology*, *4*(11), 1915. https://doi.org/10.3389/fpsyg.2020.01915

Erdfelder, E., Faul, F., & Buchner, A. (1996). Gpower: A general power analysis program. *Behavior Research Methods, Instruments, & Computers*, *28*(1), 1–11. https://doi.org/10.3758/BF03203630

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, *29*(3), 177–190. https://doi.org/10.1007/s10862-006-9035-8

Freudenthaler, L., Turba, J. D., & Tran, U. S. (2017). Emotion regulation mediates the associations of mindfulness on symptoms of depression and anxiety in the general population. *Mindfulness*, *8*(5), 1339–1344. https://doi.org/10.1007/s12671-017-0709-y

Fumero, A., Peñate, W., Oyanadel, C., & Porter, B. (2020). The effectiveness of mindfulness-based interventions on anxiety disorders. A systematic meta-review. *European Journal of Investigation in Health, Psychology and Education*, *10*(3), 704–719. https://doi.org/10.3390/ejihpe10030052

Germer, C. K., Siegel, R. D., & Fulton, P. R. (2005). *Mindfulness and psychotherapy*. Guilford Press.

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1–26. https://doi.org/10.1080/1047840X.2014.940781

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research*, *57*(1), 35–43. https://doi.org/10.1016/S0022-3999(03)00573-7

Grubbs, K. M., Cheney, A. M., Fortney, J. C., Edlund, C., Han, X., Dubbert, P., Sherbourne, C. D., Craske, M. G., Stein, M. B., Roy-Byrne, P. P., & Sullivan, J. G. (2015). The role of gender in moderating treatment outcome in collaborative care for anxiety. *Psychiatric Services (Washington, D.C.)*, *66*(3), 265–271. https://doi.org/10.1176/appi.ps.201400049

van der Gucht, K., Takano, K., Kuppens, P., & Raes, F. (2017). Potential moderators of the effects of a school-based mindfulness program on symptoms of depression in adolescents. *Mindfulness*, *8*(3), 797–806. https://doi.org/10.1007/s12671-016-0658-x

Harrington, L., Siegert, R. J., & McClure, J. (2005). Theory of mind in schizophrenia: A critical review. *Cognitive Neuropsychiatry*, *10*(4), 249–286. https://doi.org/10.1080/13546800444000056

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hezel, D. M., & McNally, R. J. (2014). Theory of mind impairments in social anxiety disorder. *Behavior Therapy*, *45*(4), 530–540. https://doi.org/10.1016/j.beth.2014.02.010

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *78*(2), 169–183. https://doi.org/10.1037/a0018555

Hofvander, B., Delorme, R., Chaste, P., Nydén, A., Wentz, E., Ståhlberg, O., Herbrecht, E., Stopin, A., Anckarsäter, H., Gillberg, C., Råstam, M., & Leboyer, M. (2009). Psychiatric and psychosocial problems in adults with normal-intelligence autism spectrum disorders. *BMC Psychiatry*, *9*(1), 35. https://doi.org/10.1186/1471-244X-9-35

Husgafvel, V. (2016). On the Buddhist roots of contemporary non-religious mindfulness practice: Moving beyond sectarian and essentialist approaches. *Temenos - Nordic Journal of Comparative Religion*, *52*(1), 87–126. https://doi.org/10.33356/temenos.55371

Ihnen, G. H., Penn, D. L., Corrigan, P. W., & Martin, J. (1998). Social perception and social skill in schizophrenia. *Psychiatry Research*, *80*(3), 275–286. https://doi.org/10.1016/S0165-1781(98)00079-1

Jalnapurkar, I., Allen, M., & Pigott, T. (2018). Sex differences in anxiety disorders: A review. *Journal of Psychiatry, Depression & Anxiety*, *4*, 12. https://doi.org/10.24966/PDA-0150/100011

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, *10*(2), 144–156. https://doi.org/10.1093/clipsy.bpg016

Kang, Y., Rahrig, H., Eichel, K., Niles, H. F., Rocha, T., Lepp, N. E., Gold, J., & Britton, W. B. (2018). Gender differences in response to a school-based mindfulness training intervention for early adolescents. *Journal of School Psychology*, *68*, 163–176. https://doi.org/10.1016/j.jsp.2018.03.004

Kaviani, H., & Hatami, N. (2016). Link between mindfulness and personality-related factors including empathy, theory of mind, openness, prosocial behaviour and suggestibility. *Clinical Depression*, *2*(4), 119. https://doi.org/10.4172/2572-0791.1000119

Kee, K. S., Kern, R. S., & Green, M. F. (1998). Perception of emotion and neurocognitive functioning in schizophrenia: What's the link? *Psychiatry Research*, *81*(1), 57–65. https://doi.org/10.1016/S0165-1781(98)00083-3

Kertz, S. J., Belden, A. C., Tillman, R., & Luby, J. (2016). Cognitive control deficits in shifting and inhibition in preschool age children are associated with increased depression and anxiety over 7.5 years of development. *Journal of Abnormal Child Psychology*, *44*(6), 1185–1196. https://doi.org/10.1007/s10802-015-0101-0

Kimhi, Y. (2014). Theory of mind abilities and deficits in autism spectrum disorders. *Topics in Language Disorders*, *34*(4), 329–343. https://doi.org/10.1097/TLD.0000000000000033

Lei, J., & Ventola, P. (2018). Characterising the relationship between theory of mind and anxiety in children with autism Spectrum disorder and typically developing children. *Research in Autism Spectrum Disorders*, *49*, 1–12. https://doi.org/10.1016/j.rasd.2018.01.005

Lenton-Brym, A. P., Moscovitch, D. A., Vidovic, V., Nilsen, E., & Friedman, O. (2018). Theory of mind ability in high socially anxious individuals. *Anxiety, Stress and Coping*, *31*(5), 487–499. https://doi.org/10.1080/10615806.2018.1483021

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck depression and anxiety inventories. *Behaviour Research and Therapy*, *33*(3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-u

Martins, C., Barreto, A. L., Baptista, J., Osório, A., Martins, E. C., & Verissimo, M. (2019). Relations between theory of mind and academic school readiness: The moderating role of child gender. *Merrill-Palmer Quarterly*, *65*(1), 101–120. https://doi.org/10.13110/merrpalmquar1982.65.1.0101

Moore, A., & Malinowski, P. (2009). Meditation, mindfulness and cognitive flexibility. *Consciousness and Cognition*, *18*(1), 176–186. https://doi.org/10.1016/j.concog.2008.12.008

Moreau, N., Rauzy, S., Bonnefoi, B., Renié, L., Martinez-Almoyna, L., Viallet, F., & Champagne-Lavau, M. (2015). Different patterns of theory of mind impairment in mild cognitive impairment. *Journal of Alzheimer's Disease*, *45*(2), 581–597. https://doi.org/10.3233/JAD-143021

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223–250. https://doi.org/10.1080/15298860309027

Nejati, V., Zabihzadeh, A., Nikfarjam, M. R., Pournaghdali, A., Naderi, Z., & Riyahi, M. T. (2012). Self as a social cue: Evidence for reading mind from eyes test. *Procedia Social and Behavioral Sciences*, *32*, 82–88. https://doi.org/10.1016/j.sbspro.2012.01.015

Németh, N., Mátrai, P., Hegyi, P., Czéh, B., Czopf, L., Hussain, A., Pammer, J., Szabó, I., Szabó, I., Kiss, L., Hartmann, P., Szilágyi, Á. L., Kiss, Z., & Simon, M. (2018). Theory of mind disturbances in

borderline personality disorder: A meta-analysis. *Psychiatry Research*, *270*, 143–153. https://doi.org/10.1016/j.psychres.2018.08.049

Nikolić, M., van der Storm, L., Colonnesi, C., Brummelman, E., Kan, K. J., & Bögels, S. (2019). Are socially anxious children poor or advanced mind-dreaders? *Child Development*, *90*(4), 1424–1441. https://doi.org/10.1111/cdev.13248

Öner, N., & LeCompte, A. (1983). *Durumluk-sürekli kaygı envanteri el kitabı*. Boğaziçi Üniversitesi Yayınları.

Öztürk, Y., Özyurt, G., Turan, S., Mutlu, C., Tufan, A., & Akay, A. P. (2020). Association of theory of mind and empathy abilities in adolescents with social anxiety disorder. *Current Psychology*. https://doi.org/10.1007/s12144-020-00707-2

Özyeşil, Z., Arslan, C., Kesici, Ş., & Deniz, M. E. (2011). Adaptation of the mindful attention awareness scale into Turkish. *Education and Science*, *36*(160), 224–235.

Pestana, J., Menéres, S., Gouveia, M. J., & Oliveira, R. F. (2018). The Reading the Mind in the Eyes Test: A Portuguese version of the adults test. *Analise Psicologica*, *36*(3), 369–381. https://doi.org/10.14417/ap.1305

Plana, I., Lavoie, M. A., Battaglia, M., & Achim, A. M. (2014). A meta-analysis and scoping review of social cognition performance in social phobia, posttraumatic stress disorder and other anxiety disorders. *Journal of Anxiety Disorders*, *28*(2), 169–177. https://doi.org/10.1016/j.janxdis.2013.09.005

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, *1*(4), 515–526. https://doi.org/10.1017/S0140525X00076512

Rodrigues, M. F., Nardi, A. E., & Levitan, M. (2017). Mindfulness in mood and anxiety disorders: A review of the literature. *Trends in Psychiatry and Psychotherapy*, *39*(3), 207–215. https://doi.org/10.1590/2237-6089-2016-0051

Roemer, L., Salters, K., Raffa, S. D., & Orsillo, S. M. (2005). Fear and avoidance of internal experiences in GAD: Preliminary tests of a conceptual model. *Cognitive Therapy and Research*, *29*(1), 71–88. https://doi.org/10.1007/s10608-005-1650-2

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.

Sharp, C. (2008). Theory of mind and conduct problems in children: Deficits in reading the "emotions of the eyes". *Cognition and Emotion*, *22*(6), 1149–1158. https://doi.org/10.1080/02699930701667586

Spek, A. A., van Ham, N. C., & Nyklíček, I. (2013). Mindfulness-based therapy in adults with an autism spectrum disorder: A randomized controlled trial. *Research in Developmental Disabilities*, *34*(1), 246–253. https://doi.org/10.1016/j.ridd.2012.08.009

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory*. Consulting Psychologists Press http://ubir.buffalo.edu/xmlui/handle/10477/2895

Subic-Wrana, C., Beutel, M. E., Knebel, A., & Lane, R. D. (2010). Theory of mind and emotional awareness deficits in patients with somatoform disorders. *Psychosomatic Medicine*, *72*(4), 404–411. https://doi.org/10.1097/PSY.0b013e3181d35e83

Szkodny, L. E., & Newman, M. G. (2013). Generalized anxiety disorder. In J. Smiths (Ed.), *The Wiley handbook of cognitive behavioral therapy: CBT for specific disorders* (Vol. III, 1st ed., pp. 1001–1022). Wiley-Blackwell.

Tan, L. B., Lo, B. C., & Macrae, C. N. (2014). Brief mindfulness meditation improves mental state attribution and empathizing. *PLoS One*, *9*(10), e110510. https://doi.org/10.1371/journal.pone.0110510

Taylor, J. A. (1953). A personality scale of manifest anxiety. *Journal of Abnormal Psychology*, *48*(2), 285–290. https://doi.org/10.1037/h0056264

Tottenham, N., Tanaka, J. W., Leon, A. C., McCarry, T., Nurse, M., Hare, T. A., Marcus, D. J., Westerlund, A., Casey, B. J., & Nelson, C. (2009). The NimStim set of facial expressions: Judgments from untrained research participants. *Psychiatry Research*, *168*(3), 242–249. https://doi.org/10.1016/j.psychres.2008.05.006

Uhart, M., Chong, R. Y., Oswald, L., Lin, P. I., & Wand, G. S. (2006). Gender differences in hypothalamic-pituitary-adrenal (HPA) axis reactivity. *Psychoneuroendocrinology*, *31*(5), 642–652. https://doi.org/10.1016/j.psyneuen.2006.02.003

van Veen, J. F., Jonker, B. W., van Vliet, I. M., & Zitman, F. G. (2009). The effects of female reproductive hormones in generalized social anxiety disorder. *International Journal of Psychiatry in Medicine*, *39*(3), 283–295. https://doi.org/10.2190/PM.39.3.e

Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—The Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences*, *40*(8), 1543–1555. https://doi.org/10.1016/j.paid.2005.11.025

Wang, Z. (2015). Theory of mind and children's understanding of teaching and learning during early childhood. *Cogent Education*, *2*(1), 1–10. https://doi.org/10.1080/2331186X.2015.1011973

Washburn, D., Wilson, G., Roes, M., Rnic, K., & Harkness, K. L. (2016). Theory of mind in social anxiety disorder, depression, and comorbid conditions. *Journal of Anxiety Disorders*, *37*, 71–77. https://doi.org/10.1016/j.janxdis.2015.11.004

Wechsler, D. (1939). *The measurement of adult intelligence*. Williams & Wilkins.

Yıldırım, E. A., Kaşar, M., Güdük, M., Ateş, E., Küçükparlak, İ., & Özalmete, E. O. (2011). Investigation of the reliability of the "reading the mind in the eyes test" in a Turkish population. *Turkish Journal of Psychiatry*, *22*(3), 177–186. https://doi.org/10.5080/u6500

Young, A. W., Perrett, D. I., Calder, A. J., Sprengelmeyer, R., & Ekman, P. (2002). *Facial expressions of emotion: Stimuli and tests (FEEST)*. Thames Valley Test Company.

How to cite this article: Balaban, G., & Bilici, M. (2022). Anxiety and theory of mind: A moderated mediation model of mindfulness and gender. *PsyCh Journal*, *11*(4), 510–519. https://doi.org/10.1002/pchj.536