Bilişsel Davranışçı Psikoterapi ve Araştırmalar Dergisi
Journal of Cognitive-Behavioral Psychotherapy and Research
DOI: 10.14744/JCBPR.2024.39376
J Cogn Behav Psychother Res 2025;14(1):39–51

Relationship Between Cognitive Flexibility and Psychological Symptoms: The Serial Mediating Role of Automatic Thoughts and Uncertainty intolerance

Asuman Kurt,[1] Yıldız Bilge[2]

[1]Department of Psychology, İstanbul Sabahattin Zaim University, Faculty of Humanities and Social Sciences, İstanbul, Türkiye
[2]Department of Clinical Psychology, University of Health Sciences, Hamidiye Faculty of Life Sciences, İstanbul, Türkiye

This study was produced using data from the first author's thesis.

Cite this article as:
Kurt A, Bilge Y. Relationship Between Cognitive Flexibility and Psychological Symptoms: The Serial Mediating Role of Automatic Thoughts and Uncertainty intolerance. J Cogn Behav Psychother Res 2025; 14(1): 39–51.

Address for correspondence:
Asuman Kurt.
İstanbul Sabahattin Zaim Üniversitesi, İnsan ve Toplum Bilimleri Fakültesi, Psikoloji Bölümü, İstanbul, Türkiye
Phone: +90 212 692 95 69
E-mail:
kurt.asuman96@gmail.com

Submitted: 03.04.2024
Revised: 27.09.2024
Accepted: 29.10.2024
Available Online: 26.02.2025

JCBPR, Available online at http://www.jcbpr.org/

ABSTRACT

This study examined the mediating role of automatic thoughts and intolerance of uncertainty in the relationship between cognitive flexibility and psychological symptoms. The study also determined the relationships among psychological symptoms, cognitive flexibility, automatic thoughts, and intolerance of uncertainty. The Sociodemographic Information Form, Brief Symptom Inventory, Intolerance of Uncertainty Scale, Cognitive Flexibility Inventory, and Automatic Thoughts Scale were administered to 402 participants (273 with an age range of 18–45. The results of the correlation analyses revealed significant relationships between psychological symptoms, cognitive flexibility, automatic thoughts, and intolerance of uncertainty. According to the results of the mediation analyses, the relationship between the cognitive flexibility-control subscale and each of the psychological symptoms, including somatization, OCD, depression and anxiety, as well as the loneliness/isolation subscale of automatic thoughts and intolerance of uncertainty, showed serial mediating effects. In addition, the first model explained 9% of the variance, the second model explained 26% of the variance, the third model explained 14% of the variance, and the fourth model explained 18% of the variance. In conclusion, cognitive flexibility, automatic thoughts, and intolerance of uncertainty were found to be important constructs for understanding psychopathologies. This study can contribute to the planning of the treatment processes of psychopathologies.

Keywords: Psychological symptoms, cognitive flexibility, automatic thoughts, intolerance of uncertainty.

ÖZ

Bilişsel Esneklik ve Psikolojik Belirtilerin İlişkisi: Otomatik Düşünceler ve Belirsizliğe Tahammülsüzlüğün Seri Aracı Rolü

Bu çalışmanın amacı, bilişsel esneklik ve psikolojik belirtiler arasındaki ilişkide otomatik düşünceler ve belirsizliğe tahammülsüzlüğün aracı rolünün incelenmesidir. Aynı zamanda psikolojik belirtiler, bilişsel esneklik, otomatik düşünceler ve belirsizliğe tahammülsüzlük arasındaki ilişkilerin belirlenmesi de amaçlandı. Yaş aralığı 18–45 yıl olan 402 kişiden oluşan katılımcılara Sosyodemografik Bilgi Formu, Kısa Semptom Envanteri, Belirsizliğe Tahammülsüzlük Ölçeği, Bilişsel Esneklik Envanteri ve Otomatik Düşünceler Ölçeği uygulandı. Yapılan korelasyon analizleri sonucunda psikolojik belirtiler, bilişsel esneklik, otomatik düşünceler ve belirsizliğe tahammülsüzlük arasında anlamlı ilişkiler

saptandı. Aracılık analizleri sonucuna göre oluşturulan dört modelde bilişsel esneklik kontrol alt boyutu ile somatizasyon, obsesif kompulsif bozukluk, depresyon ve anksiyete olmak üzere psikolojik belirtilerin her biri ile arasındaki ilişkide otomatik düşüncelerden yalnızlık alt boyutu ve belirsizliğe tahammülsüzlüğün seri aracı etkilerinin olduğu tespit edildi. Ayrıca sırasıyla ilk modelin varyansın %9'unu, ikinci modelin varyansın %26'sını, üçüncü modelin varyansın %14'ünü, dördüncü modelin ise varyansın %18'ini açıkladığı görüldü. Sonuç olarak, psikopatolojilerin anlaşılmasında bilişsel esneklik, otomatik düşünceler ve belirsizliğe tahammülsüzlüğün önemli yapılar olduğu görüldü. Aynı zamanda bu çalışmanın, psikopatolojilerin tedavi süreçlerinin planlanmasında da bir katkı sağlayabileceği düşünülmektedir.

Anahtar Kelimeler: Psikolojik belirtiler, bilişsel esneklik, otomatik düşünceler, belirsizliğe tahammülsüzlük.

INTRODUCTION

The factors associated with psychopathology remain a significant focus of contemporary research. The prevalence of psychological disorders is reported to be 12.5% worldwide (World Health Organization [WHO], 2023), with depression at 3.8% (WHO, 2023), anxiety disorders at 4% (WHO, 2022), obsessive-compulsive disorder (OCD) at 1%–3% (Strom et al, 2021), and somatization disorders at 5% (Chander et al, 2019). The high prevalence rates of psychological disorders have increased the interest in exploring concepts related to these disorders and have led to a substantial body of research examining associated variables. Early life experiences, developmental characteristics, and structural traits are among the concepts frequently emphasized in the literature on psychopathologies (Fonagy, 2003). Additionally, some studies have focused on intermediary concepts that serve as a mediator in psychopathologies. For instance, automatic thoughts, a key cognitive construct, mediate the relationship between irrational beliefs and the development of depression (Buschmann et al, 2018).

A concept addressed in this study, which is believed to be associated with psychological symptoms, is cognitive flexibility. Cognitive flexibility refers to the ability to adopt different perspectives, adapt flexibly, focus attention, and respond to conflicting situations (Diamond, 2006); generate responses from various perspectives (Takeuchi et al, 2010); think synchronously about multiple and complex situations (Jacques & Zelazo, 2005); and develop behavioral perspectives by changing environmental demands (Garcia-Garcia et al, 2010). In previous studies, cognitive flexibility has been found to be associated with obsessive-compulsive disorder (OCD), panic disorder (Chamberlain et al, 2006; Oguz et al, 2019), generalized anxiety disorder (Lee & Orsillo, 2014; Stevens et al, 2018), depression, social anxiety disorder, post-traumatic stress disorder, eating disorders (Clarke & Kiropoulos, 2021; Yu et al, 2020), and various psychological symptoms (İnözü et al, 2023). In addition, cognitive flexibility has been linked not only to psychological disorders but also to intolerance of uncertainty (Barkale Şahin, 2022; Demirtas & Yildiz, 2019; Güvenç, 2019). Moreover, one study identified cognitive flexibility as a moderating factor in the relationship between intolerance of uncertainty and psychological symptoms (İnözü et al, 2023).

Another variable in this study, intolerance of uncertainty, is characterized by anxiety or fear arising from situations perceived as intense and unknown (Fergus, 2013). Intolerance of uncertainty has been identified as being associated with anxiety and related symptoms (Bijsterbosch et al, 2020; Stevens et al, 2018; Ren et al, 2020), depressive symptoms (Gentes & Ruscio, 2011; Kardaş, 2021), and obsessive-compulsive symptoms (Hillman et al, 2022), as well as a range of other psychological disorders (Smith et al, 2019; Sun et al, 2022). Additionally, intolerance of uncertainty is defined as the tendency to react negatively to uncertain situations (Ladouceur et al, 2000) and as the tendency to have excessive negative thoughts about low-probability events (Dugas et al, 2001). Intolerance to uncertainty is examined in two dimensions: prospective intolerance to uncertainty and inhibitory intolerance to uncertainty (Birrell et al, 2011). The cognitive component, prospective intolerance of uncertainty, reflects a strong desire to predict future events (Einstein, 2014) and is more strongly associated with symptoms of generalized anxiety disorder and OCD. The behavioral component, inhibitory intolerance of uncertainty, is characterized by behavioral inhibition driven by feelings of uncertainty, particularly when individuals need to take action (Einstein, 2014). This dimension is more strongly associated with negative problem-solving orientations (Groves et al, 2020) and disorders such as panic disorder, agoraphobia, social anxiety (Stevens et al, 2018), and depression (McEvoy & Mahoney, 2012). As a predisposition to anxiety, intolerance of uncertainty has been more frequently studied in relation to anxiety and related disorders than other psychopathologies (Bijsterbosch et al, 2020; Kardaş,

2021; McEvoy & Mahoney, 2012; Ren et al, 2020; Stevens et al, 2018). Many studies have suggested that the tendency to avoid uncertainty and ambiguous situations may play a central role in the development and maintenance of anxiety and other psychopathologies (Carleton et al, 2010; Riskind et al, 2007; Yook et al, 2010) and act as a factor that amplifies maladaptive thoughts (Gentes & Ruscio, 2011).

Another variable in the study, automatic thoughts, is defined as rapid, superficial thoughts triggered by stimuli. These thoughts are typically unnoticed unless carefully examined, not chosen by the individual, and often illogical (Rice, 2015). Research in the literature has identified positive relationships between automatic thoughts and anxiety and depression (Calvete & Conner-Smith, 2005; Gündüz & Gündoğmuş, 2019). Automatic thoughts can explain depression, negative self-perceptions, somatization, and overall psychological symptoms (Şahin & Yaka, 2010; Gamsız & Aypay, 2018). Some studies have also indicated that automatic thoughts explain intolerance to uncertainty (Parmaksız, 2021) and that these two variables are interrelated (Mantzios et al, 2015). For instance, irrational beliefs and psychological symptoms have been found to explain cognitive flexibility (Gündüz, 2013), and performance-related irrational beliefs mediate the relationship between intolerance of uncertainty and mental well-being (Koop & Jooste, 2023). Individuals with low cognitive flexibility were found to have less effective skills in cognitive restructuring, which involves identifying and addressing automatic thoughts, compared to those with high cognitive flexibility (Johnco et al, 2014). A study on older adults revealed that poor cognitive flexibility skills, especially perseverative thinking styles, negatively impact the cognitive restructuring process (Johnco et al, 2013). Individuals with OCD and panic disorder have been found to exhibit higher scores on dysfunctional metacognitive beliefs, such as uncontrollability, danger, and the need to control thoughts, and lower cognitive flexibility scores than those without these disorders (Oguz et al, 2019). A study on individuals diagnosed with OCD found that those with high obsessive beliefs, particularly intrusive thoughts, had lower levels of cognitive flexibility (Şahin et al, 2018). Similarly, a study on young adults revealed a negative relationship between irrational beliefs about romantic relationships and cognitive flexibility (Low & Simpson, 2012).

In light of the existing literature, this study seeks to create a model that examines the interrelationships among these concepts. This model aims to identify whether constructs such as automatic thoughts and intolerance of uncertainty play a mediating role in the relationship between cognitive flexibility and psychological symptoms. Therefore, this study investigates the relationships among psychological symptoms, cognitive flexibility, automatic thoughts, and intolerance of uncertainty and explores the serial mediating effect of automatic thoughts and intolerance of uncertainty on the link between cognitive flexibility and psychological symptoms.

METHODS

Participants

The study sample consisted of 402 individuals aged between 18 and 45 years (M=29, SD=8.73), including 273 females (67.9%) and 129 males (32.1%). Although the study primarily included a community sample, the majority were university students. Among the participants, 6 (1.5%) had primary education, 10 (2.5%) had middle school education, 65 (16.2%) had high school education, and 321 (79.9%) had university or higher education. In terms of marital status, 158 (39.3%) participants were married, 239 (59.5%) were single, and 5 (1.2%) were divorced. Regarding income levels, 83 (20.6%) respondents reported low income, 302 (75.1%) reported medium income, and 17 (4.2%) reported high income.

Data Collection Instruments Sociodemographic Information

The researchers developed a form to gather information on the participants' gender, age, marital status, educational background, and income level.

Brief Symptom Inventory (BSI)

Developed by Derogatis (1993), the 53-item BSI assesses nine subscales: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism, along with three global indices of distress. It uses a 5-point Likert scale, with higher scores indicating more severe psychological symptoms. The Turkish adaptation by Şahin and Durak (1994) demonstrated internal consistency coefficients ranging from 0.63 to 0.86 across the four studies. However, these studies identified a five-factor structure in the Turkish version, which differed from the original scale: anxiety, depression, negative self, somatization, and hostility.

Cognitive Flexibility Inventory (CFI)

Developed by Dennis and Vander Wal (2010) and adapted into Turkish by Gülüm and Dağ (2012), the CFI measures cognitive flexibility. The study consists of 20 items and two subscales: Alternatives and Control, using a 5-point Likert scale. Higher scores indicate greater cognitive flexibility. The internal consistency coefficients were reported as 0.90 for the total scale, 0.89 for the Alternatives subscale, and 0.85 for the Control subscale. The item-total correlation coefficients ranged from 0.31 to 0.89, and the test-retest reliability coefficients ranged from 0.22 to 0.81.

Automatic Thoughts Questionnaire (ATQ)

Developed by Hollon and Kendall (1980) and adapted into Turkish by Şahin and Şahin (1992), the ATQ assesses automatic thoughts. The study comprises 30 items with five subscales: negative self-concept, confusion and escape fantasies, personal maladjustment and desire for change, loneliness/isolation, and giving up/hopelessness, rated on a 5-point Likert scale. Higher scores indicate a greater frequency of automatic thoughts. The Turkish adaptation demonstrated a split-half reliability coefficient of 0.91, an internal consistency coefficient of 0.93, and a test-retest reliability coefficient of 0.77.

Intolerance to Uncertainty Scale (IUS-12)

The short form of the IUS, developed by Carleton, Norton, and Asmundson (2007) and adapted into Turkish by Sarıçam, Erguvan, Akın, and Akça (2014), consists of 12 items with two subscales: prospective anxiety and inhibitory anxiety, rated on a 5-point Likert scale. Higher scores indicate greater intolerance to uncertainty. The factor loadings ranged from 0.55 to 0.87, and the internal consistency coefficient was reported as 0.88.

Procedure

Ethical approval for this study was obtained from Istanbul Sabahattin Zaim University on January 28, 2022 (Ethics Committee Approval No: 2022/01). Using Google Forms, data were collected via an online survey. Non-probability sampling methods, including convenience and snowball sampling, were used to distribute the survey. Participants provided informed consent by marking a checkbox after reading an explanation of the study's purpose. Data collection occurred between January 28, 2022 and February 15, 2022, with survey completion requiring approximately 15–20 min.

This study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical Analysis

The initial analyses assessed the skewness and kurtosis values to determine the normality of the data distribution. As the data exhibited a normal distribution, parametric tests were used for the statistical analyses. Pearson's correlation coefficient was applied to analyze the relationships among the continuous variables. The mediation analysis was conducted using Hayes' (2013) Process Macro v3 extension. All analyses were performed using SPSS v25.

RESULTS

Correlation Analysis Results

The relationships among cognitive flexibility, automatic thoughts, intolerance of uncertainty, and psychological symptoms were analyzed using Pearson's correlation coefficient. Negative, moderate, and weak correlations (ranging from -0.51 to -0.27, $p<0.01$) were identified between CF-Control and all variables. Weak negative correlations (ranging from -0.13, $p<0.001$ to -0.15, $p<0.01$) were identified between CF-Alternatives and specific subscales of the ATQ (Hopelessness, Confusion and Escape Fantasies, Negative self-concept) and the BSI (OCD, Interpersonal Sensitivity, Anxiety, Hostility, and Phobic Anxiety). Additionally, a strong positive correlation ($r=0.80$, $p<0.01$) was observed between BSI-Depression and ATQ-Total, along with high positive correlations (ranging from 0.51 to 0.67, $p<0.10$) between BSI-Depression and other ATQ subscales. The relationships between other variables were moderate in strength or weak in strength and positive in direction. Positive, moderate, and weak correlations (ranging from 0.28 to 0.58, $p<0.10$) were found between IUS-Total and the other variables (Table 1).

Serial Multiple Mediation Analysis Results

The Serial multiple mediation analyses were conducted using Model 6 from Hayes' (2013) PROCESS macro, considering the correlations among the study's primary variables. Among the nine psychological symptom clusters in the Brief Symptom Inventory, four models yielded significant results: somatization, depression, OCD, and anxiety. These four models examined the mediating roles of automatic thoughts related to loneliness/isolation and intolerance of uncertainty in the relationship between cognitive flexibility and these psychological symptoms.

In all four models, common pathways a_1, a_2 ve d_{21} revealed the following findings: The direct effects (a_1 ve a_2) of the independent variable, cognitive flexibility-control (CF-Control), on the mediators (automatic thoughts of loneliness/isolation and intolerance of uncertainty) were significant:

- For automatic thoughts of loneliness/isolation (b=-0.28, SE=0.03, t=-8.39, $p<0.001$, 95% CI [-0.3476, -0.2156])
- For intolerance of uncertainty (b=-0.47, SE=0.09, t=-5.13, $p<0.001$, 95% CI [-0.6557, -0.2925])

Similarly, the direct effect of the first mediator (automatic thoughts of loneliness/isolation) on the second mediator (intolerance of uncertainty) was significant as well (d_{21}) (b=1.07, SE=0.13, t=8.46, $p<0.001$, 95% CI [0.8237, 1.3226]).

Somatization Model

In the first model (Fig. 1), the direct effect of automatic thoughts of loneliness/isolation on somatization was significant (b=0.57, SE=0.06, t=8.88, $p<0.001$, 95% CI [0.3472, 0.5527]). The direct effect of intolerance of uncertainty on somatization was not significant (b=0.01, SE=0.02, t=0.20,

Table 1. Correlations between cognitive flexibility, intolerance of uncertainty, automatic thoughts, and psychological symptoms

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	1	0.41**	0.81**	-0.027**	-0.45**	-0.39**	-0.37**	-0.39**	-0.33**	-0.36**	-0.43**	-0.42**	-0.30**	-0.51**	-0.44**	-0.38**	-0.43**	-0.24**	-0.31**	-030**	-0.31**
2		1	0.73**	0.01	-0.08	-0.04	-0.13*	-0.07	-0.10	-0.13**	-0.17**	-0.15**	-0.043	-0.12**	-0.12*	-0.08	-0.13*	-0.15**	-0.10*	-0.02	-0.05
3			1	-0.15**	-0.30**	-0.24**	-0.28**	-0.26**	-0.25**	-0.28**	-0.35**	-0.32**	-0.19**	-0.36**	-0.33**	-0.26**	-0.32**	-0.23**	-0.24**	-0.18**	-0.20**
4				1	0.71**	0.93**	0.38**	0.43**	0.44**	0.39**	0.31**	0.41**	0.21**	0.38**	0.41**	0.38**	0.37**	0.40**	0.33**	0.48**	0.38**
5					1	0.92**	0.46**	0.46**	0.48**	0.43**	0.44**	0.48**	0.30**	0.47**	0.47**	0.42**	0.40**	0.29**	0.35**	0.39**	0.38**
6						1	0.45**	0.48**	0.50**	0.44**	0.40**	0.48**	0.28**	0.46**	0.48**	0.44**	0.42**	0.38**	0.37**	0.47**	0.41**
7							1	0.84**	0.80**	0.84**	0.82**	0.91**	0.48**	0.51**	0.58**	0.75**	0.59**	0.47**	0.51**	0.54**	0.59**
8								1	0.81**	0.85**	0.83**	0.92**	0.50**	0.57**	0.65**	0.78**	0.61**	0.50**	0.55**	0.65**	0.66**
9									1	0.82**	0.75**	0.87**	0.46**	0.54**	0.57**	0.74**	0.53**	0.50**	0.45**	0.58**	0.60**
10										1	0.86**	0.95**	0.49**	0.55**	0.62**	0.77**	0.62**	0.51**	0.49**	0.61**	0.64**
11											1	0.95**	0.48**	0.56**	0.63**	0.72**	0.60**	0.44**	0.48**	0.57**	0.62**
12												1	0.52**	0.60**	0.66**	0.80**	0.64**	0.51**	0.54**	0.61**	0.67**
13													1	0.59**	0.51**	0.53**	0.71**	0.47**	0.60**	0.49**	0.55**
14														1	0.66**	0.66**	0.68**	0.54**	0.60**	0.59**	0.64**
15															1	0.72**	0.69**	0.51**	0.56**	0.64**	0.66**
16																1	0.70**	0.59**	0.56**	0.66**	0.76**
17																	1	0.66**	0.69**	0.64**	0.69**
18																		1	0.58**	0.62**	0.61**
19																			1	0.52**	0.68**
20																				1	0.66**
21																					1

*: P<0.05; **: P<0.01; 1: CFI-Control; 2: CFI-Alternatives; 3: CFI-Total; 4: IUS-Prospective anxiety; 5: IUS-Inhibitory anxiety; 6: IUS-Total; 7: ATQ-Giving up and helplessness; 8: ATQ-Loneliness/isolation; 9: ATQ-Personal maladjustment and desire for change; 10: ATQ: Confusion/escape fantasies; 11: ATQ-Negative self concept; 12: ATQ-Total; 13: BSI-Somatization; 14: BSI-Obsessive-compulsivity; 15: BSI-Interpersonal sensitivity; 16: BSI-Depression; 17: BSI-Anxiety; 18: BSI-Hostility; 19: BSI-Phobic anxiety; 20: BSI-Paranoid ideation; 21: BSI-Psychoticism.

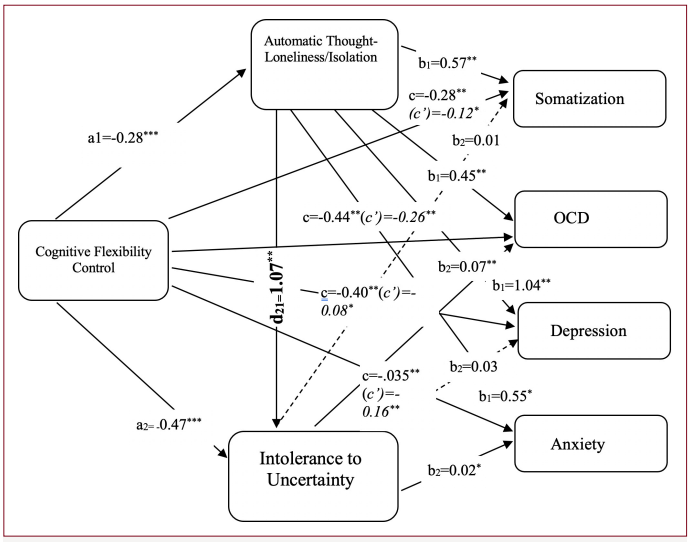

Figure 1. Serial Multiple Mediation Effects of Automatic Thoughts-Loneliness/Isolation and Intolerance of Uncertainty in the Relationship Between Cognitive Flexibility-Control and Somatization, OCD, Depression, and Anxiety.

p>0.05, 95% CI [-0.0413, 0.0504]). The total effect of CF-Control on somatization (c) was significant (b=-0.28, SE=0.04, t=-6.34, p<0.001, 95% CI [-0.1927, -0.3023]), and the direct effect (c') remained significant after controlling for the mediators (b=-0.12, SE=0.04, t=-2.60, p<0.01, 95% CI [-0.2027, -0.0280]), indicating partial mediation.

The model-explaining 9% of the variance is statistically significant (F(1.400)=40.22, p<0.001). The total indirect effect tested in the serial mediation model (point estimate =-0.16 and 95% BCa CI [-0.2300, -0.1032]) was evaluated using a 10,000-iteration bootstrap sampling procedure, and the results are summarized in Table 2.

OCD Model

In the second model (Fig. 1), both mediators, automatic thoughts of loneliness/isolation (b=0.45, SE=0.05, t=8.61, p<0.001, 95% CI [0.3472, 0.5527]) and intolerance of uncertainty (b=0.07, SE=0.02, t=3.64, p<0.001, 95% CI [0.0318, 0.1065]), had significant effects on OCD. The total effect of CF-Control on OCD (c) was significant (b=-0.44, SE=0.04, t=-11.75, p<0.001, 95% CI [-0.5102, -0.3640]), and the direct effect (c') remained significant after controlling for the mediators (b =-0.26, SE=0.04, t=-7.10, p<0.001, 95% CI [-0.3278, -0.2975]), indicating partial mediation.

The model explained 26% of the variance in OCD (F(1.400)=138.10, p<0.001). Finally, the model explaining 26% of the variance was statistically significant (F(1.400)=138.10, p<0.001). The total indirect effect tested in the serial mediation model (point estimate=-0.18 and 95% BCa CI [-0.2378, -0.1299]) was evaluated using a bootstrap sampling procedure with 10.000 iterations, and the results are presented in Table 2.

Depression Model

In the third model (Fig. 1), the effect of automatic thoughts of loneliness/isolation on depression was significant (b=1.04, SE=0.05, t=19.67, p<0.001, 95% CI [0.9383, 1.1467]). The effect of intolerance of uncertainty on depression was not significant (b=0.03, SE=0.02, t=1.64, p>0.05, 95% CI [-0.0062, 0.0695]). The total effect of CF-Control on depression (c) was significant (b=-0.40, SE=0.05, t=-8.12, p<0.001, 95% CI [-0.4923, -0.3004]), and the direct effect (c') remained significant after controlling for the mediators (b=-0.08, SE=0.04, t=-2.13, p<0.05, 95% CI [-0.1504, -0.0061]), indicating partial mediation. Finally, the model, explaining 14% of the variance is statistically significant (F(1.400)=65.94, p<0.001). The total indirect effect tested in the serial mediation model (point estimate=-0.32 and 95% BCa CI [-0.3978, -0.2389]) was evaluated using a bootstrap sampling procedure with 10,000 iterations, and the results are summarized in Table 2.

Anxiety Model

In the fourth model (Fig. 1), both mediators, automatic thoughts of loneliness/isolation (b=0.55, SE=0.05, t=10.81, p<0.001, 95% CI [0.4472, 0.6461]) and intolerance of uncertainty (b=0.02, SE=0.02, t=2.39, p<0.05, 95% CI [0.0079, 0.0801]), had significant effects on anxiety. The total effect of CF-Control on anxiety (c) was significant (b=-0.35, SE=0.04, t=-9.46, p<0.001, 95% CI [-0.4253, -0.2790]), and the direct effect (c') remained significant after controlling for the mediators (b=-0.16, SE=0.04, t=-4.60, p<0.001, 95% CI [-0.2329, -0.0952]), indicating partial mediation. Finally, the model, explaining 18% of the variance is statistically significant (F(1.400)=89.55, p<0.001). The total indirect effect tested in the serial mediation model (point estimate=-0.19 and 95% BCa CI [-0.2455, -0.1348]) was evaluated using a bootstrap sampling procedure with 10.000 iterations, and the results are summarized in Table 2.

DISCUSSION AND CONCLUSION

This study examined the relationships among cognitive flexibility, automatic thoughts, intolerance of uncertainty, and psychological symptoms and investigated the serial mediating role of automatic thoughts and intolerance of uncertainty in this relationship through models that conceptualize these variables as interconnected.

When examining the relationships between the variables in the study, we found that the Cognitive Flexibility-Control subscale was negatively related to all the psychological symptoms. The

Table 2. Point estimates and confidence intervals for indirect effects on somatization, OCD, depression, and anxiety

	Product of coefficients		%95 CI	
Effects	**Point estimate**	**SE**	**Low**	**High**
Somatization				
Total indirect effect ($c - c'$)	-0.16	0.03	-0.23	-0.10
CF-C → AT-L/I → BSI-S (a_1b_1)	-0.16	0.03	-0.21	-0.11
CF-C → BT → BSI -S (a_2b_2)	-0.002	0.01	-0.03	0.02
CF-C → AT-L/I → IU → BSI-S ($a_1d2_1b_2$)	-0.001	0.01	-0.02	0.01
OCD				
Total indirect effect ($c - c'$)	-0.18	0.03	-0.24	-0.13
CF-C → AT-L/I → BSI -OCD (a_1b_1)	-0.13	0.02	-0.18	-0.09
CF-C → IU → BSI -OCD (a_2b_2)	-0.03	0.01	-0.06	-0.01
CF-C → AT-L/I → IU → BSI -OCD ($a_1d_{21}b_2$)	-0.02	0.01	-0.04	-0.01
Depression				
Total indirect effect ($c - c'$)	-0.32	0.04	-0.40	-0.24
CF-C → AT-L/I → BSI -D (a_1b_1)	-0.29	0.04	-0.37	-0.22
CF-C → IU → BSI-D (a_2b_2)	-0.02	0.01	-0.04	0.00
CF-C → AT-L/I → IU → BSI -D ($a_1d_{21}b_2$)	-0.01	0.01	-0.02	0.00
Anxiety				
Total indirect effect ($c - c'$)	-0.19	0.03	-0.25	-0.13
CF-C → AT-L/I → BSI -A (a_1b_1)	-0.15	0.03	-0.20	-0.11
CF-C → IU → BSI -A (a_2b_2)	-0.02	0.01	-0.05	-0.00
CF-C → AT-L/I → IU → BSI -A ($a_1d_{21}b_2$)	-0.01	0.01	-0.03	-0.00

CI: Confidence interval; SE: Standard error; CF-C: Cognitive flexibility control subscale; AT-L/I: Automatic thought-loneliness/Isolation subscale; IU: Intolerance of uncertainty; BSI-S: Brief symptom somatizational bout; BSI-OCD: Brief symptom inventory obsessive compulsive disorder subscale; BSI-D: Brief symptom inventory depression subscale; BSI-A: Brief symptom inventory anxiety subscale.

findings related to cognitive flexibility, defined as the ability to perceive difficult situations as controllable, evaluate possible alternatives in challenging situations, and generate solutions to these difficulties (Gülüm & Dağ, 2012), were consistent with the literature (Stevens et al, 2018; Yu et al, 2020). Thus, the finding that low cognitive flexibility is associated with psychological symptoms is supported by the results of the current study. Another noteworthy finding in the correlation analysis was that Automatic Thoughts subscale scores and total scores had a moderate to strong positive relationship with SBI-Depression and a moderate to high positive relationship with all psychological symptom scores. Numerous studies in the literature support these findings (Buschmann et al, 2018; Calvete & Connor-Smith, 2005; Gündüz & Gündoğmuş, 2019; Hjemdal et al, 2013; Turner et al, 2019). These results also align with the emphasis on cognitive distortions in anxiety and depression, as outlined in cognitive behavioral theory (Beck, 1979). In addition, the subscale scores of Automatic Thoughts were positively related, although at moderate to weak levels, to all subscales of Cognitive Flexibility. These results were consistent with findings from the literature (Chamberlain et al, 2006; Oguz et al, 2019; Lee & Orsillo, 2014; Stevens et al, 2018; Yu et al, 2020; Clarke & Kiropoulos, 2021; İnözü et al, 2023). Therefore, decreased cognitive flexibility, along with increased automatic thoughts and intolerance of uncertainty, are interrelated. Based on the findings presented thus far and considering the existing literature, various significant relationships were identified between the variables in this study, resulting in the construction of models that address these relationships.

In line with the primary objective of this study, the serial mediating role of automatic thoughts (loneliness/isolation subscale) and intolerance of uncertainty in the relationship

between cognitive flexibility-control and psychological symptoms such as somatization, OCD, depression and anxiety was examined. According to the mediation model for somatization, automatic thoughts (loneliness/isolation subscale) and intolerance of uncertainty partially mediate the relationship between cognitive flexibility (control) and somatization. Thus, it was found that a decrease in cognitive flexibility, especially in the control subscale, which is defined as the tendency to perceive difficult situations as controllable (Dennis & Vander Wall, 2010), increases automatic thoughts related to loneliness/isolation and intolerance of uncertainty, which together contribute to higher somatization scores. Although no study in the literature directly examines all variables together, research on related topics shows that loneliness/isolation levels and automatic thoughts in young people with a history of substance abuse are significantly associated with higher levels of anxiety, depression, negative self-concept, and somatization (Gamsız & Aypay, 2018). In Gündüz's (2013) also observed that irrational beliefs and psychological symptoms explain cognitive flexibility. Moreover, a negative relationship between cognitive flexibility and somatic symptoms was observed in older women with lower educational levels (Swartz et al, 1989). Bailey and Henry's (2007) found that negative affectivity had a positive mediating effect on the relationship between difficulty identifying emotions and somatization, while fantasy proneness and imagination had a negative mediating effect. Furthermore, a study found that difficulties in identifying emotions mediated the relationship between somatization and quality of life related to mental health (Lanzara et al, 2020). A lack of cognitive flexibility, which enables individuals to perceive difficult situations as controllable, may contribute to feelings of loneliness/isolation and helplessness. If these uncomfortable thoughts and emotions remain unexpressed or undefined, they may manifest as somatic symptoms.

In the mediation model for OCD, automatic thoughts (loneliness/isolation subscale) and intolerance of uncertainty partially mediate the relationship between cognitive flexibility (control) and OCD symptoms. Thus, as cognitive flexibility in the control dimension decreases, automatic thoughts (loneliness/isolation) and intolerance of uncertainty increase, which exacerbate OCD symptoms. Related studies show that individuals diagnosed with OCD and panic disorder had lower cognitive flexibility than the control group (Oguz et al, 2019). A previous study found that high intolerance to uncertainty plays a role in the development of generalized anxiety disorder, social anxiety disorder, and OCD (Boelen & Reijntje, 2009). Another study found that automatic thoughts related to loneliness/isolation were positively associated with obsessive beliefs and perfectionism, and such beliefs were explained by automatic thoughts (Bozdoğan, 2022). A study on patients diagnosed with reactive and autogenic OCD discovered that the subscale of automatic thoughts related to loneliness/isolation was significantly higher in the autogenic group (Keleş Altun, 2015). Furthermore, although different from the model established in the current study, Eriş (2017) found that automatic thoughts and irrational beliefs partially mediated the relationship between obsessive-compulsive symptoms and depression. The attempts of patients with OCD to control intrusive thoughts and their environment are at odds with cognitive flexibility, which involves generating multiple and alternative solutions in complex situations (Jacques & Zelazo, 2005). Additionally, the Obsessive-Compulsive Disorder Working Group suggested that intolerance of uncertainty is a structural subscale of OCD. Perceived threats and worries about uncertainty can reduce an individual's capacity to generate broad behavioral perspectives and use cognitive flexibility, thereby contributing to OCD symptoms (Lee & Orsillo, 2014; Stevens et al, 2018).

For depression, the mediation model indicated that decreases in cognitive flexibility in the control dimension were associated with increased automatic thoughts (loneliness/isolation) and intolerance of uncertainty, which in turn contributed to higher levels of depressive symptoms. Related studies in the literature have suggested that cognitive flexibility is negatively related to both intolerance to uncertainty (Yıldız & Eldeleklioğlu, 2021; Demirtas & Yildiz, 2019) and automatic thoughts. Therefore, weaknesses in cognitive flexibility, a component of executive function that allows adaptive behavior in response to changing situations (Gilbert & Burgess, 2008), can contribute to difficulties in producing contradictory evidence against negative automatic thoughts and interpreting situations more flexibly and rationally. Cognitive behavioral theorists suggest that depressed individuals exhibit rigid thinking (Young et al, 2021) and tend to engage in all-or-nothing thinking, which leads them to accept maladaptive beliefs that eventually become automatic and perpetuate depression (Moore, 1996).

The relationships observed in the depression model of this study are consistent with those found in the literature, although no study has examined the exact combination of variables in this context. Nevertheless, some mediation models involve some of the variables discussed. For example, Chen et al. (2021) found that higher levels of anxiety and depression were associated with lower levels of cognitive flexibility, and negative metacognitive beliefs mediated the relationship between intolerance to uncertainty and depression. Studies have also identified the mediating role of cognitive flexibility (İnözü et al, 2023) and negative metacognitions and expectations (Durak Batıgün & Şenkal Ertürk, 2023) in the relationship between intolerance to uncertainty and psychological symptoms.

Additionally, in a study examining childhood abuse and depression in adulthood, negative automatic thoughts were found to mediate the relationship (Hou et al, 2021).

In the anxiety mediation model, automatic thoughts (loneliness/isolation) and intolerance of uncertainty partially mediate the relationship between cognitive flexibility (control subscale) and anxiety. Several studies support the findings of the present research, such as those indicating higher levels of intolerance of uncertainty in individuals with social anxiety disorder compared to controls (Stevens et al, 2018), and a study examining students in high school, where automatic thoughts related to loneliness/isolation were found to be related to social anxiety (Daş, 2022). In another study, intolerance of uncertainty was found to fully mediate the relationship between COVID-19 fear and anxiety (Kardaş, 2021). Furthermore, cognitive flexibility was shown to mediate the relationship between intolerance to uncertainty and safety signal-seeking behaviors in a patient with panic disorder (Lieberman et al, 2016). A rigid and inflexible cognitive structure may cause individuals to perceive themselves as weak, lacking resources and external support, and feeling lonely and helpless, which can lead to a catastrophic view of unsolved problems and uncertain situations. This finding is in line with Clark and Beck's (2010) emphasis on the nature of cognitive structures in the formation of anxiety.

To summarize, weaknesses in cognitive flexibility can negatively impact an individual's ability to assess situations flexibly and generate responses (İnözü et al, 2023), potentially leading to difficulties in problem-solving (Bilalić et al, 2008). In addition, poor cognitive flexibility can lead to challenges in evaluating and recalling events accurately (Barkale Şahin, 2022), as well as disruptions in assessing reality and interpreting situations rationally (Barkale Şahin, 2022). It may also result in individuals responding to external situations through assimilation, leading to more rigid and narrow reactions (Piaget, 1970) than adjusting functionally and realistically through accommodation. Similarly, intolerance to uncertainty can significantly impact individuals by prolonging anxiety, making it difficult to transition between tasks (Steven et al, 2018), and is often characterized by anxiety and fear (Fergus, 2013). Perceived threats, such as anxiety and fear, can impair individuals' response capacities (Robinson et al, 2013), leading to more limited behavioral strategies in the face of threats or challenges. Intolerance to uncertainty can make individuals perceive situations as less manageable, ultimately increasing their susceptibility to psychopathology. Automatic thoughts, which are internal dialogs shaped by core beliefs about the self and future (Beck, 1979), can lead individuals to perceive events or situations as unique and personal rather than generalizable (Seligman, 1972). These thoughts also shift attributions from external to internal and from temporary to permanent conditions (Canino, 1981), thereby contributing to a heightened vulnerability to psychopathology.

The results of this study indicate that cognitive flexibility (control) plays a significant role in the relationship between depression, somatization, OCD and anxiety symptoms through the mediating effects of automatic thoughts (loneliness/isolation) and intolerance to uncertainty. In therapeutic interventions for individuals experiencing these symptoms, it may be beneficial to help them identify and challenge automatic thoughts, particularly those centered on loneliness/isolation, while promoting communication skills and social support. Raising awareness about the inherent uncertainty in life events and teaching individuals how to regain control over situations, consider multiple perspectives and improve problem-solving skills could reduce the impact of psychopathologies.

This study has several limitations. Most participants were university students, and their educational backgrounds may have skewed the generalizability of the results. Additionally, depression, somatization, and anxiety symptoms are more prevalent in women, and our sample included a higher proportion of female participants than male participants, which may further limit the generalizability. Future research should address these limitations while considering the possibility of evaluating factors other than cognitive flexibility. For example, the scale used to measure automatic thoughts about loneliness/isolation may not distinguish between existential loneliness/isolation and automatic thoughts related to loneliness/isolation. Therefore, future studies should differentiate between existential loneliness and isolation and automatic thoughts about loneliness and isolation. Subsequent research could examine existential loneliness as a core construct.

Ethics Committee Approval: İstanbul Sabahattin Zaim University Ethics Committee granted approval for this study (date: 28.01.2023, number: 2022/01).

Author Contributions: Concept – AK, YB; Design – AK, YB; Supervision – AK, YB; Resource – AK, YB; Materials – AK, YB; Data Collection and/or Processing – AK, YB; Analysis and/or Interpretation – AK, YB; Literature Review – AK, YB; Writing – AK, YB; Critical Review – AK, YB.

Conflict of Interest: The authors have no conflict of interest to declare.

Use of AI for Writing Assistance: Artificial intelligence supported the translation of the text into English.

Financial Disclosure: The authors declared that this study has received no financial support.

Peer-review: Externally peer-reviewed.

REFERENCES

Bailey, P. E., & Henry, J. D. (2007). Alexithymia, somatization and negative affect in a community sample. *Psychiatry Res, 150*(1), 13–20.

Barkale Şahin, S. (2022). Examination of university students' perceptions of the career future in terms of tolerance for uncertainty and cognitive flexibility. *J Career Rev, 1*(1), 11–23.

Beck, A. T. (1979). *Cognitive therapy of depression*. Guilford Press.

Bijsterbosch, J. M., van den Brink, F., Vollmann, M., Boelen, P. A., & Sternheim, L. C. (2020). Understanding relations between intolerance of uncertainty, social anxiety, and body dissatisfaction in women. *J Nerv Ment Dis, 208*(10), 833–835.

Bilalić, M., McLeod, P., & Gobet, F. (2008). Inflexibility of experts--Reality or myth? Quantifying the einstellung effect in chess masters. *Cogn Psychol, 56*(2), 73–102.

Birrell, J., Meares, K., Wilkinson, A., & Freeston, M. (2011). Toward a definition of intolerance of uncertainty: A review of factor analytical studies of the intolerance of uncertainty scale. *Clin Psychol Rev, 31*(7), 1198–1208.

Boelen, P. A., & Reijntjes, A. (2009). Intolerance of uncertainty and social anxiety. *J Anxiety Disord, 23*(1), 130–135.

Bozdoğan, G. (2022). *Obsesif inançların yordayıcıları olarak otomatik düşünceler ve mükemmeliyetçilik düzeyinin incelenmesi*. Yüksek Lisans Tezi, İstanbul Kent Üniversitesi, İstanbul.

Buschmann, T., Horn, R. A., Blankenship, V. R., Garcia, Y. E., & Bohan, K. B. (2018). The relationship between automatic thoughts and irrational beliefs predicting anxiety and depression. *J Ration Emot Cogn Behav Ther, 36*(2), 137–162.

Calvete, E., & Connor-Smith, J. K. (2005). Automatic thoughts and psychological symptoms: A cross-cultural comparison of American and Spanish students. *Cogn Ther Res, 29*(2), 201–217.

Canino, F. J. (1981). Learned-helplessness theory: Implications for research in learning disabilities. *J Spec Educ, 15*(4), 471–484.

Carleton, R. N., Gosselin, P., & Asmundson, G. J. (2010). The intolerance of uncertainty index: Replication and extension with an English sample. *Psychol Assess, 22*(2), 396–406.

Carleton, R. N., Norton, M. A., & Asmundson, G. J. (2007). Fearing the unknown: A short version of the intolerance of uncertainty scale. *J Anxiety Disord, 21*(1), 105–117.

Chamberlain, S. R., Fineberg, N. A., Blackwell, A. D., Robbins, T. W., & Sahakian, B. J. (2006). Motor inhibition and cognitive flexibility in obsessive-compulsive disorder and trichotillomania. *Am J Psychiatry, 163*(7), 1282–1284.

Chander, K. R., Manjunatha, N., Binukumar, B., Kumar, C. N., Bada Math, S., & Janardhan Reddy, Y. C. (2019). The prevalence and its correlates of somatization disorder at a quaternary mental health centre. *Asian J Psychiatr, 42*, 24–27.

Chen, J., Tan, Y., Cheng, X., Peng, Z., Qin, C., Zhou, X., Xiang, B., Liu, K., & Lei, W. (2021). Maladaptive metacognitive beliefs mediated the effect of intolerance of uncertainty on depression. *Clin Psychol Psychother, 28*(6), 1525–1534.

Clark, D. A., & Beck, A. T. (2010). *Cognitive therapy of anxiety disorders: Science and practice*. Guilford Press.

Clarke, E., & Kiropoulos, L. A. (2021). Mediating the relationship between neuroticism and depressive, anxiety, and eating disorder symptoms: The role of intolerance of uncertainty and cognitive flexibility. *J Affect Disord Rep, 4*(3), 100101.

Daş, H. (2022). *Ergenlerde sosyal kaygının otomatik düşünceler, akademik yeterlilik ve sosyal yeterlilik ile modellenmesi*. (Yüksek lisans tezi, Gaziantep Üniversitesi, Gaziantep).

Demirtas, A. S., & Yildiz, B. (2019). Hopelessness and perceived stress: The mediating role of cognitive flexibility and intolerance of uncertainty. *Dusunen Adam J Psychiatry Neurol Sci, 32*(3), 259–267.

Dennis, J. P., & Vander Wal, J. S. (2010). The cognitive flexibility inventory: Instrument development and estimates of reliability and validity. *Cogn Ther Res, 34*(3), 241–253.

Derogatis, L. R. (1993). *BSI Brief Symptom Inventory: Administration, scoring, and procedures manual* (4th ed.). National Computer Systems.

Diamond, A. (2006). The early development of executive functions. In E. Bialystok & F. I. M. Craik (Eds.), *Lifespan cognition: Mechanisms of change* (pp. 70–95). Oxford University Press.

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cogn Ther Res, 25*(5), 551–558.

Durak Batıgün, A., & Şenkal Ertürk, İ. (2023). COVID-19 associated psychological symptoms in Turkish population: A path model. *Curr Psychol, 42*(3), 2436–2447.

Einstein, D. A. (2014). Extension of the transdiagnostic model to focus on intolerance of uncertainty: A review of the literature and implications for treatment. *Clin Psychol (New York), 21*(3), 280–300.

Eriş, K. (2017). *Otomatik düşüncelerin ve irrasyonel inanışların obsesif kompulsif belirtiler ve depresyon arasındaki aracı değişken rolü*. (Yüksek lisans tezi, Arel Üniversitesi, İstanbul).

Fergus, T. A. (2013). A comparison of three self-report measures of intolerance of uncertainty: An examination of structure and incremental explanatory power in a community sample. *Psychol Assess, 25*(4), 1322–1331.

Fonagy, P. (2003). The development of psychopathology from infancy to adulthood: The mysterious unfolding of disturbance in time. *Infant Ment Health J, 24*(3), 212–239.

Gamsız, Ö., & Aypay, A. (2018). The role of loneliness and automatic thoughts in predicting psychological symptoms of the individuals on probation for substance use background. *Addicta Turk J Addict, 5*(4), 765–788.

Garcia-Garcia, M., Barceló, F., Clemente, I. C., & Escera, C. (2010). The role of the dopamine transporter DAT1 genotype on the neural correlates of cognitive flexibility. *Eur J Neurosci, 31*(4), 754–760.

Gentes, E. L., & Ruscio, A. M. (2011). A meta-analysis of the relation of intolerance of uncertainty to symptoms of generalized anxiety disorder, major depressive disorder, and obsessive-compulsive disorder. *Clin Psychol Rev, 31*(6), 923–933.

Gilbert, S. J., & Burgess, P. W. (2008). Executive function. *Curr Biol, 18*(3), R110–R114.

Groves, D., Clark, L. H., & Clark, G. I. (2020). The relationship between worry and intolerance of uncertainty subtypes. *Aust Psychol, 55*(2), 132–142.

Gülüm, I. V., & Dağ, İ. (2012). Tekrarlayıcı düşünme ölçeği ve bilişsel esneklik envanterinin Türkçeye uyarlanması, geçerliliği ve güvenilirliği. *Anatol J Psychiatry, 13*(3), 216–223.

Gündüz, A., & Gündoğmuş, İ. (2019). Üniversite öğrencilerinde çocukluk çağı olumsuz yaşantıları ile otomatik düşünceler, ara inançlar, uyumsuz şemalar, anksiyete ve depresif belirti şiddeti ve yaşam kalitesi arasındaki ilişki. *Klinik Psikiyatri Derg, 22*, 424–435.

Gündüz, B. (2013). Bağlanma stilleri, akılcı olmayan inançlar ve psikolojik belirtilerin bilişsel esnekliği yordamadaki katkıları. *Kuram Uygulamada Egit Bilim, 13*(4), 2071–2085.

Güvenç, F. (2019). *Üniversite öğrencilerinde bilişsel esneklik ve belirsizliğe tahammülsüzlük ile kişilik özellikleri arasındaki ilişki*. (Yüksek Lisans Tezi, Necmettin Erbakan Üniversitesi, Konya).

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hillman, S. R., Lomax, C. L., Khaleel, N., Smith, T. R., & Gregory, J. D. (2022). The roles of intolerance of uncertainty, anxiety sensitivity and distress tolerance in hoarding disorder compared with OCD and healthy controls. *Behav Cogn Psychother, 50*(4), 392–403.

Hjemdal, O., Stiles, T., & Wells, A. (2013). Automatic thoughts and meta-cognition as predictors of depressive or anxious symptoms: A prospective study of two trajectories. *Scand J Psychol, 54*(2), 59–65.

Hollon, S. D., & Kendall, P. C. (1980). Cognitive self-statements in depression: Development of an automatic thoughts questionnaire. *Cogn Ther Res, 4*(4), 383–395.

Hou, X. L., Bian, X. H., Zuo, Z. H., Xi, J. Z., Ma, W. J., & Owens, L. D. (2021). Childhood maltreatment on young adult depression: A moderated mediation model of negative automatic thoughts and self-compassion. *J Health Psychol, 26*(13), 2552–2562.

İnözü, M., Gök, B. G., Tüzün, D., & Hacıömeroğlu, A. B. (2023). Does cognitive flexibility change the nature of the relationship between intolerance of uncertainty and psychological symptoms during the COVID-19 outbreak in Türkiye? *Curr Psychol, 42*, 17412–17423.

Jacques, S., & Zelazo, P. D. (2005). On the possible roots of cognitive flexibility. In B. D. Homer & C. S. Tamis-LeMonda (Eds.), *The development of social cognition and communication* (pp. 53–81). Lawrence Erlbaum Associates.

Johnco, C., Wuthrich, V. M., & Rapee, R. M. (2013). The role of cognitive flexibility in cognitive restructuring skill acquisition among older adults. *J Anxiety Disord, 27*(6), 576–584.

Johnco, C., Wuthrich, V. M., & Rapee, R. M. (2014). The influence of cognitive flexibility on treatment outcome and cognitive restructuring skill acquisition during cognitive behavioural treatment for anxiety and depression in older adults: Results of a pilot study. *Behav Res Ther, 57*, 55–64.

Kardaş, F. (2021). The fear of COVID-19 raises the level of depression, anxiety and stress through the mediating role of intolerance of uncertainty. *Stud Psychol, 63*(3), 291–306.

Keleş Altun, İ. (2015). *Obsesif kompülsif bozuklukta metakognisyonlar ve otomatik düşünceler*. (Tıpta Uzmanlık Tezi, Karadeniz Teknik Üniversitesi, Trabzon).

Koop, L., & Jooste, J. (2023). Mindfulness traits as potential inhibitor of irrational performance beliefs and intolerance of uncertainty amongst elite female basketball players. *Apunts Sports Med, 58*(220), 100428.

Ladouceur, R., Gosselin, P., & Dugas, M. J. (2000). Experimental manipulation of intolerance of uncertainty: A study of a theoretical model of worry. *Behav Res Ther, 38*(9), 933–941.

Lanzara, R., Conti, C., Camelio, M., Cannizzaro, P., Lalli, V., Bellomo, R. G., Saggini, R., & Porcelli, P. (2020). Alexithymia and somatization in chronic pain patients: A sequential mediation model. *Front Psychol, 11*, 545881.

Lee, J. K., & Orsillo, S. M. (2014). Investigating cognitive flexibility as a potential mechanism of mindfulness in generalized anxiety disorder. *J Behav Ther Exp Psychiatry, 45*(1), 208–216.

Lieberman, L., Gorka, S. M., Sarapas, C., & Shankman, S. A. (2016). Cognitive flexibility mediates the relation between intolerance of uncertainty and safety signal responding in those with panic disorder. *Cogn Emotion, 30*(8), 1495-1503.

Low, J., & Simpson, S. (2012). Effects of labeling on preschoolers' explicit false belief performance: Outcomes of cognitive flexibility or inhibitory control? *Child Dev, 83*(3), 1072–1084.

Mantzios, M., Wilson, J. C., Linnell, M., & Morris, P. (2015). The role of negative cognition, intolerance of uncertainty, mindfulness, and self-compassion in weight regulation among male army recruits. *Mindfulness, 6*(3), 545–552.

McEvoy, P. M., & Mahoney, A. E. (2012). To be sure, to be sure: Intolerance of uncertainty mediates symptoms of various anxiety disorders and depression. *Behav Ther, 43*(3), 533–545.

Moore, R. G. (1996). It's the thought that counts: The role of intentions and meta-awareness in cognitive therapy. *J Cogn Psychother, 10*(4), 255–269.

Oguz, G., Celikbas, Z., Batmaz, S., Cagli, S., & Sungur, M. Z. (2019). Comparison between obsessive compulsive disorder and panic disorder on metacognitive beliefs, emotional schemas, and cognitive flexibility. *Int J Cogn Ther, 12*(3), 157–178.

Parmaksız, İ. (2021). Erişkin dönemde belirsizliğe tahammülsüzlük üzerinde otomatik düşünceler ve stresle başa çıkma mekanizmalarının etkisi. *Psikiyatride Guncel Yaklasimlar, 13*, 1–11.

Piaget, J. (1970). Piaget's theory (G. Gellerier & J. Langer, Trans.). In P. H. Mussen (Ed.), *Carmichael's manual of child psychology* (3rd ed.). Wiley.

Ren, L., Yang, Z., Wang, Y., Cui, L. B., Jin, Y., Ma, Z., Zhang, Q., Wu, Z., Wang, H. N., & Yang, Q. (2020). The relations among worry, meta-worry, intolerance of uncertainty and attentional bias for threat in men at high risk for generalized anxiety disorder: A network analysis. *BMC Psychiatry, 20*(1), 452.

Rice, R. H. (2015). Cognitive-behavioral therapy. In *The SAGE encyclopedia of theory in counseling and psychotherapy* (pp. 194–199). SAGE Publications.

Riskind, J. H., Tzur, D., Williams, N. L., Mann, B., & Shahar, G. (2007). Short-term predictive effects of the looming cognitive style on anxiety disorder symptoms under restrictive methodological conditions. *Behav Res Ther, 45*(8), 1765–1777.

Robinson, O. J., Vytal, K., Cornwell, B. R., & Grillon, C. (2013). The impact of anxiety upon cognition: Perspectives from human threat of shock studies. *Front Hum Neurosci, 7*, 203.

Sarıçam, H., Erguvan, F. M., Akın, A., & Akça, M. Ş. (2014). Belirsizliğe tahammülsüzlük ölçeği (BTÖ-12) Türkçe formu: Geçerlik ve güvenilirlik çalışması. *Route Educ Soc Sci J, 1*(3), 148–157.

Seligman, M. E. (1972). Learned helplessness. *Annu Rev Med, 23*, 407–412.

Smith, N. S., Albanese, B. J., Schmidt, N. B., & Capron, D. W. (2019). Intolerance of uncertainty and responsibility for harm predict nocturnal panic attacks. *Psychiatry Res*, 273, 82–88.

Stevens, K., Rogers, T., Campbell, M., Björgvinsson, T., & Kertz, S. (2018). A transdiagnostic examination of decreased intolerance of uncertainty and treatment outcome. *Cogn Behav Ther, 47*(1), 19–33.

Strom, N. I., Soda, T., Mathews, C. A., & Davis, L. K. (2021). A dimensional perspective on the genetics of obsessive-compulsive disorder. *Transl Psychiatry, 11*(1), 401.

Sun, C., Li, Y., Kwok, S. Y. C. L., & Mu, W. (2022). The relationship between intolerance of uncertainty and problematic social media use during the COVID-19 pandemic: A serial mediation model. *Int J Environ Res Public Health, 19*(22), 14924.

Swartz, M., Landerman, R., Blazer, D., & George, L. (1989). Somatization symptoms in the community: A rural/urban comparison. *Psychosomatics, 30*(1), 44–53.

Şahin, H., Köşger, F., Eşsizoğlu, A., & Aksaray, G. (2018). The relationship between obsessive belief level and cognitive flexibility in patients with obsessive compulsive disorder. *Noro Psikiyatr Ars, 55*(4), 376–379.

Şahin, N. H., & Durak, A. (1994). Kısa semptom envanteri: Türk gençleri için uyarlanması. *Türk Psikoloji Derg, 9*(31), 44–56.

Şahin, N. H., & Şahin, N. (1992). Reliability and validity of the Turkish version of the Automatic Thoughts Questionnaire. *J Clin Psychol, 48*(3), 334–340.

Şahin, N. H., & Yaka, A. İ. (2010). Yakın ilişkilerde yaşantılar envanteri'nin (YİYE-I), kendilik algısı, olumsuz otomatik düşünceler ve psikopatolojik belirtiler bağlamında incelenmesi. *Türk Psikoloji Yazıları, 13*(26), 64–76.

Takeuchi, H., Taki, Y., Sassa, Y., Hashizume, H., Sekiguchi, A., Fukushima, A., & Kawashima, R. (2010). White matter structures associated with creativity: Evidence from diffusion tensor imaging. *Neuroimage, 51*(1), 11–18.

Turner, M. J., Carrington, S., & Miller, A. (2019). Psychological distress across sport participation groups: The mediating effects of secondary irrational beliefs on the relationship between primary irrational beliefs and symptoms of anxiety, anger, and depression. *J Clin Sport Psychol, 13*(1), 17–40.

World Health Organization. (2022, June 8). *Mental disorders*. Available at: https://www.who.int/news-room/fact-sheets/detail/mental-disorders

World Health Organization. (2023, March 31). *Depressive disorder* (depression). Available at: https://www.who.int/news-room/fact-sheets/detail/depression

World Health Organization. (2023, September 27). *Anxiety disorders*. Available at: https://www.who.int/news-room/fact-sheets/detail/anxiety-disorders

Yıldız, M., & Eldeleklioğlu, J. (2021). Investigation of the prediction status of love styles and gender on attitudes towards dating violence. *J Fam Couns Educ, 6*(2), 33–58.

Yook, K., Kim, K. H., Suh, S. Y., & Lee, K. S. (2010). Intolerance of uncertainty, worry, and rumination in major depressive disorder and generalized anxiety disorder. *J Anxiety Disord, 24*(6), 623–628.

Young, J. E., Ward-Ciesielski, E. F., Rygh, J. L., Weinberger, A. D., & Beck, A. T. (2021). Cognitive therapy for depression. In D. H. Barlow (Ed.), *Clinical handbook of psychological disorders: A step-by-step treatment manual* (6th ed., pp. 257–316). The Guilford Press.

Yu, Y., Yu, Y., & Lin, Y. (2020). Anxiety and depression aggravate impulsiveness: The mediating and moderating role of cognitive flexibility. *Psychol Health Med, 25*(1), 25–36.