

Anxiety Sensitivity, Mindfulness, and Metacognitive Beliefs: The Mediation of Emotion Regulation

Farkındalık (Mindfulness), Kaygı Duyarlılığı ile İlişkinde Duygu Düzenlemenin Üstbilişsel İnançların Aracılık Rolü

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Abstract

This study aims to explore the mediating role of emotion regulation in the relationship between metacognitive beliefs, mindfulness, and anxiety sensitivity. Data was collected from a sample of 385 participants through a survey questionnaire. The relationships among the latent variables were analyzed using SmartPLS 3. The findings revealed significant positive relationships between mindfulness and emotion regulation, as well as anxiety sensitivity. Similarly, significant positive relationships were observed between metacognitive beliefs and emotion regulation, as well as anxiety sensitivity. Additionally, emotion regulation exhibited a significant positive relationship with anxiety sensitivity. The study further investigated the mediating role of emotion regulation in the relationships between metacognitive beliefs, mindfulness, and anxiety sensitivity. The results indicate that emotion regulation plays a crucial mediating role in the relationship between metacognitive beliefs and anxiety sensitivity, as well as in the relationship between mindfulness and anxiety sensitivity. These findings highlight the importance of emotion regulation as a mechanism through which metacognitive beliefs and mindfulness influence anxiety sensitivity. Understanding the mediating role of emotion regulation can provide valuable insights for interventions aimed at promoting emotional well-being and reducing anxiety-related concerns.

Keywords: Emotion regulation, Metacognitive beliefs, Mindfulness, Anxiety sensitivity

Öz

Bu çalışmada, üstbilişsel inançlar, farkındalık ve kaygı duyarlılığı arasındaki ilişkide duygu düzenlemenin aracı rolünü araştırmayı amaçlamaktadır. Veriler, anket yoluyla 385 katılımcıdan toplanmıştır. Gizli değişkenler arasındaki ilişkiler Smart PLS 3 kullanılarak analiz edilmiştir. Bulgular, farkındalık ile duygu düzenleme ve kaygı duyarlılığı arasında anlamlı pozitif ilişkiler olduğunu ortaya koymuştur. Benzer şekilde üstbilişsel inançlar ile duygu düzenleme ve kaygı duyarlılığı arasında da anlamlı pozitif ilişkiler gözlenmiştir. Ayrıca duygu düzenleme kaygı duyarlılığı ile anlamlı pozitif ilişki göstermiştir. Çalışmada ayrıca üstbilişsel inançlar, farkındalık ve kaygı duyarlılığı arasındaki ilişkilerde duygu düzenlemenin aracı rolünü araştırılmıştır. Bulgular; duygu düzenlemenin üstbilişsel inançlar ile kaygı duyarlılığı arasındaki ilişkide ve aynı zamanda bilinçli farkındalık ile kaygı duyarlılığı arasındaki ilişkide önemli bir aracı rol oynadığını göstermektedir. Bu bulgular, üstbilişsel inançların ve farkındalığın kaygı duyarlılığını etkilediği bir mekanizma olarak duygu düzenlemenin önemini vurgulamaktadır. Duygu düzenlemenin aracılık rolünü anlamak, duygusal refahı artırmayı ve kaygıyla ilgili endişeleri azaltmayı amaçlayan müdahaleler için değerli bilgiler sağlayabilmektedir.

Anahtar Kelimeler: Duygu düzenleme, Üstbiliş inançlar, Farkındalık, Kaygı duyarlılığı

JEL Codes: I19

Araştırma Makalesi [Research Paper]

Araştırma ve Yayın Etiği Beyanı: Bu araştırma Gümüşhane Üniversitesi, Bilimsel Araştırma ve Yayın Etiği Kurulu'nun 13.12.2023 tarih ve 2023/6 sayılı karar doğrultusunda gerçekleştirilmiştir.

Submitted: 05 / 02 / 2024

Accepted: 22 / 05 / 2024

Introduction

Elevated levels of anxiety sensitivity significantly influence individuals' perceptions, particularly regarding physical, psychological, and social threats. Such heightened sensitivity often results in the magnification of stimuli as threatening, subsequently promoting avoidance behaviors. Individuals grappling with increased anxiety sensitivity find emotional regulation particularly daunting, as they encounter challenges in acknowledging and accepting their emotions. This difficulty is especially pronounced in ambiguous emotional contexts, where negative emotions tend to dominate (Kashdan et al., 2008). Within the realm of anxiety disorder research, anxiety sensitivity stands as a pivotal factor. This sensitivity is characterized by a consistent inclination to perceive anxiety-related experiences as detrimental, manifesting as an undue fear of anxiety symptoms. Such individuals tend to be overly vigilant, interpreting even vague bodily sensations as potential threats (Deacon & Abramowitz, 2006; Kwee & van den Hout, 2019).

Contrastingly, mindfulness emerges as a potent antidote to anxiety sensitivity, anchoring individuals firmly in the present moment. By fostering a deeper engagement with life's unfolding moments, practices such as focusing on sensory experiences or adopting rhythmic breathing patterns bolster this present-centric awareness (Lovas & Barsky, 2010; Shahani et al., 2020). The transformative power of mindfulness extends to reshaping neural pathways, amplifying resilience against stress, and cultivating inner tranquility (Brown et al., 2007). Furthermore, its positive influence on psychological well-being is evident as it redirects attention from negativity to more constructive emotions (Beyrami et al., 2014; Janssen et al., 2018).

Delving deeper into the psychological constructs, the influence of metacognitive beliefs on anxiety sensitivity becomes evident. These deeply ingrained beliefs not only catalyze the onset of various psychological disorders but also sustain them, with a notable emphasis on anxiety sensitivity disorder, as highlighted by Wells (2011). Central to these beliefs are elements like heightened self-awareness, metacognitive experiences—marked by excessive worry—and specific coping mechanisms such as thought suppression. The metacognitive theory of emotional vulnerability posited by Najafi et al. (2019) accentuates the pivotal role of cognitive responses in modulating both the manifestation and regulation of emotional disorders, emphasizing their predictive nature for adverse emotional outcomes.

Adding another layer to this intricate web, emotion regulation emerges as a cornerstone in this discourse. This psychological construct involves deliberate or inadvertent modulation of emotional onset, duration, or intensity through various strategies (Dennis & Hajcak, 2009).

Effective emotion regulation equips individuals to navigate stressors adeptly, strategically adjusting emotional responses to align with objectives (Gross & John, 2003). Conversely, deficient emotion regulation can precipitate chronic negative emotions, culminating in psychological distress. Indeed, suppressing or evading emotions heightens vulnerability to depression, anxiety sensitivity, and other detrimental emotional repercussions (Yılmaz et al., 2011). Existing literature illuminates the profound impact of metacognitive beliefs on emotional disorders (Wells, 2011). Furthermore, emotion regulation's salutary effect on alleviating anxiety sensitivity has been substantiated (Kashefinishabouri et al., 2021).

Noteworthy contributions by Rezaei and Zebardast (2021) have underscored the indirect correlation between students' anxiety sensitivity and their emotion regulation strategies. Echoing these sentiments, Campbell-Sills et al. (2006) pinpointed deficient emotion regulation as a linchpin in anxiety sensitivity.

Despite these illuminating insights, a conspicuous research void persists regarding emotion regulation's mediating role in the nexus between metacognitive beliefs, mindfulness, and anxiety sensitivity, especially among students. Inspired by this gap, the current research aims to clarify the complex relationships between metacognitive beliefs, anxiety sensitivity, mindfulness, and, most importantly, the mediation role of emotion regulation.

The hypotheses of the study are as follows:

- H1. Emotion regulation significantly impacts anxiety sensitivity.
- H2. Metacognitive beliefs significantly impacts anxiety sensitivity.
- H3. Metacognitive beliefs significantly impacts emotion regulation.
- H4. Mindfulness significantly impacts anxiety sensitivity.
- H5. Mindfulness significantly impacts emotion regulation.

2. Result

The 385 participants' demographic data is displayed in Table 1. 44.2% of respondents were women and 55.8% of respondents were men, according to the survey results. Sixty-five percent of the subjects in the research are unmarried. The majority of these individuals (30.1%) are under 25 years old, and 29.4% hold a bachelor's degree.

Table 1. Demographic Information of Respondents

Characteristic	N	%
Gender		
Man	215	55.8
Female	170	44.2
Marital status		
Single	233	60.5
Married	152	39.5
Age		
<25 years	116	30.1
25 to 35 years	92	23.9
36 to 45 years	76	19.7
46 to 55 years	58	15.1
> 55 years	43	11.2
Education		
Diploma	112	29.1
Associate Degree	76	19.7
Bachelor's degree	113	29.4
Master's degree	65	16.9

2.1. Construct Reliability and Validity

Table 3 presents the outcomes of Construct Reliability and Validity assessments. In gauging the reliability of our constructs, we computed both Composite Reliability (CR) and Cronbach's alpha (α) for each construct. The CR values, ranging from 0.881 to 0.958, and α values, spanning 0.820 to 0.940, indicate robust internal consistency and reliability in our study's measures. Factor loadings signify the strength of the association between each item and its corresponding construct. Our study calculated factor loadings for each item, scrutinizing their significance through the t-value. All factor loadings emerged as statistically significant at $p < 0.05$, underscoring a robust relationship between items and their respective constructs.

The Average Variance Extracted (AVE) reflects the proportion of variance in each construct explained by its indicators. Our study computed AVE for each construct and assessed their values, revealing a range from 0.506 to 0.821. Notably, all AVE values surpassed the recommended threshold of 0.5, indicative of satisfactory convergent validity in the measures employed. These findings further bolster the credibility and consistency of our measures, affirming that our constructs accurately capture the underlying variables of interest.

Table 2. Construct Reliability and Validity

Main Constructs	Scale	Items	Loadings	Cronbach's Alpha	CR+	AVE*
Metacognitive Beliefs	Uncontrollability	B1	0.761	0.906	0.923	0.571
		B4	0.737			

		B6	0.725			
		B7	0.770			
		B9	0.763			
		B14	0.761			
		B15	0.758			
		B11	0.765			
		B18	0.760			
		B3	0.766			
		B5	0.763			
		B12	0.770			
	Cognitive stability	B13	0.758	0.883	0.909	0.587
		B16	0.785			
		B24	0.760			
		B28	0.760			
		B2	0.756			
		B8	0.774			
	Cognitive uncertainty	B22	0.769	0.828	0.879	0.593
		B26	0.809			
		B30	0.740			
		B17	0.803			
		B19	0.785			
	Need to control thoughts	B21	0.825	0.820	0.881	0.650
		B25	0.812			
		B10	0.825			
		B20	0.732			
		B23	0.777			
	Positive beliefs	B27	0.761	0.860	0.896	0.589
		B29	0.731			
		B7	0.775			
		H1	0.880			
		H2	0.771			
		H3	0.810			
	Physical	H4	0.768	0.890	0.916	0.647
		H5	0.800			
		H6	0.791			
		H7	0.763			
		H8	0.789			
		H9	0.796			
	Cognitive	H10	0.766	0.873	0.904	0.611
		H11	0.782			
		H12	0.794			
		H13	0.773			
		H14	0.731			
		H15	0.778			
	Social	H16	0.771	0.873	0.904	0.612
		H17	0.815			
		H18	0.822			

Emotion Regulation	Reappraisal	T1	0.875	0.947	0.958	0.792
		T2	0.893			
		T3	0.914			
		T4	0.880			
		T5	0.889			
	T6	0.887				
	Suppression	T7	0.907	0.927	0.948	0.821
		T8	0.915			
		T9	0.896			
		T10	0.906			
Mindfulness	M1	0.686	0.930	0.939	0.506	
	M2	0.715				
	M3	0.694				
	M4	0.702				
	M5	0.731				
	M6	0.677				
	M7	0.755				
	M8	0.689				
	M9	0.728				
	M10	0.726				
	M11	0.700				
	M12	0.735				
	M13	0.736				
	M14	0.707				
	M15	0.680				

+Composite Reliability

*Average Variance Extracted

2.2. Discriminant Validity

A commonly used technique for evaluating discriminant validity is the use of Fornell and Larcker's criterion. Using the square root of the Average Variance Extracted (AVE) for each construct, the correlations between the various study constructs are compared in this manner. When a construct's square root of AVE is greater than its correlations with other constructs, discriminant validity is considered valid (Fornell & Larcker, 1981). Table 4 shows that for reflective structures, the square root of AVE is greater than the correlations with the relevant latent variables. As thus, the obtained discriminant validity attests to the construct' distinctiveness.

Table 3. Discriminant Validity

	Anxiety Sensitivity	Emotion Regulation	Metacognitive Beliefs	Mindfulness
Anxiety Sensitivity	0.757			
Emotion Regulation	0.661	0.883		
Metacognitive Beliefs	0.619	0.670	0.727	
Mindfulness	0.650	0.643	0.650	0.711

The examination of the structural model is illustrated in Figure 1, accompanied by detailed findings in Table 5. This table provides insights into the path coefficients (β) and their corresponding significance values, offering a comprehensive overview of the relationships within the structural framework.

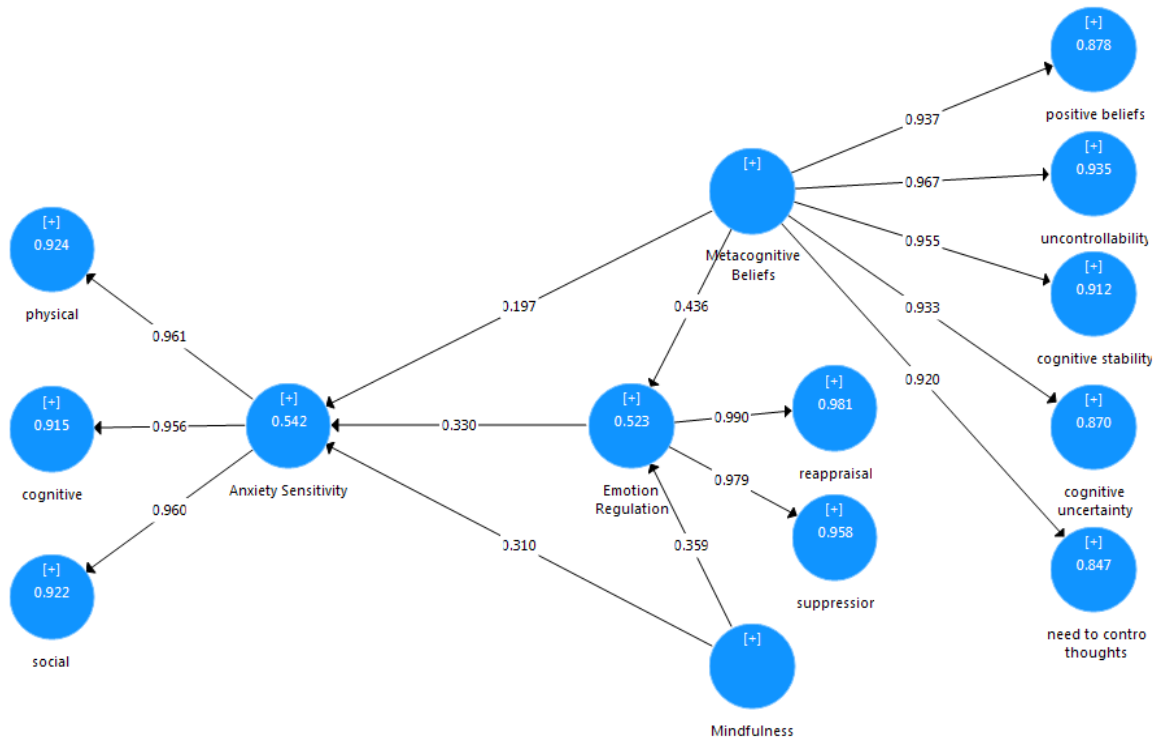


Figure 1. Graphical Representation of The Path Coefficient

Table 4. Path Coefficients (Bootstrapping results with 1000 resampling)

	β	SD	T-Statistics	P Values
Anxiety Sensitivity -> Cognitive	0.956	0.004	214.257	p<0.001
Anxiety Sensitivity -> Physical	0.961	0.004	245.164	p<0.001
Anxiety Sensitivity -> Social	0.960	0.004	262.256	p<0.001
Emotion Regulation -> Anxiety Sensitivity	0.330	0.075	4.392	p<0.001
Emotion Regulation -> Reappraisal	0.990	0.001	1150.967	p<0.001
Emotion Regulation -> Suppression	0.979	0.002	483.415	p<0.001
Metacognitive Beliefs -> Need to control thoughts	0.920	0.007	133.310	p<0.001
Metacognitive Beliefs -> Anxiety Sensitivity	0.197	0.075	2.618	0.009
Metacognitive Beliefs -> Emotion Regulation	0.436	0.061	7.194	p<0.001
Metacognitive Beliefs -> cognitive stability	0.955	0.005	208.401	p<0.001
Metacognitive Beliefs -> cognitive uncertainty	0.933	0.007	141.334	p<0.001
Metacognitive Beliefs -> positive beliefs	0.937	0.005	180.741	p<0.001
Metacognitive Beliefs -> uncontrollability	0.967	0.003	323.801	p<0.001
Mindfulness -> Anxiety Sensitivity	0.310	0.068	4.553	p<0.001
Mindfulness -> Emotion Regulation	0.359	0.060	6.009	p<0.001

According to our findings, there was a strong positive correlation between anxiety sensitivity ($\beta=0.310$, $p<0.001$) and mindfulness with emotion regulation ($\beta=0.359$, $p<0.001$). There was a strong positive correlation between Metacognitive Beliefs and Emotion Regulation ($\beta=0.436$, $p<0.001$) and Anxiety Sensitivity ($\beta=0.197$, $p=0.009$). Anxiety Sensitivity and Emotion Regulation exhibited a substantial positive connection ($\beta=0.330$, $p<0.001$). The mediating function of emotion regulation in connection to metacognitive beliefs, mindfulness, and anxiety sensitivity was examined using the Indirect Path Coefficients; the findings are displayed in the table below.

Table 5. Indirect Path Coefficients (Bootstrapping results with 1000 resampling)

	β	<i>SD</i>	T	P
Metacognitive Beliefs-> Emotion Regulation -> Anxiety Sensitivity	0.144	0.037	3.896	0.009
Mindfulness -> Emotion Regulation -> Anxiety Sensitivity	0.119	0.033	3.648	p<0.001

The findings indicate that emotion regulation serves as a mediator in both the association between metacognitive beliefs and anxiety sensitivity, as well as the link between mindfulness and anxiety sensitivity.

3. Discussion

The results of our study provide clear answers to the posed research hypotheses. The potential mediating role of emotion regulation is highlighted by the significant relationships we have found between anxiety sensitivity, metacognitive beliefs, emotion regulation, and mindfulness. The significance of comprehending these dynamics for the creation of successful intervention tactics aimed at treating anxiety-related disorders is highlighted by our findings.

Firstly, the positive relationship between Mindfulness and Emotion Regulation suggests that individuals who practice mindfulness tend to exhibit enhanced emotional regulation skills. This aligns with previous research emphasizing the positive impact of mindfulness on emotional well-being (Feldman et al., 2007; Guendelman et al., 2017). Mindfulness and emotion regulation are closely linked. Research suggests that practicing mindfulness improves emotion regulation, reducing distress and enhancing emotional recovery (Heppner et al., 2015). Similarly, the positive association between Metacognitive Beliefs and Emotion Regulation indicates that individuals with certain metacognitive patterns may also demonstrate better emotion regulation capabilities. This outcome aligns with the research conducted by Nejati et al. (2017).

Moreover, the significant positive relationships between Mindfulness and Anxiety Sensitivity, as well as between Metacognitive Beliefs and Anxiety Sensitivity, highlight the potential vulnerability to anxiety in individuals with lower levels of mindfulness or specific metacognitive belief systems. These findings underscore the importance of addressing mindfulness and metacognitive beliefs in interventions aimed at reducing anxiety sensitivity.

The mediation analysis further elucidates the role of emotion regulation in these relationships. The results indicate that emotion regulation acts as a mediator in the association between metacognitive beliefs and anxiety sensitivity, as well as between mindfulness and anxiety sensitivity (Hadipour & Rezaei-Jamalouei, 2021). This implies that the impact of metacognitive beliefs and mindfulness on anxiety sensitivity is, at least in part, explained by their influence on emotion regulation.

The association between metacognitive beliefs, mindfulness, and anxiety sensitivity is mediated by emotion control. It has been discovered that two emotion management techniques regulate these relationships: expressive suppression and cognitive reappraisal. It has been demonstrated that cognitive reappraisal helps older individuals' metacognition by lessening the effects of anxiety and despair. (Bacadini França et al., 2023). It has been discovered that mindfulness reduces stress, anxiety, and depressive symptoms indirectly by using cognitive emotion management techniques (Lordanić & Junaković, 2022). Professional caregivers of psychiatric patients have shown that emotional repression mediates the association between mindfulness and mental well-being (Eslamiyan et al., 2022). According to these results, emotion regulation techniques like expressive suppression and cognitive reappraisal may be extremely important in controlling the negative impacts of anxiety sensitivity, mindfulness, and metacognitive beliefs on mental health and wellbeing.

These findings have implications for both research and clinical practice. Understanding the mediating role of emotion regulation provides a potential target for interventions designed to alleviate anxiety sensitivity. Interventions focusing on enhancing mindfulness, modifying maladaptive metacognitive beliefs, and improving emotion regulation skills may prove beneficial in reducing vulnerability to anxiety. According to our analysis, no earlier research has produced findings that are different from those of this study.

The next step after our study is to put our findings into practice by creating interventions to improve emotion regulation, question maladaptive metacognitive beliefs, and increase mindfulness in people who are sensitive to anxiety. Extensive studies employing objective metrics can enhance our comprehension of diverse populations. In order to develop evidence-based therapies, practitioners and researchers must work together. This iterative process has the potential to improve outcomes for individuals who are sensitive to anxiety and to advance mental health interventions.

It is essential to acknowledge the limitations of the research, including its cross-sectional design and dependence on self-report measures. To increase the validity of these results, longitudinal designs and objective measurements may be used in further studies. All things considered, this research advances our knowledge of the complex connections among mindfulness, emotion regulation, metacognitive beliefs, and anxiety sensitivity, opening the door to more sophisticated mental health therapies.

Conclusion

Our study highlights the intricate connections between emotional regulation, mindfulness, metacognitive beliefs, and anxiety sensitivity. It underscores the importance of understanding these relationships for crafting effective interventions for anxiety-related disorders. We found that mindfulness and metacognitive beliefs positively correlate with emotional regulation, suggesting that individuals with these traits may have better emotional control. Additionally, lower levels of mindfulness and specific metacognitive beliefs are associated with higher anxiety sensitivity, emphasizing the need to address these factors in anxiety interventions.

Furthermore, our analysis reveals that emotional regulation acts as a mediator between mindfulness, metacognitive beliefs, and anxiety sensitivity. This suggests that improving emotional regulation skills could mitigate the impact of mindfulness and metacognitive beliefs on anxiety sensitivity. These findings have significant implications for both research and clinical practice. They highlight the potential of interventions targeting mindfulness, metacognitive beliefs, and emotional regulation to reduce vulnerability to anxiety. Despite the study's limitations, such as its cross-sectional design, these insights provide valuable groundwork for developing more sophisticated mental health therapies.

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