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A Meta-Diagnostic Model to Explain the Relationship Between Anxiety Intensity and Neuroticism in Anxiety Disorders: The Mediating Role of Intolerance of Uncertainty

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ABSTRACT

Objective: This study was undertaken with the objective of scrutinizing the meta-diagnostic framework to elucidate the correlation between neuroticism and the severity of anxiety in anxiety disorders, particularly highlighting the mediating influence of intolerance of uncertainty (IU).

Methods: The present study represents foundational research, characterized as correlational research design. The statistical population encompassed all female patients aged between 20 and 55 years who were afflicted with anxiety disorders who sought treatment at eight psychiatric and psychological centers in Tehran in 2022. The sample consisted of 678 individuals, which included 207 female patients (ages 20-55) diagnosed with generalized anxiety disorders, 242 female patients (ages 20-55) with social anxiety disorder, and 229 female patients (ages 20-55) diagnosed with panic disorder, all selected via purposive sampling method. The instruments employed in this research included the five-factor personality inventory, the anxiety assessment scale and the intolerance of uncertainty inventory. To process the data, the structural equation modeling approach was utilized to evaluate the fit of the proposed model.

Results: The results elucidated that the direct correlation between the severity of anxiety and both neuroticism and IU, as well as the direct relationship between IU and neuroticism, were substantiated. Moreover, the indirect relationship between the intensity of anxiety and neuroticism, mediated by IU, was corroborated.

Conclusions: This study underscores the significant role of IU in mediating the relationship between anxiety severity and neuroticism, suggesting that addressing IU may be pivotal in understanding and managing anxiety disorders more effectively.

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Introduction

Anxiety disorders, which include various emotional disturbances, are widespread among the general populace. Epidemiological studies indicate that these disorders constitute the most commonly diagnosed mental health conditions, exhibiting a prevalence rate between 16% and 29% ([Outwater et al., 2013](#)), and they exert considerable economic strain ([Ra & Trusty, 2015](#)). The considerable prevalence of anxiety disorders necessitates their recognition as a critical public health concern. Within the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, anxiety disorders are distinctly classified. This research specifically examines social anxiety, panic disorder, and generalized anxiety disorder from the comprehensive array of anxiety disorders included in this classification.

Generalized anxiety disorder is regarded as the most prevalent anxiety disorder, and numerous studies have indicated that its traumatic consequences are more severe when compared to those associated with major depressive disorder ([Bandelow & Michaelis, 2015](#)). Approximately 25% of individuals seeking treatment at anxiety disorder clinics, and roughly 12% of patients consulting psychiatric facilities, are diagnosed with this disorder ([Bandelow & Michaelis, 2015](#)). These statistics suggest that generalized anxiety disorder is likely the most prevalent disorder co-occurring with other mental health conditions ([Mohammadi et al., 2020](#)). Characterized by excessive and uncontrollable worry, the role of worry in generalized anxiety disorder is of such significance that some scholars advocate for a reclassification of this disorder's name within the Diagnostic and Statistical Manual of Mental Disorders to Generalized Anxiety Disorder ([Vahia, 2013](#)).

To enhance our comprehension and analysis of the mechanisms underlying these disorders, which have been identified as meta-diagnostic factors in recent research, it is essential to investigate cognitive elements such as intolerance of uncertainty, which significantly influences the experience of worry associated with these disorders. Intolerance of uncertainty is a cognitive construct that illustrates individuals' incapacity to endure ambiguous and unpredictable scenarios ([Birrell et al., 2011](#)). An individual's reluctance to accept the potential for adverse future events can be conceptualized as intolerance of uncertainty. [Dugas et al. \(2007\)](#) defined uncertainty tolerance as a cognitive bias stemming from an individual's perceptions, interpretations, and responses in unstable environments across cognitive, emotional, and behavioral dimensions. In the

context of anxiety disorders, both worry and intolerance of uncertainty may serve a protective function in mitigating negative outcomes; however, recent assertions posit that intolerance of uncertainty operates as a meta-diagnostic mechanism that contributes to the chronicity of anxiety disorder and depression symptoms ([Carleton et al., 2010](#); [Carleton et al., 2012](#); [McEvoy et al., 2010](#)).

The empirical data concerning the coexistence of anxiety disorders suggests that an array of distinctive cognitive factors contributes to the simultaneous occurrence of these disorders ([Harvey et al., 2004](#)). These shared fundamental factors are designated as meta-diagnostic factors ([Mennin et al., 2002](#)). The inadequacy and constraints inherent in specific diagnostic categories, irrespective of the coexistence and shared characteristics of mental disorders, have engendered the emergence of meta-diagnostic methodologies aimed at elucidating the fundamental and common processes underlying mental disorders ([Abasi et al., 2012](#)). Such factors have attained significant importance in elucidating the pathology of mental disorders ([Barlow et al., 2020](#)).

It is anticipated that by aligning the conceptual framework of the research, which will concurrently scrutinize the cognitive, metacognitive, and emotional processes associated with the neuroticism of anxiety disorders, progress will be made towards a more comprehensive understanding of the pathology of anxiety disorders and the formulation of effective and efficient therapeutic interventions. Consequently, the current study aims to explore the question of whether the neuroticism associated with anxiety disorders can be predicted based on the intensity of anxiety and the mediating effect of intolerance of uncertainty.

Material and Methods

The present study is categorized as applied research concerning its objectives and is classified as non-experimental or descriptive research regarding its methodology for data collection. This investigation represents a multivariate correlation design predicated on matrix analysis. The statistical population encompasses all female patients aged between 20 and 55 years, diagnosed with generalized anxiety disorder, social anxiety disorder, and panic disorder, who sought treatment at eight psychiatric and psychological centers located in Tehran during the latter half of the year 2022, amounting to an estimated total of 1500 individuals. The sample cohort consists of 600 participants, comprising 200 female patients within the age range of 20 to 55 years diagnosed

with generalized anxiety disorder, 200 female patients within the same age range suffering from social anxiety disorder, and 200 female patients aged 20 to 55 years experiencing panic disorder. This sample was selected from the aforementioned eight psychiatric and psychological centers in Tehran through a method of purposeful sampling. All participants engaged in the research completed the informed consent documentation prior to responding to the questionnaires. Furthermore, the aims of the study were articulated to them, and they were apprised of their right to withdraw from the research at any moment. Moreover, the data collected from the participants will solely be utilized for the purposes of the research.

Instruments

Neo five-factor questionnaire: The NEO Five-Factor Inventory (NEO-FFI) is a psychological assessment tool designed to measure the five major dimensions of personality, commonly referred to as the "Big Five" traits: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Developed by Paul T. Costa Jr. and Robert R. McCrae, this inventory has become one of the most widely used tools for assessing personality in both research and clinical settings.

The NEO-FFI consists of 60 items (short form) or 240 items (full version, NEO-PI-R) that participants rate on a five-point Likert scale, from "Strongly Disagree" to "Strongly Agree." Each item is designed to tap into one of the five core personality traits, with subscales within each trait for a more detailed assessment. This scale is primarily self-report, but an observer version is also available, where peers, friends, or family members provide ratings.

The NEO-FFI demonstrates high internal consistency, with Cronbach's alpha values typically reported as follows: Neuroticism: 0.86, Extraversion: 0.89, Openness to Experience: 0.87, Agreeableness: 0.86 and Conscientiousness: 0.90. These coefficients suggest that the NEO-FFI possesses strong reliability across its five domains ([McCrae & Costa Jr., 2004](#)). Test-retest reliability is also high, with coefficients for each trait ranging between 0.68 and 0.83 over extended periods, indicating the scale's stability over time ([Terracciano et al., 2006](#)). The construct validity of the NEO-FFI is well-established, with numerous studies supporting its ability to capture the intended dimensions of personality. It has strong convergent validity, correlating well with other personality measures like the Big Five Inventory (BFI) and the HEXACO Personality Inventory, and discriminant validity with unrelated constructs. Its criterion-related validity has been

supported through associations between NEO-FFI scores and various life outcomes, such as job performance, health behaviors, and interpersonal relationships ([Costa & McCrae, 1992](#)).

Anxiety questionnaire: The Beck Anxiety Inventory (BAI), developed by Aaron T. Beck and colleagues in 1990, is a widely-used self-report measure designed to assess the severity of anxiety symptoms in adolescents and adults. This 21-item scale is structured to capture the intensity of anxiety across various physical, cognitive, and emotional symptoms typically associated with anxiety disorders. Each item on the BAI describes a common anxiety symptom, such as numbness, sweating, or fear of losing control. Participants rate the severity of each symptom over the past week on a 4-point Likert scale ranging from 0 (Not at all) to 3 (Severely, I could barely stand it). The total score is obtained by summing the scores of each item, yielding a range from 0 to 63. The BAI primarily assesses physiological symptoms of anxiety, which makes it useful in distinguishing anxiety from depression. The BAI has demonstrated strong reliability, with high internal consistency (Cronbach's alpha values ranging from 0.85 to 0.94) across various studies, indicating that the items consistently measure anxiety symptoms. The test-retest reliability over a one-week period is also high, with reported coefficients around 0.75 to 0.83, suggesting stability over short periods ([Beck et al., 1988](#)). The construct validity of the BAI is supported by its correlation with other established measures of anxiety, such as the Hamilton Anxiety Rating Scale (HARS). It has shown strong convergent validity, as it correlates moderately to highly with other anxiety scales, and discriminant validity, effectively distinguishing between anxiety and depressive symptoms due to its focus on somatic symptoms. Factor analysis has also supported the BAI's two-factor structure, with one factor related to somatic symptoms and the other to cognitive symptoms ([Beck et al., 1990](#); [Fydrich et al., 1992](#)).

Uncertainty Intolerance Questionnaire: This scale was designed by [Freeston et al. \(1994\)](#). This test has 27 questions that are related to not accepting uncertainty and ambiguity, which usually leads to failure, stress, and inability to act. This test has a 5-point Likert scale (never, to (rarely, sometimes, often, always) are answered and each option is scored 1, 2, 3, 4, and 5 respectively. By analyzing the factors, four factors were obtained, which are: inability to perform the action: 1, 25, 22, 20, 15, 14, 13, 12, 9, and 1; indecision stress: 26, 24, 17, 7, 6, 5, 4, 3, 2; The negativity of unexpected events and their avoidance: 21, 19, 11, 10, 8; Uncertainty about the future 27, 23, 18, 16. In the initial version in French, internal consistency of 0.91 and a relatively good test-retest

reliability coefficient of 0.78 with an interval of 4 weeks have been obtained. Cronbach's alpha coefficient of the total score of not tolerating uncertainty was 0.79. The spectrum used in the questionnaire is based on a five-point Likert scale (including: never, rarely, sometimes, often, and always) with a minimum score of 27 and a maximum score of 135.

Results

Descriptive findings of research variables by anxiety disorder group are presented in Table 1.

Table 1. Descriptive findings of research variables by anxiety disorder group

Variable	Social anxiety		Panic disorder		Generalized anxiety disorder		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Neuroticism	39.99	7.95	24.12	8.14	26.38	8.94	30.47	10.97
Anxiety Intensity	41.84	10.61	61.94	8.05	43.44	9.29	49.12	13.14
Uncertainty Intolerance	94.26	12.65	96.51	7.79	96.98	11.99	95.85	11.07

The R^2 and Q^2 indices in Table 2 and the F^2 criterion index in Table 3 show that the research model has a good fit.

Table 2. R^2 and Q^2 criteria

Variable	R^2		Q^2	
Neuroticism	0.182	weak	0.11	Moderate
Uncertainty Intolerance	0.054	weak	0.028	Moderate

Table 3. The F^2 criterion

Variable	F^2	
The effect size of anxiety intensity on neuroticism	0.174	Strong
The effect size of anxiety intensity on uncertainty intolerance	0.057	Moderate
The effect size of uncertainty intolerance on neuroticism	0.014	Weak

In order to check the research hypotheses in the general model, direct and indirect relationships in the proposed model are presented in Table 4. The findings show that direct and indirect relationships are significant in the proposed model.

Table 4. Direct and indirect relationships in the proposed model

Path	Standardized coefficient	T Value	P Value	Result
Direct effects				
Intensity of anxiety → neuroticism	-0.391	11.86	0.001	Confirmed
Intensity of anxiety → intolerance of uncertainty	0.233	6.55	0.001	Confirmed
Intolerance of uncertainty → neuroticism	0.121	2.54	0.011	Confirmed
Indirect effect				
Intensity of anxiety → Intolerance of uncertainty → Neuroticism	0.028	2.17	0.03	confirmed

Discussion

The results of this investigation substantiate the direct correlation between the intensity of anxiety, neuroticism, and intolerance of uncertainty, as well as the direct association between intolerance of uncertainty and neuroticism. Furthermore, the indirect relationship between anxiety intensity and neuroticism via intolerance of uncertainty has also been corroborated. These findings align with the previous studies conducted by [Connor et al. \(2000\)](#). In elucidating this hypothesis, it can be posited that concerning intolerance of uncertainty, the research outcomes revealed that this overdiagnosis phenomenon is pertinent to anxiety disorders, which underscores the distinctiveness of this process within the context of such disorders. According to the distress tolerance model ([Zvolensky, 2011](#)), individuals are classified as having an anxiety disorder when they encounter transient anxiety in response to internal and external stimuli that elicit negative emotions. On one hand, these individuals interpret the negative emotions they experience as enduring, uncontrollable, escalating, perilous, devoid of significance, uniquely personal, incapable of external expression or validation, and believe that negative or conflicting emotions are intolerable ([Zvolensky, 2011](#)). The distress tolerance model posits that not only is the emotional experience significant, but the interpretation of these emotions and the strategies employed by individuals to manage or regulate them are equally crucial.

Drawing inspiration from the meta-diagnostic model, this framework accentuates the adverse interpretations of internal experiences, such as emotions. For instance, within the meta-diagnostic model, the emphasis is placed on the response to thoughts rather than the thoughts themselves, while the distress intolerance model similarly asserts that emotions are not inherently significant; rather, the theories regarding emotions and the responses elicited by these emotions are paramount ([Laposa et al., 2015](#)).

Various manifestations of anxiety symptoms share underlying vulnerabilities and appear to exhibit a more robust connection with excessive worry. Intolerance of uncertainty may serve a pivotal and distinctive role in elucidating anxiety symptoms. According to the intolerance of uncertainty model, individuals with anxiety disorders are inclined to interpret ambiguous information as threatening, and intolerance of uncertainty can provide the most comprehensive explanation for the interpretative biases observed in this population. Therefore, one plausible pathway through which intolerance of uncertainty contributes to anxiety disorders is that individuals with this intolerance exhibit a pronounced propensity to generate threatening interpretations of ambiguous stimuli, culminating in heightened levels of worry, anxiety, panic, and even anxiety sensitivity ([Dugas et al., 2007](#)).

The findings of this study align with a growing body of research that emphasizes the importance of meta-diagnostic factors—such as intolerance of uncertainty (IU)—in understanding the relationship between personality traits like neuroticism and anxiety severity across different anxiety disorders. Neuroticism, a trait associated with increased emotional sensitivity and vulnerability to stress, has long been linked to anxiety. However, this study highlights that IU plays a crucial mediating role in this relationship. This finding suggests that individuals with high neuroticism may be more likely to experience heightened anxiety intensity when they also exhibit a high intolerance of uncertain situations. The mediation model used in this study suggests that addressing IU may reduce anxiety severity among highly neurotic individuals, providing valuable insights for clinicians. Interventions targeting IU could be particularly beneficial for these individuals, potentially leading to more effective management of anxiety symptoms. For instance, therapies such as Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy (ACT) have shown promise in reducing IU and could be tailored to better serve individuals with high neuroticism. Furthermore, the study's focus on multiple types of anxiety disorders (generalized anxiety disorder, social anxiety disorder, and panic disorder) adds strength to its findings by suggesting that the relationship between neuroticism, IU, and anxiety is not disorder-specific but may generalize across different anxiety disorders.

Despite its strengths, this study has several limitations that warrant consideration. First, the cross-sectional design of the study limits causal inference, meaning that while relationships among

neuroticism, IU, and anxiety were identified, causality cannot be established. A longitudinal design would help clarify the directionality and stability of these relationships over time. Additionally, this study focused exclusively on a sample of female patients from Tehran, which may limit the generalizability of the findings to other populations, including male patients and individuals from different cultural backgrounds.

Another limitation is the self-report nature of the measurement tools, which may introduce response biases, such as social desirability or recall bias. Moreover, while the structural equation modeling approach is a robust method for examining complex relationships, it does not rule out potential confounding variables that could also influence anxiety severity, such as life stressors, social support, or genetic factors. Including such variables in future research may yield a more comprehensive understanding of the anxiety-neuroticism relationship.

To build on these findings, future studies should consider a longitudinal design to explore the stability and causal direction of the relationships between neuroticism, IU, and anxiety severity. Additionally, examining this model in more diverse samples, including male patients and individuals from various cultural backgrounds, would help determine the generalizability of the results. Including other meta-diagnostic factors, such as emotional regulation strategies or rumination, could also provide further insight into how personality traits like neuroticism contribute to anxiety. In clinical practice, these findings underscore the importance of incorporating IU-focused interventions for individuals with high neuroticism. Future intervention studies might explore the efficacy of therapies that specifically address IU, potentially integrating them into treatment plans for anxiety disorders characterized by high neuroticism.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the ethics committee of Farhangian University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection, and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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