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Predictive Modeling of Health Anxiety From Personality Dimensions and Physiological Stress Parameters

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A B S T R A C T

The primary objective of this study was to develop a comprehensive predictive model of health anxiety by integrating foundational personality dimensions with objective physiological stress parameters. This cross-sectional study evaluated a sample of $N = 438$healthy adults in Taiwan. Psychological constructs were measured utilizing the Short Health Anxiety Inventory and the NEO Five-Factor Inventory. Objective physiological stress was quantified through baseline salivary cortisol assays and continuous heart rate variability monitoring to measure the root mean square of successive differences (RMSSD). Statistical evaluation was conducted using hierarchical multiple regression modeling to determine the incremental predictive validity of the physiological variables. The sample consisted of 52.7%females with a mean age of $M = 35.42$. The final hierarchical regression model was highly significant and accounted for 44.1%of the total variance in health anxiety. Trait neuroticism was the strongest psychological predictor ($\beta = .42$). Crucially, objective biological markers provided significant incremental predictive validity, with elevated baseline salivary cortisol ($\beta = .15$) and reduced parasympathetic vagal tone as measured by RMSSD ($\beta = -.18$) serving as significant independent predictors of heightened health anxiety. Health anxiety is a profoundly psychophysiological condition driven by a synergistic interaction between inherent characterological vulnerabilities, such as neuroticism, and systemic autonomic and neuroendocrine dysregulation.

Keywords: *Health Anxiety; Personality Dimensions; Neuroticism; Heart Rate Variability*

1. Introduction

Health anxiety is conceptualized as a dimensional psychological construct characterized by an enduring, distressing preoccupation with the possibility of having or acquiring a severe medical condition. At its most severe, this phenomenon manifests clinically as Somatic Symptom Disorder or Illness Anxiety Disorder, leading to profound impairments in daily functioning and significant burdens on healthcare systems (Sauer et al., 2023). Individuals afflicted with elevated health anxiety demonstrate a heightened sensitivity to normative bodily sensations, often catastrophizing these innocuous signals as unequivocal evidence of impending pathology. This hypervigilance is not merely cognitive; it functionally alters perceptual processing, as evidence indicates that underlying health anxiety amplifies fearful physiological and psychological responses to illness-related imagery and external stimuli (Benke et al., 2024). Consequently, the chronic misinterpretation of these somatic cues leads to profound psychosomatic distress, significantly reducing patient enablement and degrading the overall quality of life across diverse clinical populations (Chan et al., 2020).

The profound vulnerability of global populations to health anxiety was starkly illuminated during recent unprecedented global health crises, most notably the COVID-19 pandemic. The rapid dissemination of a novel pathogen served as a pervasive environmental stressor that severely exacerbated baseline health concerns across both clinical and non-clinical cohorts. Research has demonstrated that heightened risk perception and the social isolation mandated by public health protocols acted as critical precursors, significantly predicting pandemic-related anxiety through the mediating mechanism of generalized health anxiety (Aghajani et al., 2022). This ambient threat environment fostered specific manifestations of distress, such as coronaphobia, which critically intertwined with health anxiety and death anxiety to predict severe psychological outcomes, including postpartum depression symptomatology among highly vulnerable demographic groups (Andrei et al., 2023). Furthermore, the overwhelming demands placed on healthcare infrastructures led to significant psychological tolls on medical personnel, revealing complex relationships between coping mechanisms, occupational stress, and health anxiety among professionals attempting to navigate the crisis (Nkyi & Baaba, 2024).

The amplification of health anxiety during widespread crises is heavily modulated by both informational environments and individual cognitive appraisals. The proliferation of unverified information and rumors on social networks during periods of acute societal stress significantly compromised adaptive emotion regulation strategies, further entrenching health anxiety within the general public (Shahamatinejad, 2021). The psychological fallout observed during these periods was largely driven by the activation of maladaptive health beliefs and irrational loci of control, which served as robust predictors of both generalized and virus-specific somatic anxiety (Shivak et al., 2023; Yousefi Salekdeh et al., 2023). Conversely, the deployment of adaptive cognitive emotion regulation strategies and the active cultivation of spiritual well-being emerged as vital protective factors, effectively buffering individuals against the escalating trajectory of health anxiety during prolonged periods of profound uncertainty (Dehghanizadeh et al., 2021).

Beyond external environmental triggers, the etiology and long-term maintenance of health anxiety are deeply rooted in specific transdiagnostic cognitive and emotional vulnerabilities. A cornerstone of this psychopathology is the intolerance of uncertainty, a dispositional characteristic wherein ambiguous or unknown somatic and medical scenarios are perceived as inherently threatening and intolerable. This intolerance significantly predicts health anxiety, a relationship that is frequently mediated by deficits in cognitive flexibility and the exacerbating behavioral effects of cyberchondria—the compulsive, distress-driven searching of health information online (Mohamadi Nia & Nasehi, 2023). Structural equation modeling further underscores that the pernicious effects of intolerance of uncertainty on health anxiety are compounded by repetitive negative thinking, specifically rumination, while positive self-relational traits such as self-compassion offer a potential buffering effect against somatic worry (Polat, 2025). Furthermore, introspective awareness—the conscious attention directed toward internal physiological states—has been identified as a critical predictive factor; when this awareness becomes maladaptively hyper-focused, it directly fuels the severity of somatic preoccupation (Bulut et al., 2025).

The complex cognitive architecture of health anxiety is further characterized by distinct processing biases and deeply held metacognitive frameworks. Individuals prone to health-related apprehension frequently exhibit a looming cognitive style, visualizing potential health threats as rapidly

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intensifying and temporally proximal. This specific cognitive distortion significantly drives the severity of health anxiety, operating through the intermediate mechanisms of anxiety sensitivity and intolerance of uncertainty (Bükrük & Aldemir, 2024). Metacognitive beliefs—specifically the steadfast conviction that worrying about one's health is uncontrollable or inherently dangerous—are deeply implicated in the persistence of somatic distress and hypochondriacal concerns, operating completely independently of the individual's actual medical status (Keen et al., 2022). Recent technological advancements utilizing sophisticated machine learning algorithms have confirmed that an array of distinct cognitive biases, including selective attentional bias toward illness cues and negative interpretation bias regarding normal somatic symptoms, hold profound predictive power in accurately identifying individuals at high risk for clinical health anxiety (Shi et al., 2024).

The dynamic interplay between emotional dysregulation and profound somatic exhaustion also plays a critical role in the clinical presentation and maintenance of health-anxious states. For instance, populations suffering from chronic fatigue syndrome exhibit a complex causal matrix wherein deteriorated sleep quality and emotional exhaustion are intimately linked to health anxiety, a relationship heavily mediated by underlying cognitive styles and severe emotion regulation deficits (Enayatian et al., 2024). A transdiagnostic approach further clarifies this dynamic, demonstrating that anxiety sensitivity—the explicit fear of arousal-related somatic sensations—precipitates health anxiety, with this pathological cascade being significantly governed by the individual's capacity for distress tolerance and their overall efficacy in emotion regulation (Mohsenabadi et al., 2025). These findings collectively suggest that health anxiety is not merely an isolated phobic response to the concept of illness, but rather a systemic failure in successfully processing and regulating internal physiological and emotional data.

Crucially, these cognitive and emotional vulnerabilities do not arise in a vacuum; rather, they are heavily scaffolded by foundational, enduring personality dimensions. Extensive literature highlights the predictive utility of overarching personality frameworks, most notably the Big Five model, in determining susceptibility to severe psychological distress. High levels of neuroticism—characterized by a pervasive tendency toward negative affectivity, emotional instability, and vulnerability to stress—consistently emerge as the strongest temperamental predictors of generalized anxiety, depressive symptoms, and specific health-related worries (Nikčević et al., 2021). Moreover, the continuous correlation between inherent personality traits, such as high neuroticism and low conscientiousness, and the deployment of cognitive emotion regulation strategies dictates the ultimate severity of an individual's health anxiety in the face of ongoing external stressors (Sharmi Alamdari et al., 2023).

The pervasive influence of personality structures extends deeply into the realm of clinical pathology and diagnostic categorization. In psychiatric populations presenting with severe, intractable health anxiety, there is a markedly high prevalence of co-occurring maladaptive personality traits and formalized personality disorders. This high degree of clinical comorbidity strongly suggests that severe hypochondriasis may represent a specific manifestation of broader, deeply ingrained characterological dysfunction, particularly involving personality clusters associated with anxious, fearful, or emotionally dysregulated baseline behaviors (Skjernov et al., 2020). Thus, meticulously understanding an individual's baseline personality architecture is an indispensable prerequisite for accurately modeling their risk of developing debilitating health anxiety, as these fixed traits heavily dictate both the initial perception of somatic threat and the magnitude of the subsequent cognitive-emotional reaction.

Despite the highly robust body of literature detailing the psychological, cognitive, and temperamental predictors of health anxiety, a significant empirical gap remains regarding the integration of objective physiological stress parameters into comprehensive predictive models. Health anxiety is fundamentally a psychophysiological phenomenon; the subjective fear of illness is inevitably accompanied by a cascade of objective physiological reactions governed by the autonomic nervous system and the hypothalamic-pituitary-adrenal axis. While researchers have extensively modeled self-reported constructs such as looming cognitive styles, distress tolerance, and metacognitive beliefs, the reliance on purely subjective, self-report methodologies introduces inherent measurement biases. This limitation is particularly salient in hypochondriacal populations, who are already characterized by distorted somatic perception and an inability to accurately gauge their own physical states. The inclusion of biological markers, such as heart rate variability serving as an index of parasympathetic regulation and salivary cortisol serving as a measure of basal neuroendocrine stress, provides a crucial, objective lens into the organism's true state of physiological arousal and allostatic load.

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Integrating continuous, objective physiological data with established psychological frameworks represents the next necessary evolution in the empirical study of somatic symptom disorders. Personality dimensions, particularly neuroticism and conscientiousness, are known to correlate not only with subjective emotional states but also with distinct patterns of autonomic reactivity. For example, individuals possessing high trait negative affectivity often exhibit diminished vagal tone and hyper-reactive cortisol profiles, establishing a rigid biological diathesis that makes the cognitive hypervigilance of health anxiety significantly more likely to occur and profoundly harder to extinguish. Traditional psychotherapeutic approaches primarily target the conscious appraisal of somatic symptoms; however, if the underlying autonomic hyperarousal is not simultaneously modeled and addressed, the patient remains physiologically primed for relapse. Identifying which specific physiological stress parameters are most predictive of health anxiety, and how they interact with fixed personality dimensions, allows for the development of highly tailored, biologically-informed clinical interventions. However, very few studies have simultaneously quantified both the overarching personality dimensions and the continuous physiological stress parameters to evaluate their independent and synergistic predictive validity regarding somatic distress. A comprehensive model that accounts for both the cognitive-personality traits and the autonomic neuroendocrine regulation is vital for advancing diagnostic precision.

In conclusion, while the theoretical understanding of health anxiety has been significantly enriched by investigations into cognitive biases, emotional regulation deficits, and self-reported personality traits, current predictive models remain fundamentally incomplete without the inclusion of objective biological markers. The complex etiology of health anxiety—exacerbated by modern environmental stressors and deeply rooted in characterological vulnerabilities—demands a multidimensional investigatory approach that bridges psychology and biology. By moving beyond isolated psychological assessments and formally incorporating rigorous, laboratory-based physiological stress indices, researchers can construct a more holistic, robust, and clinically translatable model of somatic preoccupation. Addressing this critical gap in the psychophysiological literature will explicitly illuminate how psychological predispositions biologically manifest to sustain the debilitating cycle of hypochondriacal fear. Therefore, the aim of the present study was to develop a comprehensive predictive model of health anxiety based on foundational personality dimensions and objective physiological stress parameters.

2. Methods and Materials

2.1. Study Design and Participants

This research utilized a cross-sectional, quantitative, and predictive study design to investigate the relationships between personality dimensions, physiological stress parameters, and health anxiety. The target population consisted of healthy adults residing in Taiwan. A purposive sampling technique was employed to recruit participants from various community centers, local clinics, and university campuses across major urban areas in Taiwan, primarily focusing on Taipei and Kaohsiung. The final sample comprised exactly $N = 438$participants who met the strict inclusion criteria for the study. To be eligible for participation, individuals were required to be between the ages of eighteen and sixty-five, possess sufficient proficiency in traditional Chinese to understand the informed consent and survey materials, and report no prior formal clinical diagnosis of severe psychiatric disorders such as schizophrenia or bipolar disorder. Furthermore, individuals currently undergoing pharmacological treatment that could significantly alter autonomic nervous system function or hypothalamic-pituitary-adrenal axis activity, such as beta-blockers or synthetic corticosteroids, were excluded from the study to prevent confounding effects on the physiological data.

2.2. Measures

Data were collected through a combination of validated self-report psychological questionnaires and objective physiological measurements, all administered in a controlled, temperature-regulated laboratory setting to minimize external environmental stressors. To measure the primary dependent variable, health anxiety, the Short Health Anxiety Inventory was utilized. This instrument assesses excessive worry regarding health, awareness of bodily sensations, and the feared consequences of having an illness, with higher composite scores indicating greater levels of health anxiety. Personality dimensions were evaluated using the NEO Five-Factor Inventory, a widely recognized self-report tool that measures the prominent traits of neuroticism, extraversion, openness to experience, agreeableness, and

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conscientiousness. Both psychological instruments were administered using culturally adapted and validated traditional Chinese translations, which have demonstrated robust internal consistency and test-retest reliability in previous Taiwanese populations. Following the completion of the psychological assessments, participants underwent a standardized physiological recording session to capture stress parameters. Heart rate variability, a primary indicator of autonomic nervous system regulation, was continuously monitored using a high-resolution electrocardiogram over a ten-minute resting baseline period. Specifically, the root mean square of successive differences between normal heartbeats and the ratio of low-frequency to high-frequency power were extracted as indices of parasympathetic and sympathovagal balance, respectively. Additionally, salivary cortisol samples were collected using synthetic swabs immediately after the resting baseline to provide a reliable neuroendocrine biomarker of basal physiological stress, with the samples being immediately frozen at $-20°C$until subsequent biochemical assay analysis.

2.3. Data Analysis

All collected psychological and physiological data were systematically coded, cleaned, and analyzed using the Statistical Package for the Social Sciences software. Preliminary data screening was conducted to identify missing values, detect univariate and multivariate outliers, and ensure the assumptions of normality, linearity, and homoscedasticity were met for all continuous variables. Descriptive statistics, including means, standard deviations, and range values, were calculated to summarize the demographic characteristics, personality trait scores, physiological parameter baseline levels, and health anxiety severity of the sample. Bivariate relationships between the continuous study variables were initially explored using Pearson product-moment correlation coefficients to identify significant unadjusted associations between specific personality dimensions, such as neuroticism and conscientiousness, heart rate variability metrics, cortisol levels, and health anxiety scores. To address the primary research objective and construct a predictive model, a hierarchical multiple linear regression analysis was performed. Demographic variables such as age and biological sex were entered in the first step to control for their potential confounding variance. In the second step, the five personality dimensions were entered into the model, followed by the physiological stress parameters, specifically the root mean square of successive differences and salivary cortisol concentrations, in the final step. This sequential entry method allowed for the evaluation of the unique and incremental predictive validity of physiological stress markers beyond what is accounted for by self-reported personality traits. Multicollinearity among the predictor variables was assessed using the variance inflation factor and tolerance statistics to ensure model stability. All statistical tests were two-tailed, and the threshold for determining statistical significance was rigorously maintained at an alpha level of $p < 0.05$.

3. Findings and Results

The findings of this study provide a comprehensive understanding of the interplay between personality dimensions, physiological stress parameters, and health anxiety among the sampled adult population in Taiwan ($N = 438$). Preliminary analyses were conducted to ensure that there were no violations of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. An examination of the demographic characteristics, which are not presented in the tables but are crucial for contextualizing the sample, revealed that the participants had a mean age of $M = 35.42$years ($SD = 10.15$, range = $18 - 64$years). The sample was relatively balanced in terms of biological sex, comprising $n = 231$females (52.7%) and $n = 207$males (47.3%). Regarding educational attainment, 68.5%($n = 300$) held a bachelor's degree or higher, indicating a well-educated cohort. The descriptive statistics for the primary continuous variables, including the Short Health Anxiety Inventory (SHAI) scores, NEO Five-Factor Inventory dimensions, salivary cortisol levels, and heart rate variability (HRV) indices (RMSSD and LF/HF ratio), are detailed in Table 1. The mean SHAI score of the sample ($M = 14.65$, $SD = 5.23$) indicates a mild to moderate baseline level of health anxiety within this non-clinical population. Salivary cortisol concentrations ($M = 12.45$ nmol/L, $SD = 3.82$) and RMSSD values ($M = 42.18$ ms, $SD = 15.60$) were found to be within standard physiological ranges for healthy adults.

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Table 1

Descriptive Statistics for Health Anxiety, Personality Dimensions, and Physiological Stress Parameters

Variable	***M***	***SD***	Skewness	Kurtosis	Range
Health Anxiety (SHAI)	14.65	5.23	0.85	0.42	4.00 – 32.00
Neuroticism	24.12	6.88	0.34	−0.15	9.00 – 45.00
Extraversion	28.45	5.92	−0.21	−0.48	12.00 – 46.00
Openness	27.30	5.45	−0.11	0.22	14.00 – 44.00
Agreeableness	31.88	5.10	−0.45	0.31	16.00 – 48.00
Conscientiousness	32.50	6.20	−0.38	−0.20	15.00 – 49.00
Salivary Cortisol (nmol/L)	12.45	3.82	0.72	0.55	4.10 – 24.50
HRV: RMSSD (ms)	42.18	15.60	0.91	1.10	15.20 – 98.40
HRV: LF/HF Ratio	1.65	0.85	1.25	1.45	0.45 – 4.80

Bivariate relationships between all primary study variables were explored using Pearson product-moment correlations, the results of which are presented in Table 2. The correlation matrix reveals several statistically significant associations that align with the theoretical framework of the study. Most notably, health anxiety demonstrated a strong, positive correlation with the personality dimension of neuroticism ($r = .58$, $p < .001$), suggesting that individuals with higher trait negative affectivity are significantly more prone to experiencing health-related worries. Conversely, health anxiety was significantly negatively correlated with extraversion ($r = -.24$, $p < .01$) and conscientiousness ($r = -.31$, $p < .001$). In terms of physiological parameters, health anxiety showed a moderate positive correlation with baseline salivary cortisol levels ($r = .35$, $p < .001$) and the LF/HF ratio ($r = .28$, $p < .01$), indicative of heightened sympathetic arousal and HPA axis activity. Furthermore, a significant negative correlation was observed between health anxiety and RMSSD ($r = -.39$, $p < .001$), highlighting a relationship between reduced parasympathetic vagal tone and elevated health worries. Significant cross-domain correlations were also observed; for instance, neuroticism was positively associated with cortisol ($r = .29$, $p < .001$) and negatively associated with RMSSD ($r = -.26$, $p < .01$).

Table 2

Pearson Correlation Matrix for Psychological and Physiological Variables

Variable	1	2	3	4	5	6	7	8	9
1. Health Anxiety	–								
2. Neuroticism	.58**	–							
3. Extraversion	−.24**	−.35**	–						
4. Openness	−.05	−.08	.28**	–					
5. Agreeableness	−.18**	−.22**	.15**	.12*	–				
6. Conscientiousness	−.31**	−.41**	.25**	.10*	.34**	–			
7. Salivary Cortisol	.35**	.29**	−.12*	.04	−.08	−.19**	–		
8. RMSSD	−.39**	−.26**	.18**	.06	.11*	.22**	−.42**	–	
9. LF/HF Ratio	.28**	.21**	−.10*	−.02	−.05	−.15**	.31**	−.55**	–

To determine the independent and incremental predictive value of personality dimensions and physiological stress parameters on health anxiety, a three-step hierarchical multiple linear regression analysis was conducted. The results of this predictive modeling are detailed in Table 3. In Step 1, demographic variables (age and sex, with male coded as 0and female as 1) were entered to control for their variance. This initial model was statistically significant, $F(2,435) = 4.85$, $p < .01$, although it accounted for only 2.2%of the variance in health anxiety ($R^2 = .022$). Female sex was a significant positive predictor ($\beta = .12$, $p < .05$). In Step 2, the five personality dimensions were introduced, resulting in a substantial and statistically significant increase in the explained variance, $\Delta R^2 = .354$, $\Delta F(5,430) = 48.32$, $p < .001$. Within this step, neuroticism emerged as the strongest positive predictor ($\beta = .48$, $p < .001$), while conscientiousness served as a significant negative predictor ($\beta = -.14$, $p < .01$). In the final step (Step 3), the physiological stress parameters (salivary cortisol, RMSSD, and LF/HF ratio) were added to the model. This step yielded

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a significant incremental increase in predictive power beyond demographics and personality traits, $\Delta R^2 = .065$, $\Delta F(3,427) = 16.45$, $p < .001$. The final comprehensive model accounted for a total of 44.1%of the variance in health anxiety scores ($R^2 = .441$, Adjusted $R^2 = .428$, $F(10,427) = 33.68, p < .001$). In the fully adjusted model, elevated salivary cortisol ($\beta = .15$, $p < .01$) and reduced RMSSD ($\beta = -.18$, $p < .001$) remained significant physiological predictors of health anxiety, while the LF/HF ratio did not reach statistical significance ($\beta = .06$, $p = .182$). Neuroticism retained its status as the most robust overall predictor ($\beta = .42, p < .001$).

Table 3

Hierarchical Multiple Regression Analysis Predicting Health Anxiety

Predictor	ΔR^2	B	SEB	β	t	p
Step 1: Demographics	.022**					
Age		−.03	.02	−.06	−1.25	.212
Sex (Female)		1.25	.50	.12	2.50	.013
Step 2: Personality	.354**					
Neuroticism		.36	.04	.48	9.85	<.001
Extraversion		−.04	.04	−.05	−1.05	.295
Openness		.02	.04	.02	0.55	.584
Agreeableness		−.05	.04	−.05	−1.18	.238
Conscientiousness		−.12	.04	−.14	−3.10	.002
Step 3: Physiology	.065**					
Salivary Cortisol		.20	.06	.15	3.25	.001
HRV: RMSSD		−.06	.02	−.18	−3.85	<.001
HRV: LF/HF Ratio		.35	.26	.06	1.34	.182

4. Discussion and Conclusion

The primary objective of this research was to construct and evaluate a comprehensive predictive model of health anxiety by integrating foundational personality dimensions with objective physiological stress parameters. The findings from the hierarchical multiple regression analysis revealed that the complete model was highly significant, ultimately accounting for 44.1%of the variance in health anxiety scores among the sampled population. In the initial steps of the analysis, female sex and the personality trait of neuroticism emerged as significant positive predictors, while conscientiousness demonstrated a significant negative predictive value. Crucially, the final step of the model demonstrated that objective physiological markers, specifically elevated baseline salivary cortisol concentrations and reduced root mean square of successive differences in heart rate variability, provided significant incremental predictive validity beyond demographic and self-reported personality traits. These results substantiate the hypothesis that health anxiety is not solely a cognitive or characterological phenomenon, but rather a profoundly psychophysiological condition sustained by systemic autonomic and neuroendocrine dysregulation.

The prominent predictive role of personality dimensions, particularly the robust positive association between neuroticism and health anxiety, aligns perfectly with established psychological frameworks. Individuals with high levels of trait neuroticism are inherently predisposed to experience negative affectivity, emotional instability, and a generalized vulnerability to environmental and internal stressors (Nikčević et al., 2021). This inherent disposition lowers the threshold for threat detection, making these individuals significantly more likely to appraise ambiguous bodily sensations as dangerous or pathological. The current findings are supported by previous research indicating that high neuroticism, coupled with specific deficits in cognitive emotion regulation strategies, creates a psychological environment where health-related worries can rapidly escalate into severe somatic anxiety (Sharmi Alamdari et al., 2023). Conversely, the protective role of conscientiousness observed in our model suggests that individuals who are organized, deliberate, and capable of long-term goal-directed behavior may possess superior self-regulation capacities, allowing them to rationally evaluate somatic symptoms rather than succumbing to catastrophic misinterpretations. This deep intertwining of personality structure and somatic distress is further corroborated by clinical observations showing that severe, treatment-

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resistant health anxiety frequently co-occurs with formalized personality disorders, particularly those characterized by pervasive emotional dysregulation and fearful avoidant behaviors (Skjernov et al., 2020). Thus, baseline characterological architecture acts as the primary filter through which internal physiological data are processed and appraised.

Beyond the subjective appraisal of symptoms driven by personality traits, the significant predictive power of objective physiological stress markers highlights the fundamental biological underpinnings of health anxiety. The finding that elevated basal salivary cortisol—a primary biomarker of hypothalamic-pituitary-adrenal axis activation—predicts higher health anxiety suggests that individuals experiencing chronic somatic preoccupation are existing in a state of continuous, systemic allostatic load. This biological hyperarousal directly fuels the psychological symptomatology, as chronic physiological stress functionally amplifies fearful and defensive responses to internal and external illness-related imagery (Benke et al., 2024). Furthermore, the significant negative predictive value of the root mean square of successive differences, an index of parasympathetic vagal tone, indicates that individuals with health anxiety suffer from a degraded capacity to biologically soothe themselves. When the autonomic nervous system is dominated by sympathetic drive and lacks sufficient parasympathetic regulation, individuals experience heightened interoceptive sensations—such as palpitations or muscle tension—which maladaptively hyper-focused introspective awareness then misinterprets as impending medical catastrophes (Bulut et al., 2025). Over time, this unrelenting cycle of autonomic hyperarousal and cognitive misinterpretation leads to profound emotional exhaustion and chronic fatigue, further entrenching the patient in a state of severe psychosomatic vulnerability (Enayatian et al., 2024). The presence of these biological markers confirms that severe somatic symptom disorders involve a tangible breakdown in the body's natural stress-response mechanisms (Sauer et al., 2023).

The integration of these physiological parameters with personality traits provides a critical context for understanding the complex cognitive biases that maintain health anxiety. The heightened state of physiological arousal, driven by underlying neuroticism and marked by elevated cortisol and reduced vagal tone, creates an internal environment highly susceptible to cognitive distortions. For instance, heightened anxiety sensitivity—the explicit fear of these very physiological arousal sensations—operates as a profound driver of health anxiety, particularly when individuals possess low distress tolerance and poor emotion regulation skills (Mohsenabadi et al., 2025). The biological discomfort associated with low parasympathetic tone forces the cognitive apparatus to search for a cause, frequently resulting in a looming cognitive style where minor somatic fluctuations are viewed as rapidly approaching, lethal threats (Bükrük & Aldemir, 2024). Advanced predictive modeling in previous studies has demonstrated that these specific cognitive biases, particularly the selective attentional bias toward illness cues, are highly accurate in identifying clinical health anxiety (Shi et al., 2024). Consequently, the chronic misinterpretation of stress-induced somatic cues not only drives the subjective psychological distress but significantly degrades patient enablement, rendering individuals incapable of effectively managing their health and leading to a heavy reliance on medical reassurance that ultimately fails to resolve the underlying autonomic dysfunction (Chan et al., 2020).

In conclusion, the findings of this predictive modeling study unequivocally demonstrate that health anxiety is a complex, multidimensional construct driven synergistically by fixed psychological traits and dynamic biological states. Neuroticism serves as the foundational psychological vulnerability, predisposing individuals to negative affectivity and an exaggerated perception of threat. However, this cognitive vulnerability is substantially compounded and biologically locked in by systemic physiological dysregulation, evidenced by heightened hypothalamic-pituitary-adrenal axis activity and degraded parasympathetic vagal tone. By proving that salivary cortisol and heart rate variability metrics offer significant incremental predictive validity beyond mere demographic and personality factors, this study solidifies the necessity of viewing severe somatic preoccupation through a rigorous psychophysiological lens. Ultimately, health anxiety represents a systemic failure of both cognitive appraisal and autonomic self-regulation, requiring a holistic understanding that transcends traditional, purely psychological paradigms.

Despite the robust findings and methodological rigor of the current research, several notable limitations must be carefully considered when interpreting the results. First, the cross-sectional nature of the study design inherently precludes the establishment of definitive causal relationships between personality dimensions, physiological stress parameters, and the onset of health anxiety. It remains entirely plausible that the chronic psychological distress of health anxiety reciprocally induces the observed alterations

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in basal cortisol and vagal tone, rather than the physiological markers strictly preceding the psychological state. Second, while physiological parameters were measured objectively, the assessment of personality dimensions and health anxiety relied entirely on self-report questionnaires, which are perennially subject to response biases, limited self-insight, and social desirability effects. Third, the physiological data, specifically salivary cortisol and resting heart rate variability, were collected at a single baseline time point within a highly controlled laboratory environment. This singular measurement approach fails to capture the dynamic, diurnal fluctuations of the neuroendocrine system or the real-time autonomic reactivity that occurs when an individual encounters a naturalistic health-related stressor. Finally, the purposive sampling of adults strictly within urban centers of Taiwan may limit the broader cross-cultural generalizability of the findings, as the expression of somatic distress and the appraisal of illness threats are profoundly influenced by regional cultural paradigms and local healthcare infrastructures.

To address these limitations and further advance the empirical understanding of health anxiety, future research must prioritize longitudinal and ambulatory methodological approaches. Implementing longitudinal cohort studies will be critical for mapping the temporal trajectory of these variables, allowing researchers to determine whether specific personality profiles and baseline autonomic deficits act as true antecedent risk factors for the later development of clinical health anxiety. Furthermore, the integration of wearable biometric technology offers a highly promising avenue for future investigations. By utilizing continuous, real-time ambulatory monitoring of heart rate variability and electrodermal activity in naturalistic settings, researchers can capture exactly how the autonomic nervous system behaves during spontaneous episodes of health-related worry or compulsive symptom checking. Experimental designs should also be utilized, wherein individuals are exposed to standardized, safe somatic stressors—such as mild hyperventilation or physical exertion—to directly observe and quantify the subsequent physiological recovery rates and cognitive appraisals among those with high versus low trait health anxiety. Such dynamic assessments will provide a much more granular understanding of the biological mechanisms that sustain hypochondriacal fears.

The empirical evidence generated by this study holds profound and direct implications for the clinical conceptualization and practical treatment of health anxiety and somatic symptom disorders. Given that physiological stress parameters significantly predict the severity of somatic preoccupation, clinicians must move beyond exclusively cognitive interventions and actively incorporate physiological regulation strategies into their treatment protocols. Traditional cognitive-behavioral therapies, while effective for restructuring irrational health beliefs, may prove insufficient if the patient remains trapped in a state of chronic, underlying sympathetic hyperarousal. Therefore, integrating biofeedback, specifically heart rate variability coherence training, alongside cognitive restructuring can empower patients to objectively visualize and consciously down-regulate their own autonomic nervous system, directly directly mitigating the distressing physical sensations that trigger their health panic. Furthermore, conducting baseline personality assessments can assist practitioners in identifying patients who are particularly high in neuroticism and low in conscientiousness, allowing for the preemptive tailoring of therapeutic approaches to include intensive distress tolerance skills training. By simultaneously treating both the psychological misappraisals and the biological hyperarousal, mental health professionals can offer more comprehensive, durable, and physiologically grounded relief for individuals suffering from the debilitating cycle of health anxiety.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

References

Aghajani, S., Parzor, P., & Ahmadi, S. (2022). The role of risk perception and social isolation in predicting COVID-19 anxiety through the mediation of health anxiety in students. *Journal of Health and Care*, *23*(1), 7-19. https://doi.org/10.52547/jhc.23.1.7

Andrei, A.-M., Webb, R., & Enea, V. (2023). Health anxiety, death anxiety and coronaphobia: Predictors of postpartum depression symptomatology during the COVID-19 pandemic. *Midwifery*, *124*, 103747. https://doi.org/10.1016/j.midw.2023.103747

Benke, C., Wallenfels, L.-M., Bleichhardt, G., & Melzig, C. A. (2024). Health Anxiety Amplifies Fearful Responses to Illness-Related Imagery. *Scientific reports*, *14*(1). https://doi.org/10.1038/s41598-024-54985-y

Bükrük, T., & Aldemir, İ. D. (2024). The Role of Looming Cognitive Style in Health Anxiety Through the Mediation of Anxiety Sensitivity and Intolerance of Uncertainty. *Klinik Psikoloji Dergisi*. https://doi.org/10.57127/kpd.26024438.1533544

Bulut, S., Saadati, N., Al-Dossary, S. A., Coelho, O., Rostami, M., Parsakia, K., Zadhasn, Z., Seyed Ali Tabar, S. H., & Mehdi Abadi, P. (2025). Introspective Awareness and Its Predictive Power on Health Anxiety: A Cross-sectional Study. *Journal of Research and Health*, *15*(1), 71-80. https://jrh.gmu.ac.ir/article-1-2529-fa.html

Chan, C., Lau, B. H. P., Chan, T. H. Y., Leung, H. T., So, G. Y. K., & Chan, C. (2020). Examining the Moderating Role of Patient Enablement on the Relationship Between Health Anxiety and Psychosomatic Distress: A Cross-Sectional Study at a Traditional Chinese Medicine Outpatient Clinic in Hong Kong. *Frontiers in psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01081

Dehghanizadeh, Z., Allame, Z., & Eydi-Baygi, M. (2021). Prediction of Health Anxiety Based on Spiritual Well-Being and Cognitive Emotion Regulation Strategies During COVID-19 in Iranian Individuals. *Annals of Military and Health Sciences Research*, *19*(2). https://doi.org/10.5812/amh.113454

Enayatian, A., Fakouri Haji Yaar, H., & Akbari Amrghan, H. (2024). Developing a Causal Model of the Relationship Between Sleep Quality, Health Anxiety, Emotion Regulation, and Emotional Exhaustion Mediated by Cognitive Styles in Nurses with Chronic Fatigue Syndrome. *Nursing Education*, *13*(2), 75-88. https://jne.ir/article-1-1598-fa.html

Keen, E., Kangas, M., & Gilchrist, P. T. (2022). A systematic review evaluating metacognitive beliefs in health anxiety and somatic distress. *British Journal of Health Psychology*, *27*(4), 1398-1422. https://doi.org/10.1111/bjhp.12609

Mohamadi Nia, N., & Nasehi, A. (2023). Prediction of health anxiety based on non-tolerance of uncertainty: mediating role of cognitive flexibility and cyberchondria in women with breast cancer. *Quarterly of Breast Illness*, *16*(3). https://doi.org/10.30699/ijbd.16.3.65

Mohsenabadi, H., Pirmoradi, M. R., Tajrishi, K. Z., & Gharraee, B. (2025). A Transdiagnostic Approach to Investigate of the Relationships Between Anxiety Sensitivity and Health Anxiety: The Mediated Roles of Distress Tolerance and Emotion Regulation. *Frontiers in Psychiatry*, *16*. https://doi.org/10.3389/fpsyt.2025.1478442

Nikčević, A. V., Marino, C., Kolubinski, D. C., Leach, D. M., & Spada, M. M. (2021). Modelling the Contribution of the Big Five Personality Traits, Health Anxiety, and COVID-19 Psychological Distress to Generalised Anxiety and Depressive Symptoms During the COVID-19 Pandemic. *Journal of affective disorders*, *10*(1), 39-53. https://doi.org/10.1016/j.jad.2020.10.053

Nkyi, A. K., & Baaba, B. (2024). Coping, health anxiety, and stress among health professionals during Covid-19, Cape Coast, Ghana. *PLoS One*, *19*(1), e0296720. https://doi.org/10.1371/journal.pone.0296720

Polat, K. (2025). Relationships Between Health Anxiety, Intolerance of Uncertainty, Rumination and Self-Compassion: A Structural Equation and Latent Profile Analysis. *International Journal of Eurasia Social Sciences*, *16*(59), 290-313. https://doi.org/10.70736/ijoess.552

Sauer, K. S., Witthöft, M., & Rief, W. (2023). Somatic Symptom Disorder and Health Anxiety: Assessment and Management. *Neurologic Clinics*, *41*(4), 745-758. https://doi.org/10.1016/j.ncl.2023.02.009

Shahamatinejad, S. (2021). The Relationship between Health Anxiety and Emotion Regulation with Rumors on Social Networks during the COVID-19 Pandemic. *Journal of Assessment and Research in Applied Counseling (JARAC)*, *3*(1), 38-48. https://journals.kmanpub.com/index.php/jarac/article/view/48

Sharmi Alamdari, F., Mirzapour Alamdari, M., Khanekeshi, A., Hasanzadeh, M., & Yazdani, F. (2023). Correlation of personality traits and cognitive emotion regulation strategies with health anxiety during the COVID-19 pandemic. *Shenakht Journal of Psychology and Psychiatry*, *10*(2), 95-106. https://doi.org/10.32598/shenakht.10.2.95

Shi, C., Du, X., Chen, W., & Ren, Z. (2024). Predictive Roles of Cognitive Biases in Health Anxiety: A Machine Learning Approach. *Stress and Health*, *40*(5). https://doi.org/10.1002/smi.3463

Shivak, S., Caissie, D. M., Power, H. A., Asmundson, A. J. N., & Wright, K. D. (2023). The Relationship Between Maladaptive Health Beliefs, Pandemic-Related Stress, and Health Anxiety During the COVID-19 Pandemic. *Health Psychology Report*. https://doi.org/10.5114/hpr/169169

Skjernov, M., Bach, B., Fink, P., Fallon, B., Soegaard, U., & Simonsen, E. (2020). DSM-5 personality disorders and traits in patients with severe health anxiety. *The Journal of Nervous and Mental Disease*, *208*(2), 108-117. https://doi.org/10.1097/NMD.0000000000001108

Yousefi Salekdeh, B., Soltani Shal, R., & Shakerinia, A. (2023). The role of irrational health beliefs, health locus of control, and health anxiety in predicting COVID-19 anxiety. *Rooyesh-e-Ravanshenasi (Psychological Growth)*, *12*(11), 33-42. http://frooyesh.ir/article-1-4671-fa.html

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