

The relations between different factors of intolerance of uncertainty and symptoms of generalized anxiety disorder: a network analysis

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Abstract

Background: Intolerance of uncertainty (IU) is considered as a specific risk factor in the development and maintenance of generalized anxiety disorder (GAD). Yet, researches have investigated the relations between IU and GAD (or worry) using total scores on self-report measures. This ignores that there are two different factors exist in IU, and clinical heterogeneity and differential relations among symptoms of GAD. In the present study, we explored the relations among different factors of IU and symptoms of GAD.

Methods: A dimensional approach which take individual differences into consideration in different factors of IU along a full range of normal to abnormal symptom severity levels of GAD were used in this study. Unregularized partial-correlation networks were estimated using cross-sectional data from 624 university students. Factors of IU were measured by 12-item Intolerance of Uncertainty Scale and symptoms of GAD were measured by Generalized Anxiety Disorder 7-Item Questionnaire.

Results: Five edges between two factors of IU and symptoms of GAD, including edges are between “prospective anxiety” and “nervousness or anxiety”, between “prospective anxiety” and “worry too much”, between “inhibitory anxiety” and “uncontrollable worry”, between “inhibitory anxiety” and “worry too much”, and between “inhibitory anxiety” and “restlessness”. The symptom “worry too much” had the highest strength centrality in the present network. In the community of IU, factor “inhibitory anxiety” has the higher bridge strength than factor “prospective anxiety”. And in the community of GAD symptoms, symptom “worry too much” has the higher bridge strength than other symptoms.

Conclusions: This study reveals the underlying relationship between factors of IU and various symptoms of GAD. These findings may provide some references for related preventions and interventions, such as targeting “worry too much” may minimize the level of both IU and GAD symptoms and focusing on “inhibitory anxiety” may be more effective at reducing symptoms of GAD than focusing on “prospective anxiety”.

1. Introduction

With the lifetime prevalence ranging from 4.3–5.9%, generalized anxiety disorder (GAD) is one of the most common mental health problems all over the world [1]. Characterized by excessive and uncontrollable worry about a series of events or activities lasting for at least 6 months, GAD often accompanies with other nonspecific psychological and physical symptoms [2]. Individuals with GAD have considerable role impairment and a high comorbidity with depression [3]. If GAD is not treated promptly, the prognosis is poor [4]. Therefore, it is important to identify the developing and maintaining factors for GAD to improve existing intervention strategies.

Intolerance of uncertainty (IU), “a dispositional characteristic that reflects a set of negative beliefs about uncertainty and its connotations and consequences” [5], is considered to be a specific risk factor or cognitive vulnerability in the development and maintenance of anxiety disorders [6, 7]. To better explain the relationship between IU and the psychopathology of anxiety, the most comprehensive conceptual

model was developed, which was designed primarily to explain the symptoms of generalized anxiety disorder [8]. According to research on the relationship between IU and GAD [9], IU may develop and maintain symptoms of GAD by increasing repetitive negative thought (i.e., worry) [10]. Moreover, individuals with higher level of IU are more likely to treat ambiguous phenomena as unacceptable and threatening, which may lead to a negative problem orientation and an avoidance response style [11, 12]. Thus, they will be more prone to enter the process of worry. Under such model, increasing the patient's tolerance and acceptance of uncertainty are the center of GAD therapy [13]. This strategy is supported by some randomized clinical trials with moderate to large effects [14, 15, 16].

To date, the pathways through how IU is related to individual symptoms of GAD still need to be further explored. Prior researches have generally studied IU at the disorder level or the core symptom level (i.e., worry) [17, 18, 19, 20, 21, 22]. Studies have compared the IU across different diagnostic groups or examined IU in relation to total scores on self-report measures of GAD symptoms (such as Beck Anxiety Inventory [18], Trait-Anxiety Scale of State-Trait Anxiety Inventory [19], Hamilton Rating Scale for Anxiety [20], and Generalized Anxiety Disorder Questionnaire for the Diagnostic and Statistical Manual of Mental Disorders 4th edition [21]) or worry (such as Penn State Worry Questionnaire [17, 18, 19, 20, 22]). However, as GAD is a heterogeneous syndrome characterized by worry and various cognitive, affective, and physical symptoms, the conclusions drawn from these mentioned studies might be problematic. In addition, pathological worry also has different dimensions, such as generality, excessiveness and uncontrollability dimensions [23].

Neglecting the symptomatic heterogeneity of GAD and different dimensions of worry (e.g., excessiveness and uncontrollability dimensions) are serious limitations because it may mask differential associations between different clinical symptoms and different dimensions of worry and IU. In order to further understanding the relationship between IU and GAD, a symptom-level approach should be adopted considering worry and other cognitive, affective, and physical symptoms of GAD. Moreover, there is increasingly robust evidence that IU can be represented as having two factors, including prospective anxiety which involves fear and anxiety based on future events and inhibitory anxiety involves uncertainty inhibiting action or experience [24, 25]. These two factors may play different roles in the development and maintenance of GAD. Understanding the relations between different factors of IU and symptoms of GAD may increase our insights into the specific contribution of IU to GAD.

A promising approach revealing complex relations among individual symptoms of mental disorders and their risk factor is the network approach. According to network approach, mental disorders arise from complex reciprocal influences between their constituting symptoms, instead of a latent common cause [26, 27]. Recently, research has expanded symptom networks [28, 29, 30]. The researchers integrate cognitive and biological factors that are considered as the causal roles in mental disorders, in order to find out the causality of risk factor and symptoms in mental disorders. A systematic review article has also demonstrated that adding non-symptom (e.g., risk factor) should enhance the understanding of important aspects of psychopathology [31]. In addition, this approach can give several centralities (e.g., strength and

bridge strength) and predictability indicators for each node to quantify their importance and controllability in the entire network [31, 32].

By expanding depression and anxiety symptom networks to integrate emotion regulation difficulties, repetitive negative thinking and positive reappraisal were found to be differentially related to affective, cognitive, and somatic symptoms of depression and anxiety [33]. These differences cast light on potential pathways through which repetitive negative thinking and positive reappraisal may operate within depression and anxiety [33]. By incorporating genetic risk scores into symptom networks of psychosis, research has showed that the polygenic risk score is directly connected to the spectrum of positive and depressive symptoms and allowed for a novel outlook on the investigation of the relations between genome-wide association study-based polygenic risk scores and symptoms of mental disorders [34]. These studies supported that adding important and meaningful non-symptom components as nodes in related symptom networks is both empirically feasible and theoretically enriching [28, 31].

In the present study, we tend to uncover pathways between prospective anxiety and inhibitory anxiety of IU and various symptoms of GAD. We adopted an expanded network approach to model two factors of IU within symptoms networks of GAD. There were three aims in the present study. First, we want to specify differential relations among two factors of IU and different symptoms of GAD. Second, using strength centrality to determine the relative importance of two factors of IU and different symptoms of GAD in the present network. Third, using bridge strength centrality to examine which factor of IU has the stronger connections with symptoms of GAD and which symptom of GAD has the stronger connections with IU. In addressing these objectives, we sought to keep with the Research Domain Criteria [35] by considering varying degrees of two factors of IU (i.e., prospective anxiety and inhibitory anxiety) along the continuum of severity of different GAD symptoms. In this way, we attempted to improve the understanding of complex relations between individual differences in prospective anxiety, inhibitory anxiety, as well as severity of generalized anxiety symptoms.

2. Methods

2.1. Ethics statement

This study was approved by the Independent Ethics Committee of the First Affiliated Hospital of the Fourth Military Medical University (No. KY20182047-F-1). The present study was an online survey through Wenjuanxing (www.wjx.cn) from 16 December 2020 to 18 December 2020. The first part of this online survey mainly included the informed consent. After reading the informed consent, participants can click "I agree" to complete the following survey if they want to further participate in this study. Next, they will complete the following items. Participants were also reminded that the survey was anonymous and personal information would not be disclosed, except for demographic data obtained in the first part.

2.2. Participants

We used a dimensional approach that considered individual differences in prospective anxiety and inhibitory anxiety along a full range of normal to abnormal symptom severity levels of GAD (see Research

Domain Criteria) [35]. Therefore, there were no eligibility requirements for participants in this study. In this study, WeChat was used for the dissemination of our online survey, mainly drawing on the fact that WeChat is the most popular social media, with 1.15 billion active users in China [36]. A total of 633 university students from Xijing University participated in our study. All of these participants were undergraduate students. Nine questionnaires were excluded due to their demographic information is incomplete. At last, a total of 624 questionnaires were obtained.

2.3. Measures

2.3.1. Factors of intolerance of uncertainty

The 12-item Intolerance of Uncertainty Scale (IUS-12) is a short, efficient, psychometrically sound scale for measuring IU [24, 37]. Items are rated on a five-point Likert scale ranging from 1 (“not at all characteristic of me”) to 5 (“entirely characteristic of me”). IUS-12 scores should be based on a simple sum of items, which the total score being used for evaluating a general IU. This scale has two factors, including prospective anxiety which consists of the first seven IUS-12 questions and inhibitory anxiety which consists of the last five IUS-12 questions [24]. The internal consistency of IUS-12, prospective anxiety and inhibitory anxiety in the present study was good ($\alpha = 0.84$, $\alpha = 0.70$ and $\alpha = 0.84$, respectively).

2.3.2. Symptoms of generalized anxiety disorder

The Generalized Anxiety Disorder 7-Item Questionnaire (GAD-7) is a valid and efficient self-report questionnaire for measuring the frequency of symptoms of GAD over the last two weeks [38]. GAD-7 has 7 items and each item varies from 0 to 3 (point referred to “not at all”, “several days”, “more than half the days”, and “nearly every day”, respectively). The sum of scores ranges from 0 to 21, and the higher the total score, the higher the level of GAD severity. The internal consistency of GAD-7 in this study was excellent ($\alpha = 0.90$).

2.4. Network analysis

The network was estimated via Gaussian graphical model [39], which is undirected network and its edge represents the partial correlation between nodes after controlling for all other nodes in the network. To account for the ordinal nature of the IUS-12 and GAD-7, the nonparametric Spearman rho correlations were used when estimating the network structure, as recommended by Epskamp and Fried [40]. Due to the low variables (9 variables) but high samples (624 individuals), we used unregularized model selection rather than regularization techniques commonly used in estimating the networks [41]. The visualization of the network was conducted by the Fruchterman-Reingold algorithm [42]. In the visualized network, the blue edge represents the positive correlation, while the red edge represents the negative correlation. A thicker edge means a stronger correlation between two adjacent nodes. The network was constructed and visualized using the R-package *qgraph* [43].

Recent studies have shown that strength centrality is the most reliable centrality index, and the centrality indices of betweenness and closeness seem especially unsuitable for assessing the importance of nodes in psychological networks [44, 45]. Thus, we used R-package *qgraph* to calculate the strength centrality for each node [43]. The strength of a node is defined as the sum of the absolute value of all edges

connecting to a specific node. Strength centrality of a node represents its relative importance in the network. The higher the strength, the more important it is in the network. In addition, we used R-package *networktools* to calculate the bridge strength centrality for each node [46]. The bridge strength of a node is defined as the sum of the absolute value of all edges connecting a specific node with nodes in the other community. Higher bridge strength values indicate greater extent for increasing risk of contagion to other communities [46]. In the current network, nodes were divided into two communities in advance: one community includes two factors of IUS-12 and the other community consists of seven symptoms of GAD-7. Moreover, we used R-package *mgm* to compute the predictability for each node [32]. Predictability refers to the extent to which the variance of a node can be explained by all of its neighbors.

The robustness of network was examined through conducting the R-package *bootnet* [47]. First, we evaluated the accuracy of edge weights via computing 95% confidence intervals using a non-parametric bootstrap approach (2000 bootstrap samples). Second, we evaluated the stability of node strengths and node bridge strengths via calculating correlation stability coefficient using a case-dropping bootstrap approach. The value of correlation stability coefficient preferably should be above 0.5 and should not be below 0.25 [47]. Third, we conducted bootstrapped difference tests (2000 bootstrap samples and $\alpha = 0.05$) for edge weights, node strengths and node bridge strengths to examine whether two edge weights or two node strengths or two node bridge strengths differ significantly from one another.

3. Results

3.1. Descriptive statistics

The mean age of these 624 university students (43% male) was 19.38 ± 1.12 years (mean \pm SD, range 18–25 years). In addition, 246 participants were sole offspring and 378 participants were non-sole offspring. Participants' GAD-7 scores represented almost the full range of symptom severity. On the GAD-7 (M = 4.63, SD = 3.86), a total of 333 participants had minimal anxiety symptoms (range = 0–4), 236 had mild anxiety symptoms (range = 5–9), 37 had moderate anxiety symptoms (range = 10–14), and 18 had severe anxiety symptoms (range = 15–21). Furthermore, the scores on the prospective anxiety (M = 21.70, SD = 4.24, range = 9–34) and inhibitory anxiety (M = 13.38, SD = 4.12, range = 5–24) of the IUS-12 almost covered the full range of two factors of IU. Together, the distributional characteristics of the variables allowed the present investigation to estimate the strength of the relations among individual differences in factors of IU and symptoms of GAD.

Table 1 shows abbreviation, mean scores, standard deviations and predictability for each variable selected in the present network. Table S1 showed the nonparametric Spearman rho correlation matrix of these variables (in Supplemental Material).

Table 1

Abbreviation, mean scores, standard deviations and predictability for each variable selected in the present network.

Variables	Abbreviation	M	SD	Pre
Factors of intolerance of uncertainty				
Factor-1: Prospective anxiety	Prospective anxiety	21.70	4.24	0.39
Factor-2: Inhibitory anxiety	Inhibitory anxiety	13.38	4.12	0.40
Symptoms of generalized anxiety disorder				
GAD-1: Nervousness or anxiety	Nervous	0.89	0.65	0.48
GAD-2: Uncontrollable worry	Control worry	0.66	0.66	0.52
GAD-3: Worry too much	Worry too much	0.77	0.74	0.57
GAD-4: Trouble relaxing	Relax	0.69	0.77	0.55
GAD-5: Restlessness	Restless	0.48	0.68	0.52
GAD-6: Irritable	Irritable	0.71	0.72	0.53
GAD-7: Afraid something will happen	Afraid	0.43	0.64	0.52
Abbreviations: M, mean; SD, standard deviation; Pre, predictability				

3.2. Network structure

Network structure of different factors of IU and symptoms of GAD is shown in Fig. 1. This network shows some characteristics as below. First, 21 edges are not zero (58%) among 36 possible edges and all these edges are positive. Second, we find five edges between two factors of IU and symptoms of GAD, including edges are between “prospective anxiety” and “nervousness or anxiety” (weights = 0.10), between “prospective anxiety” and “worry too much” (weights = 0.12), between “inhibitory anxiety” and “uncontrollable worry” (weights = 0.11), between “inhibitory anxiety” and “worry too much” (weights = 0.08), and between “inhibitory anxiety” and “restlessness” (weights = 0.12). In addition, we find three symptoms of GAD, including “trouble relaxing”, “irritable”, and “afraid something will happen”, do not connect with “prospective anxiety” or “inhibitory anxiety”. We also find five strongest edges are between “prospective anxiety” and “inhibitory anxiety” (weights = 0.47), between “restlessness” and “afraid something will happen” (weights = 0.33), between “worry too much” and “trouble relaxing” (weights = 0.30), between “trouble relaxing” and “irritable” (weights = 0.25), and between “nervousness or anxiety” and “uncontrollable worry” (weights = 0.24). Bootstrapped 95% confidence interval indicating the accuracy of edge weights was relatively reliable and accurate (Figure S1 in the supplementary material). Moreover, in the present network, bootstrapped difference test for edge weights indicates that three strongest edge weights are significantly different than about 50–100% proportion of the other edge weights (Figure S2 in

the supplementary material). Third, node predictability is visualized as circle around node in Fig. 1. The value of node predictability ranges from 39–57%, and the average is 50%. This indicates that on average, 50% of the variance of nodes in the present network can be explained by their neighboring nodes. Symptom “worry too much” of GAD has the highest predictability, indicating that 57% of their variance can be explained by their neighbors. And factor “prospective anxiety” of IU has the lowest predictability, indicating that 39% of its variance can be explained by its neighbors (see Table 1).

The strength centrality is shown in Fig. 2a. Symptom “worry too much” of GAD has the highest strength centrality, indicating that this symptom is the most associated node in the present network from the perspective of statistics. Factor “prospective anxiety” of IU has the lowest strength centrality, indicating that this factor is the least associated node in the present network from the perspective of statistics. The correlation stability coefficient of strength centrality is 0.44, indicating that the estimation of strength centrality meets the requirement (Figure S3 in the supplementary material). Moreover, bootstrapped difference tests for node strengths show that in the present network, the strength centrality of “worry too much” is significantly different than about 60% proportion of the other nodes’ strength centrality (Figures S4 in the supplementary material).

The bridge strength centrality is shown in Fig. 2b. In the community of IU, factor “inhibitory anxiety” has the higher bridge strength centrality than factor “prospective anxiety”. This indicates that factor “inhibitory anxiety” has the stronger connections with symptoms of GAD than factor “prospective anxiety” in the present network. In the community of GAD symptoms, symptom “worry too much” has the higher bridge strength centrality than other symptoms. This indicates that symptom “worry too much” has the stronger connections with IU than other symptoms in the present network. The correlation stability coefficient of bridge strength centrality is 0.28, indicating that the estimation of bridge strength centrality meets the requirement (Figure S5 in the supplementary material). Bootstrapped difference tests for bridge strength centrality is shown in the supplementary material (Figure S6).

4. Discussion

Employing network analysis, we aimed to reveal the pathways that how different factors of IU are related to symptoms of GAD. It was observed that “prospective anxiety” and “inhibitory anxiety” were commonly but differentially related to individual symptoms of GAD. Factor “prospective anxiety” was positively related to two symptoms, including “nervousness or anxiety” and “worry too much”. Factor “inhibitory anxiety” was positively related to three symptoms, including “uncontrollable worry”, “worry too much”, and “restlessness”. The common and different connections with individual symptoms suggest that “prospective anxiety” and “inhibitory anxiety” may have similar and specific pathways to develop and maintain GAD. In some extent, this finding adds to emerging research showing that cognitive risk factors differ considerably for individual symptoms [29, 33, 48, 49].

Factor “prospective anxiety” represents a desire for predictability, suggesting that the individual is focused on having enough information to make the future as certain as possible [50]. Individuals who have high “prospective anxiety” scores may require more information before making decisions in ambiguous situations, resulting in prolonged “nervousness or anxiety” and “worry too much” [51]. The majority of the labels assigned to factor “inhibitory anxiety” reflect the sense of feeling “stuck” and unable to respond that is reported by many individuals when faced with uncertainty [37]. We assumed that these feelings of “stuck” and unable to respond may somehow represent the sense of loss of control, and therefore are related to “uncontrollable worry” and “worry too much” which may reflect the cognitive symptoms of loss of control and “restlessness” which may reflect the physical symptom of loss of control. And this hypothesis needs to be further explored in future studies. It should be noted that the relations between factors of IU and symptoms of GAD are relatively small. Thus, the contribution of IU to GAD should not be overstated. Moreover, additional constructs thought to maintain symptoms of GAD were not taken into consideration (e.g., anxiety sensitivity and meta-cognitive beliefs), and so interactions between potential maintaining factors could not be explored [24, 52].

The edge which is between “prospective anxiety” and “inhibitory anxiety” has the strongest unregularized partial correlation. In fact, this strongest unregularized partial correlation is only a moderate correlation (weights = 0.47). As expected, the moderate correlation is reasonable when measuring two factors of one latent variable [25]. Two strongest edges which are between “worry too much” and “trouble relaxing”, between “nervousness or anxiety” and “uncontrollable worry” are consistent with the results of previous network researches investigating comorbidity of depression and anxiety symptoms in migrant Filipino domestic workers and a psychiatric sample [53, 54]. In addition, one strongest edge which is between “restlessness” and “afraid something will happen” is similar to the results of previous symptom network of GAD in Chinese soldiers [55].

Node strength centrality may play an important role in finding variables that activate or maintain the whole network as well as providing potential targets for interventions. Symptom “worry too much” of GAD has the highest centrality which indicates this symptom play the most important role in activating and maintaining the present network consisting of two factors of IU and seven symptoms of GAD. In fact, excessive worry is, indeed, the core and defining feature of GAD [56]. In addition, previous studies have found that there is a strong correlation between IU and worry [57, 58]. Therefore, preventions and interventions targeting “worry too much” might generally alleviate both IU and GAD symptoms. The predictability of “worry too much” is 0.57, indicating that “worry too much” is moderately affected by its neighboring nodes in the present network. This may indicate that we could control “worry too much” not only through other related variables that are not included in the present network or intervening on “worry too much” itself but also via its strong neighboring nodes (e.g., “trouble relaxing”).

Node bridge strength centrality may provide guidance for searching bridge variables that play important roles in the development and maintenance of IU and GAD symptoms. In the community of IU, factor “inhibitory anxiety” has the higher bridge strength than factor “prospective anxiety”. This suggests that factor “inhibitory anxiety” has more stronger associations with symptoms of GAD. Thus, from a network

perspective, “inhibitory anxiety” may be a more specific factor for GAD. Our results suggest that preventions and interventions focusing on “inhibitory anxiety” may be more effective at reducing symptoms of GAD than focusing on “prospective anxiety”. However, a previous study found that “prospective anxiety” was expected to be more associated with worry and obsessive-compulsive symptoms, whereas “inhibitory anxiety” was expected to be more associated with social anxiety and depression [17]. This needs to be further explored in future studies. In the community of GAD symptoms, symptom “worry too much” has the higher bridge strength than other symptoms. This suggests that symptom “worry too much” has stronger associations with IU. In fact, IU is important in both creating a worry bout and maintaining it [59] and, the strong relationship between IU and worry has been replicated in numerous studies [17, 18, 19, 57, 60]. Moreover, a longitudinal study in adolescents found a bidirectional and reciprocal relationship between IU and worrying, with each explaining unique variance in the development of the other across a five-year period [61]. Previous study using ecological momentary assessment also found that IU was significantly associated with worry [12]. Our results support the contributions of IU to worry processes from a network perspective.

The present study provides a fine-grained understanding of the relations between different factors of IU and symptoms of GAD. More specifically, factor “prospective anxiety” was positively related to two symptoms, including “nervousness or anxiety” and “worry too much”. Meanwhile, factor “inhibitory anxiety” was positively related to three symptoms, including “uncontrollable worry”, “worry too much”, and “restlessness”. In addition, symptom “worry too much” of GAD has the highest strength centrality in the entire network and the highest bridge strength centrality in the community consisting of seven symptoms of GAD. In the community of IU, factor “inhibitory anxiety” has the higher bridge strength than factor “prospective anxiety”. These results may provide several implications for related preventions and interventions to meet the needs of mental health in Chinese university students, such as targeting “worry too much” may minimize the level of both IU and GAD symptoms and focusing on “inhibitory anxiety” may be more effective at reducing symptoms of GAD than focusing on “prospective anxiety”.

There are some limitations in our study. First, we recruited Chinese university students and reporting factors of IU and symptoms of GAD that span the full range of normal to abnormal, which likely limits the generalizability of our findings. For example, network structure in clinical sample may be different from the network structure in the present study. Second, the cross-sectional data applied to construct the network structure of factors of IU and symptoms of GAD preclude claims about causality. Therefore, we cannot clarify the causality between the most central variable and the other variables, because there are many possibilities, such as the central variable activates the other variables, or the other variables activate the central variable, or both. Future studies could use intensive longitudinal data to investigate the causality of these variables. Third, the network structure constructed here investigated between-subject effects on a group level. This means that within a single individual, the network structure may not be replicated in the same way. Fourth, in this study, the symptoms were single-item, self-reported assessments, which may be limited to capture clinical phenomena. Self-report data may be vulnerable to subjective response biases and shared method variance, which can inflate associations between variables. More items and methods could be used in future research. Finally, the network structure in the

present study is specific to the questionnaires we used. There are often some differences among self-report tools for assessing symptoms of GAD. Thus, different self-report tools could result in different network structures.

5. Conclusion

In conclusion, this study elucidates potential pathways through which these factors of IU cause and/or are caused by symptoms of GAD. Indeed, these novel findings highlight how including hypothesized risk factors may enrich symptom networks to gain a precise understanding of processes operating in mental disorders. Understanding how putative risk factors such as two factors of IU are related to individual symptoms of GAD may provide some references for related preventions and interventions, such as targeting “worry too much” may minimize the level of both IU and GAD symptoms and focusing on “inhibitory anxiety” may be more effective at reducing symptoms of GAD than focusing on “prospective anxiety”.

Abbreviations

IU: Intolerance of uncertainty; GAD: Generalized Anxiety Disorder; IUS-12: 12-item Intolerance of Uncertainty Scale; GAD-7: Generalized Anxiety Disorder 7-Item Questionnaire; M: Mean; SD: Standard deviation; Pre: Predictability.

Declarations

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author contributions

LR, ZHW, YL, LBC, YFW, LW, XYW, JXP, KLL, YCJ, FZL, QY and XFL conceived and designed the study and interpreted the study results. LR analysed the data. LR and ZHW wrote the paper. YL, LBC, YFW, LW, XYW,

JXP, KLL, YCJ, FZL, QY and XFL critically reviewed drafts of the paper. All authors approved the final version of the manuscript.

Ethics approval and consent to participate

This study was conducted in accordance with the ethical standards put forth in the Declaration of Helsinki. The questionnaire was completed online in the WeChat application after informed consent was obtained. The study design and procedures were reviewed and approved by the Independent Ethics Committee of the First Affiliated Hospital of the Fourth Military Medical University (No. KY20182047-F-1).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Figures

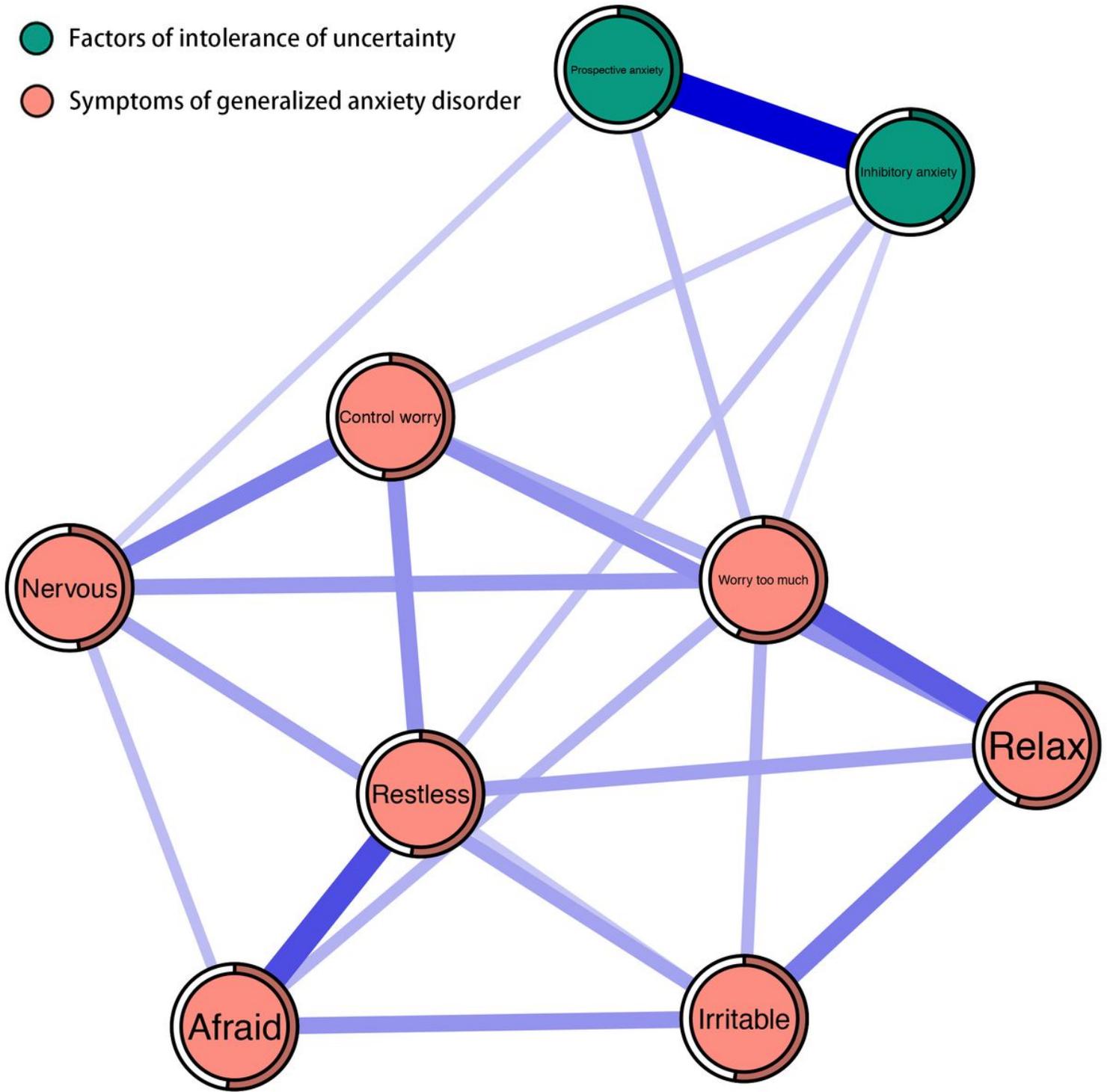


Figure 1

Network structure of different factors of intolerance of uncertainty and symptoms of generalized anxiety disorder. Note: Blue edges represent positive correlations, red edges represent negative correlations. The thickness of the edge reflects the magnitude of the correlation. The circles around nodes depict its predictability.

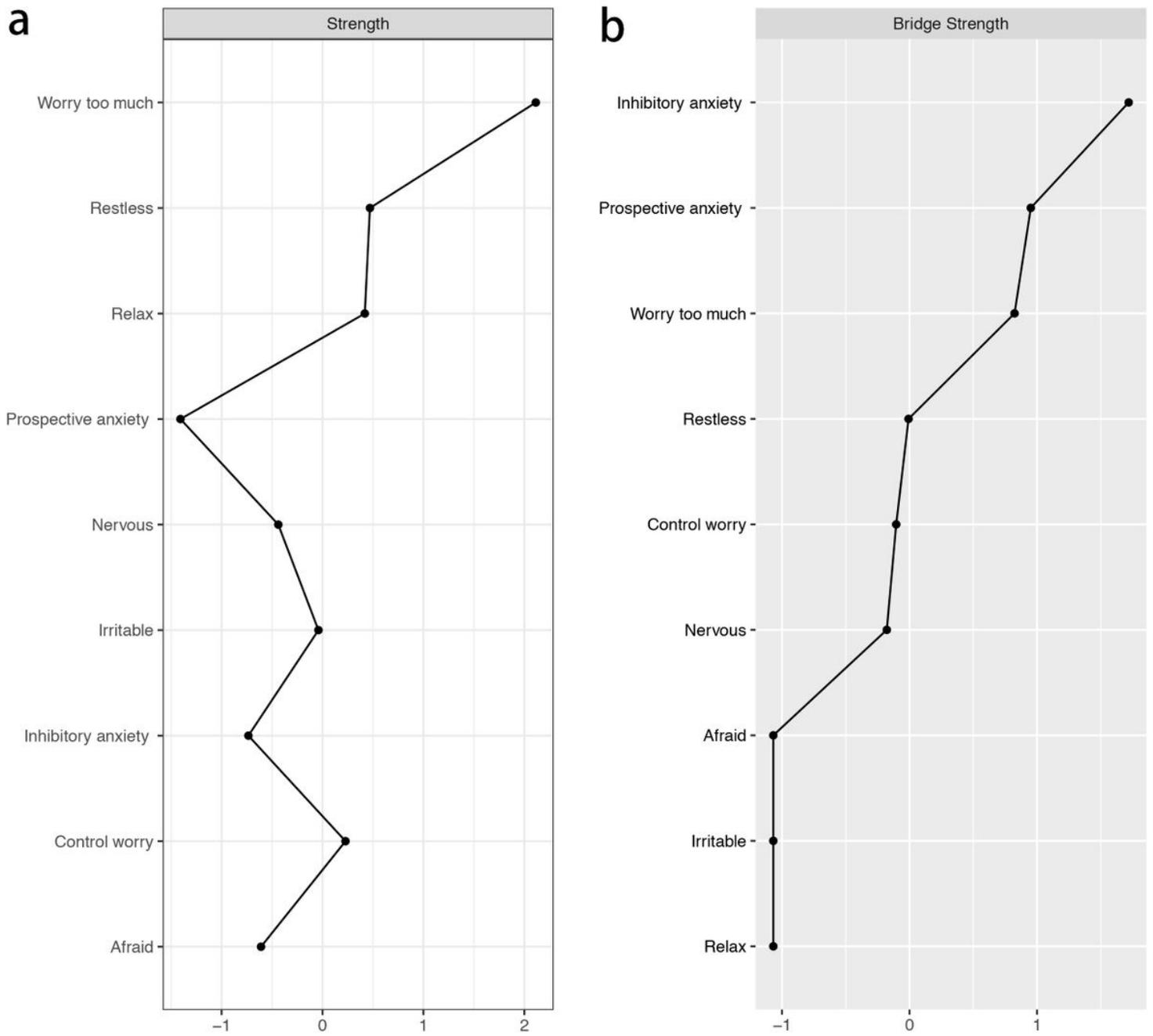


Figure 2

Centrality plot depicting the strength centrality and bridge strength centrality of each variable selected in the present network (z-score).

Supplementary Files

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- [SupplementaryMaterials.docx](#)