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BRIEF CLINICAL REPORT

The development and validation of the Intolerance of Uncertainty in Social Interactions Scale

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Abstract

Intolerance of uncertainty (IU) is commonly defined as the tendency for one to interpret uncertainty as negative or threatening. Most general or non-specific measures of IU show a strong relationship with worry and generalized anxiety disorder symptoms; however, a specialized measure of intolerance of uncertainty in social situations could provide insight into the role of IU in social anxiety. The purpose of this study was the development and preliminary validation of the Intolerance of Uncertainty in Social Interactions Scale (IU-SIS), a comprehensive measure designed to assess intolerance of uncertainty in social situations. Participants consisted of a non-referred sample. Based on an exploratory factor analysis, a two-factor solution was retained, with factors labelled *Social Ambiguity* and *Need to Reduce*. Both subscales were found to have good reliability and validity. Both subscales of the IU-SIS predicted up variance on measures of social anxiety after controlling for variance explained by a well-established general/non-specific measure of IU. Overall, the IU-SIS shows promise as a tool to elucidate the association between intolerance of uncertainty and social anxiety.

Keywords: intolerance of uncertainty; social anxiety; social interaction

Introduction

Intolerance of uncertainty (IU) is the general pre-disposition to find uncertainty about future events unacceptable (Freeston *et al.*, 1994). This construct has been found to be among the most salient predictors of worry and has consistently been found to be associated with generalized anxiety disorder (GAD) symptoms (Buhr and Dugas, 2002; Koerner and Dugas, 2007). Consistent with these findings, interventions designed to address intolerance of uncertainty have been found to be effective in the treatment of GAD.

There is some evidence to suggest that IU may be a transdiagnostic construct (Yığman and Fidan, 2021). When considering the transdiagnostic nature of IU, it is possible that domain-specific measures of IU, rather than general or non-specific IU, may yield stronger associations with specific psychiatric disorders. For example, the structure and nature of IU may differ for individuals who experience social anxiety symptoms relative to those who experience symptoms consistent with other anxiety disorders. In what appears to be the only study to address this premise, Thibodeau *et al.* (2015) developed and examined the psychometric properties of the Disorder-Specific Intolerance of Uncertainty (DSIU) scale. Based on a factor analysis, the authors found distinct factors or dimensions of IU in relation to social anxiety disorder, panic disorder, post-traumatic stress disorder, specific phobia, health anxiety, major depressive disorder, generalized anxiety disorder, and obsessive-compulsive disorder.

While the above findings are novel and promising, there are a number of opportunities to build upon the work of Thibodeau and colleagues. In particular, each domain of the DSIU included a relatively small number of items, and an emphasis seems to have been placed on determining whether each category formed distinct factors. Limited attention was given to the factor structure *within* each domain and to the specific psychometric properties of each of these domains. A logical progression is to form more comprehensive measures to assess IU in relation to the specific disorders.

A small number of studies have found that intolerance of uncertainty has been found to be associated with social anxiety symptoms (Carleton *et al.*, 2010). Due to this association, a more comprehensive, domain-specific measure of IU may provide a significant contribution to the understanding of social anxiety. As a result, the purpose of this study was to develop and provide a preliminary examination of the psychometric properties of a measure specifically designed to assess IU in relation to social interactions, the Intolerance of Uncertainty in Social Interactions Scale (IU-SIS).

Regarding item generation and potential factor structure of the IU-SIS, a number of potential themes were considered. First, it is possible that individuals with elevated social anxiety may find uncertainty related to anticipated social situations to be particularly distressing, and in response, individuals may engage in attempts to reduce uncertainty, including avoidance or excessive planning. Furthermore, it is possible that social ambiguity is a source of IU for socially anxious individuals. More specifically, ambiguity seems to be inherent in many social interactions, as social norms often dictate that individuals do not express their true thoughts and feelings directly to others, and individuals with elevated social anxiety may find this ambiguity to be particularly distressful. Overall, it was anticipated that this new measure, the IU-SIS, would exhibit a multifaceted factor structure and exhibit good reliability and validity.

Method

Participants and procedures

A non-referred undergraduate sample of students from a large university in the southeastern United States volunteered to participate in the study in exchange for course extra credit. The study was survey-based and completed on an internet-based platform. The sample consisted of 456 participants, with a mean age of 19.29 years ($SD = 3.86$). Furthermore, the sample was 61.6% female, and predominantly White/Caucasian (67.5%).

Measures

Intolerance of Uncertainty in Social Interactions Scale (IU-SIS)

The IU-SIS is a measure developed for this study to assess IU in social situations. The measure included newly generated items and items modified from previously developed measures of IU (see Buhr and Dugas, 2002; Carleton *et al.*, 2007; Thibodeau, 2013). Reference items from these measures were selected and modified to address intolerance of uncertainty within the context of social interactions or anticipated social interactions.

Other measures

In addition to the IU-SIS, participants completed a demographics questionnaire, two well-established measures of social anxiety, i.e. the Social Interaction Anxiety Scale (SIAS; Mattick and Clarke, 1997) and Social Phobia Inventory (SPIN; Connor *et al.*, 2000), the Intolerance of Uncertainty Scale-Short Form (IUS-12; Carleton *et al.*, 2007), which is common measure of general/non-specific IU, and the Post-Event Processing Inventory-Trait (PEPI-T; Blackie and

Kocovski, 2016), which assesses the tendency to engage in rumination following social interactions.

Results

Exploratory factor analysis

An exploratory factor analysis was conducted to establish the factor structure of the IU-SIS. A Principal Axis Extraction Method was used with a Promax Rotation. Based on an examination of the scree plot and inspection of items, a two-factor solution was retained. The first factor, Social Ambiguity (Intolerance of Social Ambiguity), contains 13 items and is characterized by intolerance of ambiguity in social situations, including situations in which individuals are unable to determine what others are thinking or what others think of them ($\alpha = .95$). The second factor, Need to Reduce (Need to Reduce Uncertainty), contains 15 items and is characterized by the need for uncertainty reduction and avoidance of uncertainty related to social situations, including attempts to either mitigate the uncertainty of a social situation or avoid uncertain social situations ($\alpha = .94$). Items and factor loadings are provided in Table 1.

Validity

Concurrent validity

Concurrent validity was assessed by examining whether the IU-SIS subscales were significantly associated with measures of social anxiety and post-event processing. Both IU-SIS subscales were significantly and positively associated with measures of social anxiety symptoms (i.e. the SIAS and SPIN), with r ranging from .64 to .79, and with post-event processing (i.e. the PEPQ), with r ranging from .59 to .73.

A simultaneous multiple regression was then conducted to examine whether the subscales of the IU-SIS uniquely predicted variance in measures of social anxiety. The SIAS was entered as the criterion variable. The overall model was significant ($R^2 = .58$, $F_{2,453} = 318.10$, $p<.001$) and although both subscales were significant predictors of SIAS scores, Social Ambiguity was a much more robust predictor, predicting approximately four times more variance in SIAS scores ($\beta = .65$) relative to Need to Reduce ($\beta = .15$). Similar results were obtained when the SPIN was use as the criterion variable ($R^2 = .65$, $F_{2,453} = 419.08$, $p<.001$).

Incremental validity

Hierarchical regressions were conducted to determine if each of the subscales of the IU-SIS predict variance in SIAS scores after controlling the variance explained by the IUS-12, a measure of general/non-specific IU. In the first regression, the IUS-12 was entered in the first step of the regression, and the Need to Reduce subscale of the IU-SIS was entered into the second step. The addition of Need to Reduce to the second step significantly improved the model ($\Delta R^2 = .05$, $\Delta F_{1,453} = .41.71$, $p<.001$). In the final step, both variables were significant predictors and Need to Reduce ($\beta = .38$) predicted slightly more variance than the IUS-12 ($\beta = .32$).

The regression was repeated by entering the Social Ambiguity subscale in the second step of the regression. The addition of Social Ambiguity to the second step significantly improved the model ($\Delta R^2 = .20$, $\Delta F_{1,453} = 225.67$, $p<.001$). In the second step, Social Ambiguity ($\beta = .62$) was a much more robust predictor than the IUS-12 ($\beta = .20$), predicting approximately three times more variance in SIAS scores.

Table 1. Item loadings based on exploratory factor analysis

Factor/item	Factor loading	Source
Factor 1: Need to Reduce		
1. A small unforeseen social interaction can spoil everything, even with the best planning	.73	1
2. When I am unsure about social plans, I tend to cancel them	.73	1
3. I always want to know what a social event entails for me	.56	1
4. The smallest doubt can stop me from going out with others	.75	1
5. I should plan out social events in advance to avoid uncertainty	.71	1
6. When I find myself uncertain about a situation, I doubt my ability to interpret others' motivations	.54	2
7. I must control everything to ensure others do not misinterpret me	.60	2
8. When I do not have all the needed information, it is not worth the effort to socialize	.82	2
9. Ambiguous social interactions worry me	.56	2
10. The possibility that vague situations could go poorly bothers me	.56	2
11. If I am uncertain about a social situation, I will overcompensate in ways I can control	.72	4
12. I withdraw when I cannot interpret social situations	.60	4
13. I prefer to plan out social events completely to prevent something unexpected from happening	.75	4
14. When I cannot read someone, I try to get out of the situation	.69	4
15. I try to drive myself to events I am uncertain about so I can leave on my terms	.56	4
Factor 2: Social Ambiguity		
16. I am bothered by the possibility that an interaction could go wrong	.64	2
17. I am anxious in social situations because I don't know for sure what people think of me	.86	3
18. I get anxious when I'm not sure how a social interaction will turn out	.69	3
19. I need to be certain about what others think of me	.90	3
20. Not knowing how others view me makes me anxious	1.00	3
21. I get anxious because I can't be certain that I won't embarrass myself in front of others	.68	3
22. I worry when people are looking at me because I don't know what they are thinking	.78	3
23. I like to be sure of my social standing with others	.71	4
24. I find myself over-analysing others' social cues	.59	4
25. Not knowing how people will react to me makes me nervous	.74	4
26. I like hanging out with people I know well because I know how they will react to me	.59	4
27. I like to hang out with people I know because I know where I stand with them	.67	4
28. I constantly feel the need to know exactly what others think of me	.75	4

Source denotes source of the original item: (1) Intolerance of Uncertainty Scale (Buhr and Douglas, 2002); (2) Intolerance of Uncertainty Index (Carleton *et al.*, 2007); (3) Disorder Specific Intolerance of Uncertainty Scale-Social Anxiety Subscale (Thibodeau, 2013); (4) original item.

Discussion

The purpose of this study was to develop and provide preliminary validation of a comprehensive measure designed to assess intolerance of uncertainty in relation to social interactions (i.e. the Intolerance of Uncertainty in Social Interactions Scale, IU-SIS). Based on an exploratory factor analysis, a two-factor solution was retained. The first subscale, Social Ambiguity, appears to assess intolerance of ambiguity inherent in many, if not most, social interactions. It is common for individuals to not fully express how they feel or think when engaging in social interactions, or to display vague, conflicting, or otherwise difficult-to-interpret behaviours, and this ambiguity may be particularly difficult for socially anxious individuals. From an information processing perspective, socially anxious individuals may be particularly likely to focus on and to be distressed by this ambiguity.

The second factor, labelled Need to Reduce, includes items that reflect a tendency to engage in avoidance of social situations that are perceived to involve excessive uncertainty. Other themes include excessive preparatory behaviours, information gathering about prospective social interactions, and attempts to control the circumstances of social interactions. Overall, Need to Reduce appears to assess the tendency to find social uncertainty aversive and to engage in strategies to avoid or reduce social uncertainty.

Both subscales were found to be relatively robust predictors of social anxiety symptoms. Furthermore, based on separate hierarchical regressions, both subscales predicted variance in social anxiety symptoms, after controlling for general/non-specific IU, which provides support for the incremental validity of the IU-SIS. However, it is noteworthy that Social Ambiguity seemed generally a more robust predictor of social anxiety symptoms relative to Need to Reduce.

An association was found between social intolerance of uncertainty and post-event processing (i.e. rumination following social interactions). Based on this finding it is possible that individuals, who are bothered by social uncertainty, may be compelled to ruminate or perseverate after the occurrence of a social interaction as an attempt to reduce uncertainty. Paradoxically, these attempts to reduce ambiguity may increase social anxiety, as prior interactions may be re-processed with a negative bias.

The results have potential implications for the assessment and treatment of social anxiety.

In particular, the incorporation of the IU-SIS into assessments may provide practitioners with a more nuanced understanding of their clients' perceptions of social interactions, which can help with the development of more effective treatment plans. To illustrate, individuals who score high on Social Ambiguity may benefit from intolerance of uncertainty interventions uniquely tailored to address social uncertainty, including interventions that aim to reframe ambiguity as neutral, focus on recognizing positive social cues, and addressing negative assumptions about ambiguous situations. High scorers on the Need to Reduce subscale may benefit from interventions such as graded exposure and the reduction of safety-seeking behaviours.

Although this study provides a number of unique contributions to the research literature, there are a number of limitations and directions for future research. One limitation relates to the sample used in the study, as the current sample consisted of non-referred college students. In response, additional research is needed to assess the psychometric properties of the IU-SIS in other samples, including samples of individuals diagnosed with social anxiety disorder. For example, validation of the IU-SIS in a clinical sample of patients with SAD is recommended, including whether the measure discriminates between clinical and non-clinical populations. In addition, additional research is recommended to examine the specificity of the IU-SIS. This includes efforts to determine whether the IU-SIS is a stronger predictor of symptoms of social anxiety disorder relative to other anxiety disorders, including generalized anxiety disorder. In addition, subsequent research is recommended to confirm the factor structure, and to assess the discriminant validity of the IU-SIS (i.e. the degree to which the measure distinguishes between clinical and non-clinical samples). Finally, it is noteworthy that the IU-SIS focused on general social interactions, including

common social transactions. As a result, another possible direction for future research is to assess intolerance of uncertainty in other, more specific social situations, including public speaking and related performance-related situations.

Overall, this study provides unique contributions to the literature, as the first known multifaceted measure of intolerance of social uncertainty. The IU-SIS shows promise as a tool to further investigate the relationship between intolerance of uncertainty and social anxiety.

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