

Cognitive Risk Factors of Social Anxiety

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Abstract. This study aimed to examine a model of cognitive risk factors, which were Fear of Negative Evaluation, Intolerance of Uncertainty and Shame in predicting social anxiety. Furthermore, this study also aimed to investigate any possible interactions among those factors in predicting social anxiety. Of 112 participants, nearly one half of whom were university students, completed a series of online questionnaires. Hierarchical regression via SPSS version 21.0 to examine the relative contribution of IU and interaction analyses using PROCESS macro for SPSS to investigate any possible interactions were performed. IU and FNE each consistently predicted social anxiety whilst shame unexpectedly did not. An interaction between IU and FNE was detected. These findings extend our understanding of the critical role of FNE and IU in predicting social anxiety and interestingly, FNE and IU strengthen each other in predicting social.

Keywords: Cognitive, social anxiety.

BACKGROUND

Social anxiety is a persistent fear of being criticized or embarrassed in social situations (American Psychiatric Association, 2013). The prevalence of social anxiety based on the general population data varies widely from 3% to 13% (American Psychiatric Association, 2013; Grant et al., 2005; Kessler, Chiu, Demler & Walters, 2005; Magee, Eaton, Wittchen, McGonagle & Kessler, 1996; Stein & Stein, 2008; Xu et al., 2012). Similar ranges have been reported among student samples (Baptista et al., 2012; Izgiç, Akyüz, Dogan & Kugu, 2004; Verger, Guagliardo, Gilbert, Rouillon & Masfety, 2010).

Various theorists have argued that there is no single cause for all mental disorders and that they are frequently represented by a cluster of several risk factors (e.g. Fyer & Brown, 2009; Hyman, 2003; Levinson et al., 2013). For social anxiety, various cognitive risk factors have been proposed which possibly contribute to social anxiety.

One of those is Fear of Negative Evaluation (FNE) which was proposed over forty years ago to explain social anxiety (Watson & Friend, 1969). A large number of studies has provided strong evidence that FNE is a reliable predictor of social anxiety (e.g., Carleton, Collimore & Asmundson, 2007; Collins, Westra, Dozois & Stewart, 2005; Stopa, 2001; Weeks et al., 2005; Weeks, Heimberg, Rodebaugh & Norton, 2008; Winton, Clark & Edelmann, 1995).

Another cognitive risk factor that is currently receiving increased attention is intolerance of uncertainty (IU) which is a cognitive bias to perceive and interpret uncertain situations in a negative way (Buhr & Dugas, 2002; Carleton, 2012; Carleton, Sharpe & Asmundson, 2007; Dugas, Schwartz & Francis, 2004). Interestingly, IU was originally conceived to explain worry (Carleton, Sharpe, 2007; Freeston, Rheaume, Letarte, Dugas & Ladouceur, 1994) and numerous studies support this (e.g., Buhr & Dugas, 2009; Dugas, Marchand & Ladouceur, 2005; Zlomke & Jeter, 2013). Recently, several studies have provided increasingly

consistent evidence suggesting that IU may be a transdiagnostic factor or a fundamental component across anxiety disorders and depression (Boelen & Reijntjes, 2009; Carleton et al., 2012; Khawaja & McMahon, 2011; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2011 & 2012; Michel, Rowa, Young & McCabe, 2016).

Moreover, given that one of the characteristics of social anxiety is the fear of receiving judgments that may lead to being embarrassed, shame has also recently been associated with social anxiety (Fergus, Valentiner, McGrath & Jencius, 2010; Gilbert, 2000; Hedman, Strom, Stunkel & Mortberg, 2013). Shame is a painful feeling caused by the consciousness of being scrutinized negatively or rejected socially (Gilbert, 2000; Hedman et al., 2013; Tangney, Miller, Flicker & Barlow, 1996). Shame is characterised by an evaluation of a "bad self" and is thus frequently followed by withdrawal tendencies (Cohen, Wolf, Panter & Insko, 2011; Tangney & Dearing, 2002). For instance, Hedman et al. (2013) reported that person with social anxiety are more prone to experience shame than people without it.

Therefore, the principal aim of this study is to examine a model involving FNE, IU and shame in predicting social anxiety. The results obtained are expected to clarify how the model of the occurrence and maintenance of social anxiety can be made more precise.

THE AIMS OF THE STUDY

The principal aim of this study is to address the following questions:

- 1) To what extent are FNE, IU and shame related to social anxiety?
- 2) To what extent and in what way does IU interact with FNE and shame in predicting social anxiety?

METHOD

Participants

Participants were recruited using internet-based advertising; through Facebook and E-mail. They accessed the information page through an internet link. Once they had provided consent, they completed a series of online questionnaires displayed using Qualtrics software. The total number of participants who accessed the information page was 129, although 13 participants did not opt in. Hence, the total number of participants was 116 (Mean age = 34.47; SD = 15.09; 50% were in the 21-23 years old range). The overwhelming majority of participants were Caucasians (97.4%), two third were females (73.3%), and close to one half (46.6%) were university students. A total of 112 participants provided their complete data and are included in the main analyses. The study was approved by the School of Psychology Human Ethics Committee at Newcastle University.

As the data had been already collected, a sensitivity power analysis for multiple regression was performed using G*Power 3 software ((Faul, Erdfelder, Buchner & Lang, 2009; Faul, Erdfelder, Lang & Buchner, 2007) to estimate the effect size detected from the 112 participants, for power = .80, with $\alpha = .05$. As a result, this study can detect a near medium effect size ($f^2 = .10$, $R^2 = .09$). Therefore, the final sample of 112 participants was judged to be sufficient.

Measures

Social Interaction Phobia Scales (SIPS)

The SIPS (Carleton et al., 2009) was derived from two scales, specifically the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS), developed by Mattick and Clarke (1998). The internal consistency of this scale is excellent ($\alpha = .96$; Carleton et al., 2010).

Brief Fear of Negative Evaluation scale, Straightforward (BFNE-S)

The BFNE-S (Weeks et al., 2005) is a revision of the original BFNE (Leary, 1983). It has excellent internal consistency and is more reliable across groups of samples than BFNE and BFNE-R (Weeks et al., 2005).

The Intolerance of Uncertainty Scale-Modification (IUS-M)

The IUS-M (Walker, 2008) is an ease of language modification of the Intolerance of Uncertainty Scale-12 (IUS-12) (Carleton, Norton et al., 2007). The IUS-12 itself is a revised 12-item version of the original 27-item version of the IUS (Freeston et al., 1994). The IUS-12 has been reported to have an excellent internal consistency ($\alpha = .91$ for total score), convergent validity, and discriminant validity, in addition to factor stability (Birrell et al., 2011).

Guilt and Shame Proneness (GASP)

The GASP (Cohen et al., 2011) measures the individual tendency to experience guilt and shame, and for each construct comprises two subscales. The guilt

subscales are negative behaviour-evaluation and repair action tendencies following personal misdemeanours, while the shame subscales are negative self-evaluations and withdrawal action tendencies following publicly exposed transgression.

Analyses

First, the reliability of all scales was verified. Subsequently, Pearson correlations were used reported. Then, a series of hierarchical regression analyses by means of SPSS version 21.0 were performed to examine the contributions of the independent variables. Interaction analyses using the PROCESS macro for SPSS (Hayes, 2012) were used to address any possible interactions and their interpretation. The nature of interactions was depicted through graphical analysis based on the Johnson-Neyman technique. This approach is able to address the major drawback of the pick-a-point approach that tends to be arbitrary in selecting the various values of the moderator used to estimate the conditional effect of X on Y (Hayes, 2013).

RESULTS

Preliminary Data Analyses

Prior to the data analysis, item distributions, skewness and kurtosis were examined. There were no missing data. However, there was one outlier on GASPS, which was winsorized. The scores were normally distributed. The skewness and kurtosis were evident only for SIPS (skewness = 1.61; kurtosis = 1.93). Various transformations were attempted and Log reduced both (skewness = 0.99; kurtosis = 0.09). The winsorized end transformed data were strongly correlated with the original scores ($r = 1.00$, $p < .001$ and $r = .99$, $p < .001$) and, thus, were used in all subsequent analyses.

The descriptive statistics of all measured variables are presented in table 1. The internal consistencies for SIPS, BFNE and IUS total score were excellent ($\alpha > .90$) and acceptable for GASPS.

Table 1. Descriptive Statistics

		Male (N = 29)			Female (N = 83)		
		D			D		
SIP	95	3.42	0.23	5.48	.91	2.70	0.29
S							
FN	95	8.13	.11	8.59	.89	7.98	.22
E							
IU	92	8.04	.98	6.96	.59	8.41	0.44
Tot							
al							
GA	76	6.13	.12	3.07	.05	7.22	.26
SP							
S							

The questionnaire scores were also examined in relation to gender and age using the Mann-Whitney Test. Apart from the GASPS, none of the scores

differed as a function of gender. Regarding the GASP-S, women reported higher scores ($U(112) = 363.00$, $Z = -5.62$, $p < .001$).

Table 2. Zero-order inter-correlations

	ge	IPS	FNE	US
SIPS	-.23			
FNE	-.16	.66		
IU Total	-.14	.57	.61	
GASPS	.25			.20

Note. $N = 112$, correlation coefficients $r > |.186|$ are significant, $p < .05$. Bold = Significant.

Pearson correlations (two-tailed) were calculated between all of the measured variables. There was a relationship between age and SIPS, and GASPS scores. Equivocal results related to gender have been found in previous studies on social anxiety (e.g. Barahmand, 2008; Carleton et al, 2010; Whiting et al, 2013), but gender differences regarding shame were found in this study, and age was established to be correlated with several variables including social anxiety. Therefore, age and gender were controlled in all further analyses.

All the measures except for the GASPS correlated with all the others at the moderate to strong levels (r 's(110) = .42 - .66; p 's < .05). Additionally, GASPS was significantly correlated only with BFNE ($r(110) = .20$, $p = .038$) and IUS ($r(110) = .20$, $p = .033$), and not with SIPS ($r(110) = .12$, $p = .211$). There was no high correlation to indicate multicollinearity ($r < .80$) even though there was a strong correlation between BFNE and SIPS ($r(110) = .66$, $p < .001$).

Main analyses

Although the correlation analysis indicated that the correlation between shame and social anxiety was not significant, shame was still entered in the following regression analysis. The underlying reason for this was that the correlation results indicated that shame is significantly associated with other predictors (FNE and IU). This indicates that shame may still be able to interact with other predictors in predicting the outcome. However, given the result of the correlation analysis, examination of the relative contributions of the predictors focused on FNE and IU only; shame was considered only as a possible extra variable and would be added and entered in step 4 of the analysis, over and above FNE and IU.

Table 3 Regression model of FNE, IU, and shame predicting social anxiety

	Variable	Coefficient statistic			Model step statistic			
					R^2	F	f	
	gender	0.21	2.23	.028	.064	.71	.109	.028
		0.11	1.13	260				
	NE	.67	.79	.001	.440	5.87	.108	.001

3)		0.49	6.01	<.001	.148	36.10	.107	<.001
2)	U	.30	.70	.001	.056	3.60	.107	.001
		0.60	7.99	<.001	.348	63.81	.108	<.001
	ASPS	.12	.38	.172	.008	.89	.106	.172
	U x FNE	.31	.40	.001	.086	.52	.103	.001
	NE x GASP S	.47	.97	.333				
	U x GASP S	1.77	3.13	.002				
	NE x IU x GASP S	.29	.12	.904	.000	.02	.102	.904

Note. Significance level $p < .05$. Figures in parentheses indicate the reverse order, i.e. IUS first, BNFE second.

Gender and age accounted for 6.4% of the variance in SIPS. Age significantly predicted SIPS scores, but gender did not. BFNE accounted for a greater proportion of the variance in any position entered. When entered in the second step, BFNE accounted for 44% of the variance over and above the covariates and IUS contributed an additional 5.6 %. With the order reversed, IUS accounted for 34.8% and BFNE accounted for an additional 14.8%. In line with the results of zero-order correlation analyses, the GASPS did not add a significant explanation (0.8%).

Additionally, the two-way interactions when entered together made a significant additional contribution of 8.6% of the variance; only IU x FNE and IU x shame were significant. Meanwhile, the three-way interaction did not significantly account for variance (0.0%), indicating that the interaction model could not be developed in a three-way interaction model (Aiken & West, 1991). The final model was significant ($F(9,102) = 21.39$, $p < .001$) and accounted for 65.4% of the variance in SIPS.

Referring to the principal aim of this study, which is to examine the precise role of IU in predicting social anxiety, it is considered important to further investigate possible two way-interactions involving IU: IU x FNE and IU x shame. The results obviously would provide a better explanation in terms of interpreting the role of IU in predicting social anxiety

The first series of hierarchical regressions was conducted to examine the specific role of the interaction between IU and FNE. In the first regression, IU was the predictor variable, FNE was the moderator, shame was entered as a covariate, and age and gender were also controlled. Subsequently, the reverse model, where FNE was the predictor and IU was the moderator, was examined. The second series of regressions was performed to examine the specific role

of the interaction between IU and shame. Similar regression analyses were repeated.

In this case, interaction analysis utilising the PROCESS model 1 was used due to its ability to undertake the centring and interaction terms automatically. Subsequently, the nature of the relationships are depicted using the John-Neyman technique.

Interaction between intolerance of uncertainty and fear of negative evaluation The interaction between IU and FNE accounted for an additional 5.17% of the variance, $\Delta F(1, 105) = 14.25, p < .001$; indicating that the interaction was present and significant. Figure 2 plots the regression coefficient for IU on social anxiety at different values of FNE (solid red line). Conversely, Figure 3 plots the regression coefficient for FNE on social anxiety at different values of IU. The 95% bootstrapped confidence intervals are also plotted (dotted lines). The significance zone, where the low CI exceeds zero, is indicated in orange.

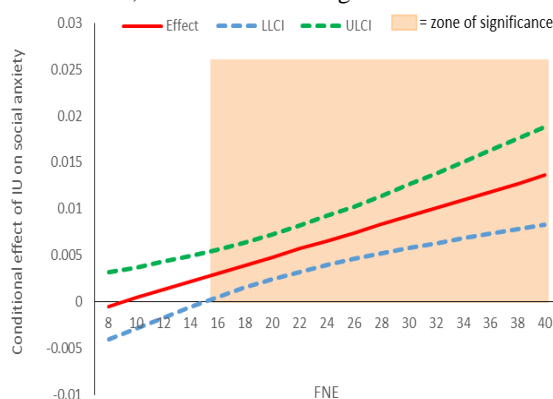


Figure 1. Conditional effect of IU on social anxiety moderated by FNE

As can be seen in Figure 2, the effect of IU on social anxiety was significant only when FNE > 15 , indicated by the lower bootstrapped confidence interval which lies above zero; the value of b at FNE = 16, $b = .0030$, $t(1, 105) = 2.34, p < .05$. By way of the increases in FNE, the relationship between IU and social anxiety becomes stronger.

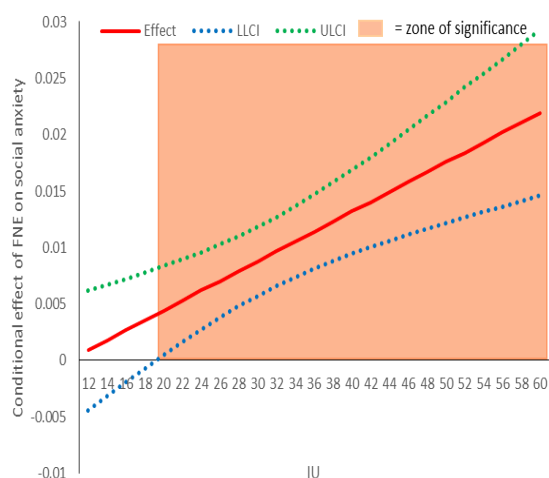


Figure 2. Conditional effect of FNE on social anxiety moderated by IU

As can be seen in Figure 3, the effect of FNE on social anxiety was significant only when IU > 19 , indicated by the lower bootstrapped confidence interval which lies above zero; the value of b at IU = 20, $b = .0044$, $t(1, 105) = 2.21, p < .05$. By way of the increases in IU, the relationship between FNE and social anxiety becomes stronger.

Interaction between intolerance of uncertainty and shame. The interaction between IUS and GASPS accounted for an additional contribution of 1.41%, $\Delta F(1, 105) = 3.54, p = .063$, but this was not statistically significant.

DISCUSSION

This current study has two principal purposes. The first aim is to examine the relative contribution of IU in predicting social anxiety, particularly relative to the presence of FNE and shame; and secondly, to examine the presence of IU's possible interactions with FNE and shame in predicting social anxiety. Several specific results from this study give supporting evidence to the findings of earlier studies in the same area, while several others are novel findings.

Firstly, this study provides additional evidence that IU consistently makes additive and unique contributions to variance in social anxiety. In conjunction with IU, FNE also contributes to variance in social anxiety. Nonetheless FNE noticeably accounted for a greater proportion of the variance, inferring that it is a reasonably stronger predictor of social anxiety; yet IU clearly contributed significant additive and unique contributions. Surprisingly, the hypothesis that shame would independently make a contribution as do IU and FNE, was not supported.

The evidence that IU and FNE consistently predict social anxiety and the contribution of FNE to the variance in social anxiety was greater than the contribution of IU supports Whiting et al. (2014) that those two cognitive vulnerability factors maintain both sub-types of social anxiety and that FNE contributed more variance. Their study used SPS and SIAS in order to measure two types of social anxiety separately, and they recruited an undergraduate sample only. This was different from this current study, which employed SIPS that is the result of a unification of both SPS and SIAS. In addition, the current study recruited a mixed sample of community members and students.

Moreover, the consistency of IU in predicting social anxiety provides further evidence and presumably complements the Cognitive Model of Social Phobia (Clark & Wells, 1995) and the Cognitive Behavioural Model of Social Phobia (Heimberg et al., 2010; Rapee & Heimberg, 1997), which emphasised the importance of FNE in maintaining social anxiety. This study provides strong evidence that IU has a consistent predictive correlation with social anxiety.

Although several recent studies have linked shame to social anxiety with a positive relationship (Fergus et al., 2010; Gilbert, 2000; Hedman et al., 2013), shame did not predict social anxiety in the present study. This non-significant result may possibly relate to the two contrasting faces of shame. According to Roos et al.,

(2013), shame is related to both avoidance and anger. Apart from an intention to avoid social situations as the result of a negative feeling of being embarrassed, shame is also characterised by blaming others for the cause of their devastating feelings, thus leading to have the intention to perform more counterproductive actions (Tangney, Wagner & Gramzow, 1992). Supporting this suggestion, Harris and Darby (2009) reported that one-third of GP patients stopped seeing their doctors due to their shame-provoking experiences, while another third of patients reported that shame motivated them to improve their health. However, the study by Harris and Darby was a retrospective cross-sectional study and thus, may have been influenced by memory bias and obviously cannot prove any causality.

Moreover, this is not in agreement with previous studies, perhaps also owing to problems with the scales. TOSCA-shame (Tangney et al., 1989), which was employed in previous studies, measures different aspects in comparison to what is measured by the GASPSHame scale used in this study. TOSCA-shame measures negative self-esteem, not shame itself (Luyten et al., 2002). A large number of studies have reported a strong correlation between low or negative self-esteem and social anxiety (e.g. Harman, Hansen, Cochran & Lindsey, 2005; Jong, 2005; Kocovski & Endler, 2000). Therefore, it is reasonable that these previous studies, which utilised TOSCA-shame, found a correlation between “shame” (actually negative self-esteem) and social anxiety. To our knowledge, this is the first study to utilise GASPSHame to investigate the relationship between shame and social anxiety and thus, it deserves further study.

Secondly, the contribution of the two-way interactions among IU, FNE and shame in predicting social anxiety was significant. However, this study does not provide evidence to support the existence of the three-way interaction between IU, FNE and shame in predicting social anxiety. Not only was this study not able to detect a small effect size, but the effect size of the three-way interaction itself was trivial ($f^2 = .02$, $R^2 = .02$).

The most interesting original finding is that there was an interaction between IU and FNE in predicting social anxiety. IU had a significant relationship with social anxiety only when the level of FNE was intermediate to high. Their relationship was augmented by the increasing level of FNE. Conversely, FNE also had a significant relationship with social anxiety only when the level of IU was intermediate to high. The effect of FNE on social anxiety was augmented by the increasing level of IU. This could be interpreted by assuming that both cognitive vulnerability factors strengthened each other.

The explanation proposed is that individuals who have FNE would excessively fear that they would receive negative judgments and consequently, they would feel anxious socially. When these individuals also have IU, they would be more likely to perceive that social situations were full of threats, particularly the possibility of obtaining negative judgments, and so would be more negatively uncertain. Consequently,

they would be more liable to feel anxious socially and thus, to avoid social situations.

However, the assumptions regarding the cognitive process herein obviously cannot be concluded from regression analysis, which can only demonstrate the presence of interaction. Moreover, only a longitudinal study or an experimental design would be able to provide temporal precedence and so evidence of causality.

Although an extensive number of previous studies have ascertained that FNE is a consistent predictor of social anxiety (e.g., Carleton et al., 2007; Collins et al., 2005; Stopa, 2001; Weeks et al., 2005 & 2008; Winton et al., 1995), to our understanding, this is the first study that provides evidence regarding the interaction between IU and FNE. Therefore, this novel finding is significant and, thus, obviously deserves further study.

The current study bolsters previous findings and provides further evidence to the growing body of literature examining the role of cognitive-risk factors in relation to social anxiety. However, several limitations must be noted, particularly in relation to the demographics of the sample, where age and gender were not evenly distributed in this study. We are aware that this will not only lead to generalisation problems, but may also potentially have influenced the findings. Also, this study recruited a non-clinical sample from among graduate students and the general population. Consequently, the results are not necessarily generalizable to those diagnosed with social anxiety. Finally, this study was a cross-sectional study and therefore, could not provide cause and effect explanations.

Notwithstanding these several limitations, this study provides novel evidence that IU has a unique role in predicting social anxiety. IU has a consistent predictive correlation with social anxiety, although its contribution to social anxiety smaller than that of FNE. IU and FNE also interact and strengthen each other in predicting social anxiety. Hence, it is critical for further study to confirm to what extent the interaction between IU and FNE can predict social anxiety. Given that attention to the roles of the dimensions of IU and particularly shame in predicting social anxiety are considerably limited in the current growing body of literature, a close attention to this issues in future studies is required.

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