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Original Citation:

Availability:

This version is available at: 11577/3318161 since: 2020-02-04T14:24:49Z

Publisher:

Springer

Published version:

DOI: 10.1007/s41811-019-00063-5

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Familial patterns of Intolerance of Uncertainty: Preliminary evidence in female university students

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Accepted: 25/11/2019

International Journal of Cognitive Therapy

Abstract

The overlap between parent and child psychological distress might be attributed to the intergenerational transmission of Intolerance of Uncertainty (IU). The current study explored the association between parental and child IU in female university students. Female undergraduates (N=234) and their parents completed questionnaires assessing IU and psychological distress. First, we tested whether living status (on one's own vs. with one or both parents) and IU predict psychological distress in undergraduates. Second, we performed between-group comparisons on IU and psychological distress measures. Third, we explored whether the path from parent to child IU is differentially mediated by child psychological distress depending on parental gender. Only IU predicted psychological distress of undergraduates. Daughters reported levels of IU and psychological distress comparable to mothers, but higher than fathers; mothers and fathers did not differ in IU, whereas the former were more psychologically distressed than the latter. Lastly, daughters' psychological distress partially mediated the path from maternal to child IU, whereas it fully mediated the path from paternal to child IU. Current findings further support the association between IU and psychological distress during college age and they tentatively suggest that differences in the intergenerational transmission of IU according to parental gender may occur.

Key words: intolerance of uncertainty; cognitive vulnerability; psychological distress; female undergraduates; family study.

Familial patterns of Intolerance of Uncertainty: Preliminary evidence in female university students

The association between parent and child psychological distress has been widely studied and documented in the literature. In a meta-analysis, Helenius, Munk-Jorgensen, and Steinhausen (2014) observed that the offspring are more likely to have anxiety disorders where parents have anxiety disorders. Lawrence, Murayama, and Creswell (2019) also documented that having a first-degree relative with an anxiety disorder constitutes a risk factor for the development of anxiety disorders. Furthermore, studies carried out with first degree relatives and probands with obsessive-compulsive disorder (OCD) showed that first degree relatives had significantly greater obsessive beliefs than controls (e.g., Albert et al., 2015; Rector, Cassin, Richter, and Burroughs, 2009). Lastly, with respect to depression, Kane and Garber (2004) observed that depression in fathers might enhance the risk in offspring. The possible ways in which familial aggregation of emotional disorders occurs has been highly debated: genetic vulnerability, modeling mechanisms, and certain parenting behaviors were depicted to increase the risk of developing an emotional disorder (Alloy et al., 2004; Moller, Nikolić, Majdandžić, and Bögels, 2016; Ollendick and Grills, 2016). In this regard, for example, Taylor, Afifi, Stein, Asmundson, and Jang (2010) investigated obsessive beliefs in monozygotic and dizygotic twins and reported that from 32% to 40% of the variance in dysfunctional belief domains were attributable to genetic factors. More recently, findings from a Swedish population register-based study showed that genetic and rearing factors act additively on the risk for depression in the offspring (Kendler, Ohlsson, Sundquist, and Sundquist, 2018).

A few studies investigated the role of cognitive variables in the intergenerational transmission of psychological distress, anxiety and depression symptoms in particular (e.g., Alloy et al., 2004; Donovan, Holmes, Farrell, and Hearn, 2017; Esbjørn, Normann, Lønfeldt, Tolstrup, and Reinholdt-Dunne; 2016; Sanchez et al., 2016; Zlomke and Young, 2009). Among trans-diagnostic vulnerability factors for emotional disorders is intolerance of uncertainty (IU), which is “the dispositional incapacity of an individual to endure the adverse reaction triggered by the perceived absence of key and sufficient information, and supported by the associated perception of

uncertainty" (Carleton, 2016, p.31). People high in IU usually tend to interpret uncertain situations as undesirable, threatening, and distressing and to overestimate the probability of a negative outcome to occur (Dugas, Gagnon, Ladoceur, and Freeston, 1998; Freeston, Rhéaume, Letarte, Dugas, and Ladouceur, 1994). Moreover, high IU individuals are likely to perform a repertoire of maladaptive behaviors encompassing diverse clinical phenotypes in order to reduce (e.g. excessive information seeking), avoid (e.g., distracting), or remove (e.g. impulsive behaviors) uncertainty and its associated distress (Bottesi, Carraro, Martignon, Cerea, and Ghisi, 2019a; Sankar, Robinson, Honey, and Freeston, 2017). IU was found to mediate the relationship between perceived anxious parenting style or perceived anxious rearing behaviors and symptoms of anxiety and worry in university students (Zlomke and Young, 2009). In a sample of community children, the association between maternal and child IU mediated the relationship between maternal and child anxiety, and child IU mediated the relationship between mother IU and child anxiety (Sanchez et al., 2016). Furthermore, Donovan, Holmes, Farrell, and Hearn (2017) observed that, in community children, maternal worry, IU and other cognitive variables (i.e., negative problem orientation and cognitive avoidance) were significantly associated with child worry; furthermore, child IU mediated the relationship between maternal IU and child worry.

The current study

In the current study, we sought to further explore the association between parental and child IU in a sample of female university students. University life represents an extremely uncertain period, characterized by several stressors such as new social environment and personal health, academic requirements, post-graduation plans and, in most cases, separation from family (Ahern and Norris, 2011; Blanco et al., 2008; Hurst, Baranik, and Daniel, 2012; Kumaraswamy, 2013). During college age, individuals may start inflexibly relying on the use of maladaptive behaviors to manage everyday life uncertainty: in those with high IU, this can foster psychological distress. Changes in living condition can promote the adoption of unhealthy lifestyles, increase of levels of

distress, and hinder psychological adjustment to such a novel context, since familial support is no longer immediately or physically available (e.g. Lupi et al., 2015; Stallmann, 2010).

To note, several studies showed that females are usually less adjusted to university life than males (Clinciu, 2013; Enochs and Roland, 2006). For example, Enochs and Roland (2006) reported that female undergraduates self-referred higher level of psychopathology (e.g. anxiety, depression, interpersonal problems), as measured by the College Adjustment Scales (Anton and Reed, 1991), than male undergraduates. Similarly, Clinciu (2013) assessed levels of students' adjustment to college and observed that female university students showed higher levels of psychological and somatic symptoms of distress than their male counterparts did. More recently, Bottesi, Martignon, Cerea, and Ghisi (2018a) found that female undergraduates were characterized by higher levels of worry, cognitive avoidance, and negative problem orientation when compared to male undergraduates. Such differences can be accounted by gender differences in the paths through which IU operates producing worry and, more broadly, psychological distress (Bottesi et al., 2018a). In light of these evidences, in the current study we decided specifically focusing our investigation on a sample made up of female university students.

First, we investigated whether living status (on one's own) and endorsing high levels of IU are predictive of higher levels of psychological distress in female university students. According to literature, we expected that both variables would emerge as significant predictors (e.g., Lupi et al., 2015; McEvoy and Erceg-Hurn, 2016; Yook, Kim, Suh, and Lee, 2010; Stallmann, 2010). Second, we examined differences on IU levels and psychological distress across students, their mothers, and their fathers. We expected no gender differences in IU levels, in line with findings from several studies (e.g., Bottesi et al., 2018a; Bottesi, Noventa, Freeston, and Ghisi, 2019b; Buhr and Dugas, 2002; Helsen, Van den Bussche, Vlaeyen, and Goubert, 2013). On the contrary, we expected fathers reporting lower levels of psychological distress than both daughters and mothers, since males are less likely to experience emotional disorders in adolescence and throughout adulthood than females (Armstrong and Khawaja, 2002; Bale and Epperson, 2015; McLean and Anderson, 2011; Salk,

Hyde, and Abramson, 2017). Third, we explored whether parental IU predicts daughters' IU, and whether daughters' psychological distress mediates this association. Research about the intergenerational transmission of IU exclusively focused on the relationship between maternal and child IU, but differential associations between parent and child psychological features depending on parental gender have been reported. For example, Sica et al. (2013) reported that fathers' – and not mothers' – not just right experiences (NJREs) were predictive of OCD symptoms in their sons, whereas no association between parental NJREs and daughters' OCD symptoms emerged. In spite of our expectation that parental IU would somewhat predict daughters' IU, we did not formulate specific hypotheses about possible differences in the mediational paths according to parental gender.

Method

Participants

A sample made up of 702 Italian community individuals entered the study. Specifically, participants were 234 female university students ($N=234$; mean age: 22.26 ± 1.72 ; $range=20-30$), their mothers ($N=234$; mean age: 52.96 ± 4.37 ; $range=39-65$), and their fathers ($N=234$; mean age: 55.63 ± 4.34 ; $range=44-69$). To be eligible for the study, students had to have been raised by their biological parents and have lived at the family home until they were at least 18 years old. Students were all attending their university studies at the School of Psychology; their mean years of education was 15.31 ± 1.47 . Marital status was 97.7% single/not in a domestic relationship and 2.1% married/in a domestic relationship. As far as parents are concerned, mean years of education were 12.97 ± 3.96 for mothers and 12.55 ± 3.95 for fathers. Among mothers, 15.4% reported being separated or divorced and 42.7% were full-time employed; with respect to fathers, 15% reported being separated or divorced and 74.4% were full-time employed. Almost half of the students still lived with one or both their parents (52.4%); the remainder declared living on their own. With regard to birth order, 21.8% of students were only children and 58.8% of the remaining ones were first born.

Measures

The *Intolerance of Uncertainty Scale-Revised* (IUS-R; Walker et al., 2010; Italian version by Bottesi et al., 2019b): a 12-item self-report questionnaire evaluating the tendency to find uncertainty upsetting and distressing on a 5-point Likert scale. The IUS-R is a measure assessing IU across the lifespan developed from the IUS-12 (Carleton, Norton, and Asmundson, 2007); in particular, the language of the original IUS-12 was simplified so that it can be easily read by an average 11-year-old student (Walker et al., 2010). The IUS-R has proven to be a reliable and valid measure of IU in several non-clinical (Bottesi et al., 2015a; Wright, Lebell, and Carleton, 2016) and clinical (e.g., Boulter, Freeston, South, and Rodgers, 2014; Joyce, Honey, Leekam, Barrett, and Rodgers, 2017) samples. The Italian IUS-R showed measurement invariance across gender, age, and over time, as well as adequate reliability and validity (Bottesi et al., 2019b). Internal consistency in the current samples was excellent (daughters: $\alpha=.93$; mothers: $\alpha=.92$; fathers: $\alpha=.89$).

The *Depression Anxiety Stress Scales-21* (DASS-21; Lovibond and Lovibond, 1995; Italian version by Bottesi et al., 2015b): a 21-item self-report questionnaire assessing depression, anxiety, and stress over the previous week on a 5-point Likert scale. Findings from the Italian validation suggested that the total score is an adequate measure of general distress; the total score of the Italian version showed excellent internal consistency and test-retest reliability. In the present samples, internal consistency was excellent (daughters: $\alpha=.95$; mothers: $\alpha=.94$; fathers: $\alpha=.95$).

Procedure

All students were provided with a general description of the aims of our research during their University lessons. Course credits were offered for participation. Those who accepted to enter the study were informed that both them and their parents were required to complete all the study measures online; three different online surveys - one for students, one for mothers and one for fathers- were created. After indicating consent by clicking agreement on the link, all participants were asked to create a shared “identifying code”; detailed instructions about how to create it were provided. Then, participants had to complete a demographic schedule and the self-report

questionnaires online. All participants were guaranteed for confidentiality that their answers would have not been communicated to the other members of the family. All responses for each survey were saved on the “Google Drive” server and then downloaded for analyses. The three resulting databases were merged, and members of the same family were matched according to the “identifying code” they provided. The research was conducted in accordance with the Declaration of Helsinki and it was approved by the Ethics Committee of Psychological Sciences of the local university.

Statistical Analyses

All statistical analyses were performed using the software Statistical Package for the Social Sciences (SPSS) version 25. Distributions on measures were considered normal according to figures of skewness and kurtosis. Indeed, scores were normally distributed with all items demonstrating acceptable levels of skewness and kurtosis ($\leq|1|$). Internal consistency was assessed by computing Cronbach alphas (α) coefficients.

A stepwise multiple regression was conducted to test whether living status (on one’s own vs. with one or both parents) and the IUS-R scores predict scores on the DASS-21 in the undergraduate sample. Univariate Analyses of Variance (ANOVAs) were performed to compare groups on their scores on both the IUS-R and the DASS-21; Bonferroni post-hoc comparisons were conducted to compare groups when significant differences emerged. Partial eta squared (η^2) values were reported to evaluate the magnitude of the effects: following Cohen (1988)’s criteria, .01 was considered a small effect size, .06 a medium one and .14 a large one.

Two mediation models were tested using a bootstrapping approach through the PROCESS macro for SPSS. Mediation occurs when 95% confidence intervals (CIs) of the indirect effect estimated from the bootstrap procedure excludes zero (Hayes, 2013). Parental IUS-R was entered, in turn, as the independent variable; daughters’ IUS-R as the dependent variable and daughters’ DASS-21 as the mediator. Ten thousand bootstrap samples and 95% bias-corrected CIs were used to evaluate the significance of the conditional indirect effect. The effect size of indirect effects was

measured as the ratio of indirect to total effect.

Results

Predictive value of living status and IUS-R on the DASS-21 scores in students

Findings from the stepwise multiple regression highlighted the IUS-R scores as the only significant predictor of the DASS-21 scores (model $R^2=.41$; $t=12.57$; $p<.001$); no interaction between the two predictors emerged (Figure 1). [FIGURE 1 HERE]

Zero-order and partial correlations for each variable at each step of the regression analysis are reported in Table 1. [TABLE 1 HERE]

Differences between groups on IUS-R and DASS-21 scores

Significant differences between groups emerged in regard to both the IUS-R and the DASS-21; in both cases, the magnitude of all effects was small (Table 2). With respect to the IUS-R, Bonferroni post-hoc comparisons revealed that daughters scored significantly higher than fathers ($p=.003$); no differences between daughters and mothers ($p=.71$) and mothers and fathers ($p=.10$) emerged. As far as the DASS-21 is concerned, daughters and mothers scored significantly higher than fathers ($p<.001$ and $p=.002$, respectively), whereas no differences between daughters and mothers were observed ($p=.89$). [TABLE 2 HERE]

Mediation models

The first mediation analysis was run entering mothers' IUS-R scores as the independent variable. The overall model was significant ($F_{(2,231)}=91.37$, $p<.001$) and explained 44.17% of the variance in daughters' IUS-R. The total effect of mothers' IUS-R on daughters' IUS-12 was significant ($b=.2790$, $SE=.0647$; 95% CI s=.1516, .4065). The direct effect of mothers' IUS-R on daughters' IUS-R was significant ($b=.1911$, $SE=.0508$; 95% CI s=.0910, .2913), and the indirect effect of mothers' IUS-R to daughters' IUS-R through daughters' DASS-21 was significant as well ($b=.0879$, $SE=.0439$; 95% CI s=.0062, .1780). The ratio of indirect to total effect was .3150 ($SE=.1703$; 95% CI s=.0382, .6018).

The second mediation model was tested including fathers' IUS-R scores as the independent variable. The overall model was significant ($F_{(2,231)}=81.17, p<.001$) and explained 41.27% of the variance in daughters' IUS-R. The total effect of fathers' IUS-R on daughters' IUS-R was significant ($b=.2029, SE=.0764; CIs=.0523, .3535$). The direct effect of fathers' IUS-R on daughters' IUS-R was not significant ($b=.0864, SE=.0603; 95\% CIs=-.0326, .2053$), whereas the indirect effect of fathers' IUS-R to daughters' IUS-R through daughters' DASS-R was significant ($b=.1165, SE=.0482; 95\% CIs=.0242, .2148$). The ratio of indirect to total effect was .5744 ($SE=1.5746; 95\% CIs=.1524, 1.6069$).

Discussion

The current study investigated familial patterns of IU in female university students, a population deserving particular attention since most lifetime psychological disorders have their peak onset during college age (Hunt and Eisenberg, 2010; Mackenzie et al., 2011; Stallman, 2010); females in particular usually show poor adjustment to university life (Bottesi et al., 2018a; Clinciu, 2013; Enochs and Roland, 2006; Stallman, 2010).

As expected, IU significantly predicted levels of psychological distress in female undergraduates. This result confirms the established association across different samples (e.g., Bottesi, Tesini, Cerea, and Ghisi, 2018b; McEvoy and Erceg-Hurn, 2016; Yook et al., 2010) and it further suggests that endorsing high levels of IU in a notoriously uncertain period, such as college age, might be associated with psychological maladjustment (Bottesi et al., 2018a; Stallman, 2010). On the contrary, living status did not interact with levels of IU and it did not emerge as a predictor of psychological distress. Although separation from family might represent an important stressor, it appears that living status *per se* is not associated with psychological well-being: on the one hand, familial support might be available independent of geographical distance; on the other hand, flatmates or others might provide social support, especially in situations characterized by high connectedness and interrelatedness (Stallman, 2010).

Between-group comparisons showed some interesting differences across samples, despite small in magnitude. Daughters endorsed levels of IU and psychological distress comparable to those referred by their mothers, but higher than those reported by their fathers. On the contrary, mothers and fathers did not differ in their IU levels, whereas the former were more psychologically distressed than the latter. One possible interpretation of this finding is that uncertainty and IU might decrease as far as people gain experience (Bottesi et al., 2019b): undergraduates have to face a novel, uncontrollable, and changeable context, thus they are likely to attribute a more negative meaning to uncertainty and/or to be less used to it than their parents - especially their fathers - are. However, literature documenting that experience in the management of uncertainty increases across the lifespan is currently lacking (Shihata, McEvoy, Mullan, and Carleton, 2016) and only longitudinal data will provide reliable evidence in this regard. To note, ties between mothers and daughters are usually stronger and closer than any other gender combinations, especially in adulthood (e.g., Sutor, Gilligan, Peng, Jung, and Pillemer, 2015); therefore, similarities among mothers and daughters can be accounted by gendered variations in the strength of ties. Rather, gender-related issues might better explain observed differences in psychological distress: indeed, women typically refer higher emotional distress, worry, catastrophic cognitions, and physiological hyperarousal compared to men (Armstrong and Khawaja, 2002; Bale and Epperson, 2015; McLean and Anderson, 2011; Salk et al., 2017).

Findings from mediational models suggest that differences in the intergenerational transmission of IU according to parental gender may occur. While maternal IU significantly predicted child IU - and daughters' psychological distress only partially mediated this association - the path from paternal to child IU was fully mediated by daughters' psychological distress. In other words, no direct association between fathers' and daughters' IU emerged. Again, such differences might be reasonably attributed to gender differences in intensity of ties (Sutor et al., 2015). To note, children usually assume as their most relevant model their same-gendered parent, mainly based on perceived similarity (e.g., Patock-Peckham, Cheong, Balhorn, and Nagosh, 2001).

Additionally, literature outlines that mothers are generally more directly involved in emotion socialization than fathers are; on the opposite, paternal parenting appears to adhere to cultural gender norms more strictly than does maternal one (Hastings, 2018). For example, fathers tend to adopt less elaborative emotion language and more emotion-dismissing behaviors compared to mothers (Cassano and Zeman, 2010; van der Pol et al., 2015; Stettler and Katz, 2014). These arguments can further explain observed differences in familial patterns of IU, given that parental modeling and parenting feedback styles are hypothesized to underlie the transmission of cognitive vulnerabilities to child psychological distress (e.g., Alloy et al., 2004; McLeod, Wood, and Weisz, 2007). Fathers, different from mothers, might not express explicitly and clearly IU to their children, who consequently might misinterpret paternal cognitive, emotional, and behavioral responses to uncertainty. Importantly, these dynamics may occur even more strongly in Italy, where family values play a crucial role in social life and the rigidity of the gender stereotype is still prominent (Ruspini, 2009).

We acknowledge that the cross-sectional nature of the design represents the main limitation of this research. Only the conduction of longitudinal studies, including also measures of parental styles and rearing behaviors, would allow gaining reliable evidence about these links. Indeed, several evidences confirm that early environment and attachment styles play a crucial role in the establishment of high levels of IU during childhood and then across the life span (e.g. Bottesi et al., 2018b; Fonagy, Gergely, Jurist, and Target, 2002; Helgeland and Torgersen, 2004). Moreover, we did not assess several dimensions characterizing students' relationships with their parents (e.g. perceived closeness, intimacy, self-disclosure), thus preventing the possibility of identifying additional factors putatively mediating the path from parent to child IU. Lastly, we did not collect detailed information about living status of undergraduates; therefore, we could not rule out that different living conditions (e.g. university housing; living with flatmates; living alone) might differentially associate with psychological distress.

Despite preliminary, findings from the current research might represent a starting point for future investigations focusing on the intergenerational transmission of IU. Gaining additional knowledge about the way trans-diagnostic cognitive vulnerabilities aggregate in families would allow better understanding familial aggregation of emotional disorders. Research in this field would ultimately help setting the frame for the development of prevention programs and psychological interventions targeting IU in families, wherein parental gender should be carefully taken into account.

Acknowledgements. The present work was carried out within the scope of the research program Dipartimenti di Eccellenza (art.1, commi 314-337 legge 232/2016), which was supported by a grant from MIUR to the Department of General Psychology, University of Padova.

Conflict of Interest. On behalf of all authors, the corresponding author states that there is no conflict of interest.

Funding. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Figure 1. Predictive value of living status (on one's own vs. with one or both parents) and IU on general distress in the undergraduate sample.

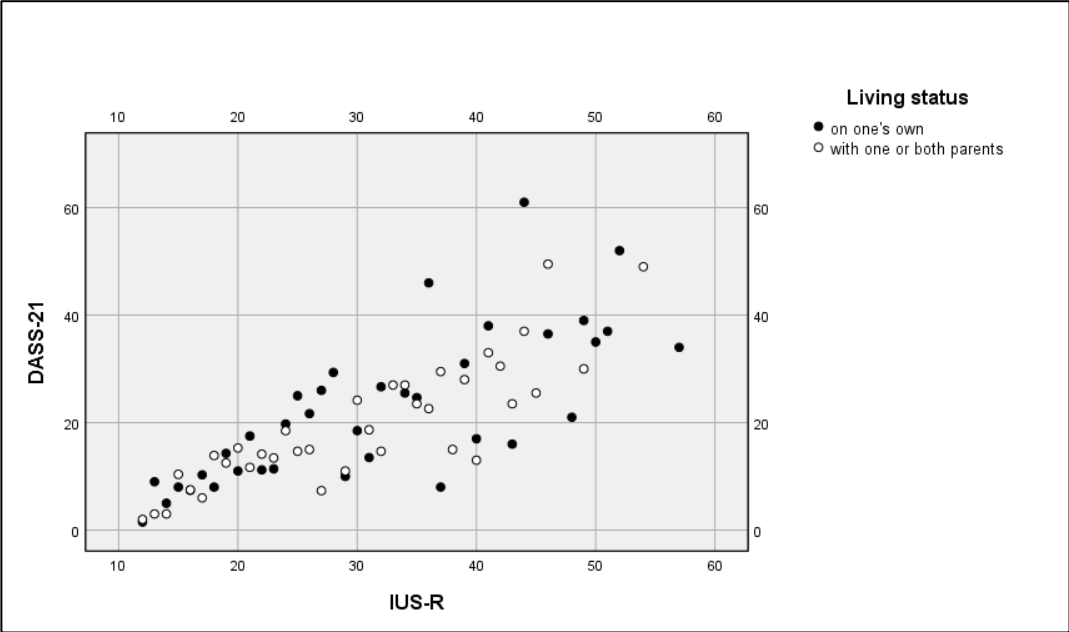


Table 1. *Stepwise multiple regression (dependent variable = DASS-21): zero-order and partial correlations.*

	Zero-order <i>r</i>	Partial <i>r</i>
Step 1		
Living status (on one's own vs. with one or both parents)	-.09	-.09
Step 2		
Living status (on one's own vs. with one or both parents)	-.09	-.08
IUS-R	.64	.64

IUS-R=Intolerance of Uncertainty Scale-R.

Table 2. Differences between groups on the IUS-R and the DASS-21.

	Daughters	Mothers	Fathers	<i>F</i> _(2,701)	<i>p</i>	partial η^2
IUS-R	26.47±9.94	25.44±9.71	23.60±8.41	5.65	.004	.02
DASS-21	17.57±12.46	16.48±10.69	12.96±10.34	10.80	<.001	.03

IUS-R=Intolerance of Uncertainty Scale-R; DASS-21=Depression Anxiety Stress Scale-21.