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Does intolerance of uncertainty mediate improvement in anger during group CBT for GAD? A preliminary investigation

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Abstract

Background: Individuals with generalized anxiety disorder (GAD) have elevated intolerance of uncertainty (IU) and anger, and IU mediates the relationship between GAD symptoms and anger.
Aims: The current pilot study examined whether group cognitive behavioural therapy (CBT) improves anger in people with GAD, and the degree to which change in IU mediates improved anger.
Method: Individuals diagnosed with GAD completed measures of worry, IU, and facets of anger, before and at the end of group CBT for GAD.
Results: Worry, IU, and internally felt and outwardly expressed anger, reduced significantly over treatment, but anger control (inwardly and outwardly) did not. CBT for GAD led to improvement in both internally felt and outwardly expressed anger, even though anger is not directly targeted in this treatment. Improvement in IU significantly mediated improvement in internally felt and outwardly expressed anger.
Conclusions: This preliminary study contributes to the literature on the importance of IU in understanding worry and other symptoms such as elevated anger, experienced by people with excessive worry.

Keywords: anger; cognitive behavioural therapy; generalized anxiety disorder; intolerance of uncertainty; mediation

Introduction

Generalized anxiety disorder (GAD) is an anxiety disorder affecting 5.7% of the population (Kessler *et al.*, 2005), characterized by excessive and uncontrollable worry across a number of areas (American Psychiatric Association, 2013). Intolerance of uncertainty (IU) has been highlighted as a fundamental factor in the experience of problematic worry. IU is 'an individual's dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty.' (p. 31, Carleton, 2016). IU is broadly considered to be a transdiagnostic phenomenon (e.g. Carleton, 2016; Carleton *et al.*, 2012; Einstein, 2014; Einstein and Mansell, 2016; Laposa *et al.*, 2015), and is also thought to be related to the onset and maintenance of worry and GAD (Koerner and Dugas, 2008; Ladouceur *et al.*, 2000; Sexton *et al.*, 2003; van der Heiden *et al.*, 2010). Cross-sectional studies show a relationship between IU and worry severity (e.g. Dugas *et al.*, 1997; Ladouceur *et al.*, 2000; Laposa *et al.*, 2015), and individuals with GAD have elevated intolerance of uncertainty (e.g. Dugas *et al.*, 2005; Gentes and Ruscio, 2011; Ladouceur *et al.*, 1999).

More recently, anger has been explored in the context of GAD, stemming from clinical observations and the diagnostic criteria of irritability as a symptom of GAD (American Psychiatric Association, 2013). Moreover, anger and anxiety are intimately linked in the fight or flight

reaction (Barlow, 2002), potentially conceptualized as two sides of the threat response. Individuals with GAD have greater anger than non-anxious controls (Erwin *et al.*, 2003), and GAD has been associated with various aspects of anger. For example, GAD has been associated with anger over-expression (Hawkins and Cougle, 2010), aggressive behaviour (Posternak and Zimmerman, 2002), higher trait anger, internalized anger (i.e. anger that is felt inside but not outwardly expressed), externally expressed anger (e.g. yelling), lower anger control, and higher hostility (Deschênes *et al.*, 2012; Erdem *et al.*, 2008). Thus, individuals with GAD tend to show higher vulnerability to facets of anger than healthy control individuals.

IU may help explain the link between GAD and anger. Fracalanza *et al.* (2014) hypothesized that 'high IU may connect GAD symptoms and anger, as IU may make individuals more prone to perceiving unfairness, goal blockage, and expectancy violations' (p. 123), and indeed these perceptions are linked to anger (e.g. Horan *et al.*, 2010). Fracalanza *et al.* (2014) investigated IU and anger in a student sample using cross-sectional analyses, and found that IU mediated the link between GAD symptoms, and inward and outward anger expression. Experimental studies with undergraduates found that (a) anger induction leads to more beliefs that uncertainty is unfair and spoils everything (Deschênes *et al.*, 2015), and (b) avoidable uncertainty leads to increased anger (Anderson *et al.*, 2016). Thus cross-sectional and experimental studies demonstrate an association between anger and IU; further work examining this relationship using treatment-seeking GAD samples is needed.

Several studies show a mediating role of IU in treatment (e.g. Mahoney and McEvoy, 2012; McEvoy and Erceg-Hurn, 2016; McEvoy and Mahoney, 2012, 2013). IU has also been examined as a mediator in GAD cognitive behaviour therapy (CBT). Bomyea *et al.* (2015) reported that IU mediated change in worry frequency in GAD CBT. Torbit and Laposa (2016) found that in group CBT for GAD, both IU and GAD symptoms improved over treatment, and IU mediated the changes in both worry severity and worry domains. Thus, IU mediates GAD treatment outcome. Meta-analyses suggest that anger is modifiable when directly targeted with CBT (e.g. Beck and Fernandez, 1998; Del Vecchio and O'Leary, 2004). Furthermore, Erwin *et al.* (2003) found that over a course of standard group CBT for individuals with social anxiety disorder, there were significant decreases in the propensity to direct anger inward or suppress it, although changes in anger control and outward expression of anger were not significant. Given some overlapping features between CBT for social anxiety disorder and GAD, such as modifying maladaptive beliefs related to situations and emotions, it may be possible that anger would also change during group CBT for GAD. To our knowledge, no studies have yet examined whether anger changes during CBT for GAD, or the role of IU in anger change.

The current study examined whether group CBT improves anger constructs in individuals with GAD, and the degree to which changes in IU mediate changes in anger constructs over the course of CBT for GAD. Based on prior research of the connection between GAD symptoms and anger, and anger change following social anxiety disorder CBT, we hypothesized that anger would improve during a course of CBT for GAD. In addition, given that IU has been found to mediate treatment outcomes for people with GAD, we hypothesized that IU would mediate improvement in anger over the course of CBT for GAD.

Method

Participants

Treatment-seeking individuals diagnosed with generalized anxiety disorder symptoms ($n = 37$) who attended the group CBT were included in this study. The treatment was provided at a large mood and anxiety disorder speciality clinic in a university-affiliated tertiary care hospital. All participants received a consultation with a psychiatrist prior to treatment, were diagnosed with GAD, and were referred to a CBT for GAD group. Participant scores on the Penn State Worry Questionnaire (PSWQ), a measure of pathological worry, were over the clinical cut-off of 45.

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Exclusion criteria for the study were: active psychosis or mania, active suicidal ideation or self-harm, an adequate course of CBT for GAD within the last 2 years, and current additional CBT for GAD.

Participants were primarily female (65%) and about half were single (54%). Self-reported ethnicities were: Caucasian (76%), Asian (8%), Black (4%) and other (12%). The average age was 38.31 years ($SD = 10.00$).

Measures

Penn State Worry Questionnaire

The PSWQ (Meyer *et al.*, 1990) is a 16-item measure of worry severity. The clinical cut-off for pathological worry is 45. Items are responded to on a 5-point Likert type scale, where 0 = not at all, and 4 = extremely. The PSWQ has demonstrated validity and reliability (Brown *et al.*, 1992; Meyer *et al.*, 1990; Stöber, 1998; van Rijsoort *et al.*, 1999). Internal consistency in the current study was good, $\alpha = .88$.

Intolerance of Uncertainty Scale–Short Form

The Intolerance of Uncertainty Scale – Short Form (IUS-12) is a short version of the 27-item version of the IUS (Freeston *et al.*, 1994), and measures reactions to ambiguous situations, uncertainty and the future. Items are responded to on a 5-point Likert-type scale, where 1 = not at all characteristic of me, and 5 = entirely characteristic of me. The IUS-12 has good validity and reliability (Gentes and Ruscio, 2011; Hong and Lee, 2015; Khawaja and Yu, 2010; McEvoy and Mahoney, 2011). Internal consistency in this study was good, $\alpha = .87$

State-Trait Anger Expression Inventory-II

Using 32 items, the State-Trait Anger Expression Inventory-II (STAXI-II; Spielberger, 1999) measures four facets of anger (eight items each): Anger Expression-In (AX-I), the tendency to feel anger internally, but supress its outward expression (e.g. 'I boil inside, but I don't show it'), Anger Expression-Out (AX-O), the tendency to express angry feelings outwardly (e.g. 'if someone annoys me, I'm apt to tell him or her how I feel'), Anger Control-In (AC-I), the tendency to reduce or modulate inwardly experienced anger (e.g. 'I try to simmer down'), and Anger Control-Out (AC-O), the tendency to reduce or modulate outward expressions of anger (e.g. 'I can stop myself from losing my temper'). The STAXI-II has good reliability and validity (Spielberger, 1999). Internal consistency for the four subscales was: AX-I, $\alpha = .55$; AX-O, $\alpha = .88$; AC-I, $\alpha = .85$; and AC-O, $\alpha = .77$. Other studies using the STAXI-II have reported the lowest Cronbach's alpha for the AX-I subscale, of the four subscales (Anderson *et al.*, 2016).

Procedure

Participants completed a manualized CBT for GAD group treatment, which was 12 weeks in length. Participants met for two hours, once a week. There were typically 8–10 participants in a group, and two co-leaders. Group content included psychoeducation about CBT models of GAD, exposure to feared and avoided situations (e.g. watching the news, reducing excessive reassurance-seeking, reducing over-preparation), thought records, problem solving, behaviour experiments to build tolerance for uncertainty exercises, worry time, productive *vs* unproductive worry, core beliefs, and relapse prevention. Session format was to review between-session homework practice with skills and give participants detailed feedback on their skills application, teaching new content or strategies, and assigning new between-session homework exercises for the coming week. Anger

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Table 1. Means, standard deviations and Pearson correlation coefficients for pre-treatment measures

Measure	1	2	3	4	5	6	Pre *M (SD)*	Post *M (SD)*	ES
(1) PSWQ	—	.18	.34	.07	−.24	−.11	66.11 (8.22)	55.00 (11.71)***	0.47
(2) IUS-12		—	.16	.13	−.26	−.05	37.92 (8.42)	31.12 (9.59)**	0.28
(3) AX-I			—	.09	−.32	−.36	19.79 (3.37)	17.79 (4.84)**	0.26
(4) AX-O				—	−.44*	−.70***	16.21 (5.48)	14.75 (5.32)*	0.23
(5) AC-I					—	.74***	19.79 (4.58)	21.39 (4.91)	0.13
(6) AC-O						—	21.88 (4.45)	22.61 (5.39)	0.06

M, mean; *SD*, standard deviation; PSWQ, Penn State Worry Questionnaire; IUS-12, Intolerance of Uncertainty Scale 12; AX-I, Anger Expression In; AX-O, Anger Expression Out; AC-I, Anger Control In; AC-O, Anger Control Out; ES, partial eta squared.
***Improvement is significant at $p < .001$;
**improvement is significant at $p < .01$;
*improvement is significant at $p < .05$.

is not directly addressed in the group protocol. Before treatment and at the end of treatment, participants completed the PSWQ, IUS-12 and STAXI-II.

Results

Of the 37 that started the group, 26 completed the treatment (30% drop-out rate). Completers did not differ from non-completers on age [F (1,34) = 0.75, $p > .05$], gender [χ^2 (1, $n = 36$) = 2.36, $p > .05$], marital status [χ^2 (5, $n = 37$) = 5.40, $p > .05$], or ethnicity [χ^2 (4, $n = 36$) = 7.22, $p > .05$]. Pre-treatment scores for the PSWQ [F (1,35) = 0.18, $p > .05$] and IUS-12 [F (1,35) = 0.38, $p > .05$] were also equivalent between completers and non-completers. The MANOVA on the four STAXI subscales at pre-treatment was significant [F (1,32) = 3.17, $p < .05$], and at the univariate level, the significant difference was that completers scored higher than non-completers on pre-treatment anger expression [F (1.35) = 4.63, $p < .05$]. There were no other significant differences for STAXI subscales. Given that our research questions were aimed at treatment response, the analyses reported below are based on treatment completers. Table 1 shows means, standard deviations, inter-correlations and partial eta squared for the PSWQ, IUS-12 and subscales of the STAXI-II. The average PSWQ score was well above the clinical cut-off for pathological worry. Due to missing data, n values for the STAXI-II were 26 at pre-treatment and 24 post-treatment.

Repeated measures analysis of variance (ANOVAs) were used to examine changes in worry, IU and anger variables (i.e. subscales of the STAXI-II). Scores on the PSWQ and IUS-12 decreased significantly over treatment: F (1,25) = 21.81, $p < .001$, and F (1,25) = 9.60, $p < .01$, respectively. Anger expression in and out as measured by the AX-I and AX-O also decreased significantly over treatment: F (1,23) = 8.08, $p < .01$, and F (1,23) = 6.83, $p < .05$, respectively. Anger control in and out as assessed by the AC-I and AC-O did not decrease significantly from pre- to post-treatment: F (1,23) = 3.32, $p = .08$, and F (1,23) = 1.52, $p > .05$.

Within-participant mediation analyses were conducted using bootstrapping (Montoya and Hayes, 2017), to determine whether IU was a mediator for improvement in the anger variables AX-I and AX-O that improved from pre- to post-treatment. MEMORE was used, a macro that estimates total, direct and indirect effects of X on Y through one or more mediations M on two occasions in a within-subjects/repeated measures design. MEMORE generates 95% conference intervals for determination of indirect effects using bootstrapping (Hayes, 2013). Results showed that improvement in IU from pre- to post-treatment significantly mediated improvement in AX-I (bootstrapping estimate =1.11, SE =.42, CI [.46, 2.18]), and AX-O (bootstrapping

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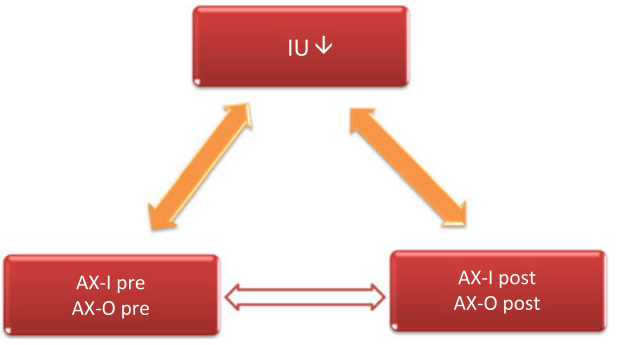

Figure 1. Visual depiction of improvement in IU as a mediator of improvement in anger expression with GAD treatment. Solid lines represent mediation relations. IU, intolerance of uncertainty; AX-I, anger expression in; AX-O, anger expression out.

estimate =1.16, *SE* = .79, CI [.02, 3.30]). As AC-I and AC-O did not improve significantly from pre- to post-treatment, the next step of examining mediation using bootstrapping was not applied (see Fig. 1).

Discussion

Consistent with prior research, CBT for GAD led to a significant improvement in the tendency to worry and IU (e.g. Dugas *et al.*, 2003, 2010; Torbit and Laposa, 2016). GAD treatment also produced a significant improvement in both internally felt anger (AX-I) and outwardly expressed anger (AX-O). Improvement in IU from pre- to post-treatment mediated reductions in internally and outwardly expressed anger from pre- to post-treatment.

To understand why facets of anger may have improved in people with GAD across treatment, we hypothesize that generalization of skills beneficial for anxiety improvement also lead to improvement in other negative emotions. Indeed, research shows that CBT for anxiety disorders frequently leads to corresponding decreases in depressive symptoms (e.g. Bauer *et al.*, 2012), despite depression not being actively addressed in treatment. The present findings in which anger was not directly targeted in CBT for GAD, yet facets of anger nevertheless improved from pre- to post-treatment, suggest the same may be true of anger. As an example, CBT for GAD in the present study included cognitive restructuring, and it is possible that as participants became better versed at identifying and challenging unhelpful beliefs and assumptions related to anxiety, that these cognitive restructuring skills generalized to beliefs underpinning other negative emotions, including anger. Cognitive restructuring may also enable de-centring from thoughts (i.e. taking a third person perspective), or thinking more flexibly (Safran and Segal, 1990), thus potentially also contributing to anger improvement (Takebe *et al.*, 2017).

Alternatively, decreases in GAD symptoms overall may be associated with alleviation in irritability more directly, leading to a decreased experience of anger. An additional possibility is that a fundamental symptom of GAD is difficulty controlling the worry, leading to frustration and anger when attempts to control the worry seem futile. As participants become better able to control their worry, using a variety of CBT intervention skills directed at targeting worry, there is less blockage of goal attainment, resulting in a decrease in both feeling, as well as expressing, anger. Lastly, improvement in the tendencies to (a) feel anger internally, but supress its outward expression and (b) express angry feelings outwardly, may be linked to increases in effective problem solving, an area of deficit in those with GAD and consequently an active area of intervention in CBT for GAD, although this is speculative.

Of note, improvement in anger facets were not found across the board, and instead specificity was seen whereby levels of anger expression (internal and external) improved significantly with GAD treatment, but levels of anger control (internal and external) were not significantly impacted by GAD treatment. While it is possible this finding was a power issue given the small sample size in

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the current study, Erwin *et al.* (2003) reported similar discrepancies during group CBT for social anxiety disorder, whereby anger control did not significantly change. However, in the study of Erwin *et al.* (2003), individuals with social anxiety disorder had comparable anger control levels to individuals without a psychological disorder, thus there may have been less 'room to improve' on the ability to regulate anger. On the other hand, prior research suggests that individuals with GAD have lower anger control skills than non-clinical controls (Deschênes *et al.*, 2012), and individuals with GAD in the present study had levels of anger control comparable to those with GAD in prior studies. Thus, it may be that the levels of anger experienced and consequently expressed by individuals with GAD in the present study were *implicitly* impacted by CBT (e.g. by improving thoughts that generate anger, or by reducing general arousal fueling irritability); however, as participants in GAD treatment did not learn skills to intentionally modulate anger, their sense of direct control over their anger may remain unchanged. This hypothesis points to the possibility that learning skills to modulate anger may offer additional benefits to people with GAD, as a follow-up or adjunct to traditional CBT; however, these ideas await empirical investigation.

Improvement in IU was found to mediate improvement in the anger variables that changed with CBT for GAD, namely anger expression in and anger expression out. This result replicates the findings in a cross-sectional student sample (Fracalanza *et al.*, 2014) showing that IU mediated the association of GAD symptom severity to anger expression in and anger expression out. Fracalanza *et al.* (2014) further noted that beliefs that uncertainty has negative behavioural and self-referent implications linked internally expressed anger to GAD symptoms, and beliefs that uncertainty spoils everything and is unfair, linked externally expressed anger to GAD symptoms. Thus, subfacets of IU may be differentially related to various aspects of anger. As the shortened version of the original IUS (IUS-12; Carleton *et al.*, 2007) was used in the present study, the IU subscales examined by Fracalanza *et al.* (2014) were not examined in the present study, but rather the construct of IU was examined holistically. Overall, the finding that improvement in IU explains significant variance in improvement in internally and externally expressed anger from pre- to post-GAD treatment suggests that learning to better tolerate uncertainty seems to improve not only worry (Dugas *et al.*, 2010), but also various facets of anger. This initial finding highlights the importance of IU as a construct, and contributes to the mounting evidence of IU as a potentially transdiagnostic factor, underlying a variety of emotional difficulties (see Boswell *et al.*, 2013; Carleton, 2016; Carleton *et al.*, 2012; Einstein, 2014; McEvoy and Mahoney, 2011, 2012), and mediating treatment outcomes (e.g. Mahoney and McEvoy, 2012; McEvoy and Erceg-Hurn, 2016; McEvoy and Mahoney, 2012, 2013). Future research may benefit from examining IU and anger in other diagnoses outside of the anxiety disorder category, such as major depressive disorder and post-traumatic stress disorder.

Limitations of the study include that following psychiatric consultation, participants did not receive a structured diagnostic interview to confirm that the participants met full diagnostic criteria for GAD. However, the average worry severity score was more than 20 points over the clinical cut-off on the PSWQ, and diagnoses were given by psychiatrists in a specialized mood and anxiety clinic, suggesting that participants struggled with pathological worry. The sample size is small, there was no control group, and participants were treatment seeking and largely Caucasian, which may restrict generalizability of the results. These limitations notwithstanding, the current study provides a small first step in highlighting the experience of anger within GAD, as well as the importance of IU in understanding worry and other symptoms such as elevated anger, experienced by people with excessive worry.

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Conflicts of interest. Dr Laposa and Dr Fracalanza declare that they have no conflicts of interest with respect to this publication.

Ethical statement. Informed consent was obtained from all individual participants included in the study. The authors have abided by the Ethical Principles of Psychologists and Code of Conduct as set out by the APA: http://www.apa.org/ethics/code/. Ethical approval was granted by the Research Ethics Board of the Centre for Addiction and Mental Health, no. 123/2010-13.

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