Correlates of Dampening and Savoring in Generalized Anxiety Disorder

Bailee L. Malivoire[1] · Gabrielle Marcotte-Beaumier[2] · David Sumantry[1] ·
Naomi Koerner[1]

Abstract

Chronic worry and generalized anxiety disorder (GAD) symptoms are associated with infrequent savoring, and high dampening, of positive emotions. The goal of the present study was to investigate the indirect role of GAD-relevant processes, including intolerance of uncertainty (IU), fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation, in the relationship between GAD symptom severity and the tendency to engage in dampening and not savor positive emotions. Community participants ($N = 233$) completed questionnaires online. In separate models, IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation fully mediated the relationships between GAD symptom severity and greater dampening and lower savoring. However, controlling for depression, only IU remained a significant mediator. A post hoc latent analysis of the mediators provided support for an underlying construct that may reflect intolerance of uncomfortable states. Intolerance of uncomfortable states was found to significantly mediate the relationship between GAD symptoms and greater dampening and lower savoring. Difficulty withstanding uncertainty may be particularly relevant in understanding why people with elevated GAD symptoms engage in efforts to avoid experiencing positive emotions. Further, the findings suggest that there may be a common factor underlying a variety of GAD-associated constructs reflecting a broad intolerance of uncomfortable inner states. Theoretical and clinical implications are discussed.

Keyword Generalized Anxiety Disorder · Dampening · Savoring · Intolerance of Uncertainty · Positive Emotion

✉ Naomi Koerner
   naomi.koerner@ryerson.ca

[1] Department of Psychology, Toronto Metropolitan University, 350 Victoria St, ON, Toronto, Canada

[2] Département de Psychologie, Université du Québec À Montréal, 405 Rue Sainte-Catherine Est, Montréal, QC, Canada

Generalized anxiety disorder (GAD) is a condition characterized by chronic and excessive worry and anxiety (American Psychiatric Association, 2013). Early theorizing on the function of chronic worry suggested that it reflects unhelpful attempts to avoid or prevent feared events (Borkovec, 1994; Borkovec et al., 2004). It was also postulated that worry helps people feel prepared, avoid surprises, and avoid relaxed states (Heide & Borkovec, 1983, 1984), the latter of which are associated with aversive physical sensations for people high in chronic worry and GAD symptoms (Heide & Borkovec, 1984; Lazarus & Mayne, 1990). Other theories of chronic worry have similarly posited that people with GAD avoid experiencing positive or relaxed states out of fear of losing control or bad things happening (Mennin et al., 2005; Turk et al., 2005) or because of the potential to be caught off guard by a negative emotional experience (Newman & Llera, 2011). There is accumulating evidence that people high in worry and GAD symptoms avoid positive emotions through infrequent savoring and high dampening of positive emotions (e.g., Abasi et al., 2021; Eisner et al., 2009). The aim of the present study was to elucidate factors that underpin the relationship between GAD severity and the lower propensity to savor and higher tendency to dampen positive emotions.

Savoring is a construct that emerged from the positive psychology literature. It refers to "individuals' perceptions of their ability to derive pleasure through […] savoring positive moments" (Bryant, 2003; pp. 175) and is measured using the Savouring Beliefs Inventory (SBI; Bryant, 2003). People can savor positive emotions associated with past, present, and future events using both cognitive (e.g., reflecting on something good than happened) and behavioral strategies (e.g., celebrating, rewarding oneself) to up-regulate positive emotion (Gentzler et al., 2016; Quoibach et al., 2010). Low endorsement of savoring may also reflect an inability to mentally hold onto and sustain positive emotions or thoughts using the aforementioned strategies (Carl et al., 2013). In contrast to savoring, dampening emerged from the literature on emotion regulation and response style theory in depression (Feldman et al., 2008). Dampening reflects thought processes that aim to diminish positive emotions to reduce the intensity and duration of a positive mood state and is measured using the Responses to Positive Affect scale (RPA; Feldman et al., 2008). Dampening strategies include suppression, distraction, and attention to negative elements (Quoibach et al., 2010).

Studies that have investigated the relationship between dampening and positive rumination (i.e., recurrent thoughts about positive experiences in response to positive emotions) suggest that these constructs load on unique factors and are significantly negatively correlated but not so strongly to suggest they are the same construct ($r = -0.12$; Feldman et al., 2008; Raes et al., 2009). Positive rumination is suggested to be related to savoring; however, it reflects a more specific process of using rumination to sustain positive emotion (Carl et al., 2013). Nonetheless, these findings support that low savoring and high dampening reflect different constructs.

A few studies have investigated the relationship between GAD symptoms, savoring, and dampening. Greater severity of worry and GAD symptoms have been found to be associated with lower savoring (Eisner et al., 2009; Palmer et al., 2021) and greater dampening (Abasi et al., 2021; Eisner et al., 2009) in student samples, and this was the case even when controlling for depressive symptoms (Eisner et al.,

2009; Palmer et al., 2021). In the study by Abasi et al. (2021), they provided preliminary evidence that dampening may be especially prominent for individuals who self-report comorbid GAD and major depressive disorder (MDD) symptoms compared to people with only MDD or GAD and nonclinical controls. Importantly, little is known about *why* chronic worry and GAD symptoms are associated with greater dampening and lower savoring. Based on the literature, we posit a number of explanatory factors, including intolerance of uncertainty (IU), avoidance of emotional contrasts, and negative beliefs about positive emotion and its regulation.

Intolerance of Uncertainty

Intolerance of uncertainty (IU) refers to a disposition to hold negative beliefs about uncertainty and its consequences and the proclivity to react negatively (emotionally, cognitively, and behaviorally) when faced with uncertainty (Buhr & Dugas, 2009; Carleton, 2016; Morriss et al., 2021; Tanovic et al., 2018). IU has been studied as a trait-like, dimensional characteristic and as a transdiagnostic process underpinning psychological disorders (McEvoy et al., 2019). There is robust evidence supporting that IU is an important feature of chronic worry and GAD—most people who have GAD report great difficulty withstanding uncertainty (Koerner & Dugas, 2006; Ladouceur et al., 2000; Sexton et al., 2009).

Studies and clinical writings suggest that people who are higher in IU or higher in GAD symptoms have difficulty tolerating the uncertainty associated with losing control over potentially negative situational outcomes. They also fear experiencing and losing control over emotional responses associated with such situations, notably anxiety, but also anger (e.g., Buhr & Dugas, 2012). Much less is known or understood about how individuals higher in IU behave in situations wherein they are likely to "feel good" and wherein the most likely outcome is a *positive* one (even if the situations are themselves uncertain). In one study, participants from an unselected community sample rated scenarios in which the outcome was unknown but certainly positive as bothersome and uncertain suggesting that even positive uncertainty can be perceived as threatening (Pepperdine et al., 2018).

Although it is well understood that most individuals (regardless of the presence of psychopathology) dislike uncertainty, find it stressful, and are motivated to resolve it (Sorrentino et al., 2009), experiments with unselected students also indicate that there are instances in which uncertainty is experienced as enjoyable and pleasurable (Whitchurch et al., 2010; Bar-Anan et al., 2009; see Anderson et al., 2019 for a review). For example, students viewing a film depicting a positive storyline experienced an amplification in their positive affect and curiosity mid-viewing when they spoke statements connoting uncertainty ("I am not sure what is happening") (Bar-Anan et al., 2009). In an unselected community sample, participants indicated they would feel both positive emotions (e.g., excited, surprised, and joyful) and negative emotions (e.g., fear and anxiety) in response to scenarios in which the outcomes were uncertain but would be positive (Morriss et al., 2022).

Our conjecture is that the combination of positive affect and uncertainty may disturb individuals who are higher in IU (such as those with a GAD profile). A higher

IU may cause individuals to question the meaning of positive events (Wilson et al., 2005) in unhelpful ways (e.g., "how/why is this great thing happening to *me*?"). Individuals who are prone to worry and anxiety (and therefore higher in IU) may "see" more readily, or search for, what can go wrong in situations even (or perhaps, especially) when the events are positive or when they are "feeling good" (Palmer et al., 2021). Allowing oneself to sit in a positive affect state may lead to questions that one would rather not entertain (e.g., "How long will I have to wait before the other shoe drops?"). Consequently, people high in GAD symptoms may experience difficulty savoring positive emotion due to the uncertainty related to the experience of feeling good. They may also use dampening strategies to decrease their experience of positive affect in an effort to reduce or eliminate uncertainty.

Contrast Avoidance

In the Contrast Avoidance Model, Newman and Llera (2011) posit that the reason people with GAD fear and avoid experiencing positive emotions is because it sets up the possibility for a negative emotional contrast (i.e., a shift from a positive, relaxed, or euthymic emotional state to a negative emotional state). As such, Newman and Llera (2011) postulate that worry is a strategy used to sustain negative affect to prevent such a shift. According to the Contrast Avoidance Model, people with GAD do not avoid all positive emotions (e.g., they do not avoid relief following avoidance of a negative outcome), and they enjoy positive emotional contrasts (i.e., a shift from a negative to positive emotional state). However, it is posited that following the initial positive experience, people with GAD will use strategies, such as worry, to return to their baseline negative affective state to mitigate the possibility of being caught off guard by an abrupt and unexpected shift to a negative emotional state. Consequently, when experiencing positive affect, people with GAD may minimize savoring and, instead, use additional strategies (e.g., suppression) to dampen their experience of positive emotion to prevent a negative contrast.

Beliefs About Positive Emotion and Its Regulation

According to Mennin and colleagues' (Mennin et al., 2005; Salters-Pedneault et al., 2006) Emotion Dysregulation Model, people with GAD find their emotions confusing, they have low confidence in their ability to access and implement emotion regulation strategies, and they doubt their ability to control their behavior when experiencing intense emotion. Greater difficulties regulating emotion are associated with greater GAD symptom severity and worry controlling for negative affectivity (Salters-Pedneault et al., 2006), and difficulties regulating emotions extend to both positive and negative emotions (e.g., Mennin et al., 2005). Negative beliefs about one's ability to self-regulate when experiencing positive affect may be associated with greater avoidance of positive emotions through greater dampening and lower savoring. Although there is evidence GAD is associated with fear of positive emotions (e.g., Mennin et al., 2005), the scale commonly used to assess the tenets of the Emotion Dysregulation Model (the Difficulties in Emotion Regulation Scale

[DERS]; Gratz & Roemer, 2004) does not assess beliefs about positive emotion, specifically. The Perth Emotion Regulation Competency Inventory (PERCI; Preece et al., 2018) is a measure of emotion regulation based on Gross' (2015) extended process model that overlaps with the DERS subscales and assesses beliefs about one's ability to regulate both positive and negative emotions (Preece et al., 2018). As such, the PERCI was used in the present study to assess beliefs about one's ability to regulate positive emotions and the relationship with GAD symptom severity, dampening, and savoring.

Study Objectives

This study sought to replicate and extend past research on GAD symptoms and dampening and savoring. It was predicted that: (i) greater GAD symptom severity would be related to greater dampening and lower savoring, controlling for depression symptoms; (ii) higher IU, contrast avoidance, and negative beliefs about positive emotion and its regulation would be associated with greater dampening, and lower savoring; and (iii) IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation would each have an indirect effect on the relationship between GAD symptom severity and the tendency to engage in greater dampening and lower savoring. Lastly, in an effort to understand whether a particular mediator *uniquely* explains the relationship between GAD symptom severity and greater dampening and lower savoring, all mediators were simultaneously entered into a mediation model. Given the novelty of this research question, no a priori hypotheses were made. Given the continuous nature of GAD symptoms (Kertz et al., 2014; Ruscio et al., 2001), the hypotheses were tested in an undifferentiated sample to capture variability in symptoms.

Method

Participants

Participants were a community sample of $N = 301$ participants from North America who completed an online study through Amazon Mechanical Turk (MTurk). MTurk is an internet-based platform that has been found to be a valid method for conducting clinical research (Hauser & Schwarz, 2016; Shapiro et al., 2013) and provides more diverse samples compared to other internet-based recruitment sources or student samples (Buhrmester et al., 2011; Casler et al., 2013). Participants were required to be 18 years of age or older, fluent in English, reside in the USA or Canada, and have at least a 95% worker approval rating on MTurk, which is consistent with other MTurk studies to ensure quality data (Paolacci & Chandler, 2014; Peer et al., 2014).

Other a priori data cleaning measures were also taken to ensure high quality data. Consistent with the recommendation to use completion time to screen out low-effort responses (Mason & Suri, 2012), participants who completed our study in under 10 min (i.e., 2 s or less per questionnaire; Huang et al., 2012) and were excluded

($N=41$). In addition, based on the recommendation to use open-ended questions to detect lower-quality data (Kennedy et al., 2020), two raters reviewed the open-ended responses to the GAD-Q-IV for nonsensical or irrelevant responses, and disagreements were resolved through discussion. Twenty-five participants were excluded based on this criterion. Lastly, consistent with the procedure in Malivoire et al. (2019), participants were also presented with a single-item question at the end of the survey asking whether their data were accurate and should be included for analyses. Two additional participants were excluded for indicating their data were invalid leaving a final sample of 233.

The mean participant age was 38.7 years (SD = 12), and 60.1% participants identified their sex as male, 39.5% female, and 0.5% intersex. Participants self-identified as White (75.1%), Black (12.0%), Latin American (3.4%), East Asian (2.6%), South Asian (2.6%), Arab/West Asian (1.3%), and Indigenous (1.3%). One participant endorsed being of mixed race (0.4%), and 3 participants (1.3%) indicated that none of the provided categories were suitable. Participants endorsed being employed full time (76.4%), being employed part-time (14.6%), or being unemployed (9.0%). Lastly, participants reported having an undergraduate degree (46.0%), a high school diploma (23.6%), a college diploma (16.7%), a master's degree (13.2%), or a doctoral degree (0.4%).

Measures

The *Generalized Anxiety Disorder Questionnaire for the DSM-IV* (GAD-Q-IV; Newman et al., 2002) assesses the diagnostic criteria for GAD and the degree of distress and impairment. The GAD-Q-IV was scored using a continuous approach to assess variability in GAD severity across the sample. High scores reflect greater severity. The GAD-Q- IV has shown convergent and discriminant validity, and good test–retest reliability (Newman et al., 2002).

The *Intolerance of Uncertainty Scale* (IUS; Buhr & Dugas, 2002) is a 27-item measure of negative beliefs about uncertainty and its implications. The IUS is rated on a 5-point Likert scale, and higher scores reflect greater negative beliefs about uncertainty. The IUS has demonstrated construct validity, excellent internal consistency ($\alpha=0.95$), good test–retest reliability ($r=0.74$; Sexton & Dugas, 2009).

The *Contrast Avoidance Questionnaire-General Emotion* (CAQ-GE; Llera & Newman, 2017) is a 25-item self-report measure that assesses the tendency to perceive emotional shifts as threatening and to sustain negative affect to avoid a negative emotional contrast. The CAQ-GE is rated on a 5-point Likert scale, and higher scores reflect greater fear and avoidance of emotional contrasts. The CAQ-GE has been validated in university and community samples and has been shown to have strong support for the two factors, convergent and discriminant validity, excellent test–retest reliability, and excellent internal reliability ($\alpha=0.96$—0.97; Llera & Newman, 2017; Rogers et al., 2022; White et al., 2021).

The *Perth Emotion Regulation Competency Inventory* (PERCI; Preece et al., 2018) is a 32-item self-report measure of the extent to which people experience difficulties regulating their positive and negative emotional experiences based on

Gross' (2015) extended process model of emotion regulation. Only the 16-item positive emotion regulation subscale was used, which consists of four types of positive emotion regulation: (1) controlling experiences; (2) inhibiting behavior; (3) activating behavior; and (4) tolerating emotions. The PERCI is rated on a 7-point Likert scale, and higher scores reflect greater difficulty regulating positive emotions. The PERCI subscales have good to excellent internal consistency ($\alpha = 0.85$–0.94) and convergent validity (Preece et al., 2018; 2022).

The *Responses to Positive Affect Questionnaire* (RPA; Feldman et al., 2008) is a 17-item self-report measure of response patterns to positive emotions. The RPA has three subscales including the emotion-focused and self-focused rumination scales that reflect actions that amplify positive emotion. In contrast, the dampening subscale (used in the present study) assesses one's propensity to engage in mental strategies to decrease the intensity and duration of positive affect. Eight items are rated on a 4-point Likert scales, and higher scores reflect greater tendency to engage in the specific response style. The RPA has been translated into several languages, and the psychometric properties have been validated in community and student samples. The RPA has been found to have convergent and divergent validity (e.g., Olofsson et al., 2014; Voss et al., 2019; Yang & Guo, 2014), and the subscales have acceptable to good internal consistency ($\alpha = 0.72$–0.80; Raes et al., 2009).

The *Savoring Beliefs Inventory* (SBI; Bryant, 2003) is a 24-item self-report measure of attitudes towards savoring and propensity to derive pleasure from and savor past, present, and future experiences. Items are rated on a 7-point Likert scale, and higher scores reflect a greater propensity to savor. The SBI has been shown to have strong temporal reliability ($r = 0.84$), good internal consistency ($\alpha = 0.89$), and excellent construct validity (Bryant, 2003). Translated versions of the SBI have also been found to have robust psychometric properties in student samples (e.g., Aghaie et al., 2017; Golay et al., 2018).

The *Center for Epidemiologic Studies Depression Scale-10* (CESD-10; Andresen et al., 1994) is a 10-measure of the frequency of depressive symptoms. Items are rated on a 4-point Likert scale with higher scores indicating greater depressive symptoms.

Procedure

This study was approved by the Research Ethics Boards of the authors' institutions. Participants were first required to provide informed consent to take part in the study following which they were required to complete a "CAPTCHA" code test to prevent non-human activity. Participants first answered questions about demographics followed by the questionnaires in randomized order. Lastly, participants were presented with a single-item question that asked about the validity of their data. Participants were then provided a debriefing form and were compensated $3.00 USD, which is consistent with comparable MTurk studies (e.g., Hall et al., 2019; Mora Ringle et al., 2020).

Statistical Analyses

To assess the first hypothesis, zero-order correlation analyses were performed between the GAD-Q-IV, the RPA, and the SBI. Partial correlations were also conducted controlling for depression (CESD-10). To assess the second hypothesis, zero-order correlations between the study variables were performed. SPSS 26 (IBM Corp, 2019) was used for all correlations. The subsequent questions were assessed through structural equation modeling (SEM) analyses using R (R Core Team, 2021). In all the mediation models, GAD-Q-IV was entered as the predictor, and the SBI and RPA were both entered as outcome variables. To assess the third hypothesis, three mediation analyses were conducted with the IUS, CAQ, and PERCI-pos entered as the mediators in separate models. To assess the exploratory research question, the mediating effects of the IUS, CAQ-GE, and PERCI-pos were tested simultaneously. All of the mediation analyses were conducted a second time controlling for the CESD-10. All estimates, including the indirect effects, were calculated using bootstrapped test statistics and standard errors ($R = 5000$ per analysis).

Results

Correlation Analyses

It was hypothesized that greater GAD symptom severity (GAD-Q-IV) would be associated with greater dampening (RPA) and lower savoring (SBI), while controlling for depression symptoms (CESD-10). Greater GAD symptoms were significantly related to greater dampening and lower savoring (see Table 1). However, when controlling for the CESD-10, the GAD-Q-IV was no longer significantly related to the dampening ($r_{ab.c} = 0.01$, $p = 0.857$) nor savoring ($r_{ab.c} = 0.04$, $p = 0.577$).

Table 1 *Means, standard deviations, and correlations for the study variables* ($N = 233$)

	M	SD	2	3	4	5	6	7
1. GAD-Q-IV	4.46	3.81	0.61	0.55	0.51	0.36	−0.36	0.38
2. CESD-10	9.11	7.06	–	0.75	0.77	0.65	−0.63	0.61
3. IUS	70.15	28.35		–	0.82	0.70	−0.62	0.66
4. CAQ-GE	58.52	25.88			–	0.77	−0.70	0.74
5. PERCI-pos	44.09	26.29				–	−0.65	0.79
6. SBI	4.99	1.12					–	−0.66
7. RPA	15.76	6.37						–

GAD-Q-IV Generalized Anxiety Disorder Questionnaire for the DSM-IV, *CESD-10* Center for Epidemiological Studies-Depression Scale, short version, *IUS* Intolerance of Uncertainty Scale, *CAQ-GE* Contrast Avoidance Questionnaire-General Emotion, *PERCI-pos* Perth Emotion Regulation Competency Inventory, Positive-Emotion Regulation subscale, *SBI* Savoring Beliefs Inventory, *RPA* Responses to Positive Affect

All correlations significant at $p < 0.001$

It was hypothesized that IU (IUS), contrast avoidance (CAQ-GE), and beliefs about positive emotion and its regulation (PERCI-pos) would be significantly related to greater dampening and lower savoring. Greater IUS, CAQ-GE, and PERCI-pos were significantly associated with greater dampening and lower savoring (see Table 1).

Separate Mediation Analyses

Three mediation models were constructed to assess the third research objective examining the indirect effect of GAD-relevant processes on the relationship between GAD symptom severity, dampening, and savoring. In the first mediation model, the IUS fully mediated the relationships between GAD-Q-IV predicting the RPA and the SBI (see Fig. 1). When controlling for the CESD-10, the IUS remained a significant mediator (see Supplementary Material 1). In the second mediation model, the CAQ-GE fully mediated the relationships between the GAD-Q-IV predicting the RPA and the SBI (see Fig. 2). However, when the CESD-10 was taken into account, the GAD-Q-IV was no longer significantly associated with the CAQ-GE. The indirect effects via the CAQ-GE did not remain significant (see Supplementary Material 2). In the third mediation model, the PERCI-pos was a partial mediator of the relationships between the GAD-Q-IV predicting the RPA and the SBI (see Fig. 3). However, when controlling for the CESD-10, the GAD-Q-IV was no longer significantly related to the PERCI-pos. As with the prior analyses, the indirect effects through the PERCI-pos were no longer significant (see Supplementary Material 3).
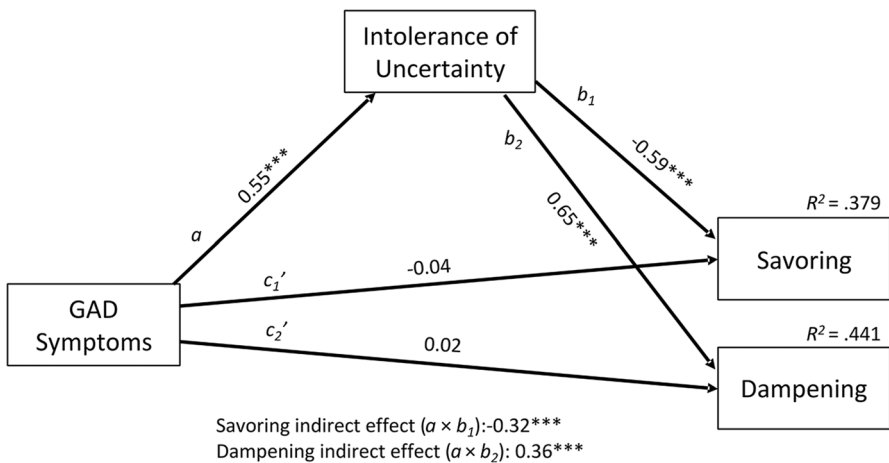

Fig. 1 *SEM results for GAD symptom severity indirectly predicting savoring and dampening* via *intolerance of uncertainty with and without controlling for depressive symptoms. Note.* Coefficients reflect path estimates when all variables are standardized. GAD generalized anxiety disorder symptoms. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
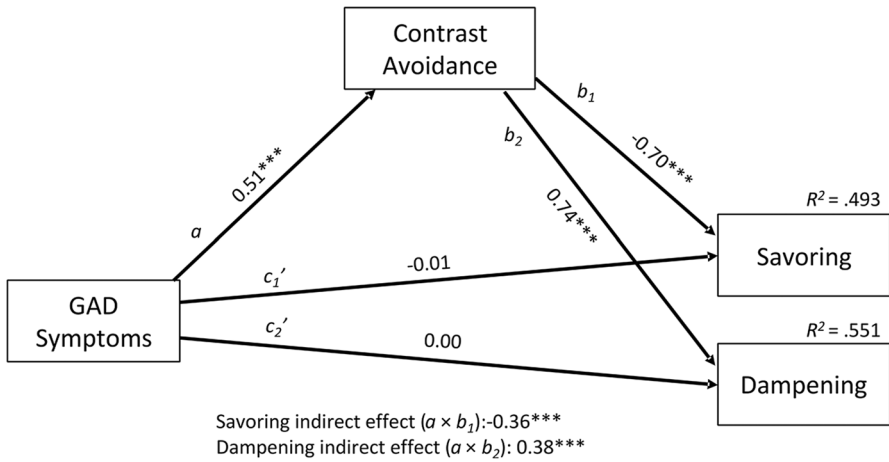
Fig. 2 *SEM results for GAD symptom severity indirectly predicting savoring and dampening* via *contrast avoidance. Note.* Coefficients reflect path estimates when all variables are standardized. GAD generalized anxiety disorder symptoms. *** $p < 0.001$.
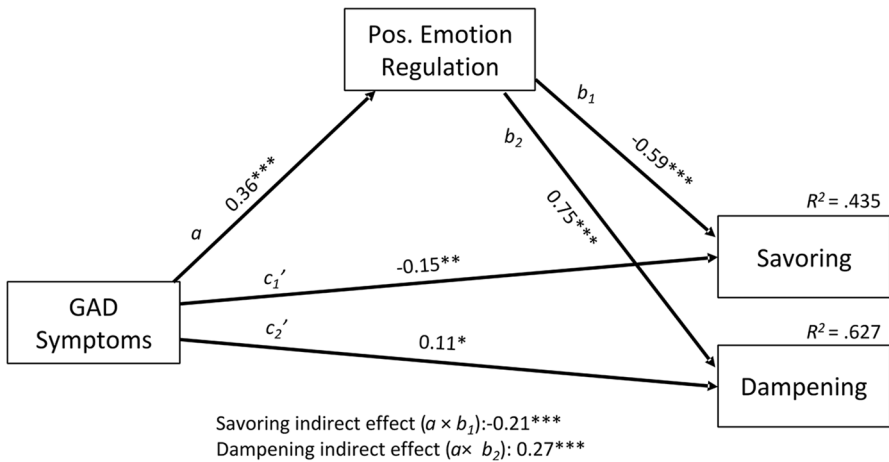

Fig. 3 *SEM results for GAD symptom severity indirectly predicting savoring and dampening* via *positive emotion and its regulation. Note.* Coefficients reflect path estimates when all variables are standardized. GAD generalized anxiety disorder symptoms. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Simultaneous Mediation Analysis

As an exploratory analysis, a mediation analysis was conducted with all three mediators (IUS, CAQ-GE, and PERCI-pos) entered simultaneously. The CAQ-GE and the PERCI-pos significantly mediated the relationships between the GAD-Q-IV with the RPA and the SBI. However, the IUS mediated neither the GAD-Q-IV → RPA nor the GAD-Q-IV → SBI relation (see Supplementary Material 4).

When controlling for the CESD-10, no indirect effects remained significant (see Supplementary Material 5).

Latent Factor Mediation Analysis

Given the high statistical correlations between the IUS, the CAQ and the PERCI-pos (*β*s in the prior SEM ranging from 0.65 to 0.75), we explored post hoc if these variables have an underlying commonality. Conceptually, these constructs all refer to a general construct implying an intolerance of uncomfortable internal experiences or states, specifically uncertainty, negative emotional shifts, and positive emotions. Intolerance of uncomfortable internal states could influence individuals with GAD to avoid sustaining positive affect. Therefore, we investigated if a general intolerance of uncomfortable internal states could explain the relationship between GAD symptoms and high tendency to dampen and low propensity to savor positive emotions. Consequently, an exploratory analysis was performed with the combined effects of the IUS, the CAQ-GE, and the PERCI-pos, as a *latent factor* (i.e., intolerance of uncomfortable internal states), in the mediation of the relationship between the GAD-Q-IV predicting the RPA and the SBI. A confirmatory factor analysis (CFA) was first performed. The IUS ($B = 24.46$, $SE = 1.14$, $p < 0.001$), the CAQ-GE ($B = 24.42$, $SE = 1.05$, $p < 0.001$), and the PERCI-pos ($B = 21.31$, $SE = 1.29$, $p < 0.001$) loaded together and contributed similarly to the latent factor, whose variance was set to equal 1. Next, a mediation analysis was conducted with the latent factor. The latent factor partially mediated the relationship between the GAD-Q-IV and the RPA, and fully mediated the association between the GAD-Q-IV and the SBI (see Fig. 4). However, when controlling for the CESD-10, the GAD-Q-IV no
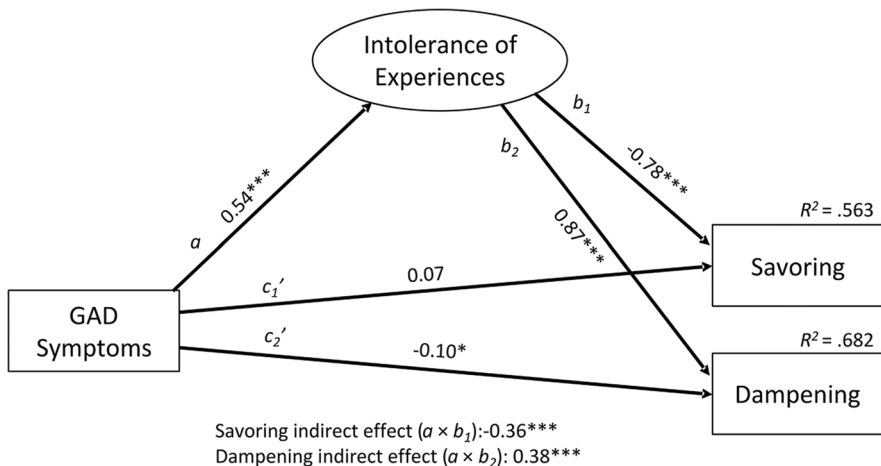

Fig. 4 *SEM results for GAD symptom severity indirectly predicting savoring and dampening* via *intolerance of experiences latent factor. Note.* Coefficients reflect path estimates when all variables are standardized. GAD generalized anxiety disorder symptoms. *** $p < 0.001$. Fit measures: *CFI* = 0.96, *TLI* = 0.89, *RMSEA* 90% CI [0.13, 0.22], *SRMR* = 0.04.

longer predicted latent intolerance of uncomfortable internal states. The indirect effects were not significant (see Supplementary Material 6).

Discussion

This study aimed to refine our understanding of the tendency to dampen and avoid savoring positive emotions in GAD by investigating the indirect effects of GAD-relevant processes that may theoretically underpin these relationships. These processes included IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation. Consistent with our predictions, greater GAD symptom severity and greater IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation were each significantly related to greater dampening and lower savoring. In contrast to past research (e.g., Eisner et al., 2009; Palmer et al., 2021), GAD symptoms were not found to significantly account for additional variance in savoring and dampening over that accounted for and shared by depression. This is unsurprising given that dysfunctional positive emotion regulation is central to depression (see Vanderlind et al., 2020 for a review), and depression symptoms are highly prevalent among people with GAD (Kalin, 2020). High dampening and low savoring may be especially prominent in people high in both GAD and depression symptoms (Abasi et al., 2021).

Consistent with the hypotheses, IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation had a significant indirect effect on the relationship between GAD symptom severity and savoring and dampening when assessed in separate models. As discussed, people with GAD may experience difficulty tolerating uncertainty related to their ability to manage their positive emotions or the outcome of a positive event and the emotional consequences. As such, when faced with an uncertain situation, people higher in IU may be more likely to experience difficulty savoring positive emotion associated with uncertainty or may use dampening strategies in an effort to avoid uncertainty associated with feeling good. This is consistent with early theorizing that suggests people with GAD experience surprises and relaxed states as aversive and consequently avoid them (Heide & Borkovec, 1983, 1984). Further, the experience of excitement and anxiety shares similarities; both emotions are experienced in anticipation of an outcome and are associated with high levels of arousal (Brooks, 2014). In a nonclinical sample, positively valanced uncertainty was found to evoke negative emotions, such as anxiety, and positive emotions, including excitement (Morriss et al., 2022). Thus, misinterpretation of excitement as anxiety in response to positive uncertainty may also contribute to avoidance for people high in IU given high levels of anxiety sensitivity (Carleton et al., 2007). Employing strategies to dampen positive emotion may foster a sense of control when faced with uncertainty associated with positive emotions.

The results also suggest that fear of negative emotional contrasts and negative beliefs about positive emotion and its regulation may explain the relationship between GAD symptoms and dampening and savoring. As discussed, the Contrast Avoidance Model posits that people with GAD engage in strategies to sustain negative affect to prevent an unexpected and aversive shift from a positive or euthymic

emotional state to a negative state. In this model, worry is discussed as a key strategy used to sustain negative affect (Newman & Llera, 2011). Our findings suggest that dampening strategies and failing to savor positive thoughts and emotions may be additional coping strategies used in response to negative beliefs about the experience of negative emotional contrasts.

In addition, the findings extend our understanding of maladaptive emotion regulation in GAD, which has largely focused on reactions to negative emotions. Specifically, the findings support that higher GAD symptoms are associated with a greater tendency to hold negative beliefs about the experience of positive emotions and one's ability to self-regulate. Further, these negative beliefs may contribute to efforts to minimize the experience of positive emotion via high dampening and low savoring. These findings corroborate the tenets of the Emotion Dysregulation Model, including that people with GAD lack confidence in their ability to regulate their emotions and consequently engage in maladaptive strategies to control and suppress their emotions (Mennin et al., 2005; Salters-Pedneault et al., 2006).

In an effort to understand the specificity of the relationships discussed above with GAD symptoms, the analyses were conducted a second time controlling for depression symptoms. The findings provide preliminary evidence that the tendency to hold negative beliefs about uncertainty and its consequences may be particularly relevant in understanding the impetus for engaging in high dampening and low savoring of positive emotions in GAD over and above depressive symptoms. However, the overlapping variance between depression and GAD symptoms may be more relevant to understanding variability in negative beliefs about negative emotional contrasts and positive emotion and its regulation across people with varying levels of GAD symptoms. This is unsurprising in light of research showing that depression symptoms are linked to deficits in positive emotion regulation (see Vanderlind et al., 2020 for a review). Further, the findings are interesting considering evidence that depression symptoms are relevant to understanding fear of negative emotional contrasts in GAD (Crouch et al., 2017). Specifically, both worry and rumination may be strategies used to sustain negative affect to prevent emotional contrasts and may vary depending on whether depression or anxiety symptoms are more prominent (Crouch et al., 2017). However, these findings should be interpreted with caution; controlling for depression may alter the construct of GAD symptom severity, given the high comorbidity between depression and GAD symptoms (Kalin, 2020). Future research could investigate the specificity of these relationships with depression symptoms.

In a preliminary effort to understand the unique impact of IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation on the relationship between GAD symptom severity and savoring and dampening, an exploratory analysis was conducted with all three mediators entered simultaneously into the model. This model tested whether any residual variance in each mediator continued to have predictive power after accounting for the other mediators. Only fear of negative emotional contrasts and negative beliefs about positive emotion and its regulation had significant indirect effects on the relationship between GAD symptom severity and savoring and dampening. This suggests that, in the model with only IU as a mediator, the variance in dampening and savoring explained by IU is accounted for by shared variance with fear of negative emotional

contrasts and negative beliefs about positive emotion and its regulation. These findings must be interpreted with caution. Despite variance inflation factors being small (< 0.5), high correlations among the mediators and dependent variables led to negligible increases in R^2 values (dampening: $R^2_{all} - R^2_{PERCI} = 0.038$; savoring: $R^2_{all} - R^2_{CAQ} = 0.028$), suggesting strong overlap in the variance accounted for by the mediators across models. Thus, the residual predictive ability of the mediators has much less explanatory power than their shared predictive ability. When controlling for depressive symptoms, none of the mediators had a significant indirect effect. Given that IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation are highly correlated, these results should be considered preliminary and interpreted with caution.

Lastly, given the high statistical relationship between IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation (and their conceptual overlap), we considered whether these constructs have an underlying commonality. A latent analysis revealed that these constructs, which have been typically investigated independently in separate models of GAD, do share a latent construct that we propose reflects an *intolerance of uncomfortable internal states*. Intolerance of uncomfortable internal states reflects difficultly sitting with all distressing internal processes including thoughts, emotions, sensations, and urges. This latent construct had a significant indirect effect on the relationships between GAD symptom severity and dampening and savoring. This finding is consistent with research showing that GAD is associated with experiential avoidance (Roemer et al., 2005), which is defined as the tendency to avoid internal experiences including thoughts, emotions, and physiological sensations (Hayes et al., 1996), and suggests that the tendency to avoid internal experiences and states is associated with greater dampening and lower savoring for those higher in GAD symptoms. Consistently, Abasi et al. (2021) also found experiential avoidance to be associated with greater dampening and lower positive rumination in an unselected student sample. However, in our study, the latent construct intolerance of uncomfortable internal states no longer had a significant indirect effect when controlling for depression, which indicates that the shared variance between the mediators is better explained by the variance accounted for and shared by depression symptoms than GAD symptoms alone.

The findings of this study (pending replication and extension) inspire ideas for therapy application that would need to be tested via experimental analyses. In the assessment and treatment of GAD, it may be useful to query about high dampening and low savoring of positive emotions as strategies to cope with uncertainty related to positive events. Dampening, for example, may be part of a larger repertoire of uncertainty-controlling behaviors (Hebert & Dugas, 2019; Marcotte-Beaumier et al., 2020). The usefulness of high dampening and low savoring could be challenged through exposure practices that encourage sustaining positive emotions alongside some degree of uncertainty. This could be achieved by engaging in intentional exercises aimed at heightening one's subjective sense of uncertainty in anticipation of events with likely positive outcomes (e.g., by asking oneself, "I wonder…?"); Bar-Anan et al., 2009). In such exercises, caution would be needed so that the heightening of the felt sense of uncertainty via questions such as "I

wonder" does not veer into unconstructive forms of ruminative analysis, which could be problematic for people with GAD. In addition, research suggests that individuals with GAD report fewer positive future events in tasks drawing on prospective imagery relative to individuals low in worry and anxiety (Tallon et al., 2020). Whether this is due to a *lower ability* to engage with positive events in the imagination, or *motivated avoidance* of such imaginings, still needs to be sorted out in research. However, there is some evidence that savoring can be trained via instruction (Corman et al., 2020). Repeated mental simulation of future or hypothetical positive events while encouraging increased savoring and withholding of dampening strategies may be useful as an exposure practice. The findings also support that people with GAD would likely benefit from emotion regulation strategies aimed at increasing tolerance of not only negative emotions but positive emotions as well. Treatment targets may include identifying and challenging unhelpful beliefs about positive emotions and one's ability to cope and increasing comfort with positive emotions through exposures.

The study's conceptual and empirical contributions should be considered in light of the following limitations. The study sample was composed primarily of white, middle-aged, well-educated, males, which may affect the generalizability of the findings. A cross-sectional design was used to test the study hypotheses, which is an important first step to test hypothesized relationships between constructs before proceeding to longitudinal research. Therefore, directionality of the relations between variables could not be confirmed. Further, we recruited individuals with a range of GAD symptoms, which is consistent with evidence that GAD symptoms exist on a continuum (Marcus et al., 2014; Ruscio et al., 2001). Nonetheless, these findings should be replicated in a clinical sample. In addition, the average score on the IUS was higher than what has been previously found in nonclinical student samples (e.g., Buhr & Dugas, 2006; Dugas et al., 2005). It is possible that the timing of data collection, which occurred in summer of 2020 shortly following the onset of the COVID-19 pandemic, may have influenced intolerance of uncertainty in the sample.

Despite these limitations, the findings provide answers to important questions about the attitudes and behaviors of individuals high in GAD symptoms vis-à-vis positive emotion and situations that may elicit such emotion. They also provide preliminary insight into potential mechanisms of the relationship between GAD symptoms and dampening and savoring. Specifically, IU, fear of negative emotional contrasts, and negative beliefs about positive emotion and its regulation were all found to have significant indirect effects on the relationship between GAD symptoms and dampening and savoring. However, IU was the only mediator that remained significant once controlling for depression. As such, IU may be particularly relevant to understanding why individuals high in GAD symptoms may tend to dampen and not savor positive emotions. However, it is important that future research employ experimental and longitudinal study designs to replicate this finding. In addition, the study findings support overlap between models of GAD emphasizing negative beliefs about uncertainty and models of GAD that stress the role of maladaptive beliefs about emotion regulation and emotional avoidance in the maintenance of GAD. Specifically, a general intolerance of uncomfortable internal states may be shared across constructs from different GAD models. These findings speak to the

need to understand commonalities across models of GAD in an effort to refine our understanding of processes that maintain GAD.

Declarations

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