



# Defining and Measuring Tolerance of Uncontrollability

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## Abstract

**Background** Life is filled with situations that remain completely beyond our control. Yet, some people seem better able to tolerate this uncontrollability than others. To date, little research has focused on understanding how people feel about the uncontrollability of life (i.e., tolerance of uncontrollability).

**Methods** This article introduces and describes tolerance of uncontrollability while distinguishing it from other related constructs, including intolerance of uncertainty, perception and level of control, learned helplessness, and global beliefs, such as religion and spirituality, optimism and pessimism, mindfulness, and distress tolerance. To measure an individual's tolerance of uncontrollability, we developed the Tolerance of Uncontrollability Questionnaire (TOUQ) and administered it, together with other measures on possibly related constructs, to 300 individuals (data were analyzed from 226 participants).

**Results** After running exploratory factor analysis, the final version of the TOUQ consists of 19 items that load onto one factor, with excellent internal consistency ( $\alpha=0.97$ ). Scores on the TOUQ were moderately related to intolerance of uncertainty and optimism, and weakly related to specific mindfulness factors.

**Conclusions** The TOUQ measures a unique construct and shows evidence of reliability and validity.

**Keywords** Loss of control · Tolerance of uncontrollability · Uncontrollability

## Introduction

Benjamin Franklin (1907) once noted that the only things in life that are certain are taxes and death, and both are beyond our control. In fact, much of what happens in our lives is beyond our control. This is not to suggest that we are never in control or can never have an impact on our experiences, but rather to recognize that there are times in which all of us lose control over our environment, and that this realization can be uncomfortable. As evidenced by some individuals developing anxiety when faced with loss of control, while others do not (e.g., Chorpita & Barlow, 1998; Hofmann, 2005), it is likely that although loss of control is universally

experienced, individuals have differing reactions to and comfort with experiences not within their control.

Given that experiencing loss of control is a universal human experience, it is imperative that we understand how people feel about and react to it. Yet, to our knowledge, exploring individuals' tolerance for the uncontrollability of life has yet to be investigated. As such, the current exploration of tolerance of uncontrollability marks a novel investigation of an experience that is both widely experienced by humanity and likely also has important implications for people's lives. How one reacts in the face of loss of control may impact things such as one's wellbeing. For example, feeling that one has a lack of control over one's emotions has been linked to the development of anxiety disorders (e.g., Chorpita & Barlow, 1998; Hofmann, 2005). This suggests that how much someone tolerates loss of control may have important implications for their mental health. Further investigation of tolerance of uncontrollability may add a unique and nuanced understanding of anxiety and mood disorders. If this is indeed the case, exploration and measurement of one's tolerance of uncontrollability may ultimately lead to a better understanding of the development of emotional disorders and may have implications for their treatment.

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## Defining Tolerance of Uncontrollability

We define tolerance of uncontrollability (TOU) as our beliefs about and comfort with the fact that many things in life are beyond our control. Reactions to uncontrollability are informed by many things, such as how predictable or unpredictable an event was in the first place and the valence of that event. While many uncontrollable events may also be unpredictable, TOU is specific to events' controllability *regardless* of their predictability. We will explore this association between unpredictability and uncontrollability further below. Furthermore, TOU encompasses general beliefs about and comfort with the uncontrollable, whether those uncontrollable experiences are positive, negative, emotionally mixed, or neutral. Despite the frequent associations, uncontrollable events are not always necessarily negative. As such, while the emotional impact of the event may partially dictate one's response, we argue that the uncontrollable nature of an event will also uniquely impact one's reaction beyond its affective valence.

## Concepts Relevant to Tolerance of Uncontrollability

A number of constructs such as intolerance of uncertainty, distress tolerance, locus of control, learned helplessness, optimism/pessimism, religiosity, and mindfulness may be relevant to the construct of TOU. Because TOU is a novel construct, this paper marks the first systematic exploration known to these authors into the relationship between TOU and other constructs. We explore a variety of constructs related to how we experience or cope with adversity and our outlook on life. Thus, the constructs related to how we deal with adversity and view the world were chosen for their seeming potential for connection with TOU. In the following paragraphs, we will discuss the overlap and distinguishing features between these constructs and TOU as well as our rationale for the inclusion of each construct within this theme.

## Tolerance of Unpleasant States

*Intolerance of Uncertainty* One seemingly related construct is intolerance of uncertainty. This construct has been defined as finding the experience of not knowing (e.g., not knowing an event's outcome) to be aversive, which is associated with efforts to resolve lack of certainty (Buhr & Dugas, 2006; Dugas et al., 2001; Rosser, 2019). Some definitions also include a sense of emotional and cognitive "paralysis" in the face of uncertainty (Birrell et al., 2011). Intolerance of uncertainty has been linked with worry (Buhr & Dugas, 2006; Freeston et al., 1994). Not

surprisingly, intolerance of uncertainty has been found to be a potent transdiagnostic factor in anxiety and mood disorders (Carleton et al., 2012). Specifically, individuals with anxiety and mood disorders scored significantly higher on the intolerance of uncertainty scale (Carleton et al., 2007) compared to nonclinical samples (Carleton et al., 2012).

It is important to note that despite the apparent similarity between 'tolerance of uncontrollability' and 'intolerance of uncertainty,' these two concepts are actually quite different. TOU refers to our beliefs about and comfort with the certainty that something is beyond our ability to influence it. This is quite different than the *not knowing* which is found to be aversive in intolerance of uncertainty. In this way, the experience, situation, or outcome is by definition known in one case (TOU) and not the other (intolerance of uncertainty). While a situation can be both outside of our control and uncertain, the uncertainty is not always present, making TOU distinct from intolerance of uncertainty. When someone experiences lack of control in a situation that was not predicted, the outcome of that situation may also become uncertain for them, but this is not always the case. Sometimes something beyond our control is completely certain. As such, these two concepts may be correlated depending on the context of the experience, yet remain distinct. Because of this seeming potential for connection as both concepts deal with tolerance of types of life experiences, the current study provides an initial exploration in to whether people who are less tolerant of uncontrollability may also experience intolerance of uncertainty.

*Distress Tolerance* Another concept that may have some potential relevance to TOU is distress tolerance. Distress tolerance has been broadly defined as one's perceived capacity as well as behavioral ability to withstand distressing or aversive states (e.g., pain, negative emotions; Leyro et al., 2010). Extant work on distress tolerance suggests it has a hierarchical structure with related but distinct lower-order factors (Bernstein et al., 2009), including tolerance of uncertainty, ambiguity, frustration, negative emotions, and physical discomfort (Zvolensky et al., 2010). It has been suggested that those with low distress tolerance may respond maladaptively to stressful situations (Leyro et al., 2010). Individuals with low distress tolerance likely find distress unbearable, feeling they cannot manage distress and judging themselves as a result (Simons & Gaher, 2005). As such, individuals with low distress tolerance will engage in significant attempts to avoid distress and report feeling consumed by it when they are unable to avoid it (Simons & Gaher, 2005). Difficulties with distress tolerance have been linked to psychopathology (Anestis et al., 2007; Bernstein, et al., 2011; Nock & Mendes, 2008), and skill-building to address this difficulty is a pillar of treatment for individuals with borderline personality disorder (Linehan, 1993), amongst other disorders.

Distress tolerance is similar to TOU in that both concepts involve an acknowledgment of lack of control. Distress tolerance is more specific than TOU, as it is relevant to aversive stimuli or experiences only, whereas TOU encompasses all experiences that involve lack of control, regardless of valence. Another difference is the construct of distress tolerance includes both perceptions and behaviors related to managing distress, whereas TOU only explores people's beliefs about and comfort with uncontrollable situations and experiences. Given that these two concepts share some aspects, it is worth exploring the potential for correlation between the two.

### Life Outlook and Perception of Control

**Locus of Control** One concept related to control that is often described in the literature in relation to anxiety and depression is *locus of control*. Locus of control can be defined as the extent to which people believe they have power over events in their own lives and has long been conceptualized as a stable trait (Rotter, 1966). The two types of loci of control are internal and external. An individual with an *internal locus of control* believes he or she can influence events and their outcomes. A person with an *external locus of control* tends to believe that outside forces are usually responsible for how events unfold. Those with an internal locus of control tend to have higher self-esteem, perseverance, positive outlook, and respond well under adverse conditions (Cunningham et al., 1991; Pu et al., 2017). Those with a more external locus of control tend to experience more negative emotions and poorer psychological health (Klonowicz, 2001; Pu et al., 2017). Rotter (1966) hypothesized that whether an individual has an internal versus external locus of control is of significance to understanding differences in how people attribute personal control to reward when faced with the same situation. Interestingly, one's locus of control can vary daily depending on particular factors, such as anxiety and stress (Ryon & Gleason, 2014).

One's locus of control may certainly be related to TOU, as both include reference to loss of control. However, TOU is specifically exploring individuals' reactions and beliefs when they are in a situation considered to be externally controlled. TOU is not concerned with whether or not we believe we can control our environment (i.e., locus of control) but rather on when we *know we certainly cannot control* the situation or outcome. It may be that individuals with high internal loci of control are particularly low in TOU as they believe they should have control. Thus, violations of that belief would be difficult for these individuals to manage. Alternatively, it is possible that those with a high internal locus of control have greater TOU because they are able to manage a time limited loss of control given that they still generally feel in control. This again poses an

empirical question but suggests possible avenues through which TOU and locus of control may be linked.

**Learned Helplessness** Another concept related to level of control is *learned helplessness*, which was coined by Seligman and Maier (1967). Learned helplessness can be described as a lack of escape behavior or increased avoidance behavior after experiencing an uncontrollable stressor that leads the individual to believe that they cannot change their environment (Seligman & Maier, 1967). Benson and Kennelly (1976) found that uncontrollable aversive outcomes, rather than uncontrollable reinforcements, produce learned helplessness. Similarly, Maier and Seligman (1976) argued that exposure to uncontrollable events interferes with one's tendency to perceive relationships that are contingent between behavior and outcomes. The authors argue that when an individual is faced with an uncontrollable event, he or she may experience deficits motivationally (motivation to respond in the face of later aversive events lessens), cognitively (subject has trouble learning even if a response worked), and emotionally (can lead to depression and anxiety).

Research has found that even healthy individuals will show greater anxiety levels in uncontrollable conditions (Havranek et al., 2016). The perceived controllability aspect of learned helplessness (Teodorescu & Erev, 2014) is perhaps the most relevant to tolerance of uncontrollability. Perceived controllability refers to the perceived relationship between one's efforts and the outcome. Perception of control is adaptive for survival, as it is necessary to perceive that one has control over their decisions in order to form self-efficacy beliefs (Leotti et al., 2010). However, if one perceives an independence between one's efforts and the quality of the outcome, one's efforts may diminish as a result, which often leads to feelings of depression and helplessness. Ryan and Deci (2006) argued that autonomy and self-determination are fundamental psychological needs. Thus, it may be more beneficial to perceive oneself as in control.

While the agency involved in perception of control may be helpful, it remains undeniable that certain experiences occur beyond our control. While this aspect of learned helplessness may influence one's TOU, these concepts remain distinct. TOU does not involve one's general outlook on whether one has control over life events, but rather refers to beliefs about and comfort with instances in which lack of control is clearly evident. It may be that those with higher perceptions of control (and lower learned helplessness) are less tolerant of things happening beyond their control because this violates their basic world outlook. Alternatively, it could be that those with high learned helplessness also experience less discomfort with uncontrollability because they have already accepted that the world is operating beyond their reach.

**Optimism and Pessimism** Optimism and pessimism are constructs dealing with one's outlook on life. Optimism has been defined as, "the generalized expectation that good things will happen" (Rasmussen et al., 2009). Meta-analyses on optimism have found that optimism is a significant predictor of physical health (Rasmussen et al., 2009), has a negative association with negative affect, and is positively related to coping (Andersson, 1996). Specific to coping, optimism is associated with increased approach coping and decreased avoidance coping (Nes & Segerstrom, 2006). By contrast, pessimism has been defined as expecting things to go poorly or outcomes to be negative (Scheier et al., 2001). Evidence suggests that pessimists experience more distress when navigating life difficulties (Scheier et al., 2001) and pessimism is associated with less adaptive coping, including denial, distancing, focusing on stress, and disengaging (Scheier et al., 1986).

We expect optimism and pessimism may be related to TOU. One's outlook on whether experiences are expected to go well or poorly (optimism/pessimism) may influence how one feels about uncontrollable events. However, optimism and pessimism focus more on one's outlook in general and may be distinct from TOU since TOU is specific to facets of life outside of one's control.

### Spirituality and Mindfulness

**Religion and Spirituality** Religion and spirituality have also been linked to control. Indeed, locus of control is a mediator between health and religion (Pargament, 1997). Perceiving negative events in life as externally caused, rather than internally, is often seen in more religious individuals and may serve as a coping mechanism or explanation for negative life events. Studies have found that ascribing to a religion has a positive influence on health if the religion is viewed positively (Seybold & Hill, 2001). It is also possible that participating in religion (e.g., prayer, etc.) may give individuals a sense of control. Interestingly, individuals with diabetes who had more religious beliefs were found to have fewer depressive symptoms, potentially due to the emotional support, healing themes, or practical assistance religion may provide (Amadi et al., 2016). Alternatively, if a religion emphasizes an individual's powerlessness and the role of fate, this could diminish one's sense of control. Religion often serves as a protective factor in relation to mental health (Larson et al., 1992), yet religion has also been associated with some aspects of psychopathology such as rigidity, authoritarianism, dogmatism, dependence, and suggestibility (Gartner, 1996).

As religiosity involves aspects of locus of control, religion shares some overlapping components to TOU. Someone who is religious and finds comfort in their belief that a deity is in control may also have high TOU. This is because

experiences beyond one's control may be attributed to intervention by a deity and thus, will be considered to be less aversive. Therefore, religiosity may be positively related to TOU, but those who are not religious remain unexplained.

**Mindfulness** Mindfulness can be described as active focus on the present moment, with acceptance and awareness of current thoughts and feelings (Drake et al., 2008). Mindfulness also emphasizes the importance of noticing without labeling or judging. While mindfulness differs from TOU in important ways, one's ability to be in the present moment using a nonjudgmental stance may be associated with greater TOU. Individuals who engage in mindfulness tend to experience reduced psychological distress (Brown et al., 2007) and increased acceptance, which leads to greater psychological health (Hayes et al., 1999). While mindfulness is often used more generally to promote wellbeing (Kocovski et al., 2009), there have been several mindfulness-based interventions developed for the treatment of psychopathology. Mindfulness-based therapy was derived from Buddhist practices and has been shown to reduce negative psychological states such as anxiety, stress, and depression (Hofmann et al., 2010) and has also been found to reduce distress, increase positive mood, and reduce rumination (Kocovski et al., 2009).

Both mindfulness and TOU presumably involve an acceptance of the current state of one's experience. However, mindfulness involves a specific focus in time (i.e., present moment focus) that is not always a component of TOU. Furthermore, while the nonjudgmental stance of mindfulness may have implications for those who adopt it as they encounter uncontrollable situations, it does not address all that is encompassed in "tolerance." The tolerance as it applies to TOU involves a comfort level that implies a judgment is being made about how comfortable one is with lack of control, making it quite distinct from the nonjudgmental facet of mindfulness.

### Measuring Tolerance of Uncontrollability

While the construct of TOU may have important relationships with the aforementioned factors, we have argued that nonetheless, it remains notably distinct. Having defined TOU as one's beliefs about and comfort with the fact that many of our experiences are beyond our control, we became interested in finding a way to measure this construct. To our knowledge, a measure of TOU does not exist. In the current study, we developed a measure titled the Tolerance of Uncontrollability Questionnaire (TOUQ). Although interview or behavioral tasks could assess one's TOU, a self-report questionnaire is the best way to provide an easily accessible, quick, and validated measure to assess this construct. We tested this measure with 300 adult individuals and completed exploratory factor analyses to investigate the dimensions of this

preliminary measure. Participants also completed measures of related constructs of interest to determine convergent and discriminant validity.

We made a series of predictions for how TOU would be related to various constructs of interest, while remaining its own construct. Specifically, it was hypothesized that the TOUQ would relate to intolerance of uncertainty yet remain distinct from it because it does not address the fear or dislike for the unknown but rather beliefs and comfort with *objective* lack of control. We also expected that one's locus of control would be a related construct, such that higher tolerance for uncontrollable events may suggest a heightened awareness of external control and less identification with internal sense of control. However, we expected the TOUQ to be a distinct construct from locus of control, given that we are measuring attitudes about an inherent lack of control rather than one's differential *belief* in one's own control. An individual's level of optimism or pessimism was further expected to interact with the TOUQ, given that a pessimistic outlook on life may stem from intolerance of uncontrollability whereas optimism may relate to the assumption that one is able to cope or adapt despite the uncontrollability of life. That said, optimism and pessimism focus more on one's outlook on life in general and may be distinct from the TOUQ since the TOUQ measures tolerance of specific facets of life that are outside control.

We expected that aspects of mindfulness would relate to TOU given that acceptance and tolerance of a situation likely depend on non-judgment, non-reactivity, and/or the ability to accurately describe the circumstance. Distress tolerance was included to determine if tolerance of uncontrollability measures acceptance of simple distress or acceptance of an irrefutable fact of life. The TOUQ was created to measure more longstanding tolerance and assumptions of uncontrollability, whereas distress tolerance relates to more momentary or situational distress, and including this measure allows us to explore how the two factors may relate to one another. TOU was also expected to relate to one's sense of religiosity, such that a greater sense of belief in a higher power may allow individuals to feel more tolerant of their lack of control over outcomes. Lastly, given the relationship between depression and learned helplessness (e.g., Maier & Seligman, 1976), it is possible that tolerance of uncontrollable facets of life may relate to depressive symptomology. However, no specific predictions about TOUQ scores relative to depression were made, given that this study focused purely on measure development and validation and such predictions would be outside the scope of inquiry. We predicted that the TOUQ would possess both convergent and divergent validity with the aforementioned constructs.

## Methods

### Item Generation

Authors AH, SGH, and ALB first reviewed the psychological literature to specify the boundaries of relevant constructs as well as control as a construct, confirmed that no prior measure of TOU existed, examined current scales of related constructs, and defined TOU. Next, AH, SGH, and ALB independently created 10 items each, for an initial pool of 30 items assessing level of tolerance to uncontrollable events. After gaining input from other laboratory members on content and face validity, SGH and AH, experts in emotional disorders, and ALB chose a final set of 20 items.

### Participants

After obtaining informed consent, the TOUQ and measures of hypothetically related constructs (see below) were tested with a sample of 300 participants (final  $N = 226$ ) from Amazon Mechanical Turk (mTURK). Measures were presented in a randomized order for each participant. This sample number was chosen in accordance with common practices of including a minimum of 10 participants per item (200–300 observations; for review see, Boateng et al., 2018). The average age of the sample was 34 years ( $SD 9.9$ ) and was 58% male. The sample identified as being members of the following racial groups: 62.4% Caucasian/White; 13.7% Asian; 11.5% Black/African American; 5.3% Hispanic/Latino; 4.9% Multi-racial; 1.8% American Indian/Alaskan Native; and 0.4% of the sample did not provide a response. The sample represented an advanced education level ( $M = 14$  years;  $Med = 16$  years).

In an effort to avoid inaccurate data, we included attention check questions throughout the survey battery and only sampled individuals with hit-approval-rates of at least 95%. A final group of 226 individuals accurately answered the attention check questions and were paid \$2 for completing the study. 74 participants were excluded from analyses due to the following reasons: (1) they did not answer all attention check questions correctly, (2) they did not follow survey code instructions properly; (3) they passively completed the surveys by putting the same response for almost all questionnaires; (4) they used repeated codes or IP addresses and (5) they had significant missing questionnaire data.

### Exploratory Factor Analysis

To explore the factor structure of the TOUQ, we examined participants' responses on each item, rated on a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly

agree”). See Appendix for final scale. All items were positively phrased (and thus higher scores corresponded to more tolerance) given that positively- and negatively- worded items often load onto different factors. Inter-item correlations were calculated as a part of the item reduction process and missing item data were deleted (Boateng et al., 2018). An exploratory factor analysis via maximum likelihood estimation was conducted using SPSS version 24 (Brown, 2015; Costello & Osborne, 2005). To test whether a factor analytic approach was appropriate for these data, we ran the Kaiser–Meyer–Olkin test of sampling adequacy (closer to 1 indicates factor analytic approach may be warranted) and Bartlett’s test of sphericity (recommended to be  $p < .05$ ). The factor structure of the TOUQ was determined using results from the Scree test (Cattell, 1966), the strength of the parameter estimates (recommended to be  $> .40$ ), and the Kaiser Guttman rule (Eigenvalues  $> 1$ ; Boateng et al., 2018). Additionally, the final factor solution was also determined by comparing the eigenvalues generated from the data to eigenvalues that were randomly generated based on principal component analysis (i.e., parallel analysis; O’Connor, 2000). If true eigenvalues are greater than the randomly generated eigenvalues from the parallel analysis, the factor is retained (O’Connor, 2000). Scale reliability and internal consistency for all measures was calculated and quantified using Cronbach’s alpha.

### Convergent and Discriminant Validity

Following the EFA, we examined convergent and discriminant validity between the total score on the TOUQ and measures of intolerance of uncertainty, mindfulness, locus of control, optimism/pessimism, distress tolerance, religiosity, and depression.

### Measures

**Tolerance of Uncontrollability Questionnaire (TOUQ)** The final version of the TOUQ contains 19 items all loading onto one factor. The internal consistency for the TOUQ was excellent ( $\alpha = 0.966$ ).

**Intolerance of Uncertainty Scale-Short Form (IUSS)** The IUSS (Carleton et al., 2007) consists of 12 items rated from “not at all characteristic of me” to “entirely characteristic of me.” The scale includes a total score, a prospective anxiety subscale (uncertainty about the future), and an inhibitory anxiety subscale (anxiety levels that keep one from functioning). Scale reliability was excellent for the total score

( $\alpha = 0.919$ ), prospective anxiety ( $\alpha = 0.856$ ), and inhibitory anxiety ( $\alpha = 0.899$ ) in our sample.

**Five Facet Mindfulness Questionnaire-15 Item Version (FFMQ-15)** The FFMQ-15 (Baer et al., 2012) is the validated short form of the original 39-item questionnaire (Baer et al., 2006). The 15 items form 5 factors: *Observing*, *Describing*, *Acting with Awareness*, *Non-judgment*, and *Non-reactivity*, which indicate different strategies for being mindful. Each of the subscales exhibited good to excellent consistency ( $\alpha$ 's = 0.604–0.870).

**Life Orientation Test-Revised (LOT-R)** The LOT-R (Scheier et al., 1994) measures optimism and pessimism using a series of construct-related items amongst filler items for a total scale of 10 items. Within our sample, the LOT-R exhibited poor to moderate reliability ( $\alpha = .503$  with fillers;  $\alpha = 0.306$  without fillers). For data analytic purposes, we computed subscale scores for optimism and pessimism, which exhibited excellent consistency ( $\alpha$ 's = 0.871 and 0.877).

**Duke University Religion Index (DUREL)** Koenig and Büssing’s (2010) 5-item index measures religiosity according to frequency of church attendance, frequency of religious practices, and overall beliefs and experiences regarding religion across three subscales. Total scale reliability was excellent ( $\alpha = 0.898$ ). Given that some subscales only encompassed one question, we did not compute reliability for the subscales.

**Distress Tolerance Scale (DTS)** The DTS (Simons & Gaher, 2005) is a 15-item measure that assesses one’s tolerance of emotional distress. It consists of four subscales rated from “strongly agree” to “strongly disagree”: *Tolerance* (ability to handle distress), *Absorption* (how distress becomes a part of other aspects of life), *Appraisal* (interpretations of distress), and *Regulation* (ways of changing one’s distress). The total scale exhibited excellent reliability in our sample ( $\alpha = 0.938$ ) and the subscale scores were also excellent ( $\alpha$ 's = 0.838–0.863).

**Rotter’s Locus of Control Scale (LOC)** The LOC Scale (Rotter, 1966) is a 29-item measure (with 6 fillers) that indicates if a person believes he or she is in control (internal LOC) or that control is outside of their hands or attributed to something or someone else (external LOC). Two subscales differentiating these two loci of control are produced. Within our sample, this scale exhibited poor consistency ( $\alpha$ 's = 0.202 with fillers and 0.128 without fillers).

**Center for Epidemiological Studies-Depression Scale (CES-D)** The CES-D (Radloff, 1977) consists of 20 items that measure different depressive symptoms experienced over the past week, with options ranging from “rarely” to

“most or almost all the time.” Consistency in our sample was excellent ( $\alpha=0.948$ ).

## Results

### Exploratory Factor Analysis

An initial exploratory factor analysis of the original 20 items revealed two factors with Eigenvalues greater than 1 and parameter estimates greater than 0.4. This approach was used based on results of the Kaiser–Meyer–Olkin test of sampling adequacy and Bartlett’s test of sphericity, which revealed that a factor analysis was appropriate for these data. Specifically, results revealed that a sampling adequacy statistic of 0.97 and a statistically significant Bartlett’s test ( $p < .001$ ).

Results showed that the first factor accounted for 60.9% of the variance in indicators, with an Eigenvalue of 12.2, and the second factor accounted for 5.5% of the variance in indicators, with an Eigenvalue of 1.1. Goodness of fit statistics revealed a significant fit to the data ( $\chi^2=397.02$ ,  $df=170$ ,  $p < .001$ ).

Given the results of the Scree test (see Fig. 1) and potential for a two-factor solution, a second exploratory

factor analysis was conducted to determine if a two-factor solution explained the data better. Results revealed the same variance and Eigenvalue estimates, however, the fit to the data was different, although significant as expected ( $\chi^2=248.21$ ,  $df=151$ ,  $p < .001$ ). The chi-square difference test between the one and two factor models revealed a significant difference in model fit, such that the two-factor model explained the data better than the one-factor solution ( $148.81 > 30.14$ , at  $p = .05$  with 19 df). However, when examining the strength of the parameter estimates for the two-factor solution, item estimates for the second factor were either low (at or below 0.4), highly correlated with factor one, or not interpretable as a differential factor.

A third exploratory factor analysis was conducted for a one-factor solution with item 9 removed, since this question was worded differently than the rest, to address controllability instead of uncontrollability, and since it exhibited the weakest loading of all items. Findings revealed that the one-factor solution had an Eigenvalue of 11.81 and accounted for 62.2% of the variance in indicators (goodness-of-fit:  $\chi^2=330.35$ ,  $df=152$ ,  $p < .001$ ). Additionally, parallel analysis results (O’Connor, 2000) revealed that a one factor solution should be retained given that the eigenvalue obtained for a one factor solution was greater than a randomly generated eigenvalue of 1.5. However,

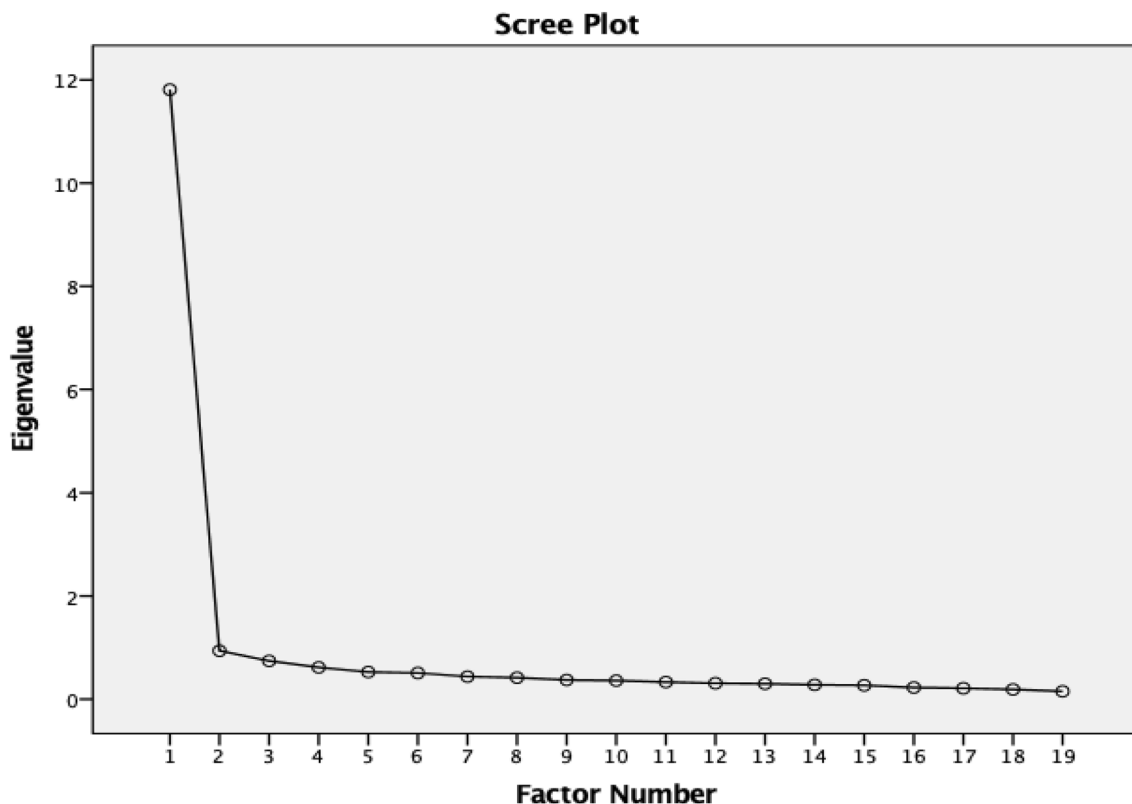


Fig. 1 Scree plot to determine the factor structure of the TOUQ

the eigenvalue from our data for factor two was less than the randomly generated eigenvalue, suggesting it may be due to chance and should not be retained. Thus, we chose a one-factor solution. The final questionnaire comprised of 19 items was used for all subsequent analyses (see Appendix for scale). In addition, the TOUQ inter-item correlations were high (see Table 1).

## Convergent & Discriminant Validity

Table 2 shows the means, standard deviations, and significant correlations between the TOUQ and the aforementioned scales and questionnaires for convergent and discriminant validity. Overall correlations were low to

**Table 1** Inter-item correlations of the TOUQ

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. TOUQ1	4.69	1.62								
2. TOUQ2	4.67	1.64	.71**							
			[.64, .77]							
3. TOUQ3	4.90	1.62	.64**	.68**						
			[.56, .71]	[.60, .74]						
4. TOUQ4	4.94	1.58	.65**	.69**	.65**					
			[.57, .72]	[.62, .75]	[.57, .72]					
5. TOUQ5	5.15	1.38	.42**	.50**	.45**	.42**				
			[.31, .52]	[.40, .60]	[.34, .55]	[.30, .52]				
6. TOUQ6	4.81	1.55	.71**	.72**	.75**	.73**	.54**			
			[.64, .77]	[.65, .78]	[.69, .80]	[.67, .79]	[.45, .63]			
7. TOUQ7	4.75	1.58	.64**	.65**	.66**	.67**	.50**	.68**		
			[.55, .71]	[.57, .72]	[.58, .73]	[.60, .74]	[.40, .59]	[.60, .74]		
8. TOUQ8	5.07	1.51	.55**	.61**	.60**	.62**	.46**	.67**	.61**	
			[.45, .64]	[.52, .69]	[.50, .67]	[.54, .70]	[.35, .55]	[.59, .73]	[.52, .69]	
9. TOUQ9	4.99	1.42	.56**	.58**	.60**	.66**	.47**	.68**	.58**	.70**
			[.46, .64]	[.49, .66]	[.51, .68]	[.58, .73]	[.36, .57]	[.60, .74]	[.48, .66]	[.63, .76]
10. TOUQ10	4.45	1.70	.62**	.60**	.62**	.60**	.44**	.69**	.68**	.56**
			[.53, .69]	[.51, .68]	[.53, .70]	[.51, .68]	[.33, .54]	[.61, .75]	[.60, .74]	[.46, .64]
11. TOUQ11	4.42	1.69	.69**	.68**	.59**	.59**	.41**	.69**	.68**	.52**
			[.61, .75]	[.60, .74]	[.50, .67]	[.50, .67]	[.30, .51]	[.62, .75]	[.60, .75]	[.42, .61]
12. TOUQ12	4.81	1.56	.63**	.65**	.65**	.60**	.49**	.68**	.55**	.59**
			[.54, .70]	[.57, .72]	[.56, .72]	[.51, .68]	[.39, .59]	[.60, .74]	[.45, .63]	[.50, .67]
13. TOUQ13	4.51	1.73	.61**	.63**	.59**	.58**	.45**	.72**	.60**	.57**
			[.52, .69]	[.55, .70]	[.49, .67]	[.49, .66]	[.34, .55]	[.65, .77]	[.51, .68]	[.48, .65]
14. TOUQ14	4.78	1.57	.65**	.72**	.68**	.66**	.54**	.69**	.72**	.59**
			[.57, .72]	[.65, .78]	[.61, .75]	[.58, .73]	[.44, .62]	[.62, .75]	[.65, .78]	[.50, .67]
15. TOUQ15	4.59	1.71	.66**	.64**	.60**	.60**	.49**	.69**	.67**	.54**
			[.58, .72]	[.56, .71]	[.51, .68]	[.51, .68]	[.39, .59]	[.61, .75]	[.59, .74]	[.44, .62]
16. TOUQ16	5.12	1.51	.47**	.45**	.49**	.51**	.34**	.56**	.50**	.52**
			[.36, .56]	[.34, .55]	[.39, .59]	[.41, .60]	[.22, .45]	[.46, .64]	[.39, .59]	[.42, .61]
17. TOUQ17	4.84	1.55	.59**	.67**	.66**	.66**	.48**	.76**	.61**	.65**
			[.50, .67]	[.59, .73]	[.58, .72]	[.58, .73]	[.37, .57]	[.69, .81]	[.52, .69]	[.57, .72]
18. TOUQ18	5.27	1.40	.49**	.56**	.53**	.59**	.46**	.62**	.57**	.52**
			[.39, .59]	[.46, .64]	[.43, .62]	[.49, .67]	[.35, .56]	[.53, .69]	[.48, .65]	[.42, .61]
19. TOUQ19	4.53	1.68	.63**	.66**	.56**	.65**	.40**	.67**	.67**	.57**
			[.55, .71]	[.58, .73]	[.47, .65]	[.56, .72]	[.28, .50]	[.59, .73]	[.59, .73]	[.48, .66]



**Table 1** (continued)

Variable	9	10	11	12	13	14	15	16	17	18
TOUQ10	.58** [.49, .66]									
TOUQ11	.50** [.39, .59]	.70** [.63, .76]								
TOUQ12	.56** [.46, .64]	.60** [.51, .68]	.60** [.51, .68]							
TOUQ13	.59** [.49, .67]	.66** [.58, .73]	.69** [.62, .75]	.61** [.53, .69]						
TOUQ14	.58** [.48, .66]	.69** [.61, .75]	.70** [.63, .76]	.68** [.61, .75]	.65** [.57, .72]					
TOUQ15	.55** [.45, .63]	.63** [.54, .70]	.69** [.62, .75]	.63** [.55, .71]	.64** [.56, .71]	.71** [.64, .77]				
TOUQ16	.62** [.53, .69]	.51** [.41, .60]	.45** [.34, .55]	.50** [.39, .59]	.60** [.51, .68]	.47** [.37, .57]	.40** [.29, .50]			
TOUQ17	.66** [.58, .73]	.65** [.57, .72]	.56** [.47, .65]	.63** [.55, .71]	.62** [.53, .69]	.66** [.58, .73]	.61** [.53, .69]	.54** [.44, .63]		
TOUQ18	.63** [.54, .70]	.51** [.40, .60]	.47** [.37, .57]	.61** [.52, .68]	.49** [.38, .58]	.56** [.46, .64]	.51** [.41, .60]	.51** [.41, .60]	.59** [.49, .67]	
TOUQ19	.59** [.49, .67]	.60** [.51, .68]	.65** [.57, .72]	.56** [.46, .64]	.61** [.52, .69]	.67** [.59, .74]	.62** [.53, .69]	.49** [.38, .58]	.62** [.53, .70]	.56** [.47, .65]

*M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). \*Indicates  $p < .05$ . \*\* Indicates  $p < .01$

moderate with a subset of the measures we included ( $r$ 's = 0.131–0.440;  $p$ 's < .001–.05), suggesting that the TOUQ is related to these measures yet may be a distinct construct for future inquiry.

As hypothesized, there was a moderate correlation between the TOUQ and the IUSS and its subscales (total:  $r = 0.399$ ,  $p < .001$ ; prospective anxiety:  $r = -0.432$ ,  $p < .001$ ; inhibitory anxiety:  $r = -0.313$ ,  $p < .001$ ). The largest significant correlation was found between the LOT-R and the TOUQ (total:  $r = 0.324$ ,  $p < .01$ ; optimism:  $r = 0.440$ ,  $p < .001$ ), such that, in line with our hypotheses, higher tolerance of uncontrollable events was associated with higher optimism scores. Interestingly, the hypothesis that intolerance would be correlated with pessimism scores, was not supported. The smallest significant correlations were between the TOUQ and measures of LOC and mindfulness. As hypothesized, there was a significant association between locus of control and tolerance of uncontrollability ( $r = -0.172$ ,  $p = .01$ ). However, we expected that tolerance may be related to external control, but the negative correlation coefficient indicates that higher tolerance was actually weakly correlated with internal LOC. For mindfulness, small, significant correlations were revealed between the *Describing* ( $r = 0.153$ ,  $p = .02$ ), *Non-judgment* ( $r = 0.131$ ,

$p = .05$ ), and *Non-reactivity* ( $r = 0.205$ ,  $p = .002$ ) subscales and the TOUQ, which supported our original hypothesis. Non-significant correlations were observed between the TOUQ and distress tolerance, religiosity, and depression.

## Discussion

The current study explores tolerance of uncontrollability as a new construct. As part of this study, 226 participants completed the TOUQ measure developed for this study as well as measures of intolerance of uncertainty, mindfulness, locus of control, optimism/pessimism, distress tolerance, depression, and religiosity. Results from exploratory factor analyses revealed a final version of the TOUQ, which consists of 19 items that load onto one factor. This factor accounts for 62.2% of the variance in indicators and exemplifies a good fit to the data, with excellent reliability and high inter-item correlations. Our study represents an initial exploration and creation of a new measure of an unexplored but potentially important psychological construct. We present here preliminary data to suggest that TOU is related to, but may be different from, various psychological constructs such as intolerance of uncertainty, mindfulness, locus of control, and optimism.

**Table 2** Means, standard deviations, and correlations with confidence intervals

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. FFMQ Describe	10.24	2.57								
2. FFMQ Nonreactivity	9.35	2.73	.41**							
			[.29, .51]							
3. IUSS Prospective Anxiety	21.30	6.09	-.19**	-.04						
			[-.31, -.06]	[-.17, .09]						
4. IUSS Inhibitory Anxiety	10.36	4.36	-.31**	-.22**	.74**					
			[-.42, -.18]	[-.34, -.10]	[.67, .79]					
5. IUSS Total	34.31	10.74	-.27**	-.14*	.94**	.92**				
			[-.39, -.15]	[-.27, -.01]	[.92, .95]	[.90, .94]				
6. LOC Total	10.83	4.16	-.19**	-.25**	.17*	.29**	.24**			
			[-.31, -.06]	[-.37, -.13]	[.04, .29]	[.17, .41]	[.12, .36]			
7. LOT-R Optimism	11.09	3.14	.20**	.19**	-.33**	-.32**	-.35**	-.40**		
			[.08, .33]	[.06, .31]	[-.44, -.21]	[-.43, -.19]	[-.46, -.23]	[-.51, -.29]		
8. LOT-R Total	20.29	3.61	-.23**	-.11	.09	.26**	.19**	-.07	.42**	
			[-.35, -.11]	[-.24, .02]	[-.04, .22]	[.14, .38]	[.06, .31]	[-.20, .06]	[.30, .52]	
9. TOUQ Total	81.26	21.52	.15*	.20**	-.43**	-.31**	-.40**	-.17**	.44**	.32**
			[.02, .28]	[.08, .33]	[-.53, -.32]	[-.43, -.19]	[-.50, -.28]	[-.30, -.04]	[.33, .54]	[.20, .44]

*M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). \*Indicates  $p < .05$ . \*\* Indicates  $p < .01$

Results of this study indicate, as hypothesized, that TOU may be a unique construct. Scores on the TOUQ were found to be moderately to weakly correlated with other constructs of interest, including intolerance of uncertainty, locus of control, optimism, and mindfulness. TOU was found to only be weakly related to mindfulness factors. In line with our hypotheses, there was a relationship found between intolerance of uncertainty and TOU, indicating that the constructs are related, but may measure different concepts. TOU was more strongly correlated with the prospective anxiety subscale of the IUSS compared to the inhibitory subscales, which makes sense given that both scales measure tolerance of future-oriented sources of anxiety. It is possible that tolerance of uncontrollable situations is different from intolerance of uncertainty since TOUQ measures tolerance of the inherent lack of control over our circumstances rather than lack of prediction of the future. However, further research should continue to investigate the relationship between intolerance of uncertainty and TOU, especially in clinical samples, to determine whether TOU is in fact uniquely different from intolerance of uncertainty. It is possible that both TOU and intolerance of uncertainty may be implicated in anxiety, however, this is an empirical question. There is a strong connection established between intolerance of uncertainty and anxiety (e.g., Carleton et al., 2012). Similarly, feelings of loss of control over one's emotions is linked to anxiety disorders (Chorpita & Barlow, 1998; Hofmann, 2005).

Interestingly, the strongest correlation was found between optimism and TOU. Specifically, higher tolerance for uncontrollable events was associated with greater optimism. This makes sense as perhaps those who are optimistic often expect that situations beyond their control will work out well, allowing them to be more tolerant of these events compared to individuals who do not have as rosy of an outlook. The hypothesis that intolerance of uncontrollability would be correlated with pessimism scores, was not supported, which suggests that tolerance may be related to optimism, but that intolerance may not necessarily assume a pessimistic outlook.

We predicted that TOU might be somewhat related to having an external locus of control. However, in contrast to our primary prediction, our results show that higher tolerance was actually weakly correlated with having an internal locus of control. This may suggest that people who view themselves as primary agents of control actually exhibit more general tolerance, although more research is needed to replicate this finding. Possibly, individuals with internal loci of control may feel that situations are not actually uncontrollable, thus increasing their tolerance. It is also noteworthy that the LOC displayed poor internal consistency, so this result should be interpreted with more caution than other relationships.

Counter to our predictions, our results suggest that TOU was not significantly associated with distress tolerance, religiosity, or depression. On one hand, this may suggest that TOU is distinct from these constructs. Alternatively, a survey of individuals with psychological disorders may show a relationship between TOU and distress tolerance or depression, for example.

Overall, TOU represents a new construct that taps into beliefs about and comfort with the universal human experience of uncontrollability. Importantly, the current study should be interpreted within a few important confines. First, this study used a sample of individuals from the MURK platform. Thus, the sample may be somewhat self-selected for individuals interested in participated in research, those who are at least somewhat tech savvy, and those with access to a computer. Indeed, research suggests that individuals on MTURK have some differing personality traits compared to traditional samples (Goodman et al., 2013). Second, the current study relied solely on self-report data collected at one time point. It is likely that gathering multimodal evidence (e.g., behavioral observation and psychophysiology measures) across time would provide rich additional detail and contribute to a more fine-grained understanding of TOU and its potential variability. Although the final study sample does not meet the ideal minimum sample size of 300 (Yong & Pearce, 2013), the factor structure of the TOUQ was robust and the psychometric data were solid with precedent for completing initial EFAs in samples of 200 or more (Boateng, et al., 2018). Finally, because we used an unselected sample, we cannot fully explore or make claims about possible links between individuals' TOU and psychopathology, despite previous literature (e.g., Chorpita & Barlow, 1998; Chorpita et al., 1998; Hofmann, 2005) suggesting possible areas for application. As with any study, there is risk of bias when generating and editing items; this is worth mentioning since this process was conducted within one laboratory, without consultation from outside research groups or experts.

Future studies should explore TOU in clinical samples, especially those in which beliefs about control are key to determine if TOU may indicate an important transdiagnostic factor within psychopathology. Additionally, it is important to note that additional measures of locus of control exist (e.g., Cherlin & Bourque, 1974; Meyers & Wong, 1988), which should be explored in relation to the TOUQ in the future. Future studies should conduct additional exploratory and confirmatory factor analyses, as well as explore measurement invariance in heterogeneous samples to further support the introduction of TOU as a new construct. Additional research may also employ item-response theory (IRT) and/or structural equation modeling (SEM)

approaches to further explore the measurement structure of the TOUQ, as our study represents a preliminary EFA that should be confirmed in other samples. Finally, the conclusion that TOU is specific to an event regardless of the event's predictability could be experimentally tested in future studies by manipulating the level of an event's predictability (across difference valences) to see if TOU is predictive independent of this factor or if it interacts with it.

Despite these constraints, the current study marks a novel inquiry into an important aspect of the human experience. How we feel about situations and experiences beyond our control likely has a significant impact on how we navigate our daily lives. Indeed, one's ability to tolerate uncontrollability may have important implications for our understanding of psychopathology. It may also have important implications for our wellbeing, resiliency, and even how we make decisions and marks an exciting area for future study.

## Appendix

### Tolerance of Uncontrollability Questionnaire (TOUQ)

The following statements are rated using the following scale: 1—Strongly disagree, 2- Disagree, 3- Slightly disagree, 4—Neither agree nor disagree, 5—Slightly agree, 6—Agree, 7 -Strongly agree.

*Instructions* Please rate your agreement with the following statements. There are no right or wrong answers.

1. I am generally okay when I cannot control the outcome of things.
2. I do not have complete control over how life turns out and that's okay with me.
3. I can't always control what happens to me and that's okay.
4. I accept the uncontrollability of life.
5. It's sometimes important to let go of our attempts to control the uncontrollable.
6. The fact that life is uncontrollable.
7. Life is often difficult to control and I'm okay with that.
8. It's okay that sometimes things happen outside of my control.
9. Things will happen the way they happen and that's okay.
10. I usually don't mind when I have to give up control.
11. Not having control over things doesn't bother me too much.
12. Many things in life are outside of my control, and that's okay.

13. I am generally okay with not having control over what will happen in the future.
14. I can't always control things in life and that's okay
15. I am tolerant of uncontrollability.
16. Whatever happens, happens.
17. Some things in life are uncontrollable, and I am okay with that.
18. Nobody is in complete control over one's life and that's okay.
19. I am not too bothered when things happen outside of my control.

Scoring: 1pt: strongly disagree; 2pts: disagree; 3pts: slightly disagree; 4pts: neither agree/disagree; 5pts: slightly agree; 6pts: agree; 7pts: strongly agree.

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**Data Availability** The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

### Declarations

**Conflict of Interest** Dr. Hofmann receives financial support from the Alexander von Humboldt Foundation (as part of the Humboldt Prize), NIH/NCCIH (R01AT007257), NIH/NIMH (R01MH099021, U01MH108168), and the James S. McDonnell Foundation 21st Century Science Initiative in Understanding Human Cognition – Special Initiative. He receives compensation for his work as editor of Cognitive Therapy and Research from SpringerNature and the Association for Psychological Science, and as an advisor from the Palo Alto Health Sciences, Otsuka Pharmaceuticals, Jazz Pharmaceuticals and for his work as a Subject Matter Expert from John Wiley & Sons, Inc. and SilverCloud Health, Inc. He also receives royalties and payments for his editorial work from various publishers. Dr. Aleena Hay, Ms. Abigail L. Barthel, and Ms. Danielle M. Moskow do not have any interests or activities to report.

**Ethical Approval** The data were collected in an ethical manner in accordance with Boston University's Institutional Review Board and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Boston University's Internal Review Board reviewed the presented study and the study was granted exemption.

**Informed Consent** All participants completed the informed consent process before participating in the research study presented.

**Research Involving Human and Animal Participants** No animal studies were carried out by the authors for this article.

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