The World Assumptions Questionnaire: Development of a measure of the assumptive world

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Abstract

Assumptive World Theory (Janoff-Bulman, 1992) proposes that traumatic events are psychologically distressing because they shatter some of survivors' fundamental assumptions about the world. This idea has been regarded as a truism in the trauma literature, although tests of the theory have provided mixed results. More recently, reviews of the most commonly used measure of the assumptive world, the World Assumptions Scale (WAS; Janoff-Bulman, 1989), have revealed flaws in its psychometric properties. Thus, the current study aims to develop a new measure of the assumptive world, the World Assumptions Questionnaire. Qualitative survey and interview data were collected from trauma survivors, undergraduates, trauma researchers, and clinicians treating trauma survivors to generate content domains and items. An initial quantitative survey study of 236 undergraduates was used to evaluate the underlying factor structure of the item pool and select items for the final scale. A second quantitative, repeat-administration, survey study of 312 undergraduates yielded findings that the World Assumptions Questionnaire had strong psychometric properties including satisfactory temporal stability, a stable factor structure reflective of the proposed measurement model, satisfactory internal consistency reliability, and more evidence of content and construct validity. Results from these studies are presented and implications for further research are discussed.

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Overview of the Dissertation and Literature Review

Introduction

Over the past several decades, psychologists have taken interest in the profound effects of traumatic events on the lives of survivors. Posttraumatic Stress Disorder (PTSD) was added to the DSM-III in 1980 (American Psychiatric Association, 1980) as an anxiety spectrum disorder that occurs following a psychologically-traumatic event outside the range of normal experience. From there, scholars began to focus on less pathological responses (i.e., resilience and adaptation) to trauma and even to positive consequences (i.e., posttraumatic growth, or PTG). As explanatory models have developed, trauma scholars have become increasingly interested in the role of cognitive outcomes and cognitive processes in determining the trajectory of post-trauma adaptation among survivors (Dalgleish, 2004). Treatments for PTSD have focused on post-trauma cognitions (e.g., Foa, Hearst-Ikeda, & Perry, 1995; Resick & Schnicke, 1992), and cognitive processing is thought to constitute the major pathway to PTG (see Calhoun & Tedeschi, 2006, for a review). Thus, cognitive outcomes and mechanisms constitute primary areas of interest in the trauma literature.

One cognitive outcome construct that has received much attention in recent decades is that of the assumptive world (Janoff-Bulman, 1989, 1992; Kauffman, 2002). The term “assumptive world” was coined by Parkes (1971, 1975) and refers to a “strongly held set of assumptions about the world and the self which is confidently maintained and used as a means of recognizing, planning and acting” (1975, p. 132). The construct was subsequently elaborated upon by Janoff-Bulman (1989) who theorized that the assumptive world was best thought of as a cognitive schema. As with other cognitive schemata, the assumptive world is developed and modified gradually in accord with lived experience. Once established, however, it is thought to be held on such a basic and generally unquestioned level that it is only upon confrontation with a stimulus of seismic proportions, such as a traumatic event, that the assumptive world's veracity is called into question. Thus, most theory and research on traumatic events conceptualizes the assumptive world as an outcome variable. That traumatic life events shatter fundamental assumptions held by the trauma survivor has been taken as a truism in the psychological literature on trauma.

Organization of the Dissertation

This dissertation is organized as follows. I first briefly describe theoretical perspectives on the construct of the assumptive world and then review extant empirical findings on the effects of trauma upon the assumptive world. I then review limitations of existing measures of the assumptive world as well as other measures of cognitive outcomes related to trauma. Next, I present the methods used in item generation and content validation as well as two studies conducted to develop a new and psychometrically sound measure of the assumptive world. The first study identifies the factor structure of the World Assumptions Questionnaire (WAQ); the second replicates that factor structure and assesses the temporal stability and construct validity of the WAQ. Finally, I offer a more general synthesis of the findings of these studies, considering previous research and measurement in this area, and describe future directions for research.

Theoretical Perspectives on the Assumptive World

Major theoretical models addressing the assumptive world propose the shattering of the assumptive world to be the psychological event of primary focal importance following a traumatic event. Janoff-Bulman's (1989, 1992) and Joseph and Linley's (2005) theories constitute two major models that tout the importance of the survivor's fundamental assumptions, their dissolution, and their subsequent reconstruction.

Both theories also bear essential similarities. For example, they both conceptualize fundamental schema change as an outcome of other mechanistic processing variables (i.e., accommodation and assimilation). They also both agree that these cognitive processes ensue as the survivor realizes the discrepancy between the pre-trauma assumptive world and the lessons learned from the traumatic event. According to both theories, patterns of post-trauma adjustment are thought to be corollaries of the status of an individual's post-trauma assumptive world. When the assumptive world is shattered, individuals experience symptoms consistent with PTSD (i.e., avoidance and re-experiencing); when the assumptive world is rebuilt (i.e., accommodated) in accord with lessons learned from the trauma, the revised assumptive world is either consistent with positive, growth-focused views (i.e., PTG or positive accommodation) or negative, distress-focused views (i.e., posttraumatic depression or negative accommodation). Both theories engage the assumptive world at length, and both, particularly Janoff-Bulman's (given its scholarly seniority), have stimulated empirical inquiry. Thus, it is clear that the assumptive world construct is of central focus in theories related to both distress and growth following traumatic events. For a more complete discussion of these theories and their discussion of the assumptive world, see Appendix A.

Empirical Findings on the Assumptive World

Much of the empirical inquiry that has sought to test assumptive world theory has generated inconsistent findings. Most research on the assumptive world has employed cross-sectional studies comparing groups of either trauma and no-trauma survivors or trauma survivors with or without PTSD and most studies have used the World Assumptions Scale (WAS; Janoff-Bulman, 1989) to assess assumptions. A review of this literature (summarized in Appendix B) showed that effects for the trauma vs. no-trauma comparisons (e.g., Harris & Valentiner, 2002; Walker et al., 2005) ranged from small to medium in size and were generally consistent with the hypothesized direction of the effect (i.e., no-trauma participants had more positive assumptions). However, only the effects for three of the eight WAS subscales were consistently at least medium in size. PTSD vs. no-PTSD comparison studies (e.g., Dekel et al., 2004; Foa et al., 1999) also suggested that only three subscales showed more negative assumptions among PTSD groups. Mixed findings have also been found in longitudinal studies (e.g., Rini et al., 2004; Ginzburg, 2004), showing significant effects across time for traumatized populations on the two subscales, but not the others. Different subscales yield significant effects depending on the study design. A more thorough treatment of the extant empirical findings on the assumptive world can be found in Appendix B.

Inconsistent support for the original assumptive world theory may be reflective of any of three possibilities (or a combination thereof). First, it is possible that assumptive world theory (Janoff-Bulman, 1989) has been taken as a truism, but actually lacks veracity. Second, many of the studies testing the theory have been cross-sectional and thus do not provide a strong test of the theory. Third, because most studies operationalize world assumptions using the WAS, inconsistent findings may be due to the questionable psychometric properties of the WAS. Although inconsistent research findings may reflect each of these possibilities, it will be impossible to adequately test assumptive world theory, even with a stronger research design, without a psychometrically sound measure of the assumptive world. Therefore, existing measures of cognitive outcomes in the trauma literature are reviewed next.

Cognitive Outcome Measurement in the Trauma Literature

Multiple theories (e.g., Ehlers & Clark, 2000; Janoff-Bulman, 1992; Joseph & Linley, 2005) accounting for the outcomes of traumatic life events, healthy or pathological, posit that survivors' cognitions are of central interest, and as such, several measures of trauma-related cognitions have been developed. Although this review will focus primarily on evaluating the WAS (Janoff-Bulman, 1989), due to its ubiquity in research on how basic assumptions are altered by traumatic life events, alternative approaches to measuring trauma-related cognitions will be briefly introduced and critically evaluated.

Critique of the World Assumptions Scale

The WAS is the lone measure of world assumptions in widespread use. It was developed by Janoff-Bulman (1989) using exploratory factor analysis and the subscales were used to differentiate between trauma and no-trauma groups. These analyses were taken as "sufficient grounds to begin to use the scale as a heuristic tool" (Janoff-Bulman, 1989, p. 125). However, scrutiny of measure development literature and the subsequent research using the scale yields several concerns about its psychometric properties, as described further below following a description of the measure.

Janoff-Bulman's (1989) final version of the WAS contained 32 items divided into 8 subscales (Randomness, Justice, Controllability of the World, Benevolence of People, Benevolence of the Impersonal World, Self-Worth, Self-Control, and Luck) to address each aspect of the assumptive world elaborated in her theory. High scores on each of the meaningfulness/explicability subscales indicate assumptions that: bad events do not occur at random (randomness), bad events are not distributed according to justice principles (justice), and events in the world cannot be controlled by people's behaviors (controllability). High scores on each of the worthiness subscales indicate assumptions that: one is not a worthy or virtuous person (self-worth), one behaves irresponsibly (self-control), and one is not lucky (luck). High scores on each of the benevolence of the world subscales indicate beliefs that people are not benevolent and the impersonal world is not benevolent (benevolence of people and benevolence of the impersonal world subscales). Each subscale is comprised of 4 items. The items are usually measured on a 6-point Likert scale (anchored by "strongly agree" and "strongly disagree"), although they also have been measured using 8-point and 5-point response scales.

As mentioned, findings suggest concerns with several major psychometric properties of the WAS. First, the measure development process did not include an empirical assessment of content validity (i.e., the degree to which it taps the domains of the assumptive world). Second, regarding internal consistency reliability, several of the subscales have alphas in the 0.50 – 0.70 range in multiple studies (e.g., Ginzburg, 2004;

Tomich & Helgeson, 2002), levels that indicate questionable consistency of measurement from item-to-item. Third, the temporal stability of the WAS has also been found to be lower than desirable (Kaler et al., 2008) when compared to measures of similar constructs. Last, factor structure constitutes an area of pronounced concern. Repeated exploratory factor analyses in the literature (Harris & Valentiner, 2002; Jeavons & Greenwood, 2007; Littleton & Breitkopf, 2006; Rini et al., 2004) have failed to produce consistent results, or results consistent with the factor structure originally proposed (Janoff-Bulman, 1989). Additionally, confirmatory factor analyses (Elklit et al., 2007; Kaler et al., 2008) have yielded varying indicators of model fit, but more importantly have failed to produce results supportive of the measurement model (i.e., several items with very weak loadings on factors and very highly correlated factors). In sum, these problems with the WAS create difficulties for testing assumptive world theory. These indicators of psychometric quality are discussed in greater detail in Appendix C, along with mixed evidence for construct validity (i.e., correlations with theoretically similar measures).

Other Measures of Trauma-Related Cognitions

There are alternative measures of trauma-related cognitions existing in the literature. However, they bear limitations in adequately tapping world assumptions as a construct. The three most relevant measures are briefly discussed below.

The Posttraumatic Cognitions Inventory (PTCI, Foa et al., 1999) constitutes what is perhaps the most widely used measure of trauma-related cognitions in the research literature on PTSD. Evidence for the measure's reliability, temporal stability, convergent and criterion-related validity, and factor structure has been documented in multiple studies (e.g., Beck et al., 2004; Foa et al., 1999). The PTCI consists of 3 subscales assessing cognitions following a traumatic event: negative beliefs about the self (21 items; e.g., “If I think about the event, I will not be able to handle it”), negative beliefs about the world (7 items; e.g., “People are not what they seem”), and self-blame (5 items; e.g, “The event happened because of the way I acted”). Responses are made on a Likert-style response scale anchored by “totally disagree” and “totally agree.”

There are two primary reasons that the PTCI does not adequately suit the purposes of assessing the assumptive world. First, items from this scale assess primarily self-related constructs, and those that assess beliefs about the world are few in number and heterogeneous in content. Of the 36 items on the PTCI, only seven assess beliefs about the world. Of these seven, four consist of statements related to the trustworthiness and transparency of people, and the remaining three consist of statements about the need to be vigilant, the world being dangerous, and the inability to know what will happen next.

Second, the instructions and several of the items from the PTCI require the respondent to reflect upon a specific traumatic event and then to assess changes, such as “I have permanently changed for the worse.” Evidence from a series of studies (McFarland & Alvaro, 2000) suggested that participants have a difficult time assessing change in their level of well-being and functioning, and, in particular, will respond in ways that reflect inaccurate self-perceptions if a threatening or negative event is first primed (i.e., reflecting upon a trauma). Additionally, evidence from a prospective study of PTG showed that self-reported changes following a traumatic event had very small correlations with actual changes from pre- to post-trauma (Frazier et al., in press).

More minor issues with the PTCI include that none of its items are reverse-scored, rendering the scale more vulnerable to response sets, and also that the scale was subjected to principal components analysis instead of factor analysis. This practice can yield factor loadings that are inflated and results that differ substantially from those obtained in the preferred analytic strategy, that of factor analysis (Reise, Waller, & Comrey, 2000).

A newer measure, the Trauma Relevant Assumptions Scale (TRAS, Buck, Kindt, Arntz, Hout, & Schouten, 2008), sought to improve upon current measures in the literature (especially the WAS and PTCI) by purportedly assessing both the “rigidity” and “valence” of the trauma-related cognitions that it assesses. The results described in the initial paper (Buck et al., 2008) showed evidence of stable factor structure, internal consistency reliability, and some evidence for convergent validity (i.e., moderate correlations with distress measures) and criterion-related validity (i.e., significant subscale differences between trauma survivors with PTSD, survivors without PTSD, and those without traumas).

Items were written to resemble items from the PTCI and the WAS and additional items used in questionnaires in studies of trauma. The item pool was organized around five domains of assumptions including self, others, world, controllability, and justice. The response scale is structured so that for each item two diametrically opposing statements are placed at either end of a 100 millimeter horizontal line. Participants are asked to make a cross mark to represent where along a continuum of belief they endorse. A measure of the participant’s extremity of answering (the degree to which they tend to answer toward the ends of the lines for each item) is taken as a measure of the person's "rigidity" of belief, and their valence of belief is thought to be derived from their average score (much in the manner a scale with Likert-style responses would be computed). An exploratory principal components analysis was conducted on the item pool, and the two extracted components were comprised of items assessing beliefs about the world (e.g., "I can always trust people" versus "I can never trust people") and beliefs about self (e.g., "I am always a weak person" versus "I am always a strong person"). The final published scale is comprised of 31 items in two subscales corresponding to the world and self components extracted in the principal components analysis.

Although the TRAS assesses broad, non-trauma specific (i.e., non-circumstantial) assumptions, it still has several shortcomings. First, there is no evidence that a response scale of this nature improves upon or even matches the utility of more commonly used types of response scales, and the contention that this manner of response taps the rigidity as well as valence of participants' beliefs remains without strong empirical support. Second, the assumptions about the world assessed are posited to be distinct from assumptions about the self; however, they frequently assess self-relevant beliefs. For example, "I will always be able to prevent bad things from happening to me" reads as though it assesses beliefs about the degree to which the participant believes she or he is in control of outcomes (similar to Janoff-Bulman's, 1989, category of self-control beliefs), but it is classified as an item tapping the *world* subscale rather than the *self*. Items of this nature obscure the construct assessed by this subscale. Third, as with the PTCI, the researchers used principal components analysis rather than factor analysis in conducting item selection. Last, that the measure includes only two subscales prevents it from precisely identifying the assumptions about the world or about the self that sustain change from pre- to post-trauma. The two subscales, as with the PTCI's negative beliefs about the world subscale, are heterogeneous in content and therefore difficult to interpret.

A third measure, the Traumatic Stress Institute (TSI) Belief Scale, Revision L (Pearlman, 1996) was developed to assess beliefs about self and others that arise commonly from the experience of trauma. It is comprised of 80 items, which make up ten subscales. Each subscale assesses either self or world relevant beliefs regarding 5 different domains, including safety, trust, esteem, intimacy, and control. Participants indicate their agreement with the items on a 6-point Likert scale. Internal consistency coefficients for the subscales range from .65 to .84. The TSI Belief Scale's development strategy was never published, and its use was restricted to those who were willing to share any raw data they gathered on the scale with its author. The measure has subsequently been republished in an 84-item format as the Trauma and Attachment Belief Scale (TABS; Pearlman, 2003), and is available for a fee in both youth and adult formats. The TABS has not been used widely in research on world assumptions, perhaps due to its cost. Further, its length might be prohibitive for inclusion in the context of large self-report survey studies.

In sum, three measures (the TRAS, TSI Belief Scale or TABS, and the WAS) are used to tap the assumptive world, and only the WAS is in widespread use. Although the PTCI often is used in research on trauma, the subscale that most adequately addresses the assumptive world is heterogeneous in content and therefore difficult to interpret precisely. Each of these scales has rather serious limitations. Thus, the development of a superior measure of the assumptive world seems warranted and necessary, given the theoretical importance of this construct to the trauma literature.

Development of the World Assumptions Questionnaire

Overview

The purpose of the following studies was to develop a psychometrically sound and improved measure of world assumptions – the World Assumptions Questionnaire (WAQ). The first stage of the research involved the generation of a pool of potential items for the measure informed by three separate qualitative data collections – one with trauma survivors, a second with undergraduates, and a third with members of the American Psychological Association's Division 56 (trauma psychology). Coding of the qualitative data from these three groups yielded a reliable four-category coding scheme. Next, the items generated to tap these four categories were rated for content validity and clarity and then administered to a sample of undergraduates along with several measures of theoretically-related constructs. A final set of 25 items, representing the four factors identified in the first administration of the items, were administered to a larger sample of undergraduates to further assess factor structure, temporal stability, and construct validity. Each of these steps in the test development process are further described below.

Content Validity and Item Generation

To ensure that the eventual item pool assessed the most important domains of the assumptive world, items were generated after a review of the literature on cognitions related to trauma and interviews and surveys with trauma survivors, trauma researchers and clinicians, and undergraduates who had experienced stressful events. Specifically, the primary investigator conducted, recorded, and transcribed semi-structured interviews with 16 trauma survivors already involved in a prospective study on trauma. Additionally, data were gathered online in open-ended self-report format from 14 researchers and clinicians from the American Psychological Association's Division 56 (trauma psychology) and also from 77 undergraduates at a large Midwestern University. All of the interviews and surveys asked individuals to describe the beliefs they saw as changed by a traumatic event based on their personal or professional experience.

Data from these interviews and surveys were categorized semantically by independent raters (i.e., the PI and three members of a trauma research lab). The raters then met to develop a consensus about the major categories of beliefs represented in the literature on trauma-related cognitions and the qualitative data. A four-category coding scheme was agreed upon and was found to be reliable when used by two raters (i.e., the PI and a trained member of the trauma research lab) to code surveys from the 77 undergraduates (Cohen's $\kappa = .78$). The categories included beliefs about the predictability of life events, beliefs about the controllability of the world, beliefs about the safety of the world, and beliefs about the nature of people. The categories were not meant to be entirely orthogonal, as it was known that an empirical analysis of the underlying structure of the items would be conducted in studies 1 and 2, and further because Janoff-Bulman's (1992) articulation of the assumptive world held these beliefs would be interrelated.

The principal investigator then generated the item pool, seeking to maximize the degree to which the items addressed the full range of domains in each category. Priority was also placed on producing items that used clear and concise language (e.g., avoiding “double-barreled” questions), were not redundant with one another, and as often as possible reflected language used by those involved in the surveys and interviews. The item pool contained 67 items that were then rated for clarity of language and content validity by nine experts on trauma research. The 52 items with average ratings greater than the value indicating an “adequate” (2 on a 3-point scale) fit to the construct were retained for further analysis. A more detailed discussion of this item generation process can be found in Appendix D.

Study 1

The remaining 52 items were administered to a sample of undergraduates in a single-administration online survey to empirically discern the factor structure underlying the items using an EFA. Further, measures of theoretically related (i.e., trauma history and PTSD symptoms) or unrelated (i.e., social desirability) constructs were included in the questionnaire to assist in selecting items. Items were also screened for distributional properties (i.e., skewness and kurtosis) and their potential to contribute to desirable qualities in the final scale (i.e., high inter-item correlations to maximize internal consistency reliability).

Method

Participants and Procedures

Students enrolled in undergraduate courses in the Psychology Department of a large Midwestern university were recruited to participate in a study on life events and beliefs for extra credit. A total of 236 individuals completed the online survey, which was in keeping with the desired sample size of 200, appropriate for an EFA with the number of items in the current analysis (Floyd & Widaman, 1995). Of them, 70% were female, 70% were between the ages of 18 and 21, and 22% were between 22 and 30. Most participants identified as European-American/White (81%), whereas 9% identified as Asian-American/Pacific Islander, 4% as African-American/Black, and 2% as Hispanic-American/Latina(o). First year students constituted 31% of the sample, and the remainder of the sample was divided roughly evenly between 2nd, 3rd, and 4th year students.

Measures

World Assumption Questionnaire item pool. The 52 items retained after those with inadequate content ratings were removed from the item pool were included in the survey (see Appendix F). Each item was rated on a 5-point scale ranging from 1 (“strongly agree”) to 5 (“strongly disagree”).

Social desirability. The Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) is a widely-used measure that assesses the degree to which an individual is responding in a socially desirable (i.e., “fake good”) manner. A short form of the scale consisting of 8 items was administered for this survey (M = 1.50, SD = .25). Participants were asked to respond with a “yes” (1) or “no” (2) to items such as “Are you always willing to admit when you make a mistake?” Four of the items were reverse-scored, and the internal consistency of the measure was found to be lower than satisfactory (alpha = .62).

Traumatic life events. The TLEQ (Kubany et al., 2000), a list of 23 stressful events (e.g., natural disaster), was used to assess participants’ history of major stressors. Participants were asked if they had ever experienced the events as well as if the event caused them to feel a sense of fear, helplessness, or horror. This subjective reaction is

Criterion A2 in the diagnostic criteria for PTSD in the DSM-IV-TR (American Psychiatric Association, 2004). Evidence for the TLEQ's validity has been found in interview and survey formats (Kubany, 2004).

PTSD symptoms. The Posttraumatic Stress Disorder Checklist (PCL-S by Weathers, Litz, Herman, Huska, & Keane, 1993) is a 17-item self-report measure that is used as a screening instrument for assessing the degree to which someone experiences symptoms of PTSD. Participants are instructed to answer each item on a 5-point Likert-style scale ranging from 1 ("Not at all") to 5 ("Extremely"). Items pose questions about how much an individual has experienced a symptom of PTSD in the past two weeks. A sample item reads, "Suddenly acting or feeling as if the event were happening again (as if you were reliving it?)." The internal consistency of the scale in this sample was .90 (M = 1.66, SD = .65), and evidence for the validity of its scores for screening and research purposes has been established in multiple studies (e.g., Andrykowski, Cordova, Studts, & Miller, 1998). A more recent study (Adkins, Weathers, McDevitt-Murphy, & Daniels, 2008) assessed the psychometric properties of the PCL in a sample of college students. Evidence for the temporal stability, internal consistency, and convergent validity of the PCL were found.

Results and Discussion

Preliminary Analyses

Analysis of skewness and kurtosis for the measures revealed that the MCSDS was approximately normally distributed, whereas the PCL was positively skewed. Inspection of the data revealed no outliers. Missing data analyses revealed that less than 1% of the data were missing, and Little's (1988) test of Missing Completely at Random

(MCAR) was not significant, $\chi^2(7454) = 5844.40$, *ns*. When significant, this test indicates that the hypothesis that the data are MCAR can be rejected. Therefore, no evidence was found to suggest the data were not MCAR. Due to the low percentage of missing data and no evidence to support that the data were missing at random or missing not at random, pairwise deletion was used in the statistical analyses.

Approximately 71% of the sample reported having experienced at least one event on the TLEQ that caused them to feel intense fear, helplessness, or horror. The most common of these events was the sudden and unexpected loss of a loved one (32%). Other commonly endorsed events included a loved one's life threatening experience (16%); "other" stressful events not specifically mentioned in the TLEQ (15%); and seeing, hearing, or experiencing family violence while growing up (11%).

Exploratory Factor Analysis

A polychoric correlation matrix for the 52 items was generated for use in an exploratory factor analysis. Polychoric correlations estimate the linear relationship between two unobserved continuous variables that theoretically underlie the response distributions of the observed non-continuous data (e.g., ordinal Likert scales). That is, computation of the polychoric correlation assumes that a continuous latent response distribution accounts for the observed variables represented in ordinal form (Muthen, 1984). Polychoric correlations were used in this analysis because, unlike product-moment correlations, they do not assume the observed ordinal variables are normally distributed; rather, they assume that the underlying (unobserved) continuous variables are bivariate normal in their distributions and estimate the relationship between the latent response distributions of these variables, taking into account the distributional properties of the observed ordinal data (for discussion of the computation of polychoric correlations, see Olsson, 1979). They are more viable for use in item-level factor analyses such as this especially because they are less likely to produce factors that account for similarity in distributional properties (e.g., skewness or kurtosis) rather than similarity in item content (for more on this problem in factor analyses, see Bernstein & Teng, 1989). Examples of exploratory factor analyses conducted using polychoric correlations using a variety of extraction methods are increasingly common (e.g., Appleton, Christenson, Kim, & Reschly, 2006; Holgado-Tello, Carrasco-Ortiz, del Barrio Gandara, & Chacon Moscoso, 2009).

The polycor package (Fox, 2008) in R 2.8.0 (The R Development Core Team, 2008) was used to generate the item correlation matrix. This matrix was then subjected to a principal axis factor analysis with oblique, direct oblimin rotation (deltas = 0) in R 2.8.0. Factor loadings and communalities can be found in Table 1. Findings from Bartlett's Test of Sphericity, χ^2 (1326) = 4293.70, p < .001, and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (*KMO* = .80) supported that the variables in the correlation matrix shared substantial common variance and that the matrix met standards of factorability.

Scree-plot (see Figure 1) analysis indicated the prominence of five factors in the data with eigenvalues of 9.91, 3.84, 3.08, 2.63, and 1.94. Examination of the rotated pattern matrix showed that items loading highly on the first factor pertained to a sense of the controllability and predictability of events; the second factor appeared to tap the predictability and comprehensibility (i.e., whether one can truly know another) of people; items with highest loadings on the third factor assessed the trustworthiness and goodness of others; and the fourth factor tapped beliefs related to vulnerability to bad events. Only four items loaded more highly on factor five than on other factors, and they seemed to assess beliefs reflective of fatalistic assumptions or that things happen for a reason (e.g., “Everything happens to people for a reason,” and “Everyone leaves this world when they are supposed to”).

Further refinement of the item pool entailed examining the items with the highest loadings on each of the factors for their relations with other measures, skewness, kurtosis, and inter-item correlation with other items on that subscale. More specifically, items that were minimally related to social desirability, maximally (negatively or positively) related to the PCL and number of criterion A events, most closely approximated a normal distribution, and contributed to a high internal consistency coefficient for the subscale were retained for further analysis in study 2. A target number of 6 or 7 items per subscale was also established to balance the succinctness (i.e., ultimately 5-7 items per subscale and fewer than 35 items for the total measure) and internal consistency of the measure. Thus, because only 4 items exhibited their highest loadings on factor 5, which seemed to tap fatalism, this factor was dropped as a potential subscale. The EFA was run again, extracting only 4 factors for rotation to verify that there were no meaningful changes to the factor structure. Based on these initial item analyses 25 items were chosen for the final scale. For more specific information about the selection of items for the final administration, see Appendix G.

Study 2

The 25 items selected from Study 1 were administered in an online survey to a second sample of undergraduates at two time points a month apart. This study sought to test the measurement model for the 25 items from the WAQ item pool using a CFA. Further, the study sought to assess the temporal stability of the measure.

Evidence for construct validity was evaluated by testing hypothesized relations with other measures. Specifically, the following hypotheses were tested: the WAQ subscales should correlate moderately and negatively with trauma related measures, including the PCL-S, PTCI, and the number of criterion A traumas experienced. The scales should correlate significantly and negatively in the small-to-moderate range with general measures of distress (i.e., the PANAS negative affect subscale and the DASS-21). Finally, the subscales should relate significantly and positively in the small-to-moderate range with general well-being measures (i.e., the PANAS positive affect subscale and the SWLS).

It was also hypothesized that each subscale of the WAQ would correlate significantly and moderately with theoretically-related measures. Specifically, significant positive relations were hypothesized between the controllability and predictability of life events subscale and measures of mastery and present control; significant negative relations were hypothesized between the comprehensibility and predictability of people subscale and measures of attachment insecurity (and positive relations with attachment security); significant positive relations were hypothesized between the trustworthiness and goodness of people and a measure of trust; and significant negative relations were hypothesized between the safety and vulnerability subscale and a measure of the perceived likelihood that a negative event will happen again. For evidence of discriminant validity, it was hypothesized that the WAQ subscales should correlate minimally with a measure of social desirability.

Method

Participants and Procedures

Participants were students enrolled in undergraduate courses in the Psychology Department of a large Midwestern university. They were recruited to complete two surveys on life events and beliefs administered approximately 1 month apart, and they received extra credit for their participation. A total of 312 individuals completed the Time 1 survey, and 270 (87%) completed the Time 2 survey. This was consistent with the proposed sample size of at least 300 participants for a Confirmatory Factor Analysis at Time 1, supported by the factor analysis literature (e.g., Floyd & Widaman, 1995). Of the Time 1 participants, 74% were female, 81% were between the ages of 18 and 21, and 17% were between 22 and 30. Most Time 1 participants identified as European-American/White (75%), whereas 12% identified as Asian/Asian-American/Pacific Islander, 2% as African-American/Black, 2% as Hispanic-American/Latina(o), and 2% as Middle-Eastern or Arab-American. Sixteen percent of the sample identified as international students, refugees, or U.S. immigrants. Thirty-four percent of the sample was comprised of 1st year students, and the remainder of the sample was composed mainly of 2nd, 3rd, and 4th year students (24%, 17%, and 22%, respectively).

Comparisons of those who completed only the Time 1 survey and those who completed both yielded no effects significant at a p <.05 level on any of the scales, lifetime number of criterion A traumas experienced, or demographic variables. Measures were administered only at Time 1 unless they were used to assess participants' trauma experiences between administrations or the temporal stability of the measure.

Measures (Times 1 & 2)

Stressful events. As in study 1, the TLEQ (Kubany et al., 2000) was used to gather lifetime trauma histories from participants at Time 1 as well as participants' experiences of traumatic events between time points at Time 2. Time 1 participants completed the full 23-item TLEQ, whereas they completed a short form of the TLEQ at Time 2 because items with content regarding childhood events (e.g., "Before your 13th birthday: Did anyone who was at least 5 years older than you touch or fondle your body in a sexual way or make you touch or fondle his or her body in a sexual way?") were not included in the assessment of recent traumas.

At both time points, participants were asked to identify the most distressing event of those identified on the TLEQ. Follow-up questions were then posed to ascertain a more specific understanding of participants' most distressing trauma, including whether it was intentionally caused by another, whether it was life threatening to them, and whether it happened more than one time. If they responded that it happened once, they were asked to identify the age at which the trauma occurred. If a participant indicated that a trauma occurred more than once, they were asked to identify the ages at which it first and last occurred.

Assumptive world. The 25-items selected from the item pool were used to assess assumptions related to the controllability and predictability of events, the comprehensibility and predictability of people, the trustworthiness and goodness of people, and the safety of the world (see Appendix F). Reliabilities and descriptive statistics for the measure can be found in Table 2.

Measures (Time 1)

Control related beliefs. Beliefs related to participants' sense of their efficacy and control in dealing with problems was tapped by the Mastery Scale (Pearlin & Schooler, 1978). This 7-item scale contains 2 reverse-scored items and is scaled from 1 ("strongly disagree") to 4 ("strongly agree") (*M* = 2.01, *SD* = .48). Evidence for the scale's internal consistency reliability and construct validity has been found in other studies (e.g., Berry & West, 1993). The internal consistency coefficient for the scale in this sample was .80.

The Perceived Control Over Stressful Events Scale (PCOSES; Keenan, Frazier, Shallcross, Perera, & Anders, 2007) is a 22-item scale answered with regard to the participant's worst event on the TLEQ. It has four subscales designed to tap various aspects of perceived control over stressful life events. The response scale ranges from 1 ("strongly disagree") to 4 ("strongly agree"). Ten of the items are reverse-scored to prevent response sets. The future likelihood subscale (*M* = 2.17, *SD* = .83) consists of 5 items (e.g.,"I fully expect something similar to happen to me again"); the past control subscale (*M* = 1.84, *SD* = .83) consists of 5 items (e.g., "I could have done something to prevent this event from happening"), the present control subscale (*M* = 3.06, *SD* = .57) consists of 8 items (e.g., "How I deal with this event now is under my control"), and the future control subscale (*M* = 2.57, *SD* = .97) has 4 items (e.g., "I have no control over whether a similar event happens to me again."). Internal consistency coefficients for Time 1 were .91 for the future likelihood subscale, .86 for the past control subscale, .80 for the present control subscale, and .90 for the future control subscale.

PTSD symptoms. As in study 1, the PCL (Weathers et al., 1993) was used to assess PTSD symptomatology in the sample (*M* = 1.81, *SD* = .74). The Cronbach's alpha for the sample was .89.

Distress. The Depression Anxiety Stress Scales (DASS-21, Lovibond & Lovibond, 1995) is a 21-item measure assessing the degree to which an individual is experiencing depression, anxiety, and stress (for the full scale, M = 1.64, SD = .49). The measure consists of three subscales (i.e., anxiety, depression, and stress), and the total score is also used widely as an indicator of distress. A sample item from the stress subscale reads “I found it hard to wind down.” Participants responded to items on a 0 (“does not apply) to 3 (“very much”) scale regarding the degree to which each item applied to them over the prior 2 weeks. The DASS-21 subscales have been shown to have good internal consistency reliability (α’s = .82 to .93) and convergent validity in the form of substantial correlations with measures of similar constructs (Crawford & Henry, 2003). The alpha for the total DASS in this sample was .92.

Affectivity. The Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988) is a short measure of positive and negative emotionality that consists of two separate scales. Each scale consists of 10 items, each comprised of a single affect term (e.g., “excited,” ”distressed”). Participants were instructed to rate the degree to which they experienced each emotion over the past 2 weeks on a scale from 1 (“very slightly or not at all”) to 5 (“extremely”). The PANAS has strong psychometric properties, including convergent and discriminant validity, sufficient stability over time, internal consistency, and orthogonal factor structure (Watson et al., 1988). The internal consistency coefficients for the negative affect (M = 2.45, SD = .83) and positive affect (M = 3.68, SD = .84) subscales were .86 and .89, respectively.

Social desirability. As in study 1, an 8-item short-form of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) was used to assess the tendency of participants to present themselves in a socially sanctioned manner. As in study 1, the internal consistency coefficient for the scale (*M* = 1.73, *SD* = .30) was somewhat lower than satisfactory (.65).

Life satisfaction. The Satisfaction with Life Scale (SWLS, Diener, Emmons, Larsen, & Griffin, 1985) consists of 5 items that ask participants to rate their agreement with statements such as “I am satisfied with my life,” on a 1 to 7 scale, ranging from “absolutely untrue” to “absolutely true” (*M* = 4.94, *SD* = 1.22). Evidence for the psychometric properties of the SWLS including convergent and discriminant validity and stable factor structure has been demonstrated in multiple samples (e.g., Pavot & Diener, 1993). The alpha for this sample was .88.

Interpersonal trust and attachment. The Trust Inventory (Couch, Adams, & Jones, 1996) includes a 20-item generalized trust subscale used to tap the degree to which participants endorse trust in others. The response scale for the measure ranged from 1 (“disagree strongly”) to 6 (“agree strongly”). Sample items included “I accept others at ‘face value’,” and “Only a fool would trust most people.” Assessments of the psychometric properties of the Trust Inventory (e.g., Couch & James, 1997) show a high 9-week temporal stability coefficient for the generalized trust subscale (*r* = .80) and high internal consistency reliabilities for all subscales, ranging from .87 to .92. Additionally, evidence for concurrent validity was found in the form of a large negative correlation with a measure of suspicion (*r* = -.65). Five of the items on the scale are reverse-scored, and the internal consistency coefficient for the current sample was .90 (*M* = 4.35, *SD* = .69).

The Measure of Attachment Quality (MAQ, Carver, 1997) is a 14-item scale with three reverse-scored items. The measure taps adult attachment patterns and has four separate subscales to assess secure (a 3-item subscale), avoidant (5 items), and two anxious-ambivalent (both 3 items long) patterns of attachment. The MAQ’s factor structure and convergent validity (i.e., moderate correlations with measures of interpersonal avoidance and anxiety) have received support, and internal consistency reliabilities for the measure range from .66 to .83 (Kim & Carver, 2007). The items are scaled from 1 (“I disagree with the statement a lot”) to 4 (“I agree with the statement a lot”). Sample items include “When I’m close to someone it gives me a sense of comfort about life in general,” (security subscale) and “I find others are reluctant to get as close as I would like” (ambivalent-merger subscale). Alpha coeffiecients were .71 for the security subscale (M = 3.44, SD = .56), .78 for avoidance (M = 1.98, SD = .62), .81 for ambivalent-worried (M = 2.26, SD = .86), and .71 for ambivalent-merger (M = 1.98, SD = .67).

Cognitions related to trauma. The PTCI (Foa et al., 1999) was also discussed in Chapter 2. For the purposes of this study, the Negative Cognitions about the World subscale was used to assess specific cognitions commonly related to traumatic events. This subscale (M = 4.01, SD = 1.71) includes 7 items (e.g., “I have to be on guard all the time.”), and participants are asked to indicate their level of agreement with each on a scale ranging from 1 (“totally disagree”) to 7 (“totally agree”). None of the items are reverse-scored. Evidence for the structural and convergent validity of the measure was documented in the initial study and has been replicated subsequently (e.g., Beck et al., 2004). The internal consistency for this sample was .86.

Results and Discussion

Preliminary Analyses

Analysis of skewness and kurtosis for the measures revealed that all measures except the PCL, which was again positively skewed, were approximately normally distributed, although the future likelihood subscale of the PCOSES was also somewhat kurtotic. Inspection of the data also revealed no evidence of outliers. Missing data analyses revealed that the data set exhibited less than 1% missingness at both time points, and Little's test of MCAR (Little, 1988) was not significant, $\chi^2(22306) = 16833.30$, *ns*. Again, pairwise deletion was employed due to the low rate of missing data and the lack of evidence to support that the data were not MCAR.

At Time 1, roughly 73% of the sample reported having experienced at least one lifetime event on the TLEQ that caused them to feel intense fear, helplessness, or horror. More specifically, 44% identified a single event, 10% identified two, and the remaining 19% endorse 3 or more events of this nature. As in study 1, more participants (29%) endorsed the sudden and unexpected loss of a loved one as a criterion A event than any other event. Also consistent with the prior study, other stressors endorsed at relatively high rates included a loved one's life threatening experience (i.e., accident, life-threatening illness; 15%); seeing, hearing, or experiencing family violence while growing up (14%); and "other" stressful events not specifically assessed in the TLEQ (12%).

Of the Time 2 sample ($n = 270$), 36 (13%) reported having experienced one or more events on the TLEQ that they characterized as having elicited feelings of intense fear, helplessness, or horror between Times 1 and 2. The most commonly endorsed of these events were a loved one surviving a life-threatening circumstance (*n* = 13), the sudden and unexpected loss of a loved one (*n* = 5), and “other” events that were life-threatening, caused serious injury, or were highly disturbing (*n* = 9).

Factor Structure

A polychoric correlation matrix and an asymptotic covariance matrix for the items in the WAQ at Time 1 were computed using PRELIS for use in a confirmatory factor analysis with LISREL 8.80 (Jöreskog & Sörbom, 2006) to assess the factor structure of the WAQ. The matrices were used to evaluate the fit of model specified with each item loading on each of the subscale factors. The factors were allowed to correlate with one another, which accords with theory (Janoff-Bulman, 1989) and other CFAs in the assumptive world literature (Elklit et al., 2007; Kaler et al., 2008). The error covariances were constrained to zero as there is no theoretical reason why they should correlate. Although weighted least squares estimation has been identified as theoretically optimal for use with polychoric correlation matrices in CFA, this estimation method is also impractical for models in samples with fewer than 1000 participants (Hu & Bentler, 1992; Muthen, 1993). A more practical alternative, diagonally weighted least squares estimation – which has been found to be a robust alternative estimation method in samples of 200 participants (e.g., Wang & Cunningham, 2005) – was used in the current CFAs. Robust weighted least squares estimation, a similar approach to diagonally weighted least squares estimation, has also been found to produce parameter estimates and fit statistics that are more robust to smaller sample sizes (Flora & Curran, 2004).

Fit statistics for the CFA of the full model of the WAQ were only somewhat supportive of fit. The chi-square statistic, $\chi^2(269) = 1390.87$, $p < .001$ was significant. The *SRMR* (.09), *TLI* (.91), *CFI* (.92), and *IFI* (.92) all fell into a range indicating adequate fit (i.e., above .90 for the *TLI*, *CFI*, and *IFI* and below .10 for the *SRMR*; Finch & West, 1997). However, the *RMSEA* (.08, the 90% confidence interval ranged from .08 to .09) showed that the model fit was only marginally adequate given that standards for adequate fit have been identified as .08 or below (Browne & Cudeck, 1992). Inspection of the parameter estimates (see Table 3) revealed that the magnitudes of two factor loadings were weak (i.e., below .40). Additionally, modification indices indicated that one of the items from the first factor cross-loaded heavily on the fourth factor.

After dropping these three items from the model, fit indices indicated adequate fit. Specifically, although the chi-square statistic was still significant, χ^2 (203) = 929.13, $p < .001$, the *RMSEA* (.08, 90% confidence interval = .07 to .08), *SRMR* (.09), *TLI* (.93), *CFI* (.94), and *IFI* (.94) all fell into ranges indicating satisfactory fit of the model. Further, all parameter estimates remained significant, all factor loadings had reasonably large magnitudes (i.e., greater than or equal to .45; Table 4), and factors correlated moderately (*r* ranged from .25 to .58; see Table 5). Thus, this 22-item scale was used in assessing evidence for the measure's reliability, temporal stability, and construct validity. The items included in the final scale can be found in Appendix H.

Temporal Stability and Internal Consistency

Findings regarding the internal consistency coefficients and 1-month temporal stability of the WAQ are summarized in Table 2. Cronbach's alphas for the WAQ subscales ranged from .74 to .82 (*M* = .78). Temporal stabilities were computed as the product-moment correlation between Time 1 and Time 2 scores of the subscales only for those participants who did not report a criterion A trauma between time points (n = 233). Coefficients for the WAQ ranged from .68 to .74 (*M* = .70). Thus, the WAQ subscales generally were more internally consistent and more stable over time than the WAS subscales in previous studies (Kaler et al., 2008). Moreover, the temporal stability coefficients for the WAQ fell into a range closer to those of other measures of basic schemata. For example, the temporal stability coefficients for the Brief Core Schema Scales by Fowler and colleagues (2006), assessed at three weeks apart, ranged from .70 to .84.

Evidence for Validity

Correlations between the WAQ subscales and other measures included to assess construct validity can be found in Table 6. Because Janoff-Bulman’s (1992) formulation of the assumptive world held that shattered assumptions account for some of the symptoms commonly observed in PTSD, the WAQ was hypothesized to correlate moderately and negatively ($|r| \geq .30$) with trauma-related variables (i.e., PTSD symptoms, total number of lifetime Criterion A traumas, and trauma-related cognitions). The average absolute correlation between the WAQ subscales and the PCL was .30 (two of four exceeded r = .30). For the number of criterion A events, no correlation on the WAQ exceeded .30. The average absolute correlation between the WAQ subscales and the PTCI negative cognitions about the world subscale was .46, and all but one of the subscale correlations (Comprehensibility and Predictability of

People; r = .27) was greater than .30 in magnitude. Thus, the WAQ subscales were moderately related to other trauma-related measures as hypothesized.

It was further hypothesized that the WAQ should correlate significantly and negatively (with small-to-moderate relations) with measures of generalized distress (i.e., DASS-21 and the negative affect subscale of the PANAS) (Table 6). All of the WAQ subscales were significantly correlated with distress and negative affect, ranging in size from -.15 to -.46. Thus, the WAQ appears to be consistently related to variables tapping generalized distress (average absolute correlations of r = .27 with negative affect and r = .34 with distress).

Measures of subjective well-being (i.e., SWLS and the positive affect subscale of the PANAS) also were expected to correlate significantly and positively (in the small-to-moderate range) with the WAQ subscales (Table 6). The WAQ subscales were significantly correlated with positive affect and satisfaction with life, with the exception of the comprehensibility and predictability of people subscale, which correlated significantly with neither, and safety and vulnerability which did not correlate significantly with positive affect. Thus, the WAQ subscales were somewhat less consistently related in the hypothesized manner with measures of subjective well-being.

More specific evidence for convergent and discriminant validity of the WAQ was also found (Table 6). None of the WAQ subscales were significantly correlated with social desirability, providing evidence of discriminant validity. For convergent validity, subscale-specific hypotheses included significant and moderate relations between the controllability of events subscale and the present control subscale of the PCOSES and the mastery scale; between the comprehensibility and predictability of people and the MAQ subscales; between the trustworthiness and goodness of people subscale and the trust scale; and between the safety and vulnerability subscale and the future likelihood subscale of the PCOSES. Evidence for the validity of the controllability of events and trustworthiness and goodness of people subscales was found – with correlations ranging from .38 to .69 with theoretically related measures. The hypothesis that the safety and vulnerability subscale would relate negatively and moderately with the future likelihood subscale of the PCOSES was not fully supported; the correlation was significant and in the hypothesized direction, but was small (r = -.19). Of the hypotheses, only those relevant to the comprehensibility and predictability subscale failed to achieve any support – showing only one small-sized significant correlation with an attachment-related scale.

General Discussion

These studies provided evidence regarding the reliability, factor structure, content and construct validity of a new measure of the assumptive world. The pool of items from which the final measure was drawn was based on interviews and surveys of trauma survivors as well as surveys of trauma researchers and clinicians. These items were selected based on content ratings by experts, initial explorations of the factor structure of the item pool, correlations with theoretically related constructs, and confirmation of the factor structure in an independent sample. The final measure is composed of four subscales: Controllability of Events, Comprehensibility and Predictability of People, Trustworthiness and Goodness of People, and Safety and Vulnerability.

The psychometric properties of the resulting scale, the World Assumptions Questionnaire, were very good. Internal consistency and temporal stability coefficients over a 1-month period were satisfactory and were comparable to or better than those for measures of similar constructs. Furthermore, evidence was found for consistent small-to-moderate relations between the WAQ subscales and other trauma-related variables like PTSD symptoms and common posttraumatic cognitions. The scale also constitutes an improvement over other existing measures of cognition in the trauma literature because it does not require the respondent to reference a trauma in completing the questionnaire – a feature that primes awareness of the stressful event, which can influence participants' reporting of psychological variables (McFarland & Alvaro, 2000).

The findings of these studies demonstrate that the WAQ compares favorably with the WAS on three crucial psychometric qualities. First, all four of the WAQ subscales have adequate internal consistencies and high temporal stability coefficients The importance of using a measure of the assumptive world that is relatively stable over time cannot be overstated, given that Janoff-Bulman (1992) proposed that pre- to post-trauma change would constitute the strongest evidence for the validity of assumptive world theory. Second, the data not only fit the WAQ's measurement model adequately in a CFA, but all of the factor loadings reflected that the items relate strongly to their respective subscales. However, the scale was modified by the elimination of 3 items in the CFA administration, which heightens the need for a replication of the CFA of the 22-item WAQ to ensure that this model does not over-capitalize on sample-specific characteristics in Study 2. On the other hand, whereas the WAS has been found to show adequate fit in some studies (Elklit et al., 2008), its loadings have not been found to reflect the proposed measurement model (i.e., several factor loadings were weak). Last, findings indicated that the WAQ related to a stronger degree with other trauma-related variables did than the WAS (see Kaler et al., 2008), suggesting some evidence for construct validity. For example, WAQ subscales had sizeable relations with the PTCI (Foa et al., 1999), a measure of more circumstantial posttraumatic cognitions that are thought to be influenced by both event-specific perceptions and beliefs comprising the assumptive world.

Additional findings relevant to construct validity included that the WAQ related in the hypothesized manner with measures of general distress, although relations with measures of subjective well-being were less consistent for the comprehensibility and predictability of people subscale and for the safety and vulnerability subscale. More specific evidence for discriminant validity was found in the form of negligible relations between the WAQ and social desirability. Findings were also generally supportive of evidence for convergent validity, though somewhat mixed for the comprehensibility and predictability of people subscale. Thus, findings from these studies suggest the WAQ has excellent reliability, indications of sound factor structure, and accruing evidence for construct validity. Nonetheless, the studies presented here also bear several limitations.

Limitations

The subscale of the WAQ assessing the Comprehensibility and Predictability of People related weakly to theoretically correlated variables such as interpersonal attachment. The construct this subscale was intended to assess is the single area of content measured by the WAQ that was not included in or addressed by Janoff-

Bulman's (1989) original articulation of assumptive world theory. This subscale, in particular, will require earnest attention regarding evidence for validity as well as theoretical utility. For example, beliefs about how well one can know another person or predict their behaviors may be more likely to change following a trauma related to unexpected, intentional behavior by another human being. Whereas there is no way to assess, in hindsight, the proportion of trauma survivors of whom this was true in the samples included here, it is likely that community samples, clinical samples, and military samples have higher representations of individuals exposed to traumas of this nature (e.g., unexpected attack, robbery, suicide) than do undergraduate samples. As such, the measure should be administered to more samples exhibiting more serious interpersonally-perpetrated trauma for closer examination of evidence for validity.

The matter of sample characteristics raises the additional concern that the samples for studies 1 and 2 were both comprised mainly of relatively highly educated, young adult, European American participants. Further assessment of construct validity and the stability of the WAQ factor structure needs to be conducted in samples more inclusive of diversity in age, level of education, race, and socio-economic status. Gilfus (1999) leveled the criticism of assumptive world theory as being naïve for assuming that, prior to encountering a traumatic event, all people are characterized by positive assumptions about the world. For a more nuanced understanding of how these basic assumptions might differ at baseline for assorted populations, more prospective data need to be gathered. Also, although participants in the current studies identified the distress caused by their stressors as significant, a sample including a larger proportion of individuals who, themselves, experienced (rather than witnessed) a major trauma would also provide valuable data.

Last, a relatively minor limitation of the study concerns the inclusion of a measure of social desirability that demonstrated inadequate internal consistency reliability for these samples. Further reading of the empirical literature assessing the use of short-forms of the Marlowe-Crowne Social Desirability Scales (Crowne & Marlowe, 1960) yields ample critique of using such abbreviated forms (e.g., Barger, 2002). Use of the full-scale in another administration of the WAQ would provide a better test of each subscale's independence of participants' tendencies to answer in inauthentic and socially-sanctioned manners.

Directions for Future Inquiry

A large, multiple time-point prospective study using a more diverse sample of participants with greater likelihood of experiencing – rather than witnessing or hearing about – traumatic events between time points would provide the strongest test of the psychometric properties of the WAQ as well as of assumptive world theory. Large pre- to post-service military samples or multi-site urban samples might offer the greatest possibility of fulfilling such parameters. Additionally, constructs in such a study would be more effectively and completely assessed if non-self-report indicators were included in the data.

Beyond acquiring a more desirable sample, though, further attention should be devoted to the WAQ's clinical utility as well as whether the assumptive world should also be assessed using implicit measures. Analogous cognitive structures, like "core beliefs" in the cognitive therapy literature (see Beck, 1995), are thought to be largely implicit, as contrasted with more explicit cognitions (e.g., automatic thoughts). Implicit measurement of these beliefs might account for outcome variance in addition to that accounted for by explicit measures. Furthermore, to consider the parallel with the constructs of cognitive therapy more seriously, the use of the WAQ as a measure of therapeutic outcome for those suffering from trauma-related concerns might also serve as a useful guide in determining the degree to which therapy clients are able to become aware of and modify their most deeply held cognitions. For instance, if clients can amend the contents of their assumptive world in a way that accommodates the events they have encountered, a more sustainable outcome might be attained in therapy.

Table 1

EFA results: Communalities and Factor Loadings in Rotated Pattern Matrix

Item	Communality	F 1	F 2	F 3	F 4	F 5
43	.61	-.77	-.16	--	--	--
31	.67	-.77	.15	.16	--	--
23	.54	-.75	.11	--	--	--
48	.51	-.72	--	--	--	--
7	.52	-.70	--	--	--	--
50	.49	-.69	.13	--	--	--
46	.58	.63	.33	--	.17	--
15	.46	-.63	--	-.15	--	.21
27	.39	.56	.24	--	-.11	--
19	.46	.56	.20	--	--	--
5	.43	-.55	--	--	-.27	--
3	.44	.49	.11	-.13	.21	--
35	.31	.41	.31	--	-.14	--
20	.18	-.32	.23	--	--	.20
21	.15	-.29	.13	.16	.11	-.21
40	.69	--	.81	--	--	--
44	.56	--	.71	--	.10	--
47	.56	.14	.66	--	--	--
8	.38	--	.56	-.18	--	--
39	.34	--	.55	--	--	.10

Table 1. Continued

Item	Communality	F 1	F 2	F 3	F 4	F 5
16	.27	--	.43	--	.22	--
41	.25	.21	.42	--	--	--
11	.27	--	.41	--	.19	.14
17	.26	--	.38	.14	.25	--
12	.24	-.27	-.30	.15	.13	.11
37	.31	.28	.28	-.11	.16	.13
49	.76	--	--	.88	.10	--
36	.75	--	--	.85	--	--
32	.55	--	.19	-.69	--	--
24	.45	--	--	.63	.17	--
30	.52	-.25	.18	.50	-.33	--
51	.29	--	.16	-.43	--	--
52	.31	--	.13	-.39	.27	--
22	.35	-.31	.21	.39	-.20	-.11
28	.14	--	--	.28	-.16	.16
4	.28	--	.27	-.27	.13	-.21
38	.14	-.19	.10	.26	--	--
10	.77	--	--	.15	.87	--
6	.39	--	--	--	.62	--
9	.47	--	.14	--	.60	-.15
34	.32	--	--	--	.54	.15

Table 1. Continued

Item	Communality	F 1	F 2	F 3	F 4	F 5
1	.40	.21	-.12	--	.47	.35
14	.26	--	.23	--	.42	--
26	.30	-.14	.13	.24	-.41	--
18	.32	--	.11	-.30	.38	.15
2	.26	.16	--	--	.34	.25
45	.32	.20	.18	-.16	.34	--
42	.25	.15	--	-.24	.34	--
33	.58	-.12	--	--	--	.74
25	.55	--	--	--	--	.74
29	.54	--	.11	.14	-.23	.56
13	.27	-.21	-.11	-.15	-.12	.44

Note. Items are listed in descending order of absolute factor loading on their largest factors. F = Factor.

Table 2

Temporal Stability and Internal consistency Coefficients for the WAQ Subscales

	M (*SD*)	α (n = 312)[a]	Temporal Stability (n = 233)[b]
WAQ CE	4.06 (.88)	.82	.68
WAQ CPP	2.74 (.76)	.75	.69
WAQ TGP	3.82 (.71)	.80	.74
WAQ SV	2.75 (.75)	.74	.70

Note. WAQ = World Assumptions Questionnaire; CE = Controllability of Events; CPP = Comprehensibility and Predictability of People; TGP = Trustworthiness and Goodness of People; SV = Safety and Vulnerability.

[a] Coefficients computed using Time 1 data. [b] Coefficients based on those who participated at both time points and did not experience a criterion A trauma between Times 1 and 2.

Table 3

Standardized factor loadings from CFA of the WAQ including 25 items

Item	CE	CPP	TGP	SV
3	.78 (.03)			
5	.66 (.06)			
11	.77 (.04)			
13	.76 (.04)			
21	.61 (.05)			
23	.71 (.04)			
8		.50 (.07)		
9		.68 (.06)		
16		.34 (.08)		
17		.75 (.04)		
18		.77 (.05)		
20		.72 (.05)		
12			.54 (.07)	
14			.82 (.04)	
15			.64 (.06)	
22			.75 (.05)	
24			.65 (.05)	
25			.62 (.06)	
1				.65 (.05)
2				.55 (.06)

Table 3. Continued

Item	CE	CPP	TGP	SV
4				.60 (.05)
6				.58 (.06)
7				.32 (.07)
10				.69 (.05)
19				.72 (.04)

Note. Values in parentheses are the standard errors of the estimates. CE = Controllability of Events; CPP = Comprehensibility and Predictability of People; TGP = Trustworthiness and Goodness of People; SV = Safety and Vulnerability.

Table 4

Standardized Factor Loadings from CFA of the WAQ reduced to 22 items (N = 312)

Item	CE	CPP	TGP	SV
3	.77 (.03)			
5	.67 (.06)			
13	.80 (.04)			
21	.65 (.05)			
23	.75 (.04)			
8		.45 (.08)		
9		.68 (.06)		
17		.73 (.05)		
18		.77 (.05)		
20		.73 (.05)		
12			.56 (.07)	
14			.82 (.04)	
15			.64 (.06)	
22			.76 (.05)	
24			.65 (.05)	
25			.61 (.06)	
1				.63 (.05)
2				.54 (.06)
4				.59 (.05)
6				.56 (.06)

Table 4. Continued

Item	CE	CPP	TGP	SV
10				.68 (.05)
19				.73 (.04)

Note. Values in parentheses are the standard errors of the estimates. CE = Controllability of Events; CPP = Comprehensibility and Predictability of People; TGP = Trustworthiness and Goodness of People; SV = Safety and Vulnerability.

Table 5

Ψ-estimates from CFA of the WAQ reduced to 22 items (N = 312)

	CE	CPP	TGP
CPP	.34 (.07)		
TGP	.49 (.07)	.25 (.07)	
SV	.49 (.06)	.58 (.06)	.46 (.06)

Note. Values in parentheses are the standard errors of the estimates. CE = Controllability of Events; CPP = Comprehensibility and Predictability of People; TGP = Trustworthiness and Goodness of People; SV = Safety and Vulnerability.

Table 6

Correlations between the WAQ and theoretically related measures (*N* = 312)

WAQ:	CE	CPP	TGP	SV
PTSD Symptoms [a]	-.34	-.26	-.36	-.26
# Criterion A Events	-.12	-.17	-.19	-.16
Trauma-Related Cognitions [a]	-.37	-.27	-.70	-.48
Negative Affect	-.28	-.15	-.42	-.24
Distress	-.39	-.17	-.46	-.32
Positive Affect	.34	.02	.29	.07
Satisfaction with Life	.32	.11	.36	.23
Social Desirability	-.09	.04	-.09	-.07
Present Control [a]	.38			
Mastery	.60			
Secure Attachment		.01		
Avoidant Attachment		-.07		
Anxious-Merger Attachment		-.06		
Trust			.69	
Future Likelihood [a]				-.19

Notes. WAQ = World Assumptions Questionnaire; CE = Controllability of Events; CPP = Comprehensibility and Predictability of People; TGP = Trustworthiness and Goodness of People; SV = Safety and Vulnerability.

[a] Measured among those who experienced a Criterion A trauma at Time 1 (n = 254).

All correlations of the magnitude $|r|$ = .12 are significant at a $p < .05$ level.

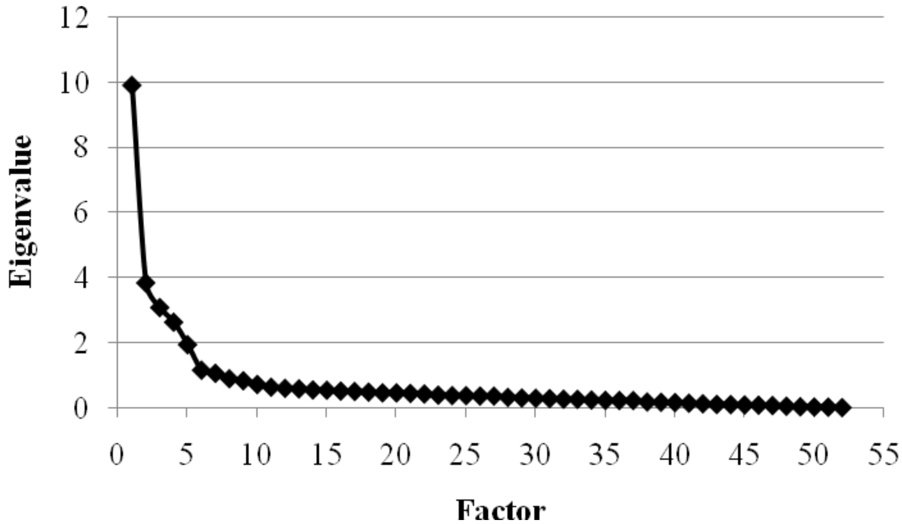

Figure 1. Scree plot of eigenvalues for each factor

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Appendix A

Theoretical Perspectives on the Assumptive World

Janoff-Bulman (1989) focused on world assumptions that she theorized were most likely to be challenged by traumatic events. These assumptions were defined as a set of schemata that are: 1) basic in the sense that they are foundational to other cognitive systems, 2) relevant to our beliefs about safety and vulnerability, 3) developed on the basis of lessons learned in accrued life experiences, 4) resistant to change for the implicit fervency with which they are held to be true, and 5) thought to change in response to traumatic life events. Each of these characteristics is further elaborated below.

First, the assumptive world is a set of schemata that serves as a foundation for an individual's more specific beliefs. That is, Janoff-Bulman (1989) posited that more circumstantial cognitions, such as the attributions we make about another person's actions, are informed by the more fundamental assumptive world. For example, if an individual holds the assumption that people are benevolent, she or he is likely to explain a negative action taken by another person in a way that upholds this assumption (e.g., attributing an individual's transgression to external referents, thereby preserving the possibility that this person is still essentially good).

Second, the schemata contained within the assumptive world that are thought to be changed by trauma are those with direct relevance to beliefs about safety and vulnerability. Janoff-Bulman (1989) proposed contents of the assumptive world that she theorized were most often altered by trauma, although she stopped short of claiming that her list of domains was complete, stating that "the proposed categories and the assumptions comprising these categories are unlikely to be exhaustive of vulnerability-related assumptions" (p.117). She theorized that there exist three principal categories of the assumptive world relevant to individuals' core assumptions about vulnerability and safety: beliefs about the benevolence (or malevolence) of the world, the meaningfulness of the world (i.e., its explicability), and the worthiness of the self.

She also subdivided each of these domains. Assumptions about the benevolence of the world were thought to consist of belief in the benevolence of the impersonal world and the benevolence of people. Assumptions about the explicability of the world were thought to be comprised of principles regarding the distribution of outcomes: belief in justice was thought to favor virtue-based explanations of outcomes (e.g., the virtue of patience – good things happen to those who wait); belief in controllability was thought to favor explanations based on people's behavior (e.g., that careful behavior prevents bad outcomes); belief in chance was thought to yield explanations regarding the randomness of events and hence their lack of predictability. Assumptions about worthiness of the self were theorized to parallel the distributional principles of world explicability; they reflect one's assumptions about her or his own virtuousness, the appropriateness of her or his behaviors, and her or his luckiness.

These assumptions were also thought to interact in ways that assist individuals in formulating their ideas regarding their own personal vulnerability and safety. For example, one who believes that tragic events are distributed on the basis of the principle of justice – bad things happen to bad people – and who also believes that her or his own behavior has been upright and virtuous is unlikely to feel vulnerable or unsafe. Conversely, if this same individual judges her or his own behavior to be somehow depraved or immoral, she or he will feel quite vulnerable. Further, one who holds the assumption that the world is essentially benevolent will be generally less likely to feel endangered or vulnerable.

Third, the assumptive world, as with other core schemata (e.g., Fowler et al., 2006), is thought to form in response to lived experience and to become highly resistant to change as experiences in support of the assumptive world accrue. Social cognition research has demonstrated that our schemata can affect how we interpret new stimuli (e.g., Fiske & Dyer, 1985; Fiske & Linville, 1980; Markus, Smith, & Moreland, 1985) and how we encode new information in memory (e.g., Cantor & Mischel, 1977). Generally, that is, people tend to interpret stimuli in ways that are consistent with their current schemata and remember information, potentially falsely, in schema-consistent ways. The existence of such cognitive processes is also abundantly supported in the literature on the interpretation of information in the presence of stereotypes or pre-conceived notions (e.g., Snyder & Swann, 1978). With these tendencies, we build a cognitive belief system that is supports and therefore largely reinforces our basic assumptions.

Last, in the event of a trauma, individuals are thought to undergo a shattering of their assumptive world (Janoff-Bulman, 1989; Kauffman, 2002). The assumptive world is theorized to be critical to understanding survivors' reactions to traumas because it is thought that its disintegration in the face of trauma and subsequent reassembly are causally related to the nature of the post-trauma reaction, be it PTSD, resilience and adaptation, or PTG (Janoff-Bulman, 2006). For example, the individual who assumes that people are benevolent will experience a challenge to that belief if another individual does something to them with plainly malevolent intention (e.g., a violent assault). Janoff-Bulman (1989; 1992) theorized that such traumatic events are so provocative that they have the potential to shatter or cause the disintegration of that fundamental assumption about benevolence in the world. In particular, she states that traumatic events so persuasively force the survivor to recognize her or his fragility and fundamental vulnerability that such events cut directly to the core of the assumptive world – offering persuasive and powerful argument against the person's most fundamentally held assumptions. Immersed in a compromised cognitive landscape such as that of the disintegrated assumptive world, the individual is thought to first experience profound physiological arousal and acute hypervigilance to the potential dangers in the environment (Janoff-Bulman, 1992). From this point of dissolution, the trauma survivor is thought to proceed toward reconciling the unsettling discrepancy between the traumatic, apparently malevolent event and her or his assumption of benevolence.

Janoff-Bulman (1992) stated that the "possibilities for a new assumptive world are framed by two extremes: maintaining the old assumptions unchanged or accepting the new assumptions implied by the victimization" (p. 94). The processes that are thought to ensue in this rebuilding resemble those proposed by Piaget (1954): assimilation and accommodation. The assimilation and accommodation framework, originally theorized to reflect the process of cognitive development in children, has been oft-cited as a sound analogue to the cognitive processes involved in constructing a new post-trauma assumptive world. For the trauma survivor, assimilation involves altering the interpretation of the event so that it is less contrary to the assumptive world, whereas accommodation involves the revising the parameters and contents of the assumptive world in such a way that acknowledges the possibility that traumatic events are indeed possible and, for the survivor, a fact of life. In the trauma literature, assimilation and accommodation are tasks that are usually thought of as happening simultaneously within individual survivors rather than in mutually exclusive fashion.

The results of the trauma survivor's accommodation and assimilation tasks are thought to determine the degree to which she or he manifests a variety of potential outcomes. Initially, Janoff-Bulman (1992) characterized the symptom constellation denotative of PTSD as manifestations of these tasks. That is, the symptoms characteristic of PTSD (i.e., re-experiencing, avoidance, and hyperarousal) are discussed as mechanisms by which survivors achieve assimilation and/or accommodation. Specifically, posttraumatic reactions in the form of denial, emotional numbing, and dissociation were thought to signify efforts toward skirting painful thoughts and images that contradict the contents of the pre-trauma assumptive world whereas intrusive thoughts and re-experiencing of traumatic events were thought to signify efforts toward confronting this contradictory material. Janoff-Bulman's discussion of these cognitive processes addressed them as efforts to facilitate recovery from extreme events rather than being necessarily indicative of pathology. She noted that avoidance processes, such as avoiding conversations, activities, places, or people related to the event, "interfere with the mastery of the event" (Janoff-Bulman, 1992, p. 103), whereas re-experiencing symptoms (e.g., intrusive thoughts, nightmares, and flashbacks) facilitate cognitive processing. This cognitive processing is thought to be necessary to accommodating or assimilating the traumatic event. As she stated:

“Representations of the traumatic event – through intrusive thoughts and images – provide a new means for rendering closer and closer approximations of the new, threatening data and the old assumptions, such that ultimately assimilation of the traumatic experience and accommodation of prior assumptions can be successfully completed” (1992, p. 106). As implied, the process of rebuilding one’s assumptive world is not a consciously or explicitly pursued goal, but rather occurs as a natural process, mediated by the symptom progressions mentioned above. It is a way to find a new psychological equilibrium after the former equilibrium is compromised.

Three specific types of cognitive processes are thought to affect the nature and success of cognitive assimilation processes. These include *social comparison*, *self-blame*, and *reframing* of the trauma as generative of benefits such as a sense of purpose and meaning (Janoff-Bulman, 1992). The *social comparison* processes of survivors are thought to serve a generally palliative function, where individuals compare themselves to those who have experienced apparently more distressing traumas or who are experiencing more pronounced psychiatric symptoms. For example, Janoff-Bulman (1992) drew on the work of scholars studying positive illusions and self-enhancement strategies (Taylor, 1990) to suggest that trauma survivors engage in such comparisons to build beliefs that they are particularly capable of coping and that their traumas were not as bad as they could have been. To answer questions related to establishing why the event occurred at all, and specifically why the event befell him or her, the trauma survivor is thought commonly to respond with *self-blame*. Janoff-Bulman (1992) surmised that blaming one’s own past behavior (i.e., behavioral self-blame) for the event reflect the survivor’s attempts to reduce the danger to her or his assumptive world. Theoretically, the survivor is thought to be able to maintain assumptions about the meaningfulness of the world – for instance that events are in some way controllable - by attributing the negative events to their own behaviors or characteristics[1]. Last, survivors are thought to *reframe* their traumatic experience; they reappraise the event, arriving at an understanding of it that focuses on the event's ability to produce eudaimonic change, rather than the degree to which it produces distress. The trauma then becomes thought of as generative of new priorities and sources of meaning and purpose. The success of these three cognitive strategies at assimilating the trauma into an event that is congruent with the pre-trauma assumptive world is thought to determine the degree to which the post-trauma assumptive world must be revised (i.e., how much accommodation the survivor's cognitive system must undergo).

Regarding the course of outcomes following a traumatic life event, assumptive world theory argues that trauma-related pathology (i.e., PTSD or posttraumatic reactive depression) arises in two different ways. First, PTSD is thought to occur when survivors fail to readily assimilate or accommodate the lessons of the traumatic event into their global meaning systems or assumptive worlds. In this situation, they theoretically continue to experience the symptomatic oscillations between avoiding the trauma material (through avoidance, dissociation, and emotional numbing) and confronting the memory of the trauma (through intrusive thoughts and nightmares). These symptoms will persist until individuals engage in sufficient cognitive processing that their assumptive worlds and the lessons learned from the trauma can be reconciled (Janoff-

[1] Longitudinal evidence (Frazier, 2003) indicates that greater behavioral self-blame regarding the event engenders greater distress, a finding not directly contradictory to this theory, but somewhat counterintuitive, given that Janoff-Bulman's (1992) model proposes that self-blame should reduce the amount of cognitive processing and confrontation with trauma material (i.e., intrusive thoughts).

Bulman, 1992). On the other hand, trauma-induced reactive depressive symptoms are thought to occur when the assumptive world is revised to reflect uniformly negative beliefs (e.g., events occur at random, the self is unlucky, and the world is a malevolent place) about the world and self (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Janoff-Bulman & Hecker, 1988).

More recently, the trauma research literature has begun to focus on beneficial outcomes following traumatic life events. Both resilience - the ability of individuals to maintain their level of psychological functioning in spite of adverse events and environments (e.g., Masten, 2001) - and PTG - demonstrating growth over and above pre-trauma levels of functioning as a result of a stressful or traumatic event (e.g., Calhoun & Tedeschi, 2006) - seek to focus research attention on individuals' adaptive responses to trauma and adversity. Only recently has scholarly dialogue on world assumptions sought to address the role of fundamental schema change in outcomes reflective of PTG or resilience. One nascent effort toward such an application (Janoff-Bulman, 2006) suggests that growth might be achieved by two avenues. First, it is thought that individuals might simply have more developed, cognitively complex, and well-informed assumptive worlds after being forced to engage in the process of effortful revision and cognitive processing. These more complex cognitive foundations would theoretically be stronger and more nuanced, demonstrating greater integrity and ability to accommodate new challenges and ambiguities. More concretely, this might be reflected by a trauma survivor's reports that she or he is "stronger" or "wiser" after the event. Indeed, it stands to reason that with a more realistic or elaborate assumptive world, a survivor's cognitive landscape might be less prone to fracture in the face of new challenging events. Notably, however, this proposition is counter to the finding that the experience of prior traumas is one of the strongest risk factors for PTSD (Brewin, Andrews, & Valentine, 2000). Second, assumptions relevant to meaning and purpose in life are thought to be made more salient by an experience that highlights existential concerns, like mortality. That is, when faced with one's mortality, an individual theoretically becomes more concerned with those aspects of life that are most central, meaningful, and important to her or him. The new salience of these core values and beliefs influences the manner in which a new assumptive world and belief system is constructed, such that survivors arrive at a new assumptive world that is more profoundly informed by what matters to them. For example, a trauma survivor's statement that she changed her priorities in positive ways after her trauma might be reflective of such a route toward growth.

Joseph and Linley (2005) recently proposed a model that attempts to conceptualize both negative and positive trajectories of outcome following trauma in terms of accommodation and assimilation processes. This theory, titled an "organismic valuing theory of growth through adversity," posits that individuals have a natural predisposition toward rebuilding their shattered schemata (i.e., assumptive world). This can be accomplished in three ways. First, individuals might assimilate the traumatic event, modifying the meaning of the event so it fits more consistently with the contents of their assumptive world. According to the theory, this occurs when survivors do not engage in the process of meaning-making regarding the significance of the event. If survivors do attempt to assign significance to the trauma, they will undertake one of the two other routes toward rebuilding the assumptive world. That is, they might accommodate the event by changing their assumptive world in ways that lead to distressing outcomes (i.e., “negative accommodation”). Alternatively, they might accommodate the event in ways that are growth-promoting (i.e., “positive accommodation”). Joseph and Linley argued that the natural tendency is for individuals to engage in positive accommodation, and given a psychologically nourishing environment (i.e., an environment that provides them with a sense of autonomy, competence, and relatedness - the components specified by Self-Determination Theory by Deci & Ryan, 2000) they will do so successfully. Further, they note that growth will be demonstrated in ways that are eudaimonic rather than hedonic in nature; that is, growth will engender outcomes that produce overarching psychological richness or well-being rather than transitory or primarily affective states like happiness.

Thus, Janoff-Bulman’s (1989, 1992) and Joseph and Linley’s (2005) theories constitute the major psychological models that tout the importance of the survivor’s fundamental assumptions,. Both theories bear limitations. For instance, Janoff-Bulman’s theory proposes that most people who have not yet endured a traumatic event hold assumptions that the world is benevolent, meaningful, and that the self is worthy of good. This has been criticized as naïve and simplistic (Gilfus, 1999). Further, the implication of this postulate seems to be that traumatic life events necessarily cause one’s assumptions to become more negative. An additional criticism regards Assumptive World Theory’s failure to clearly define those criteria by which a traumatic event can be distinguished from other stressful events. Joseph and Linley’s model, by contrast, describes both positive and negative changes in the assumptive world. However, their model simply does not address the nature of pre-trauma assumptions.

Appendix B

Empirical Findings on the Assumptive World

In this section, empirical research on the assumptive world will be reviewed. Findings are organized in accord with study design. Many of the studies reviewed are cross-sectional in nature. First, cross-sectional studies contrasting trauma and no-trauma groups will be discussed. Second, cross-sectional studies presenting correlational findings without contrast groups are presented. Third, cross-sectional studies with contrasts between groups with and without clinical psychopathology (e.g., PTSD) are addressed. Last, the review will describe longitudinal studies and treatment studies employing multiple assessments. The review will conclude with a summary and critique of this body of literature.

For the purposes of this review, it is important to note that the WAS has been used in variable ways across studies. Some studies have scored the WAS using 8 subscales (i.e., Justice, Controllability of the World, Randomness of the World, Benevolence of People, Benevolence of the Impersonal World, Luck, Self-Control, and Self-Worth), some have used 3 summary scores (i.e., Meaningfulness of the World, Benevolence of the World, and Self-Worthiness), and some have used a total global score..

Cross-sectional Comparisons between Trauma and No-Trauma Groups

Cross-sectional studies using the WAS have sought to uncover differences in world assumptions between no-trauma groups and individuals who have experienced specific traumas and mixed trauma groups. Studies using undergraduate samples will be reviewed first, followed by studies using non-student samples.

Studies conducted on samples of undergraduates have revealed varied findings. In a sample of 30 undergraduates, bereaved students saw the world as significantly less controllable and themselves as having less self-control and less luck than a group of 30 non-bereft controls (Boelen et al., 2004). In another study (Harris & Valentiner, 2002), students who had experienced a physical assault (n = 32) saw themselves as less lucky and as having less personal self-control and self-worth than a contrast group (n = 316) who had not been assaulted. In a study on the effects of parental divorce (Franklin et al., 1990), no significant differences were found on the 8 subscales of the WAS between 190 college students with divorced parents and 458 with parents who had intact marriages. Among a mixed-trauma sample consisting of 83 survivors and 83 controls, discriminant analyses revealed that self-worth, randomness, and benevolence of the impersonal world subscales reliably differentiated between groups (Janoff-Bulman, 1989). Last, in a study of 167 undergraduates (Webb & Whitmer, 2001), those who reported past physical abuse were significantly more likely to see the world and people as less benevolent, to possess less self-worth, and to believe in the randomness of events compared to those not reporting past physical abuse. Past emotional abuse was related to diminished self-worth.

Other trauma vs. no-trauma contrasts were conducted in non-undergraduate samples; of these several focused on samples victimized by other people. Significant differences between 40 male rape survivors and 40 controls were revealed on only one of the 8 WAS subscales (Walker et al., 2005). Specifically, rape survivors held assumptions reflective of significantly lower self-worth than did the control group. Findings from a study contrasting 118 individuals who reported being bullied at work and 118 non-bullied controls (Mikkelsen & Einarsen, 2002) showed significant differences between the groups on benevolence of the impersonal world and of people, luck, self-worth, justice, and controllability. Each difference showed that the bullied sample had more negative assumptions. Among a sample of 69 women who reported no (n = 16), mild (n = 38), or severe (n = 15) harassment in the workplace, no group differences on the WAS subscales were found, and the WAS subscales also did not correlate with a questionnaire identifying antagonistic sexual experiences (McDermut et al., 2000). Last, the three WAS summary scores were compared for 65 survivors of the South African Apartheid (all survivors were either physically tortured or witnessed the violent death of a loved one) and 65 no-trauma controls (Magwaza, 1999). Findings revealed significant differences between groups on meaningfulness and benevolence of the world summary scores indicating that survivors viewed the world as less meaningful and as less benevolent than did the controls.

Other comparison studies examined survivors of terminal illness or bereaved parents. In one exemplary study, 164 breast cancer survivors were compared to 164 matched controls on a variety of indices of functioning, including world assumptions (Tomich & Helgeson, 2002). The cancer survivors were surveyed at 5-years post-diagnosis. Group differences were found on two subscales of the WAS, controllability and randomness, such that cancer survivors were more likely to believe that the world is uncontrollable and that events befall people at random. Among a sample of bereaved parents who lost children to murder (n = 64), accidental cause (n = 37), or illness (n = 34) and a comparison group of 30 non-bereft parents, the bereaved samples reported less self-worth and saw the world to be less benevolent than the non-bereaved parents

(Matthews & Marwit, 2004). In an earlier study (Wickie & Marwit, 2000), the three summary scores were used to examine differences between bereaved parents who had lost their children to murder (n = 21) or accidental death (n = 10). Parents with murdered children saw the world as significantly less benevolent.

In sum, these studies indicate a somewhat mixed picture. First, it is difficult to summarize the findings mentioned above as they pertain to specific subscales of the WAS because some studies used 8 subscales whereas others used 3. However, in 6 of 12 studies, assumptions related to self-worth were shown to be more negative for trauma survivors. In 6 of 12 studies, assumptions related to benevolence of the world (impersonal or interpersonal) differed in the same manner. Overall, only 2 of 12 studies (i.e., those examining parental divorce and harassment in the workplace) showed no significant differences on the WAS. Thus, half of the studies reflected change in assumptions about the self, and half indicated change in assumptions about the world. As such, these cross-sectional comparison studies reflect modest support for the notion that trauma changes basic assumptions about the self and world.

In attempt to consolidate information, the mean effect size (Cohen's *d*) was computed for those studies that examined contrasts between groups on the 8 WAS subscales (i.e., not the three summary scores or scores on alternative factor analyzed scales). Studies were not included if they failed to report crucial information (e.g., standard deviations). In all, 3 studies (Boelen, Kip, Voorsluijs, & Bout, 2004; Mikkelsen & Einarsen, 2002; Walker, Archer, & Davies, 2005) reported the necessary information on all 8 subscales (total n = 376 across 3 studies), and 1 study (Franklin, Janoff-Bulman, & Roberts, 1990) reported this information for the benevolence of the impersonal world and benevolence of people subscales (total n = 944 across 4 studies). Average effect sizes (*d*s, weighted for sample size) are as follows: .27 (range = .07 to .54) for benevolence of people, .21 (range = .07 to .31) for benevolence of the impersonal world, -.10 (range = -.38 to .23) for randomness[2], .75 (range = .15 to 1.03) for justice, .37 (range = -.41 to .84) for controllability, .80 (range = .16 to .92) for self-worth, .61 (range = .54 to .97) for luck, and .27 (range = .01 to .76) for self-control. These effect sizes all indicate that, on average, no-trauma groups had more positive world assumptions (e.g., the world is more benevolent, events are not distributed at random) than the trauma samples to which they were compared. Thus, moderate to large effects were found on subscales tapping assumptions about justice, self-worth, and luck; four other subscales (benevolence of people and the world, controllability, self-control) had effect sizes in the small-to-moderate range; and the effect size for one scale (randomness) was below small, according to Cohen's conventions for interpreting effect sizes. Thus, only three subscales revealed effects of medium size or greater, and the ranges for several subscales (e.g., controllability and randomness) reflect the general unreliability of the contrast-group findings.

Cross-sectional Studies without Comparison Groups

In other cross-sectional studies, the WAS has been administered to trauma samples without including comparison groups. For instance, among 651 undergraduates, self-reported histories of physical abuse and maternal alcoholism were related to lower self-worth (Harter & Vanecek, 2000). In another study (Littleton &

[2] The randomness subscale is scored in such a way that lower scores indicate the participant's endorsement that events are distributed at random. The score on this subscale is generally predicted to decrease in trauma samples, whereas all of the scores on the other subscales are thought to increase.

Breitkopf, 2006), 216 rape survivors' responses to the WAS suggested weak endorsement (e.g., "slightly agree") of factors tapping belief in a benevolent world and the benevolence of people, the belief in justice, the belief in the randomness of events, and in positive self-worth. Finally, the total global score of the WAS (all subscales summed) revealed small but statistically significant correlations with reports of childhood physical abuse and current sexual abuse among a sample of 43 domestic abuse survivors recruited from shelters and outpatient mental health facilities (Weaver & Clum, 1996).

Other studies of groups experiencing stress or trauma speak more to criterion-related validity by examining associations between the WAS and distress-related measures. For example, among 601 male police officers endorsement of the assumption that the world is just predicted less on-the-job distress (Brown, Fielding, & Grover, 1999). In addition, a study of 200 people living with HIV or AIDS (Farber, Schwartz, Schaper, Moonen, & McDaniel, 2000) suggested that benevolence of the impersonal world, benevolence of people, self-worth, and luck assumptions were all related to illness-related stress such that those with more stress rated themselves as less lucky and worthy and the world and people as less benevolent.

Cross-sectional Comparisons of Psychopathology vs. No-psychopathology Groups

Additional cross-sectional research addresses differences in world assumptions between controls and individuals manifesting psychiatric pathology, and several pertain to PTSD. Hypotheses for these comparisons typically predict that those who have experienced no traumas will have the most positive assumptions, that those with a trauma but no PTSD will have more negative assumptions, and that those with PTSD or other trauma-related psychopathology will reflect the most negative assumptions. Among a sample of 170 traumatized individuals with PTSD, 185 traumatized individuals without PTSD, and 162 non-traumatized controls, findings suggested relations between several WAS subscales and measures of clinical distress (Foa et al., 1999). For example, those with more PTSD symptoms held assumptions reflecting that they possessed lower self-worth and were unlucky. Additionally, four (i.e., self-worth, benevolence of the world, luck, and self-control) of the eight subscales correlated significantly with measures of depression and anxiety. In other studies PTSD symptoms have been associated with lower self-worth (Dekel, Solomon, Elklit, & Ginzburg, 2004), perceiving one's self as being less lucky and having less self-control (Owens & Chard, 2001), and with a composite measure of negative cognitions that included two WAS summary scores (benevolence of the world and worthiness of the self) (Pyevich, Newman, & Daleiden, 2003). Thus, across studies, PTSD symptoms were related to luck, self-control, and self-worth subscales. And, as reflected in theories on world assumptions, more disrupted assumptions were related to depression. However, it bears noting that none of these studies provided an adequate test of Janoff-Bulman's (1992) hypotheses about the relations among PTSD and change in assumptions (e.g., that re-experiencing symptoms are predictive of increased accommodation and avoidance symptoms greater assimilation). Further, the subscale reflecting differences differed from one study to the next, and the effect sizes for correlations and mean differences were generally small.

Change over Time in WAS Scores in Trauma Groups

Longitudinal studies offer a more rigorous test of the hypothesis that world assumptions change as a result of traumatic life experiences (i.e., accommodation occurs). One longitudinal study (Rini et al., 2004) followed 100 mothers with children who were hospitalized to undergo a bone-marrow transplant. The WAS was completed at the time of initial hospitalization and one-year later. Findings showed that participants were less likely to report that life events were distributed in just or controllable ways at one-year follow-up. These were the only significant differences detected over the course of the year. Further, participants' prior traumatic life events were less predictive of their world assumptions than were recent stressful life events. This finding suggests that all events, not only traumatic life events, might mold the assumptive world, a potentiality acknowledged by Janoff-Bulman (1992).

A second longitudinal study (Ginzburg, 2004) examined the world assumptions of survivors of myocardial infarctions (MI) at one week and seven months post-MI. The survivors were divided in two groups: one group screened positively for the symptoms of PTSD (PTSD), the other did not (non-PTSD). A comparison group of non-MI patients was also included. The only change detected across time points showed that those in the PTSD group perceived themselves as less lucky at the seven-month follow-up than at initial measurement. Additionally, group-contrast analyses showed that the PTSD group reported more negative assumptions regarding their own self-worth than the non-PTSD group and the control group at time 1. The PTSD group also endorsed more beliefs that events occur at random in the world than did the control group at time 2.

Jeavons and Godber (2005) followed 107 survivors of road crashes from the time they were admitted to a hospital. The sample completed surveys at 3, 6, and 12-month follow-ups as well. There were no significant changes over time on the three WAS summary scores although measures tapping PTSD and trauma-related distress did show changes. The worthiness summary score was most significantly correlated with the PTSD and distress measures.

Quasi-experimental or experimental treatment studies also provide the opportunity to observe the assumptive world over a longitudinal time-course. Four of these studies exist in the literature (Livanou et al., 2002; Owens, Pike, & Chard, 2001; Park & Blumberg, 2002; Pauvonic & Lars-Goran, 2001). Of these, three demonstrated some significant change in assumptive worlds due to psychotherapeutic intervention. The lone study that showed no changes for a treatment group over the course of time (Park & Blumberg, 2002) examined the effects of a writing intervention. Only Owens et al. (2001) analyzed each of the WAS subscales separately and found treatment effects on the self-worth and benevolence of the impersonal world subscales. Each of the other studies operationalized world assumptions with the total sum score of the WAS, which prevents more specific commentary on which assumptions are likely to be affected. Their findings did indicate change on the total WAS score. Taken together, the treatment studies suggest that it may be possible for individuals to modify their assumptive world, given tasks that are targeted toward cognitive change. These findings are consistent with assumptive world theory's construal of the mutability of assumptions – that traumas shatter assumptions suddenly, whereas gradual, effortful revision in core schemata is also possible and natural to development.

Overall, the findings from longitudinal studies offer some support for the notion that traumatic events might change an individual’s fundamental assumptions. Two of the longitudinal studies used comparison groups, but one contrasted trauma vs. no-trauma groups (Rini et al., 2004) whereas the other contrasted PTSD vs. no-PTSD groups (Ginzburg, 2004). Further, within group change was significant for two of three longitudinal studies, but the change was demonstrated on different subscales (i.e., the luck subscale showed change for one study and justice and controllability subscales showed change for the other). Here again, however, we lack evidence to aid in predicting the precise nature of the impact of a traumatic event or a therapeutic intervention upon the assumptive world’s contents. For example, the studies above do not yield findings that indicate that one particular type of trauma, such as bereavement, will likely produce change in beliefs about randomness, whereas a different trauma will not, but will likely produce changes in views about the benevolence of people. Nonetheless, the findings reflect changes in world assumptions on scales from all three categories of world assumptions proposed by Janoff-Bulman (1989) – benevolence of the world, meaningfulness of the world, and worthiness of the self.

Summary and Critique of the Empirical Literature

Much of the inconsistency described in the empirical findings reviewed above may be reflective of problems (e.g., unreliability) in measurement. First, differences between trauma and comparison groups as well as comparisons over time among trauma survivors were mixed. Most subscales reflected changes in at least one of the studies reviewed, but none did so predictably or across the majority of studies. Second, examination of effect sizes for the subscales among the trauma vs. no-trauma comparison studies indicates that the range in effect sizes produced has often been very wide. Third, findings reviewed above reveal that some of the subscales (especially the self-worth scale) bear strong relations to measures of distress.

Although the assumptive world has been studied over the course of the decades following its introduction to the trauma literature, the findings mentioned above must be noted with proper skepticism. First, most of the findings are cross-sectional in nature, belying a need for longitudinal, specifically, prospective studies of traumatic events and their effects upon the assumptive world. That is, even the longitudinal studies described above begin to measure change after the traumatic event has already occurred. Only a prospective design is able to account for change in the assumptive world from pre- to post-trauma. No such study exists in this literature. Second, many of the comparison group and longitudinal studies may muddy important differences within samples of trauma survivors between those who predominantly assimilated versus accommodated the trauma. That is, hypothesized differences between trauma and no-trauma groups or among survivors across time will only occur if many of them have engaged in at least some accommodation (i.e., have revised their assumptive worlds). Third, the empirical literature relies heavily on the WAS, which manifests several psychometric problems. As noted, the inconsistency of the literature reviewed above may be due to bad theory, ill-suited tests of that theory, and/or over-reliance on an instrument of problematic quality. Of these three, I address the psychometric shortcomings of the WAS and propose the development of a new measure because we will be unable to ameliorate the other two issues without good measurement. That is, assumptive world theory will not be tested to a satisfactory degree without a good way to operationalize its key construct, the assumptive world.

Appendix C

Evaluation of the Psychometric Properties of the World Assumptions Scale

Content Validity

In developing a measure of a construct, it is important to elaborately describe the construct (Clark & Watson, 1995) including its content domains and related variables (i.e., the "nomological net", Cronbach & Meehl, 1955). Janoff-Bulman's (1989) original and subsequent (Janoff-Bulman, 1992) elaborations on the assumptive world construct specify three domains of the assumptive world with relevance to people's beliefs about safety and vulnerability (i.e., the belief systems theoretically most profoundly affected by traumatic events). As noted, these domains include assumptions about the benevolence of the world, assumptions about the meaningfulness or explicability of life events, and assumptions about the worthiness of the self. As mentioned, each of these domains is parsed into smaller subsets of assumptions. Further, Janoff-Bulman (1992) theorized that most people believe that the world is benevolent, meaningful (i.e., not random), and that they are worthy (i.e., unlikely to be the victim of a traumatic event). In later writings she mentions that these beliefs are often implicit and unlikely to be readily recognized in everyday situations, but they become apparent after encounter with an event that is seismic enough to disturb them.

The concern that these assumptions might best be considered as implicit rather than explicit would seem to raise concerns about developing an explicit, self-report measure with which to tap them. No evidence to date speaks directly to this concern with respect to the assumptive world; however, a recent prospective study (Engelhard, Huijding, van den Hout, & de Jong, 2007) examined vulnerability-related cognitions and their relations with PTSD among soldiers deployed for Operation Iraqi Freedom/Operation Enduring Freedom. They found that neither implicit nor explicit measures of participants' beliefs regarding their own vulnerability at pre-deployment were related to post-deployment PTSD symptoms. Results also showed that both implicit and explicit measures of vulnerability beliefs from post-deployment surveys accounted for unique variance in concurrent PTSD symptoms. Furthermore, only an explicit measure of vulnerability-related assumptions accounted for variance in PTSD at a 15-month follow-up over and above pre-existing neuroticism. Counter to theory, findings did not support a main effect for time on changes in assumptions. These findings seem to indicate that both implicit and explicit measures might contribute to our understandings of how assumptions relate to post-trauma trajectories of distress and well-being, not, on the contrary, that such assumptions are best measured by implicit assessments.

Although Janoff-Bulman (1989) described the manner in which world assumptions might relate to people's estimations of personal vulnerability, she did not present evidence that these particular assumptions represent an exhaustive or particularly accurate list of assumptions most relevant to trauma survivors. In addition, Janoff-Bulman's (1989; 1992) formulations maintain that the assumptive world contains beliefs that are not world assumptions per se but rather beliefs about the self (i.e., self-worth, self-control, and luck subscales). Conceptual differences between these types of assumptions are clear (i.e., they possess entirely different referents – the self vs. the world). Including both types of assumptions under the umbrella concept of world assumptions muddies the concept. Although Janoff-Bulman (1989) has theorized clearly about how these assumptions about self and world might interact in informing visions of one's own vulnerability or safety, theory and research have not yet addressed how different types of assumptions might be differentially affected by traumatic events. For instance, one's assumptions about self-worth might be more influenced by affective states than, for example, one's assumptions about the randomness of events. Considering this, self-reports of self-worth might be especially prone to reflect changes shortly after a negative life event when negative emotional response is high; however, such a change would not reflect a revision of schemata involving self-worth, but rather the scale's sensitivity to state negative affect. In addition, we lack clear theory about whether and how these assumptions might differ across cultures.

Item Clarity

An additional problem with the WAS is that some of its items exhibit basic problems in terms of clarity and redundancy. For example, in the case of "Life is too full of uncertainties that are determined by chance," an item on the randomness subscale, a "disagree" answer might indicate one of three different things: perhaps the respondent disagrees that life is too full of uncertainties, or that those uncertainties are determined by chance, or that either is true. As an example of redundancy, the self-control subscale contains items that read "I almost always make an effort to prevent bad things from happening to me," and "I take the actions necessary to protect myself against misfortune." Although this is not a significant hindrance to the scale's integrity, items should be selected for their ability to over-sample the content of a domain (Reise et al., 2000); given that two of four total items used to assess an individual's assumptions about self-control are redundant, it seems unlikely that the content of this domain has been over-sampled. That is, redundancy of items, particularly on a brief scale or subscale, prevents those items from tapping the breadth of the construct they are developed to measure. This is particularly concerning when the constructs the items are thought to measure are as broad as the core schemata that comprise the assumptive world. These two criticisms are not intended as outright indictments of the quality of the measure, but rather as aspects to be improved upon in later scale development or revision efforts.

Reliability

Several of the studies reviewed reflect deficits of the WAS on indices of reliability. Among the empirical studies discussed, those that provide estimates of internal consistency for the subscales of the WAS among their samples suggest that there is room for improvement. For example, the randomness subscale has repeatedly posted internal consistency reliabilities (Cronbach's alphas) in the 0.40 – 0.50 range (see e.g., Giesen-Bloo & Arntz, 2005; Walker et al., 2005). In fact, several of the subscales consistently have alphas in the 0.50 – 0.70 range (see Ginzburg, 2004; Tomich & Helgeson, 2002), levels that indicate questionable consistency of measurement from item-to-item. Because alpha is profoundly influenced by the number of items on a scale, it would be inappropriate to establish a strict cutoff for internal consistency reliability for all measures (Cortina, 1993). However, these coefficients suggest room for improvement. Further, only one longitudinal study (Kaler et al., 2008) currently estimates test-retest reliability among individuals who have not experienced a trauma (i.e., those whose scores would be expected to be stable). Results among a sample of 543 undergraduates at multiple universities surveyed twice, 8 weeks apart, revealed test-retest reliability coefficients ranging from .38 to .65. These results are quite concerning considering that scales tapping similar constructs (i.e., foundational schemata) have test-retest reliabilities in the $r = 0.70 – 0.80$ ranges (e.g., Fowler et al., 2006).

Factor Structure

An added area of particular concern regarding the psychometric properties of the WAS is its apparently unstable factor structure. Janoff-Bulman's (1989) original exploratory factor analysis (EFA) suggested the extraction of 7 factors – each of the hypothesized domains of world assumptions loaded on separate factors, except benevolence of the impersonal world and benevolence of people, which loaded on the same factor. Four additional EFAs have been conducted on the scale (Harris & Valentiner, 2002; Jeavons & Greenwood, 2007; Littleton & Breitkopf, 2006; Rini et al., 2004), and none reproduced the 8-factor structure proposed by Janoff-Bulman (1989). For instance, Harris and Valentiner's EFA suggested that the self-worth and self-control items loaded onto a single factor, as did the justice and controllability items, and the benevolence of the impersonal world and benevolence of people items. Rini et al. reported similar results, with the exception that self-control, self-worth, and luck items loaded on a single factor. Littleton and Breitkopf (2006) extracted a four factor solution. The benevolence of the impersonal world and benevolence of the world items loaded on one factor and the justice, randomness, and self-worth items loaded on their theoretically identified factors. However, luck, controllability, and self-control items did not replicate the proposed factor solution, and the authors did not comment further on the nature of the remaining factors.

Admittedly, comparing EFAs conducted across different samples for their solutions is not the best means of assessing structural stability. The best way to test the factor-structure stability is to conduct a confirmatory factor analysis (CFA), testing the originally proposed factor structure with indices of fit and examination of the parameter estimates (Finch & West, 1997; Floyd & Widaman, 1995). Examining the indices of fit for the model provides evidence regarding whether the data reflect the 8-subscale factor structure proposed by Janoff-Bulman (1989). Two CFA studies (Elklit et al., 2007; Kaler et al., 2008) of the WAS exist in the research literature. Results from a CFA of the WAS items among 1,710 traffic and motor vehicle accident survivors from Denmark supported the 8-factor model of the WAS. Indices of fit for a model with items loading on the originally theorized 8 subscales, which were allowed to correlate, were generally satisfactory (*CFI* = .93, *IFI* = .93, *SRMR* = .07, *RMSEA* = .05). However, a CFA using data from 742 undergraduates from multiple universities (Kaler et al., 2008) revealed several fit indices below recommended levels (*NFI* = .84, *TLI* = .86, *CFI* = .88) and only one indicating that the data fit this model (*RMSEA* = .05) (see Finch & West, 1997 for recommended levels). Further, both studies showed a pattern of very high correlations between factors and troublesomely weak factor loadings for some items.

Criterion-related, Convergent, and Discriminant Validity

As a final criticism, only recently have studies sought explicitly to establish evidence for the convergent or discriminant validity (Campbell & Fiske, 1959) of the WAS, despite the literature's heavy reliance upon it. Nonetheless, several of the studies reviewed above present opportunities to evaluate evidence for criterion-related validity, and a few findings present evidence regarding the measure's convergent and discriminant validity.

Several studies, also reviewed in Appendix B, document significant relations between clinical distress measures and the WAS subscales Significant negative relations were revealed between PTSD symptoms and assumptions about self-worth (Dekel et al., 2004; Elklit et al., 2007; Foa et al., 1999; Owens & Chard, 2001), luck (Elklit et al., 2007; Foa et al., 1999; Owens & Chard, 2001), and self-control (Owens & Chard, 2001). Significant relations between PTSD symptoms and other WAS subscales (i.e., benevolence of people, benevolence of the world, and randomness) were found in one study (Elklit et al., 2007), but none of these relations was of even small-to-moderate effect size. Measures of clinical depression and state and trait anxiety were found to correlate negatively with assumptions related to self-worth (Foa et al., 1999; Harris & Valentiner, 2002), and benevolence of the impersonal world, luck, and self-control (Foa et al., 1999). Other expressions of distress were also found to relate significantly to assumptions: HIV/AIDS-related stress related negatively to assumptions about self-worth, benevolence of the impersonal world, benevolence of people, and luck (Farber et al., 2000), and work-related stress related negatively to assumptions about justice among police officers (Brown et al., 1999). Also, a measure of complicated grief was found to correlate significantly with assumptions about luck and the controllability of the world (Boelen et al., 2004). Results from another study (O'Connor & Elklit, 2008) indicated that individuals with secure attachment styles had significantly higher scores on the benevolence of the world subscale of the WAS than those with preoccupied or fearful attachment. Notably, the subscale of the WAS tapping assumptions about the randomness of events did not relate significantly to any of the measures of distress noted above. This may be due to the unreliability of this particular subscale as noted earlier. Nonetheless, because both Janoff-Bulman's (1992) and Joseph and Linley's (2005) theories propose relations between the assumptive world and clinical distress (e.g., PTSD, depression), these findings constitute some evidence for criterion-related validity.

Significant relations indicating evidence for convergent validity among non-clinical variables and world assumptions have also been documented in the literature, although existing evidence also reveals concerns regarding the discriminant validity of the WAS. .For instance, positive affect and negative affect related significantly and in opposite directions with assumptions about the controllability of the world (Tomich & Helgeson, 2002), and positive affect also related significantly with assumptions about the benevolence of the impersonal world. However, these correlations were small, and not all of the subscales from the WAS were included in the study. These findings are also relevant to discriminant validity because the assumptive world is thought to be a primarily cognitive construct. Significant and large relations with affective variables would be undesirable for a scale that is used to capture cognitive (not emotional) changes.

Also, optimism about marriage was positively related to assumptions about the benevolence of people among students with divorced parents, and optimism about marriage related significantly and positively with assumptions about the benevolence of the impersonal world among students whose parents had not divorced (Franklin et al., 1990). These findings constitute limited evidence for convergent validity.

Thus, several of the subscales of the WAS relate to measures of general clinical distress and to trauma-related distress (PTSD). However, the literature manifests only scant evidence regarding the convergent and discriminant validity of the WAS (i.e., that the measure does tap the domains it should and does not tap the domains that it should not tap). For example, only one study (Tomich & Helgeson, 2002) examined relations between the measure and affective states. As noted, the measure's association with affective variables remains an important area for exploration because, if a subscale on the WAS is influenced profoundly by affect, a change in the score of that scale may indicate fluctuations in mood rather than actual cognitive accommodation.

Two studies have sought to specifically assess evidence for the validity on the WAS, as such they are examined in more detail here. The first study (Elklit et al., 2007) examined relations between the WAS and PTSD symptoms among a sample of Danish traffic and motor vehicle accident survivors with whiplash (n = 1,710). The results of the study offer mixed evidence with regard to concurrent validity of the WAS. Five of the WAS subscales correlated significantly with the Harvard Trauma Questionnaire, a measure of PTSD symptoms. However, among the five subscales only one, self-worth, had a correlation with an absolute magnitude greater than .30 (r = -.50). Luck, benevolence of the world, and benevolence of people subscales all revealed absolute correlation coefficients between .20 and .30 whereas the absolute correlation coefficients for all other subscales were lower than r = .13 (randomness was statistically significant at r = .12). In sum, the study offered scant evidence for the concurrent validity of most of the WAS subscales. However, it bears mention that this evaluation of evidence for validity is relatively narrow in scope, considering that Janoff-Bulman's

(1992) theory was not a theory on PTSD, per se, but rather the effects of trauma exposure. Examining relations between the WAS and a PTSD measure assesses only a fragment of the nomological net.

The second study (Kaler et al., 2008) that sought to assess evidence for the validity of the WAS offered a comparatively broad assessment of the scale's relations with theoretically related variables. Participants (Time 1 $N = 742$; Time 2 $n = 655$), undergraduates from four large universities in the United States, completed two online surveys 8 weeks apart. Those who experienced a trauma from the Traumatic Life Events Questionnaire (Kubany, 2004) between surveys were included in a trauma group ($n = 56$), and a no-trauma group matched on sex, age, ethnicity, and prior trauma history was selected for comparison. Although these contrast groups provided the first known prospective data on the WAS, group-comparison results suggested small (and non-significant) differences between the groups on changes in assumptions. Further analysis revealed that these results were very difficult to interpret due to the possible impact of unreliability in measurement on change scores. Nonetheless, the results of particular interest concerning validity addressed relations between the WAS and a variety of distress and well-being variables.

Time 1 assessment of correlations between WAS scales and trauma- and stress-related variables yielded unfavorable findings with regard to evidence for concurrent validity. Only the self-worth subscale correlated with the number of lifetime criterion A traumas or PTSD symptoms with a magnitude greater than $|r| = .17$. On a measure of general distress (i.e., stress, depression, and anxiety symptoms) a similar pattern emerged – self-worth correlated with distress moderately, whereas no other scale correlated with distress above a magnitude of $|r| = .16$. Again, self-worth correlated moderately with negative affect, but all other subscales had correlations below $|r| = .19$. Thus, only the self-worth subscale demonstrated correlations of the hypothesized size with measures of distress.

The WAS subscales related to well-being measures in a more theoretically consistent manner, though some subscales continued to show only very small relations. Positive affect and optimism both correlated above $|r| = .20$ with benevolence of the world, luck, and self-worth. Additionally, both satisfaction with life and self-esteem showed correlations above $|r| = .20$ with benevolence of people, benevolence of the world, luck, self-control, and self-worth. As such, the WAS subscales (except controllability of the world) correlated more consistently with well-being variables in the predicted direction and size. It bears mention that the self-worth subscale was the only subscale to correlate as hypothesized with both distress and well-being measures. Of further interest, the magnitudes of some of these correlations (e.g., between self-worth and self-esteem or life satisfaction) warrant concerns that this subscale may overlap too much with these constructs to be considered a uniquely trauma-related assumption.

Summary of the Critique on Assumptive World Measurement

The preceding review indicates that the mixed findings in the research literature on the assumptive world might conceivably be due to problems with the measure most commonly used to assess the construct of central interest. Concerns regarding the as yet unexamined content validity, item clarity, poor reliability and temporal stability, unstable factor structure, and mixed evidence for construct validity of the WAS must be addressed in order to evaluate the truism that Janoff-Bulman's (1992) theory represents.

Appendix D

Content Validity and Item Generation

Interviews with Trauma Survivors

Trauma survivors were recruited from a pre-existing sample involved in a prospective study of traumatic events at a large Midwestern university. Criteria for selection from the larger sample included that the students reported a traumatic event in their past that caused them to feel intense fear, helplessness, or horror (i.e., thereby meeting criterion A for a diagnosis of PTSD in the DSM-IV-TR (American Psychiatric Association, 2004), they participated in all four prior time points of the prospective study on trauma, and they had not been in their final year of enrollment at the university at the time of the prospective study. Sixteen individuals responded and agreed to complete the semi-structured interview with an advanced graduate student in counseling psychology. Interviews were taped and then transcribed. The final sample of interviewees was 69% female. Most of the sample (*n* = 11; 69%) identified as European American/White, and the remaining 5 individuals identified as Native-American, Chinese-Indonesian, Hispanic-American, African-American, and Asian-Indian. They ranged in age from 18 to 25 years old, and the modal ages were 19 and 20.

The semi-structured interview began with an assessment of the participant's trauma history using the Traumatic Life Events Questionnaire (TLEQ, Kubany et al., 2000). The TLEQ contains a list of 23 stressful events (e.g., natural disaster) and interview participants indicated whether they had experienced any of the 23 events in their lifetime. Evidence for the reliability and validity of the TLEQ has been found for both survey and interview formats (Kubany, 2004).

After each event endorsed by participants, they were queried with regard to when the event occurred and whether it caused them to experience intense fear, helplessness, or horror. They also were asked to briefly describe the event. Upon the completion of the TLEQ and follow-up questions, each individual was asked to identify the event that they considered to be most distressing to them. The most distressing events included the unexpected death of a loved one (*n* = 6), experiencing a natural disaster (*n* = 3), sexual assault (*n* = 1), child sexual abuse (*n* = 2), physical violence by a partner (*n* = 2), witnessing a murder (*n* = 1), and a loved one surviving a life-threatening injury (*n* = 1).

Participants were asked to focus on this event in answering several broad open-ended questions about the event's impact upon them (e.g., "How did this event affect you?") as well as more focused open-ended questions to assess their perceptions of psychological changes they experienced following the event. Specifically, they were asked about perceived positive and negative changes and changes to their beliefs about the world. At the end of the interview, they were also asked if there was anything further about their experience of the event that they wanted to comment upon. For a written summary of the interview protocol, see Appendix E.

Division 56 Survey

Subscribers to the American Psychological Association's Division 56 (Trauma Psychology) list-serve were recruited by e-mail to participate in a short open-ended online survey on assumptions about the world and traumatic life events for no compensation. Fourteen individuals the online survey. Participants ranged in age from 31 to 72 years old (*M* = 50.50, *SD* = 14.18), and 72% of them were female. Most identified as European American/White (n = 10), whereas 2 individuals identified as multi-racial, 1 identified as Latina, and 1 as Middle-Eastern/Arab-American. When queried regarding their highest educational achievement, 1 individual reported completion of a bachelor’s degree, 2 a master’s degree, and the remaining 11 a doctoral degree (e.g., Ph.D., Ed.D.). In describing the sources of their knowledge of trauma, 79% noted formal training in graduate school on trauma, 93% reported clinical experience with trauma survivors, 86% reported experience with research in the area of traumatic events, 71% reported experiences with helping friends and family members deal with a trauma, and 64% reported having had a traumatic experience of their own. The participants had worked an average of 21.79 years (ranging from 8 to 32 years) in the trauma field.

In addition to answering questions about demographic information, level of training, and sources of experience in the trauma field, participants were asked to respond to two open-ended queries. The first read, “Based on your experiences with survivors of traumatic events (e.g., clients, family, friends) as well as your own personal experiences, which basic assumptions about the world most often change in the aftermath of such events?” The second read, “Now think about your research, reading, and formal training. Do these suggest any additional assumptions about the world that change following traumatic life experiences? If ‘yes,’ what are these assumptions?”

Undergraduates Survey

Undergraduate students enrolled in an introductory psychology class at a large Midwestern university were recruited to participate in a short survey on life events and beliefs as an assignment in their class. A total of 682 individuals completed the survey.

Most (62%) were female, and 90% were between the ages of 18 and 21. Most participants identified as European-American/White (76%), whereas 15% identified as Asian-American/Pacific Islander, 2% as African-American/Black, 2% as Hispanic-American/Latina(o), 1% as Middle-Eastern or Arab-American, 1% as African-born immigrants, less than 1% as Native-American/American-Indian, and less than 1% as foreign-born Hmong.

In this sample participants were asked to describe the most stressful event that had ever happened to them. Follow-up questions addressed whether that event was in the past or ongoing, whether the event occurred more than once, the age at which it occurred or the age at which it first and last occurred (if it was a repeated event), as well as a series of questions to assess the severity and nature of the stressor (e.g., “how much distress did the event cause you at the time it occurred or at the time it started,” and “to what extent did this event cause you to feel that your own life was in danger”). These data were used to assist coders in identifying a group of participants who had experienced an event severe enough to be considered traumatic.

The survey then directed participants to answer questions about the degree to which their beliefs and assumptions about the world were changed by the event they identified as their most stressful. First, participants were asked to respond with a “yes” or “no” answer to an item assessing whether the event they had experienced had changed their basic beliefs. After this they were asked “If ‘yes,’ in what ways did your beliefs change,” or “If ‘no,’ in what ways was the event consistent with your beliefs.” Participants were also directed to answer these questions in less than two paragraphs.

Coding Strategy

Analysis and coding of the data proceeded in two phases. In the initial phase, the data on beliefs and assumptions collected in the interviews, expert surveys, and student surveys were examined by two independent raters (both doctoral students in counseling psychology who conduct trauma research). The raters and the primary investigator agreed upon guidelines by which to determine whether beliefs were world assumptions prior to their reading of the data. A world assumption was defined as (1) an assessment about how things are in the world, as opposed to a conviction about how things should be; (2) aspects of the world instead of aspects of the self (Kaler et al., 2008); and (3) sufficiently general to be considered a foundational or core belief rather than trauma-specific (e.g., "people are not trustworthy," versus "college men are not trustworthy"). The research team also determined that beliefs that were said to be unchanged (i.e., reinforced) by traumatic events could be world assumptions. After an initial reading of the data, and a review of the literature on the world assumptions by the principal investigator, the raters were asked to inductively produce their own coding scheme by which to classify the assumptions they found in the data – categorizing the beliefs they identified as consistent with the definition of world assumptions in a way that made theoretical sense to them. Once coding was complete, the two raters and the primary investigator met to come to consensus on the primary categories of assumptions represented in the data. The agreed-upon set of four categories was used for the coding scheme in the second phase of analysis and coding. They included beliefs about the predictability of life events, beliefs about safety and vulnerability, the controllability of the world, and the nature of people.

In the second phase of coding, the primary investigator and an independent rater from the research team (not a rater in the first phase of analysis) completed a coding of the data from the surveys of the 682 students to assess the reliability of the coding scheme developed by the first raters. Initially, the data were coded Yes, No, or Maybe regarding whether they were world assumptions according to the guidelines used in the first coding. The two raters independently coded the first 82 responses to ensure that their ratings were consistent with one another. Of these responses, the raters agreed on 91%. After conferring to discuss the disagreements, each was reconciled. The primary investigator and the independent rater then split the remaining data and coded it separately in the same way. Proportions of the data reflected relatively even distributions across coders such that the primary investigator and rater identified similar proportions of "maybe," "no," and "yes," answers (7% and 8%, 74% and 70%, and 19% and 22%, respectively). The coders then met to reconcile those that were ambiguous.

Next, because the sample was asked to identify their own "most stressful" events, participants' stressors were coded for whether they were severe enough to be considered probable traumatic events. The events reported by each of the participants identified as having commented on a belief that fit the guidelines of a world assumption (i.e., coded as "yes", n = 168) were assessed for whether they qualified as probable traumas in accord with the following criteria: anything causing serious physical harm or threat to life and physical integrity (of self and significant others) was considered a probable trauma; those events that were unexpected, intentionally caused by someone else, and caused "considerable" or "extreme" distress (based on self-report items in the survey) were also considered likely traumas. After an initial coding, the rater and principal investigator disagreed on 41 (24%) of the events.

A consensus meeting was held to resolve these cases. After deciding to eliminate any instances of break-ups or infidelity from the sample (with the exception of two divorces that included indicators of severity at a substantial level – both participants reported that they sought clinical attention as a result), only 24 (an 86% agreement) discrepancies remained. These were resolved in the consensus meeting after re-assessment. Of the 168 participants who discussed a world assumption, 77 (46%) were determined to be probable traumatic life events. The most common distressing events included sudden or unexpected death of a loved one (n = 23), serious injury or illness of a loved one (n = 19), and serious injury or illness of self (n = 14). Other less common events included recent combat experience, motor vehicle accidents, rapes, and childhood physical abuse.

The final phase of analysis entailed coding the 77 passages that included world assumptions according to the categorical framework developed in the first phase of analysis. The principal investigator and the same independent rater defined each of the categories of world assumptions to assess the reliability of the categories produced. After independently rating the participants' descriptions of how their beliefs changed or were reinforced, the two sets of ratings were compared and were found to agree 89% of the time (Cohen's κ = .78, indicating substantial agreement). This reliability was judged to be satisfactory by the research team, and accordingly an item pool was developed to reflect each of the categories.

Categories of Assumptions

Results from the three qualitative data collections suggested a 4-category scheme of assumptions, which was found to be reliable in independent ratings. Here each of the categories of belief represented in this scheme will be defined. Further, qualitative data will be used to provide examples of statements about the assumptions in each category. Of note, the categories were intended to be somewhat related, considering that they all pertain to changes felt after the occurrence of a stressful event; Janoff-Bulman (1992) also proposed that assumptions included in the assumptive world were likely to be related. Certainly, several of the categories below bear similarity to the domains of belief suggested to be important in Assumptive World Theory (e.g., controllability of the world); although some of the categories include beliefs described by previous theory as well as beliefs not previously studied (e.g., the degree to which one assumes they can understand or know other people). Evidence of this can also be found in interview participants' statements below. The item pool generated to tap these categories of beliefs is included in Appendix F.

Beliefs about the predictability of life events were included in the first category. This included any assumption used to explain the probability that an event might occur in the future. The category included beliefs that events are distributed to people at random, that a principle of justice (e.g., good things happen to good people), God's will, or simply that everything happens for a reason. Of note, this category would include beliefs Janoff-Bulman (1992) addressed in her assumptive world theory, specifically randomness and justice. For instance, an interview participant from who lost a friend to suicide noted "I guess I think things are less predictable now than they were before. You just don't think that at this time in life that anything will happen like that." Another interview participant who survived a major natural disaster noted “I think earlier I actually thought that good things happen to good people. When bad things happened to people, I wondered if maybe something caused that. Now, I know it’s anybody’s game.”

The second category of beliefs included those about vulnerability and danger. Specifically, the category consisted of assumptions related to one’s fragility, the possibility that very bad things might happen, and people’s imperviousness or vulnerability to negative events. One interview participant who lived through a major natural disaster stated “Who is to say I’m in a safe environment? I have a heightened sense of awareness that things are random and you can’t tell what’s going to happen next. I feel a bit more like something bad could happen to me.”

The third category of assumptions included beliefs regarding the controllability of events in the world. Specifically, this subsumed beliefs about how controllable outcomes in one’s life are, how much control people have over the events that befall them, and how much control people have over others. For example, when asked about how her beliefs changed, one interview participant, also a survivor of child sexual abuse, commented “Sometimes you can control things, but I think it’s really situational.”

Last, assumptions that were included in the final category addressed the nature of people. Beliefs about whether one can truly know another person, the predictability of other people, and the trustworthiness and goodness of people were amongst those most commonly mentioned. One interview participant who had been raped as a teenager remarked “I saw people as mostly being good, now I’m a lot more wary of guys in bars and more suspicious in general. I don't assume people are good anymore. I know the questions I need to ask to figure them out, but I still just think that people can be good or bad." A domestic violence survivor stated "It's so true that you can't always know people the way you want to and someone could be abusive or not. You can only know yourself."

Content Ratings by Experts

A group consisting of nine advanced doctoral-level graduate students and Ph.D.-level trauma researchers and clinicians completed a questionnaire to rate the content validity of a pool of items created by the primary investigator. The items were written to tap, as broadly as possible, the four content domains described above. Items were also written with the intention of being as clear as possible (e.g., avoiding ambiguous wording or "double-barreled" questions). Additionally, language from the surveys and interviews was consulted in deciding upon the wording of the items. The group of experts consisted of 5 Ph.D.-level Psychologists involved in research or treatment of trauma-related concerns and four graduate students in a counseling psychology doctoral program, all with primary research interests in trauma. The raters included 7 women and 2 men, ranged in age from 29 to 59, and were either European American (n = 7), Asian (n = 1), or Asian-American (n = 1).

The questionnaire included definitions of each of the categories from the coding scheme along with corresponding items produced to assess them. Raters were asked to rate each item on a scale including three points – 1 ("poor example of the construct"), 2 ("adequate example of the construct"), and 3 ("excellent example of the construct"). Raters also were instructed, "When making your ratings please take the following factors into account: Is the statement realistic? Is it something that people are likely to say? Is it relatively clear and unambiguous? Is it general enough to apply across situations? The items will be rated on a 'strongly agree' to 'strongly disagree' scale by participants."

Only those items (a total of 52) with a score above 2, indicating a greater than "adequate" example of the specified construct, were retained for further analysis. In the end, 11 items representing the predictability of events, 12 items representing safety and vulnerability, 14 items representing the controllability of the world, and 15 items representing the nature of people comprised the 52 items. Mean ratings for each item are included in Appendix F.

Appendix E

Interview Protocol

1. How old are you?
2. What is your racial or ethnic identity?
3. What is your major?
4. What year are you in school?

The next questions will require you to indicate whether you have experienced a variety of stressful events.

The events described below are far more common than many people realize and can affect a person's mental health or later quality of life. Again, please indicate whether you have experienced any of these events with a "yes" or "no" answer. After each question, I may also attempt to gather more information about the specifics of the events you have experienced.

1. Have you ever experienced a natural disaster (flood, hurricane, earthquake, etc.)
2. Were you involved in a motor vehicle accident for which you received medical attention or that badly injured or killed someone?
3. Have you been involved in any other kind of accident in which you or someone else was badly hurt?
4. Have you lived, worked, or had military service in a war zone?
5. Have you experienced the sudden and unexpected death of a close friend or loved one?
6. Has a loved one ever survived a life-threatening or permanently disabling accident, assault, or illness?
7. Have you ever had a life-threatening illness?
8. Have you been robbed or been present during a robbery in which the robber(s) used or displayed a weapon?
9. Have you ever been hit or beaten up and badly hurt by a stranger or someone you didn't know very well?
10. Have you seen a stranger (or someone you didn't know very well) attack or beat up someone and seriously injure or kill him or her?
11. Has anyone threatened to kill you or cause you serious physical harm?
12. While growing up: Were you physically punished in a way that resulted in bruises, burns, cuts, or broken bones?
13. While growing up: Did you see or hear family violence?
14. Have you ever slapped, punched, kicked, beaten up, or otherwise physically hurt by your spouse (or former spouse), a boyfriend or girlfriend, or some other intimate partner?

15. Before your 13th birthday: Did anyone who was at least 5 years older than you touch or fondle your body in a sexual way or make you touch or fondle his or her body in a sexual way?
16. Before your 13th birthday: Did anyone close to your age touch sexual parts of your body or make you touch sexual parts of his or her body against your will or without your consent?
17. After your 13th birthday and before your 18th birthday: Did anyone touch sexual parts of your body or make you touch sexual parts of his or her body against your will or without your consent?
18. After your 18th birthday: Did anyone touch sexual parts of your body or make you touch sexual parts of his or her body against your will or without your consent?
19. Were you ever subjected to uninvited or unwanted sexual attention?
20. Has anyone stalked you (in other words, followed you or kept track of your activities), causing you to feel intimidated or concerned for your safety?
21. Have you or an intimate partner ever had a miscarriage?
22. Have you or an intimate partner ever had an abortion?
23. Have you experienced (or seen) any other events that were life threatening, caused serious injury, or were highly disturbing or distressing?

Of the events that you indicated you have experienced, which ones caused you to feel intense fear, helplessness or horror when they happened? **This was asked for each event to which participants replied "yes."

You said you experienced _____, ___, and ___. Of these events, which caused you the most distress?

The next questions ask your experiences regarding this most distressing event. Again, remember that you may decline to answer any of the questions that you do not feel comfortable answering. Please provide me with as much information as you feel able to provide.

1. How did this event affect you?
2. How did your life change as a result of this event?
3. Sometimes people say that bad events have led to positive changes in their lives. Was this true for you? What types of positive changes did you experience?
4. Sometimes people say that bad events have led to a variety of problems in their lives. Was this true for you? What types of problems did you observe?
5. Sometimes people say that bad events resulted in changes to their most basic beliefs about the world, the things they assumed to be true about the world. Was this true for you? What changes to your most basic beliefs did you experience?

The next set of questions concern your perceptions of control over the event.

6. How much control do you think you had over the event happening? Do you think you could have prevented it? If so, what could you have done?

8. How much control do you feel you have over how you’re dealing with the event now?
9. How much control do you feel you have over whether you will experience a similar event again in the future?

Thank you very much for participating in this interview. Do you have any questions for me?

Appendix F

Comprehensive table of items

Item	MCR	ITC [a]	M	SD	PCL	A	SOC	S	K
You never know what's going to happen tomorrow.									
	2.33	0.40	2.02	0.92	-0.05	-0.17	-0.07	0.99	0.85
People's lives are very fragile.									
	2.22	0.39	2.16	0.89	-0.27	-0.21	-0.04	-0.47	-0.22
I don't feel in control of the events that happen to me.									
	2.78	0.52	3.38	0.92	-0.09	-0.10	0.07	0.64	0.19
It is impossible to fully know another person. [b]									
	2.33	0.34	3.03	1.15					
You usually can know what is going to happen in your life.									
	2.11	0.53	2.84	0.99	0.14	0.08	-0.01	-0.08	-0.88
Terrible things might happen to me.									
	2.44	0.47	2.45	0.87	-0.01	-0.16	-0.10	0.66	0.47
Most people have a lot of control over what happens to them in life.									
	2.56	0.63	3.22	0.91	0.23	0.15	-0.01	0.28	-0.64
It is very difficult to know what others are thinking.									
	2.11	0.49	2.76	0.98	0.02	0.05	-0.04	0.35	-0.92
No one is safe just because they are a good person.									
	2.28	0.44	1.90	0.83	-0.06	-0.09	-0.09	0.83	0.42
Anyone can experience a very bad event.									
	2.33	0.54	1.45	0.62	0.00	-0.03	-0.09	1.61	4.73
I have no control over the actions of others.									
	2.33	0.39	2.55	0.95	-0.03	-0.09	-0.01	0.22	-0.84
I believe people are quite predictable. [b]									
	2.11	0.32	2.98	0.82					
People get what they deserve.									
	2.44	0.31	3.41	0.89	0.03	0.03	0.11	-0.08	-0.29
There are no guarantees in life.									
	2.56	0.29	1.99	0.76	0.00	-0.04	-0.02	1.29	3.08
The experiences people have in life are under their control.									
	2.33	0.54	2.91	0.82	0.16	0.07	0.05	0.18	-0.11
People often behave in unpredictable ways.									
	2.67	0.40	2.53	0.80	0.01	-0.07	0.04	0.40	-0.46
Bad things happen randomly, without rhyme or reason.									
	2.56	0.37	2.38	0.87	-0.05	-0.03	0.00	0.51	0.15
People are less safe than they usually realize.									
	2.67	0.41	2.87	0.93	-0.19	-0.24	-0.07	-0.06	-0.96
Those who think they're in control of what happens to them are wrong.									
	2.17	0.58	3.12	0.86	-0.16	-0.13	-0.02	-0.18	-0.51
People tend to do what is best for themselves.									
	2.22	0.17	3.82	0.70	0.09	0.00	-0.08	1.06	2.46

Item	MCR	ITC [a]	M	SD	PCL	A	SOC	S	K
The events people experience on a day-to-day basis are mostly predictable. [b]	2.22	0.17	3.60	0.73					
People are mostly quite safe from harm.	2.11	0.33	2.73	0.81	0.23	0.16	0.00	0.45	-0.93
I determine my course in life.	2.67	0.58	3.75	0.73	0.19	0.06	0.03	0.95	1.72
For the most part, I believe people are good.	2.78	0.51	2.12	0.72	0.18	0.11	0.06	1.03	2.29
Everything happens to people for a reason.	2.78	0.65	2.53	1.06	0.05	0.01	0.07	0.38	-0.67
There is little chance that bad things will happen to me.	2.22	0.34	2.56	0.82	0.04	0.06	0.08	-0.66	0.26
Most of what I experience is out of my control.	2.67	0.50	3.43	0.82	-0.06	-0.03	0.03	-0.54	-0.43
Most people are motivated to do what is best for others. [b]	2.22	0.21	3.23	0.80					
Everyone leaves this world when they are supposed to.	2.22	0.53	3.20	1.15	0.04	0.02	0.11	-0.19	-0.81
I believe I am mainly safe from harm.	2.56	0.50	2.59	0.79	0.31	0.30	0.05	0.88	0.44
I have a great deal of control over what will happen to me in my life.	2.67	0.68	3.41	0.82	0.21	0.11	0.03	0.49	-0.29
Most people cannot be trusted.	2.44	0.57	2.48	0.83	-0.13	-0.22	-0.01	-0.80	0.43
Most events in my life have happened for a reason.	2.78	0.64	2.46	0.93	0.14	0.03	0.02	0.64	-0.17
Bad things happen to us all.	2.33	0.34	1.91	0.73	0.00	-0.13	-0.01	1.09	2.81
It’s difficult for people to truly influence what will happen to them.	2.11	0.36	3.22	0.84	-0.08	-0.09	-0.06	-0.28	-1.06
Other people are usually trustworthy.	2.44	0.63	2.58	0.78	0.16	0.16	0.05	0.71	-0.10
The world is a totally unpredictable place.	2.44	0.38	2.63	1.00	-0.05	-0.17	-0.07	0.99	0.85
I can get through the day without thinking much about my safety.	2.22	0.26	2.37	0.97	-0.27	-0.21	-0.04	-0.47	-0.22
You can’t control anyone but yourself.	2.44	0.45	2.36	0.89	0.05	0.01	0.10	0.48	-0.48
It is hard to know exactly what motivates another person.	2.33	0.65	2.52	0.91	-0.03	0.01	-0.07	0.53	-0.79
Life is made up of a series of random events.	2.11	0.39	2.81	0.94	-0.17	-0.06	0.14	0.06	-0.85

Item	MCR	ITC [a]	M	SD	PCL	A	SOC	S	K
I will face great danger in my life.	2.33	0.41	3.10	0.84	-0.18	-0.14	0.01	-0.19	-0.07
People mostly control the events that happen to them.	2.22	0.63	3.24	0.80	0.13	0.11	-0.05	0.48	-0.74
It can be very difficult to predict other people's behavior.	2.56	0.61	2.54	0.85	0.00	0.02	-0.04	0.69	-0.60
People fool themselves into feeling safe.	2.67	0.44	2.80	0.90	-0.21	-0.18	-0.02	0.01	-0.95
You can't control most of what happens to you.	2.67	0.56	3.11	0.86	-0.14	-0.06	0.11	-0.39	-0.96
It is hard to understand why people do what they do.	2.67	0.61	2.70	0.92	-0.10	-0.04	0.01	0.25	-1.05
Most of what happens to me happens because I choose it.	2.33	0.57	3.45	0.84	0.15	0.04	-0.05	0.73	0.19
Most people can be trusted.	2.78	0.66	2.58	0.83	0.13	0.14	0.08	0.64	-0.38
It is ultimately up to me to determine how events in my life will happen.	2.11	0.58	3.51	0.82	0.18	0.00	0.09	0.69	0.26
It is difficult for me to take most of what people say at face-value.	2.28	0.48	3.02	0.93	-0.16	-0.24	-0.15	-0.15	-0.88
What people say and what they do are often very different things.	2.22	0.42	3.61	0.83	-0.23	-0.18	-0.10	0.40	-0.09

Note. MCR = Mean content rating, ITC = Item-total correlation, M = Mean, SD = Standard Deviation, PCL = Correlation between item and the PTSD Checklist, A = Correlation between item and the number of Criterion A events, SOC = Correlation between item and Marlowe-Crowne Social Desirability Scale, S = Item skewness, K = Item kurtosis. Items in boldface were selected to be administered in Study 2.
[a]Item-total correlation between item and the other items loading highest on the same factor. [b]Item's factor loading did not exceed an absolute value of .30 in the EFA and was therefore not examined for correlations or skewness and kurtosis.

Appendix G

Item Selection (Study 1 Results continued)

Fifteen out of 52 items had their highest magnitude loading on the first factor, controllability and predictability of events. Of these items, 13 of the loadings exceeded an absolute value of .40. Their distributions, relations with constructs mentioned above, and item-scale correlations with other items loading highest on the same factor were used to narrow this group to a set of six items (see Appendix F for this information). Item selection sought to maximize the number of inclusion criteria met (e.g., high item-scale correlation relative to other potential items) and minimize the number of exclusion criteria met (e.g., kurtosis divided by the standard error of kurtosis not greater than 2).

On the second, third, and fourth factors, 11 items out of the 52 had their highest absolute loadings on each. Six of the seven items with the highest absolute loadings were retained for the second factor because they also best met the selection criteria. For the third factor, the goodness and trustworthiness of people, 6 of the items were retained for Study 2, two of which exhibited lower factor loadings (.39, “What people say and what they do are often very different things,” and .43, “It is difficult for me to take most of what people say at face value.”) than one other (.50, “I believe I am mainly safe from harm.”) in order to maximize internal consistency and preserve face validity. On factor 4, seven items were retained for further analysis. Of these, three of the items were included though they had lower factor loadings (two with loadings of .34 and another with a loading of .38) than three other items (.54, .42, and .41) because they better maximized item-scale correlations and reduced skewness and kurtosis.

Analyses of items from factor 5 revealed that only 4 out of 52 of items exhibited their highest magnitude loadings on this factor. Further, two of the items were highly related (i.e., “Everything happens to people for a reason,” and “Most events in my life have happened for a reason,” *r* = .65). The other two items, “Everyone leaves this world when they are supposed to,” and “People get what they deserve,” were related conceptually in terms of their fatalistic quality, however they were not highly correlated (*r* = .22). Because there was an insufficient quantity to reach the target number of items per subscale, and because it accounted for less of the variance in the item pool than other factors (4.5% versus other factors ranging between 7.0% and 12.0%), the 5^{th} factor was not retained as a subscale for Study 2.

An additional principal axis factor analysis (using the identical rotation procedure) was conducted, extracting 4 instead of 5 factors to assess whether this changed the meanings of the four most prominent factors or altered which items loaded on each. No changes of this nature were found in this analysis. Thus, a 25-item measure with four subscales was retained for assessment of its structural and temporal stability as well as evidence for its construct validity in Study 2. Subscales included a 6-item subscale assessing the controllability and predictability of events, a 6-item subscale tapping the predictability and comprehensibility of people, another 6-item subscale tapping the trustworthiness and goodness of people, and a 7-item subscale for assessing beliefs related to one’s safety and vulnerability.

Appendix H

World Assumptions Questionnaire

Please rate the following statements on how much you agree or disagree with them using the following scale:

1 = Strongly Agree

2 = Agree

3 = Slightly Agree

4 = Slightly Disagree

5 = Disagree

6 = Strongly Disagree

1. Most people can be trusted. *TGP
2. I don't feel in control of the events that happen to me. CE
3. You usually can know what is going to happen in your life. *CE
4. It is difficult for me to take most of what people say at face-value. TGP
5. It is very difficult to know what others are thinking. CPP
6. Anyone can experience a very bad event. SV
7. People often behave in unpredictable ways. CPP
8. People are less safe than they usually realize. SV
9. For the most part, I believe people are good. *TGP
10. I have a great deal of control over what will happen to me in my life. *CE

11. You never know what's going to happen tomorrow. SV
12. Other people are usually trustworthy. *TGP
13. People's lives are very fragile. SV
14. It is hard to know exactly what motivates another person.CPP
15. Most people cannot be trusted. TGP
16. People fool themselves into feeling safe. SV
17. It is hard to understand why people do what they do. CPP
18. Most of what happens to me happens because I choose it. *CE
19. Terrible things might happen to me. SV
20. It is ultimately up to me to determine how events in my life will happen. *CE
21. It can be very difficult to predict other people's behavior. CPP
22. What people say and what they do are often very different things. TGP

* denotes reverse-scoring

CE = item on the Controllability of Events subscale

CPP = item on the Comprehensibility and Predictability of People subscale

TGP = item on the Trustworthiness and Goodness of People subscale

SV = item on the Safety and Vulnerability subscale