THE GLASS IS NEITHER HALF FULL NOR EMPTY, IT IS SHATTERED:  
A PROSPECTIVE STUDY OF SHATTERED ASSUMPTIONS THEORY  
AND PSYCHOLOGICAL FLEXIBILITY  

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Thesis Prepared for the Degree of  
MASTER OF SCIENCE  

UNIVERSITY OF NORTH TEXAS  
December 2013  

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Schuler, Eric Robert. *The glass is neither half full nor empty, it is shattered: A prospective study of shattered assumptions theory and psychological flexibility.* Master of Science (Psychology), December 2013, 62 pp., 6 tables, 6 figures, references, 82 titles.

Shattered assumptions theory posits that each individual has a core set of assumptions about the world and the self, often termed the *assumptive world* which includes: the world is a benevolent place, the world is meaningful, and the self is worthy. Experiencing a traumatic event is believed to lead individuals to question these assumptions in light of the new contradictory information that causes the assumptive world to shatter, leaving the individual to rebuild a more negative perception of the world and themselves. This rebuilding of a fragile new set of core beliefs is believed to be a cause of posttraumatic stress disorder (PTSD) symptoms. Although shattered assumptions theory has been widely accepted in the field of trauma psychology, the shattering of the assumptive world has not been empirically supported due to measurement issues and poor research designs. The current study implemented a prospective design to assess a new measure of the individual’s assumptive world when there is an intervening trauma. In a college sample (*N* = 336), individuals who experienced a traumatic event over the course of the semester (*n* = 40) evidenced decreases in optimism in their assumptive worlds, in comparison to individuals who did not experience a traumatic event. The results suggest there is a limited shattering of the assumptive world for those who experienced a traumatic event. Applications, limitations and future directions are discussed.
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# TABLE OF CONTENTS

**LIST OF TABLES**

| LIST OF TABLES                                      | iv |

**LIST OF FIGURES**

| LIST OF FIGURES                                      | v |

**THE GLASS IS NEITHER HALF FULL NOR EMPTY, IT IS SHATTERED: A PROSPECTIVE STUDY OF SHATTERED ASSUMPTIONS THEORY AND PSYCHOLOGICAL FLEXIBILITY**

| Page |
|-----------------------------------------------|---|
| Introduction                                  | 1 |
| The Theoretical Origin and Nature of the Fundamental World Assumptions | 1 |
| Shattering of Assumptions: The Destructive Nature of Trauma          | 5 |
| Research into the Inoculation Effect            | 9 |
| The Role of Psychological Flexibility on Trauma | 15 |
| Previous Research into Shattered Assumptions   | 16 |
| The Influence of Shattered Assumptions Theory  | 21 |
| Change Scores and Lord’s Paradox                | 22 |
| Present Study                                   | 26 |
| Methods                                        | 28 |
| Participants                                   | 28 |
| Measures                                       | 28 |
| Procedure                                      | 31 |
| Results                                        | 32 |
| Data Preparation                               | 32 |
| Structural Equation Modeling                   | 41 |
| Model of Intervening Trauma and Time 1 WAQ Scores Moderating Time 2 WAQ Scores | 43 |
| Impact of Prior Traumas on Subsequent Traumas and the Assumptive World | 44 |
| Discussion                                     | 47 |
| REFERENCES                                    | 56 |
LIST OF TABLES

Table 1  Descriptive Statistics of Measures of PTSD, Assumptive World, And Psychological Flexibility ................................................................................................................................. 34

Table 2  Internal Reliability Coefficients and Test-Retest Reliability of the Measures of Interest ....................................................................................................................................................... 35

Table 3  Correlational Matrix of WAQ, AAQ-II and PCL-S ....................................................... 37

Table 4  Means and SD of WAQ and Subscales by Control and Intervening Trauma Groups.... 38

Table 5 Correlational Matrix of Delta WAQ, PCL-S, and AAQ-II for SEM......................... 41

Table 6 Frequencies of the Types of Intervening Trauma Reported on the Trauma History Questionnaire ........................................................................................................................................ 48
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Confirmatory factor analysis of the WAQ by hypothesized subscales</td>
<td>37</td>
</tr>
<tr>
<td>2</td>
<td>Mean scores of the WAQ at Time 1 and Time 2 between intervening trauma and no trauma</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>Hypothetical model of the impact of prior traumas on the assumptive world, psychological flexibility, and PTSD symptom severity</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Alternative model of AAQ-II mediating the relationship between trauma sums and PCL-S</td>
<td>43</td>
</tr>
<tr>
<td>5</td>
<td>Model of WAQ Time 1 scores and intervening trauma moderating Time 1 WAQ scores</td>
<td>43</td>
</tr>
<tr>
<td>6</td>
<td>Bar graph of the trauma/no trauma group means on the four WAQ subscales</td>
<td>49</td>
</tr>
</tbody>
</table>
THE GLASS IS NEITHER HALF FULL NOR EMPTY, IT IS SHATTERED: A PROSPECTIVE STUDY OF SHATTERED ASSUMPTIONS THEORY AND PSYCHOLOGICAL FLEXIBILITY

Introduction

During the course of our lives, there is a possibility that we will experience some sort of traumatic or stressful life event that will leave us questioning the world that we live in is truly how we previously perceived it. The event shakes us to our core, and shatters the previously held assumptions of how we view the world, ourselves, and the others living in it. These assumptions are called the *assumptive world* and are made up of the concepts that: the world is a just and orderly place, others can be trusted, and bad things do not happen to good individuals (Janoff-Bulman, 1992).

*The Theoretical Origin and Nature of the Fundamental World Assumptions*

The notion of an internal representation of how the world is perceived to function has been around in psychology since early in the 20th century. These internal representations of the world and the self have been called schemas (Bartlett, 1932), personal and world theories (Epstein, 1984), assumptions or the assumptive world (Janoff-Bulman, 1992), cultural worldviews (Solomon, Greenberg, & Pyszczynski, 1991; Solomon, Greenberg, Pyszczynski, & Kolle, 2004), and working models (Bowlby; 1969, 1973). Psychiatrist John Bowlby developed the concept that each person builds a representation of themselves and the world around them in order to make sense of events, construct plans, and forecast what should happen in the individual’s future (Bowlby; 1969, 1973). Each of these terms differ in the operational definition but they all have a common underlying concept that individuals have internal representations of how they perceive the world to function (e.g., there is order in the world) and that others are
presumed to follow a set of unarticulated social rules (e.g. individuals should treat each other in
the same manner that they would like to be treated). For the remainder of this thesis, terminology
consistent with a majority of the shattered assumptions research is used and these internal
representations are called *assumptions or the assumptive world*, a term that Janoff-Bulman
borrowed from the psychiatrist Colin Murray Parkes (Janoff-Bulman, 1992; Mills, 2010). The
theory of shattered assumptions was formulated in Janoff-Bulman’s (1992) influential work
*Shattered Assumptions: Towards a New Psychology of Trauma*. The theory that Janoff-Bulman
describes is an extension of the work of psychiatrist Colin M. Parke and centers primarily on the
impact and destructive nature of a traumatic event and how an individual attempts to incorporate
the ordeal and their victimization into their assumptive world in order to give life meaning and
purpose. Janoff-Bulman offers a comprehensive theory of the psychological responses to a
traumatic event through the integration of various works of historical psychologists, sociologists,
and social anthropologists (Mills, 2010). These assumptions are defined as unarticulated,
“strongly held assumptions about the world and the self which are confidently maintained and
used as a means of recognizing, planning, and acting” (Parkes, 1975, p. 132). These assumptions
of the world and the self are developed early in life from the contact we have with others that
protect us and ensure our continued survival.

The assumptions about how the world and others function are hypothesized to be
constructed at an early age from the interactions with an individual’s primary caregivers (Janoff-
Bulman, 1992). A child is born into the world defenseless, unable to provide for him/herself or
survive the harsh elements. In a healthy relationship, the mother, father, or other care-giver
provide for and protect the child. It is through this interaction and love that the assumptions
about other individuals and the world are formed (Janoff-Bulman, 1992). In an unhealthy
relationship, it is believed that individual will not develop an optimistic view of the self and others, but rather a pessimistic outlook (Janoff-Bulman, 1992). These assumptions of others as caring and kind individuals are present to supply meaning in one’s life are thought to be generalized to individuals outside of the parental caregivers as the child grows and experiences the world around them (Janoff-Bulman, 1992). Over time, individuals create assumptions about many aspects of life and what they believe should and should not occur, these minor assumptions branch off the three primary core assumptions (Janoff-Bulman, 1992). Some of the person’s assumptions (e.g., large trucks are destroying the environment) will be directly tested by minor events or other individuals (e.g., learning about the destruction of the ozone through a public service announcement), which in turn will leave her to develop a set of counter-arguments to defend her assumptions in life and lessen the rigidity of her ideas on how she perceives reality (e.g., maybe it is not the trucks destroying the environment, but rather factories burning coal) (Janoff-Bulman, 1992). All of an individual’s assumptions of the world are believed to fall within the three overarching core assumptions: the world as benevolent, the world as meaningful, and the self as worthy (Janoff-Bulman, 1992).

Janoff-Bulman postulated several assumptions that most individuals have about themselves and the world around them. Primarily, there are three fundamental assumptions; the world is benevolent, the world is meaningful, and the self is worthy (Janoff-Bulman, 1992, p. 6). While it is speculated that not everyone holds these three basic assumptions true, based on Janoff-Bulman’s prior research with trauma victims meeting the criteria for the diagnosis of clinical posttraumatic stress disorder (PTSD) from an earlier edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM), a majority of individuals do have some variation
of this core set of assumptions in place (Janoff-Bulman, 1992). Each of the three core assumptions in the assumptive world can be broken down into sub-category assumptions.

- The world as a benevolent place can be broken down to mean that the world is a safe environment (compared to seeing the world as a hostile, malevolent one) and others are decent and caring individuals, which parallels how we would tend to view ourselves (Janoff-Bulman, 1992).

- The world as a meaningful place involves the individual concepts that there is a reason for everything that happens to a person as well as bad things happen only to bad people (the notion that the world is a just place to live in) (Janoff-Bulman, 1992). An additional part of the assumption of the world being meaningful is the concept of that the world is not a random place. If there is mostly randomness in the world, then there can be no underlying meaning behind the events that may befall us (e.g. a traumatic event) (Janoff-Bulman, 1992).

- The assumption of self-worth is how we, as individuals, see ourselves as kind, moral, capable and deserve of good things to happen as a reward for our abilities (Janoff-Bulman, 1992).

These assumptions allow an individual to function at a healthy level rather than live in constant fear of the world and others. The assumptive world is considered the foundation of our conceptual understanding of reality and act as a filter to how we perceive the world and others around us (Janoff-Bulman, 1992). In a closer assessment of the sub-assumptions, they appear to have overlapping content and this could cause issues when trying to measure each of the eight assumptions as postulated by Janoff-Bulman as separate, uncorrelated, theoretical constructs (Kaler, 2010). It would be more beneficial for researchers to use the three core assumptions or reduce the assumptions to non-overlapping constructs to test so as not to measure the same items a subsequent time (Kaler, 2010).

The assumptions of the world serve as a framework for minor assumptions that may not be considered critical to the individual (e.g., politicians are always honest) that can be challenged by others and reformed (e.g., politician sometimes lie) or overturned as time goes on (e.g., politicians can never be trusted) (Janoff-Bulman, 1992). These minor assumptions or perceptions
shift as we gather more information about the world that we live in through our individual experiences. It is believed that these three core world assumptions are not directly challenged, so they cannot develop flexibility or counter-arguments and are susceptible to destruction under extreme negative life events that cause these beliefs to come into question (Janoff-Bulman, 1992). Juxtaposed to these minor challenges, the nature of a traumatic event calls into question the basic core assumptions of meaningfulness, benevolence, and self-worth. The onslaught of contradictions to the assumptive world can shatter the framework of how the individual perceives the world around them as well as their views of the self (Janoff-Bulman, 1992). It stands to reason that a measure of flexibility is critical in terms of providing a stable enough foundation to perceive the world in a meaningful way on a daily basis, but not so rigid as to be unable to bend and shift when contradictory information about how the world truly works is realized by the individual.

Shattering of Assumptions: The Destructive Nature of Trauma

It is inevitable that over the course of our lives some of us will be faced with loss and suffering. In this discussion, a traumatic event will be defined as an event that meets the Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text rev. (DSM-IV-TR; American Psychiatric Association, 2000) A1 criterion for PTSD that an individual has “experienced, witnessed, or was confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of the self or other” and that the A2 criterion that the individual felt “intense fear, helplessness or horror” (APA, 2000, p. 463). Some typical traumatic events recognized by the DSM-IV-TR include:

- Sexual assault or rape
- Physical assault


- Terrorist attack or being taken as a hostage
- Natural or manmade disasters
- Military combat
- Diagnosis of a life threatening illness

Additionally, highly stressful life events outside of the DSM-IV-TR classifications can be viewed to be just as traumatic to an individual and these events can lead to PTSD symptoms despite not having met the A1 and A2 criterion (Boals & Schuettler, 2009; Cameron, Palm, & Follette, 2010; Gold, Marx, & Soler-Baillo, 2005). In considering what is a traumatic event is for the individual, it is important to consider stressful life events as potentially shattering an individual’s assumptive world, since the A1 criteria has been reported to not to be related to clinical levels of PTSD symptoms (Boals & Schuettler, 2009; Cameron et al., 2010). Other emotions besides fear (e.g. sadness and anger) have been found to be related to PTSD symptomatology, and that the current DSM-IV-TR criteria for PTSD may not be sufficient or accurate (Hathaway, Boals, & Banks, 2010). It is important to understand the event through the lens that the individual feels like their life had been altered because of it, as such it is important that the individual is able to determine for them what was a stressful negative life event that may not fall within the realm of the DSM-IV-TR criteria.

Although the assumptions of the world are important for the individual to understand the world, these assumptions are really illusions that have been built to supply purpose and meaning in our lives (Mills, 2010). A traumatic event will cause these assumptions to be called into question when new information of the world is found to be incongruent with the prior perceptions. Although many of the assumptions that an individual has are strong enough to withstand direct challenges from others with differing world assumptions, a traumatic event
shatters the assumptions of how the world are believed to function and destroys the illusions that are held so dear by the individual (Janoff-Bulman & Berg, 1998). The fundamental assumptions will typically go unquestioned and are the least likely to be tested directly by our surrounding reality. It is these same assumptions that are viewed as the least flexible and traumatic events pose a direct challenge to these rigid assumptions and since there has been no prior need to defend these assumptions, they are shattered (Janoff-Bulman, 1992, p. 89).

Traumas have such a devastating impact on an individual that they will instantly recognize the previous assumptions of control and invulnerability as mere illusions (Mills, 2010). An example of the assumptions being shattered is an unfortunate scenario in which a woman has been raped. If she believes the core assumptions of the world and herself prior to the trauma and experiences a rape, how can she still believe that people are naturally good, that there is order in the world, and that bad things only happen to bad people? She can no longer find comfort in the illusions that once provided purpose, meaning, and control in her life. The illusions are replaced with the realizations that the world is random, others cannot be trusted, that she is defenseless, and at any moment, her life can end at the hands of another for no logical or apparent reason (Janoff-Bulman, 1992).

Janoff-Bulman speculated that this increase in the awareness of mortality gives rise to the symptoms of PTSD (e.g., avoidance of any reminders of the event, re-experiencing the event, and intrusive thoughts about the event) and that these reminders are part of an automatic coping process that attempts to integrate the negative event into a post-trauma set of assumptions (Janoff-Bulman, 1992; Mills, 2010). The self-awareness of her own mortality is seen as a violation of her assumptions of the self, and in turn, this awareness is believed to cause immobilizing existential anxiety (Becker, 1973). Paradoxically, research into existential anxiety
and mortality realization has shown that world-views and beliefs in self-worth can act as buffering systems to keep this death anxiety from becoming conscious and paralyzing us from living normal, healthy lives (Solomon et al., 1991). The loss of the assumptive world is, by extension, a loss of the sense of self in that “[t]he ground on which we live and stake out our existence is presumed, that is, taken for granted… Loss of the assumptive/presumptive world is loss of safety, and loss of safety is loss of self. To the extent the self ceases to be safe, it ceases to be” since the individual will have a schema on how they view themselves compared to others in the world (Kaufman, 2002b, p. 209). The assumptive world can be seen as the core schema of how we understand the world and ourselves, and when the assumptions of the world and self are called into question, an individual is calling everything they thought they knew about life into question. A traumatic event has the power to destroy the illusions we have of the world and ourselves, leaving us to feel scared, helpless, and alone, unable to have meaning and purpose in our lives. Ultimately, trauma has the power to drastically change how we fundamentally perceive the world around us at our core.

It is theorized that after the assumptions of the world and the self are destroyed by a traumatic event, the individual must attempt to put the shattered pieces back together in order to be a psychologically healthy and functioning individual (Janoff-Bulman, 1992). This cognitive restructuring of the assumptions is considered to be tenuous and it is posited that the rebuilt assumptive world is fragile since it has been constructed in order to incorporate the memories of the traumatic event and the individual’s victimization (Janoff-Bulman, 1992). With the fragility of the new assumptive world, there is a strong possibility that “it would not take much in the way of an extreme event to shatter this fragile inner world” (Janoff-Bulman, 1992, p. 90). Over time the individual should be able to reappraise their assumptions and create a stronger post-trauma
belief structure; however, it will never be as strong as the pre-trauma assumptions of the world and self that were created when she was little (Janoff-Bulman, 1992). Through the process of recreating the assumptive world, the individual may experience unwanted reminders of the event, which can be a symptom of PTSD (APA, 2000).

Research into the Inoculation Effect

According to shattered assumption theory, individuals who have the most positive assumptions of the world and themselves are the most likely to have their assumptions violated from a traumatic event will develop symptoms associated with PTSD (Janoff-Bulman, 1992; Park, Mills, & Edmondson, 2012). It is believed that since these the core assumptions are not openly challenged, they are the most rigid of an individual’s belief structure (Janoff-Bulman, 1992). However, it is believed that these same individuals who had the most optimistic worldview are most likely to recover the quickest following the trauma since the psychological and social resources that helped in the formation and validation of the initial positive assumptions will likely provide the same support to help them cope and adapt after a traumatic event (Mills, 2010). In the creation of shattered assumptions theory, Janoff-Bulman suggested that “to the extent that the fundamental assumptions have already been questioned; they may be less likely to shatter” (Janoff-Bulman, 1992, p. 89).

Through the coping process of integrating the traumatic experience with their prior assumptive world, an individual is likely to develop “counter arguments” that help to provide some defense to the belief structures that have been rebuilt to prevent future shattering (Janoff-Bulman, 1992). This restructuring will leave the individual with a less rigid assumptive world and a less optimistic perception of the world and others (Kaufman, 2002b). During the process of rebuilding the assumptive world, an individual has to resolve the discrepant information of the
trauma with the pre-existing scheme into one that “both incorporates the trauma and permits flexible emotional engagement with the world” (Newman, Riggs, & Roth, 1997, p. 198). The assumptive world should have “flexibility that allows individuals to confront the ambiguity and unfairness of life” so that the assumptions can be rebuilt to integrate the event and allow the individual to function (Kaufman, 2002a, p.5). However, only two studies that have assessed the inoculation effect of past traumas against subsequent events within the Shattered Assumptions research paradigm.

One prior unpublished research study within the framework of shattered assumptions theory was done by Mary Alice Mills, assessed the inoculation of prior trauma, but made use of subscales of the World Assumptions Scale (WAS; Janoff-Bulman, 1989) that has recently been shown to have poor psychometric qualities (Kaler et al., 2008). The Mills (2010) study assessed the impact of prior traumas on the assumptive world, which the researcher hypothesized that past trauma experiences would have an inoculating effect rather than a sensitizing effect, but the results of the study indicated that prior trauma histories had a sensitizing effect (Mills, 2010). Some limitations of this study were that the traumas may not have been of a significant magnitude to shatter the individual’s assumptive world since there was little change in the assumptive world and one of the scale that was chosen to assess the world view of the individual, the Humanistic Morality and Liberal Belief Scale (HMLB; Kaldstad & Stifoss-Hanssed, 1993), may have been ineffective as a measure to tap the assumptive world (Mills, 2010). Although the Mills study looked at the inoculation effect of prior trauma histories, it did not assess levels of psychological flexibility acting as a mediator for changes in the assumptive world influencing PTSD symptoms or in terms of how much the individual would avoid the aversive nature of the memory of the trauma when reconstructing the assumptive world is needed.
One other study that looked at the inoculation effect was done by Gibson and Leitenberg (2001) and examined if there were changes in benevolence and meaningfulness in the assumptive world with victims of sexual assault (occurred within the last year) and had a prior history of childhood abuse. The researchers found that there were no relation between a prior trauma history and the assumptive world (Gibson & Leitenberg, 2001). This study used a retrospective and cross-sectional design, so a baseline of the assumptive world could not be adequately measured, and the WAS was implemented to gauge the individual’s assumptions. Due to the study design and the use of a poor measure, the inoculation effect towards changes in an individual’s assumptive world has yet to be empirically investigated.

The inoculation effect of having a prior trauma history has not been properly assessed within the Shattered Assumptions paradigm, but has been studied in terms of life stress in children and through observing others who have experienced a tragedy. The inoculation effect has been proposed to be at work when individuals who have witnessed others going through difficulties in life and “can provide an individual with the vicarious experiences that may inoculate against trauma to the extent that the experiences perceived as potentially relevant to one’s own life” and will be more adapt to cope with the event if it occurs to them personally (Fisher & Fisher, 1993; Rando, 2002, p. 183). Additionally, the work of Lazurus and Folkman examined children who were protected from extreme stressors were reported to be more susceptible to stress later in life in that coping strategies to deal with the events in daily life could not be properly developed (Lazarus & Folkman, 1984; Rando, 2002). The inoculation effect in regards to prior traumatic histories as proposed by shattered assumptions theory has not been empirically tested due to methodological and measurement limitations.
Research into the impact of prior traumatic histories has had varying results in the impact of these events on PTSD symptoms associated with future traumatic events. Some studies have reported that there is a sensitizing effect of developing PTSD with the occurrence of subsequent traumas (Astin, Ogland-Hand, Coleman, & Foy, 1995; Breslau, Chilcoat, Kessler, & Davis, 1999). Dougall, Herberman, Delahanty, Inslicht and Baum (2000) assessed levels of stress and the role of prior traumatic histories in PTSD symptoms in a sample of workers (N = 108) who worked at a site of an air disaster. The researchers reported that if the prior traumas were dissimilar to the airline crash, there was a vulnerability to increased distress and PTSD symptoms, while reported occurrences of similar traumatic events did not indicate an inoculating or sensitizing effect (Dougall et al., 2000).

Schuster, Park, and Frisman (2011) investigated the role of prior traumas and coping strategies in homeless women to assess if avoidant or active coping mediated the relationship between having a prior trauma and psychological symptom severity in a subsequent trauma. The study reported that the avoidant coping style did mediate the relationship of the sum of lifetime traumas and the baseline PTSD symptoms with general distress, while there was no mediation in active coping and having a past trauma history (Schuster et al., 2011). This finding could be interpreted as individuals who have not successfully integrated the trauma to have meaning or fit within their assumptive world through an active coping strategy are at risk of future distress in a subsequent traumatic event.

In a study by Breslau and Peterson (2010) the researchers reported that in a cross-sectional study there was a lack of support for the hypothesis that a prior traumatic history “sensitizes” or increases the risk of developing PTSD symptoms from subsequent traumatic events. Additionally, the study proposed that the sensitization effect of a past trauma history is
not from the trauma but rather personal vulnerabilities (e.g., neuroticism, a history of major
depression or anxiety disorders) (Breslau & Peterson, 2010). Prior victimization of physical or
sexual assault as a child would be detrimental on the assumptive world in that it runs counter to
how the assumptive world is believed to form through the interactions of early childhood
caregivers providing a nurturing and loving environment (Janoff-Bulman, 1992). Potentially,
these early traumas that were at the hand of a parent would disrupt a positive assumptive world
from forming and would create a negative view of others and the perceptions of how the world is
supposed to work instead. Theoretically, these negative outlook would be fundamentally
different compared to a child raised in a nurturing and caring environment, and future traumas
would not shatter them since they are not positive in nature (Janoff-Bulman, 1992).

In a recent study by Frazier, Gavian, Hirai, Park, Tennen, Tomich, and Tashiro (2011)
risk factors for pre-trauma (neuroticism, negative affect, and prior distress), protective factors
(consisting of self-esteem and optimism), PSTD symptomology and severity were assessed in a
relationship mediated by subjective event related distress, unsupportive social support, and
perceived control over the events. The mediation relationship was assessed through the use of a
prospective design that controlled for prior trauma histories by obtaining measurements before a
trauma occurred in a large sample undergraduate population who were assessed again after a
span of eight weeks (Frazier et al. 2011). The prospective design was implemented to reduce the
likelihood that participants would have difficulty assessing the degree of their pre-trauma factors
after the occurrence of the event (Frazier et al., 2011). Frazier and colleagues reported that the
relationship of risk factors of neuroticism, negative affect, and prior distress and PTSD
symptoms were mediated by unsupportive social interactions, however the protective factors did
not predict PTSD symptoms when they were included into the analyses (Frazier et al., 2011).
This study additionally reported that the risk factors were better than proposed protective factors in determining who would or would not develop PTSD symptoms in a subsequent traumatic event (Frazier et al., 2011). In the earlier discussion of the loss of the assumptive world as the loss of the self, the protective factor of self-esteem not predicting PTSD symptoms is understandable in that when an individual has their schemas destroyed and question their self-worth and everything they used to believe in then self-esteem would no longer be of any help (Kaufman, 2002b). The Frazier et al. (2011) study did collect information about prior traumas in their undergraduate sample (85% of the sample reported a prior traumatic event), but this was controlled for rather than assessed in relation to the inoculation effect or past trauma sensitization.

In the context of shattered assumptions theory, if the traumatic event is appropriately adapted and rebuilt into the person’s assumptive world it should have an inoculating effect towards the impact of similar future traumas (Janoff-Bulman, 1992; Mills, 2010). This inoculating effect and the defenses that individuals have in place against future traumas has been called resiliency and resilient individuals appear to not be as impacted by the trauma compared to those who have never experienced a negative life event (Calhoun, Tedeschi, Cann & Hanks, 2010). The psychologist George Bonanno suggested that resilient individuals will experience initial forms of distress in the case of bereavement, but they will have little need for grief work compared to individuals who are less resilient and will continue to feel distress over the course of their therapy (Bonanno, 2004). Individuals who have had some of their assumptions tested will have more pliable beliefs and could be much more psychologically flexible in their thinking compared to those who have not experienced a negative life event (Janoff-Bulman, 1992). Individuals with prior traumatic histories and who are also flexible in their belief structures
should be more resilient to the distress associated with the event and should not have their revised assumptive world shattered by a future traumatic event since the prior traumas are now integrated into their assumptive world and they have developed counter arguments against future attacks on their belief system.

*The Role of Psychological Flexibility on Trauma*

Psychological flexibility is defined as the amount of flexibility a person has to persist or change their actions when they come into situations in which they need to adapt (Bond, Hayes, & Barnes-Holmes, 2006). In addition, psychological flexibility has incorporated the individual’s willingness to experience change in the present moment (Bond et al., 2006). This is a primary component in the acceptance and commitment therapy (ACT; Hayes, Stroshal, & Wilson, 1999) that is designed to change the problematic processes that some clients have and to help them establish healthier and more effective ways of coping (Bond et al., 2011). Psychological flexibility can be profoundly constrained by internal events that individuals do not want to re-experience (experiential avoidance or EA), such as a trauma or extreme stressor, whereas day to day stressors have us question some of our ideas allows for less rigid thinking or assumptions that are more easily defended (Bond et al., 2011; Chawla & Ostafin, 2007). Prior research into experiential avoidance and individuals who have experienced a trauma has reported that EA is related to psychological distress (Higgins, 2000), impaired functioning (Plumb, Orsillo, & Luterek, 2004) and has a positive relationship with developing the symptoms of PTSD (Orcutt, Pickett, & Pope, 2005). In a review of the literature by Chawla and Ostafin (2007), EA is proposed to mediate the relationship this trauma and psychological distress and maladaptive coping. Individuals who are flexible in their thinking and do not avoid the aversive nature of the
traumatic memory should have a more malleable assumptive world and have a resiliency towards future traumas.

The construct of psychological flexibility may be an underlying cause as to why some individuals are more resilient in the wake of the assumptions being shattered than those who have not had their beliefs challenged in a previously profound way. According to ACT, a trauma survivor would benefit from the therapy in that they would learn to provide a context to the event and allow them to “have a traumatic history and make changes in their lives that are consistent with their values and goals” (Varra & Follette, 2004, p. 136). For individuals with a history of traumatic experiences, they revise their assumptions of the world and values in order to “develop a conceptualized version of self that is heavily imbued with the past and current effects of the trauma” (Varra & Follette, 2004, p. 149). To integrate ACT into shattered assumptions theory, the process of having the survivors learn to no longer avoid the aversive nature of the memory of the trauma and develop flexibility in their thinking can be seen as the individual reconstructing the trauma into their assumptive world and developing a set of counter arguments that should provide an inoculation effect or resiliency to future traumas. In order to examine the impact of psychological flexibility on shattered assumptions, the two must be studied in a prospective study, something that has not been studied by any prior shattered assumption theory research.

Previous Research into Shattered Assumptions

Since the inception of shattered assumptions theory, there have been numerous attempts to empirically evaluate the theory and determine the accuracy of the constructs (Kaler, 2010). Unfortunately, many of the studies were poorly designed and used the WAS, an inappropriate tool, to measure changes in the assumptive world (Kaler et al., 2008). Janoff-Bulman developed the WAS (Janoff-Bulman, 1989) to tap into each of the three core assumptions and can be
broken up into sub-category assumptions (a total of eight consisting of: self-worth, luck, justice, benevolence of the world, benevolence of people, self-controllability, controllability, and randomness) that were assessed using 32 items. Janoff-Bulman (1992) reported that based on a cross-sectional design, there were differences in how individuals viewed the world and themselves between groups that had experienced a traumatic event and those who were unable to nominate an event. However, by using cross sectional designs, the data is a snap shot of the assumptions, and there can be no confirmation of assumptions being shattered or of any change in the individual’s perceptions since there is no reference point prior to trauma to compare these to.

In a study by Rini, Mamie, DuHamel, Austin, Ostroff, and Boulad (2004), the WAS was implemented in a longitudinal design to measure changes in the fundamental assumptions of the world in a sample consisting of 100 mothers who had their child undergo a bone marrow transplantation (BMT) due to a serious medical illness. The researchers reported that changes in benevolence and self-worth were related to the negative event and the indicators of medical risk and the child’s medical course were not related to changes in the assumptive world (Rini et al., 2004). Ginzburg (2004) had patients who had suffered a myocardial infarction (heart attack) complete the WAS after the event and again seven months after hospitalization. The scores of the WAS were then compared to a group of control subjects who matched the patients on socio-economic levels and age, but had no previous history of heart issues (Ginzburg, 2004). Ginzburg sought to determine if the change in assumptions were initiated by the medical event or from the development of PTSD (Ginzburg, 2004). Due to methodological issues of having the participants complete the WAS after the event and not prior, it is uncertain if there was change in the perception of one’s luck (found to be significant between the groups) was from the event or
PTSD (Ginzburg, 2004). Both of these studies failed to use a prospective design, so changes in the assumptive world from before the initial diagnosis could not be measured.

In another study, Mary Alice Mills (2010) used a prospective design to assess changes in the assumptive world and reported that lifetime trauma (the sum of traumatic events in a person’s life) had a positive relationship to PTSD symptoms that continued to have a lingering negative impact on the individual’s outlook (Mills, 2010). Mills (2010) reported that the impact of these traumas were not picked up by the measures used in the study that corresponded with the WAS, so the “shattering” of these assumptions was not found (Mills, 2010). There were two findings of interest in this study; first, lifetime trauma exposure was reported to be inversely related to the reported level of personal mastery over the event, and secondly, the sum of childhood interpersonal trauma was inversely related to the degree in which the individual believed in luck (Mills, 2010). Prior traumas related to childhood victimization at the hands of the caregivers could be problematic in that their occurrence may not allow for a positive assumptive world based on interactions with early caregivers to form. This study did not look at measures of psychological flexibility as a form of resiliency towards a trauma and there were possible issues of reliability and validity with the measure used by the researcher (Mills, 2010).

In another prospective study, Kaler et al. (2008) looked at the change in the assumptive world prior to a traumatic event and again two months after. Kaler et al. (2008) initiated this study to assess the psychometric properties of the WAS since a majority of the previous research used the measurement, which has potentially led some researchers to erroneously disregard shattered assumptions theory as wrong (Kaler et al., 2008). Kaler et al. (2008) reported that the WAS scale lacked temporal stability (the core assumptions in individuals who did not experienced a trauma between Time 1 and again eight weeks later at Time 2 should remain
unchanged) and had poor construct validity when it was compared to scales measuring similar theoretical constructs (Kaler et al., 2008). There was a significant relationship between the assumptions an individual has on their self-worth and subsequent mental distress in the form of symptoms related to PTSD (Kaler et al., 2008). The Kaler et al. (2008) study presented the need for a better measure of the assumptive world to validate the theory, which led to the development of the World Assumptions Questionnaire to address the psychometric issues of the WAS that was used in all prior research (WAQ; Kaler, 2010). Instead of the eight related sub-categories that comprised the WAS, the WAQ consists of four domains; controllability of events, comprehensibility and predictability of people, trustworthiness and goodness of people, and safety of the world (Kaler, 2010). Kaler reported that the WAQ was better at tapping into a person’s core assumptions and was stable over multiple testing times (Kaler, 2010). The WAQ has the potential to be an improvement in measuring the changes in the assumptive world and allow researchers to start empirically assessing the tenets of shattered assumptions theory.

The WAQ was tested to determine convergent and discriminant validity using previously well documented scales in the Kaler (2010) measure development study. The subscale of Controllability of Events was found to correlate with the Control Scale of the Perceived Control Over Stressful Events Scale (PCOSES; Keenan, Frazier, Shallcross, Perea, & Anders, 2007) and the Personal Mastery Scale (Pearlin & Schooler, 1978). The Comprehensibility and Predictions of People subscale correlated with the Measurement of Attachment Quality scale (MAQ; Carver, 1997). Trustworthiness and Goodness of People subscale correlated with the Trust Inventory (Couch, Adams, & Jones, 1996) and the Safety and Vulnerability subscale correlated with the Future Likelihood subscale of the PCOSES (PCOSES; Keenan et al., 2007). All four of the subscales had a positive correlation with the Satisfaction With Life Scale (SWLS; Diener,
Emmons, Larsen, & Griffin, 1985) and the Positive Affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The WAQ was also found to be negatively correlated with the Negative Affect in the PANAS (PANAS; Watson et al., 1988), and the levels of distress in the Depression, Anxiety, Stress Scale -21 (DASS-21; Lovibond & Lovibond, 1995). The WAQ correlated moderately and negatively with the PSTD symptoms measured with the PTSD Checklist-Specific (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993). Kaler (2010) correlated the four subscales of the WAQ with the Marlowe-Crowne Social Desirability Scale (MCSD; Crowne & Marlowe, 1960) and the correlation was not significant, which suggested discriminate validity (Kaler, 2010). Kaler also reported that the WAQ better tapped into the core assumptions and was stable over testing times using a college sample, an improvement over the WAS scale (Kaler, 2010).

In 2010, Cann, Calhoun, Tedeschi, Kilmer, Gil-Rivas, Vishnevsky, and Danhauer created the Core Beliefs Inventory (CBI; Cann et al., 2010) as a replacement for the WAS to assess changes in the assumptive world. This measure consists of nine items that each start with “Because of this event…” which makes the statements less geared toward the general day to day assumptive world that the individual carries around with them and more towards a situational appraisal of the assumptions (Cann et al., 2010, p. 21). The instructions of the CBI describes the general theory of shattered assumption of how a trauma can shake an individual’s core beliefs of the world, others, and themselves and then asks the individual to how much they have examined each core belief (Cann et al., 2010). This set of instructions is slightly problematic in that it is asking the individual to recall the trauma and their past assumptions to compare how they currently feel, which in turn primes a more negative assumptive world that may not measure how the individual’s assumptive world functions in everyday life. The manner in which the items and
instructions are worded calls the trauma back to the forefront of the individual’s thinking, which has been seen in prior trauma research to have a priming effect on views of the self and world in a more negative light (McFarland & Alvaro, 2000). The study assessed discriminant validity with only one scale, the SWLS (SWLS; Diener et al., 1985) and the convergent validity was with the subscales of the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) which was then used in a simple regression to have the CBI predict the PTGI (Cann et al., 2010, study 1). The CBI needs further psychometric assessments for convergent, discriminant validity, or analyzed with a confirmatory factor analysis. Due to these concerns, the CBI is currently an ineffective tool to empirically measure changes in an individual’s assumptive world following a trauma. However, with modifications, the CBI has the potential to be another measure of the assumptive world.

Despite the fact that prior research has been unable to empirically report the shattering effect of a trauma on an individual’s assumptive world, the previously mentioned researchers have made improvements to the methodology of shattered assumptions research and have advanced the measures used to assess the assumptions. After the theory was initially proposed, various researchers have utilized the theory’s tenets to help explain their findings despite the lack of empirical evidence (Kaler, 2010). There is a need to empirically test the truth of shattered assumptions theory since some researchers have been overzealous in believing the theory and have used it as a foundation for their own theories of what occurs after a traumatic event.

*The Influence of Shattered Assumptions Theory*

Shattered assumptions theory has been influential to many trauma researchers as a new way to understand the impact of trauma on an individual and how belief shifts and perceptions shift. Some researchers have used shattered assumption theory as a foundation for their own
research and theories surrounding traumatic events. If a researcher were to type the phrase “shattered assumptions” into the PsycINFO database to search for peer-reviewed articles and books, they would find hundreds of citations and references to the theory in diverse areas of research (Mills, 2010, p. 14). Mills (2010) reported that shattered assumptions theory has impacted various areas of research that include, but not limited to: discrimination (Foster, Sloto, & Ruby, 2006), complicated grief (Swan & Scott, 2009), and bereavement (Matthews & Marwit, 2006). Additionally, this theory has spurred other researchers to rethink the views of trauma (Mills, 2010). Shattered assumptions theory has been used in a wide array of trauma research that spans how individuals: cognitively restructure events (Pennebaker, 1997; Sloan & Marx, 2004), feel there is personal growth after a traumatic event and that life has more meaning (Tedeschi & Calhoun, 1995) and the reappraisal of life goals and belief structures (Park & Folkman, 1997). Each of these branches of trauma research has led to extensive research in their respected areas over the last twenty years. This could be problematic since shattered assumption theory has not been thoroughly validated or researched. There is a potential that the assumptions of the world that these subsequent research areas use as a foundation may not actually exist. Without proper research into the shattering of one’s assumptions of the world, some of this research could be called into question.

Change Scores and Lord’s Paradox

One potential issue in assessing change scores in a measure is the statistical issue of Lord’s paradox, which is the occurrence of two statistical analyses that assess change scores will have contradictory results (Lord, 1967). This paradox can occur when using a change score for a multivariate analysis of variance (MANOVA) and comparing the results with an analysis of covariance (e.g., ANCOVA) (Lord, 1967; 1969). This paradox of contradictory results was
described by Frederic Lord and he suggested that these findings could be the result of pre-existing differences in the groups that were being tested (Lord, 1967, p. 305). In the ANCOVA, differences in the intercepts of groups can be significantly different while comparing a change score or means will result in no differences, which Lord argues in his discussion of this paradox using height over time between boys and girls during an academic year (1967, p. 305). In the current study, groups were assessed on not only the impact of change in the assumptive world from an intervening trauma but the impact of having a prior stressful or traumatic event and how these may shape the individual’s ability to reconstruct the assumptive world after a subsequent trauma.

One method of reducing this bias in the analysis is to use an ANCOVA to partial out the variance that can be potentially explained by pretest variables (Locasio & Cordray, 1983). However, ANCOVAs can be problematic in that when there is high multicollinearity among the independent variable and the covariate, the shared variance will be removed with the covariate and could yield non-significant differences and have higher rates of sampling error (Henson, 2002). Additionally, the more covariates used in an ANCOVA, the more biased the outcomes will be (Campbell & Erlebacher, 1975). Henson (1998) concludes that “ANCOVA is a regression of covariate variables on the dependent variable from the entire sample ignoring group membership, at least if the ANCOVA assumptions are perfectly met” (p. 7). As such, the results of running an ANCOVA will be identical to the results in multiple regression analyses. Another method to remove this issue of shared variance being removed is to interpret both the Beta weights (the amount of credit each variable is given in the creation of the synthetic dependent variable) and squared semipartial correlations.
In the current study, the change scores were assessed using multiple regression on the whole WAQ scores and a separate multiple regression on each subscale with Time 1 and a dummy coded variable of trauma (whether or not there was an intervening trauma) were entered into the model to predict Time 2 scores. If the trauma variable accounted for a statistically significant amount of variance in the synthetic Time 2 scores after removing the variance explained by the Time 1 scores, then it may reflect that intervening trauma accounts for a separate portion of variance. With this statistical issue in mind, the statistical analyses as used in the psychometric assessment of the WAS (Kaler et al., 2008) and the creation of the WAQ (Kaler, 2010) was not used as they could result in non-significant findings due to Lord’s paradox. Instead, change scores at Time 1 and Time 2 were assessed using by assessing the covariance in a multiple regression to see if having an intervening trauma will have statistical significance in predicting Time 2 WAQ scores and subscale scores above and beyond Time 1 scores. The squared semipartial correlations, which represent the squared correlation of the variable of interest after the influence of another variable (Time 1 WAQ scores) have been control for (Howell, 2010, p. 537). The squared semi partial correlations are used to help determine how much variance the predictor can account for above and beyond the portion accounted for by the Time 1 WAQ scores, which can be used as an effect size (Howell, 2010, p. 537). By using this alternative analysis, the change scores between groups and overtime were assessed in a less biased manner.

Currently, there has not been any strong empirical evidence that an individual’s assumptive world is shattered by a surviving a traumatic life event. This has been mainly due to the use poor measures and inadequate research designs to test the tenets of the theory (Kaler et al., & Park, 2008). Prior research has primarily implemented the WAS (Janoff-Bulman, 1989) to
measure changes in the individual’s assumptive world. However, the use of this tool and the implementation of retrospective and cross sectional studies have led some researchers to erroneously disregard shattered assumptions theory as inaccurate since the WAS lacks the ability to accurately measure changes in the assumptive world over time (temporal reliability range = .38 to .65) (Kaler et al., 2008). The WAS been found to lack internal reliability (Cronbach’s alpha range = .60 to .83), though there was a significant relationship between the assumptions an individual has on their self-worth and subsequent mental distress in the form of PTSD symptoms (Kaler et al., 2008). Additionally, the WAS consists of eight overlapping subscales that have exhibited little construct validity when the scale was compared to other measures of similar constructs (Kaler et al., 2008). The use of the WAS could potentially increase the likelihood of committing a type-1 statistical error (rejecting the null hypothesis, when it is in fact true) in experiments that have attempted to test the tenets of shattered assumptions theory (Kaler et al., 2008).

Since the primary assessment of an individual’s assumptive world has repeatedly exhibited poor psychometric properties, there has been no empirical evidence that there is a shattering effect of the assumptive world after experiencing a traumatic event. By implementing a new measurement of the assumptive world, the World Assumptions Questionnaire (WAQ; Kaler, 2010), the shattering effect of a trauma on an individual’s assumptive world could be assessed through a prospective, two time point design. Presently, there has been no prior research to empirically test the role of psychological flexibility in determining if the assumptive world is shattered or not in individuals who have lived through a trauma. Psychological flexibility is the degree to which an individual will either accept or avoid actions or emotions in situations that they need to adapt (Hayes, Stroshal, & Wilson, 1999). The present study was to test
psychological flexibility and prior trauma histories as potential mediators in the relationship of changes in the assumptive world due to a trauma and subsequent PTSD symptomology. In order to empirically assess this relationship a prospective design is needed to determine why some individuals have their assumptive world shattered, while others do not.

Present Study

The present study used a prospective design to attempt to accurately measure changes in the assumptive world that a traumatic event is believed to shatter and assess the relationship with PTSD symptom severity. Psychological flexibility was assessed as a mediator to help explain why some individuals suffer from PTSD symptoms if the assumptions of the world and self are shattered whereas other individuals are unaffected by the event. Additionally, the influence of having a prior traumatic history on an individual’s assumptive world and their psychological flexibility was assessed using structural equation modeling (SEM). There were approximately eight weeks between the baseline survey and the follow-up questionnaire. By implementing a prospective study, baseline measurements of the assumptive world in individuals who had not experienced a traumatic life event were collected. The present study attempted to examine the following research questions:

a) Did a traumatic event impact an individual’s assumptive world from the baseline to the follow-up assessment (if a trauma occurred)?

b) Was there a correlation in the degree of psychological flexibility and prior trauma histories?

c) Did psychological flexibility act as a mediator in the hypothetical model of inoculation of shattering assumptions, past traumas and subsequent PTSD symptomology?

d) Were there differences in the change in assumptive worlds between time 1 and time 2 in groups of individuals with a prior trauma history and individuals without the prior history?
The hypotheses in the present study are that participants who experienced a traumatic event between Time 1 and Time 2 will evidence a more negative outlook of the world and of the self (higher score on the WAQ) when compared to non-traumatized individuals, indicating a shattering of the assumptive world. For the change in the assumptive world scores between prior trauma history participants and no history participants, it is hypothesized that individuals who had experienced a prior traumatic event would have a minimal change in WAQ scores with a subsequent trauma, since it is posited that counter arguments will have developed (Janoff-Bulman, 1992). Individuals who did not have a past trauma history are posited to have the largest reduction to their WAQ scores and there should have been large mean difference between the two groups. The researcher hypothesizes that there will be a moderate positive correlation between prior traumatic histories and psychological flexibility. Participants with a prior history of trauma are thought to have an inoculating effect towards subsequent traumas and exhibit higher levels of psychological flexibility since their prior assumptive world have been tested and there was the potential for counter-arguments to be developed. Based on shattered assumptions theory, psychological flexibility will play a role in counter arguments and whether assumptions would shatter. The role of psychological flexibility will be assessed as a mediator between changes in the assumptive world and PTSD symptomology. Individuals who scored high on levels of psychological flexibility should have resulted in having a weakening of their assumptions from the traumatic event, and have minimal symptoms associated with PTSD. Individuals who are low in psychological flexibility were predicted to have a higher prevalence of PTSD symptoms and complete shattering of their prior assumptive world since counter arguments have not been developed. Through the implementation of a better measurement of the assumptive world and an appropriate research design, shattered assumptions theory could be
properly evaluated to determine if it is a valid theory for the use in other areas of trauma research and in the field of psychology in general.

Methods

Participants

Participants were recruited from the University of North Texas’ Department of Psychology’s undergraduate participant pool (SONA system). Participants received partial course credit by completing study. The initial sample was consisted of 491 participants. One hundred fifty five participants did not complete both time points, and were removed from subsequent analyses, leaving a final sample of $N = 336$. The sample consisted of 70.5% females ($n = 237$), with an average age of 19.82 years ($SD = 3.26$). In the sample, 53.6% identified as Caucasian, 13.4% African American, 6% Asian, 24.7% Hispanic, 0.3% Native American, and 2.1% other.

Measures

Global assumptions of the world. The World Assumptions Questionnaire (WAQ; Kaler, 2010) was developed as a replacement of the WAS (Janoff-Bulman, 1992) after the results of a prospective study reported poor psychometrics and validity concerns (Kaler et al., 2008). The WAQ consists of 25 items that each corresponds to the four assumptions posited by Janoff-Bulman (Janoff-Bulman, 1992). The subscales of the WAQ are Controllability of Events, Comprehensibility and Predictability of People, Trustworthiness and Goodness of People, and Safety of the World. The participant uses a 6-point Likert scale ranging from 1 (strongly agree) to 6 (strongly disagree), with 7 items being reverse coded. Lower scores on the WAQ reflect more pessimistic views of the self, the world, and others. Item examples include ‘People often behave in unpredictable ways’ (from the Comprehensibility and Predictability of People
subscales) and ‘Most of what happens to me happens because I choose it’ (from the Controllability of Events subscale). The WAQ subscales had adequate internal reliability in the current study: Controllability of Events ($\alpha = .74$ at Time 1 and .78 at Time 2), Comprehensibility and Predictability of People ($\alpha = .74$ at Time 1 and .80 at Time 2), Trustworthiness and Goodness of People ($\alpha = .78$ at Time 1 and .77 at Time 2), and Safety of the World ($\alpha = .66$ at Time 1 and .71 at Time 2). In the development of the WAQ, the internal reliabilities were reported to be: Controllability of Events ($\alpha = .82$), Comprehensibility and Predictability of People ($\alpha = .75$), Trustworthiness and Goodness of People ($\alpha = .80$), and Safety ($\alpha = .74$) (Kaler, 2010).

Psychological flexibility. The Acceptance and Action Questionnaire –II (AAQ-II; Bond, et al., 2011) was used to establish the degree of psychological flexibility in individuals. The questionnaire consists of seven items that participants rate how much they agree to each item using a 7-point Likert scale (0 = never true, 1 = very seldom true, 2 = seldom true, 3 = sometimes true, 4 = frequently true, 5 = almost always true, 6 = always true). Sample items in the AAQ-II are “My painful experiences and memories make it difficult for me to live a life that I would value” and “It seems like most people are handling their lives better than I am.” The items are summed and a low overall score indicates psychological flexibility and the higher the score on the AAQ-II, the more inflexible or avoidant the individual is. The AAQ-II has been reported to have the mean alpha coefficient is .84 (.78 - .88), and the 3- and 12-month test-retest reliability is .81 and .79 (Bond, et al., 2011). The AAQ-II has recently been reported to correlate highly with measures of the constructs of neuroticism compared to other measures of experiential avoidance (Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011). Prior research assessing
psychological flexibility has used the AAQ-II as the standard measure (Chawla & Ostafin, 2007). In the current study, the internal reliability was .90 at Time 1 and .90 at Time 2.

**Traumatic history.** To assess the participant’s past traumatic history, the Stressful Life Events Screening Questionnaire (SLESQ; Goodman, Corcoran, Turner, Yuan, & Green, 1998) was used. The SLESQ consists of 11 specific categories of traumatic events (e.g. witness another person being killed or assaulted) and two general events to assess the lifetime exposure to traumatic life events in non-treatment seeking participants. Participants are asked if they experienced the event (indicated by marking “yes” or “no”) and the frequency, duration, and if anyone was hospitalized or died in the event. The SLESQ has been found to have adequate convergent validity, test-retest reliability and can differentiate between A1 and non-A1 criterion for PTSD diagnosis in a college sample of women (Goodman, Corcoran, Turner, Yuan, & Green, 1998). A modified version of the SLESQ (items that ask about childhood trauma were removed) was used to assess for an intervening trauma at Time 2.

**Posttraumatic stress disorder symptom severity.** The Posttraumatic Checklist – Specific version (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993) was administered to gauge how stressful the negative life event was to the individual. The PCL-S is a 17-item questionnaire that requires the participant report their most stressful negative life event and rate their agreement with how often they have experienced each of the items listed over the course of the last two weeks. Two example items from the checklist include: ‘Trouble remembering important parts of the stressful experience?’ and ‘Feeling emotionally numb or being unable to have loving feelings for those close to you?’ Participants rated the frequency they have experienced each item using a 5-point Likert scale that ranged from 1 (not at all) to 5 (extremely). Upon
completion, the items are added together and the total is used to generate an index of PSTD symptomatology. In the current study, $\alpha = .96$ at Time 1 and .97 at Time 2.

**Demographic information.** Participants were asked to click and/or type in answers that corresponded to their genders, ethnicities, and ages. Participants were asked for their names so SONA credits could be granted upon completion of each time point of the study and so that Time 1 and Time 2 data could be matched.

**Procedure**

The study was completed through an online survey website as part of a larger ongoing study. Participants were given the link to complete the study upon enrolling in Time 1 and Time 2 of the study. At Time 1, participants read through an online version of the informed consent form that described the potential risks and benefits of the study, researcher’s contact information, compensation of partial course credit for participation and that the study asked about potentially negative life events and perceptions of the world. After reading and electronically signing the informed consent, participants were asked to complete questionnaires that reflect the constructs of: a measure of the assumptive world, a measure of psychological flexibility, past trauma history, and PTSD symptom severity. The specific measurements for this study were given in the order in which they are listed above. The trauma history questionnaire and other measures that ask about a specific trauma were given after the scales of the assumptive world but before the demographics. This sequence of measurements was designed to prevent the recall of the traumatic event from priming a temporary negative outlook of the assumptive world since the researcher is more concerned about the everyday assumptions in traumatized and non-traumatized individuals (McFarland & Alvaro, 2000). Approximately eight weeks after completing the Time 1 survey, the participants received a link to Time 2. The measurements and
procedures at Time 2 were the same except after completing the assumptive world and psychological flexibility scales, the participants were asked “Since the completion of the Time 1 survey, have you experienced a traumatic or negative life event?” If participants indicate that this has happened, the trauma questionnaires were geared to reference that event. The Stressful Life Events Screener Questionnaire (SLESQ; Green, Chung, Daroowalla, Kaltman, & DeBenedictis, 2006) was administered, but five items that correspond to traumas that could not have occurred during the eight week time frame (e.g., unwanted sexual contact before age 13) were removed. This modified SLEQ has been implemented in prior prospective trauma studies and reduces confusion and the chance that a participant will select past traumas in addition to the new traumatic event (Frazier et al., 2011). Participants who had not experienced a trauma or negative life event between Time 1 and Time 2 \( (n = 293) \) were used to replicate the temporal stability of the WAQ from the Kaler (2010) study and add to the literature the validity of this measurement over the WAS and to act as a comparison group against those individuals that did experience a trauma life event. Upon completing Time 2 of the study, participants received the full debriefing form of the study containing the hypotheses, and researcher contact information that could be printed out.

Results

Data Preparation

I collected the data from the online database after two semesters of data collection \( (N = 336) \). All of the data from both time points were matched and then entered into a single excel data log. Data were cleaned and variables were re-coded that were reverse coded. The AAQ-II was transformed through reverse coding to reflect psychological flexibility instead of experiential avoidance. Once the data had been cleaned and coded, it remained password
protected and de-identified as per IRB protocol. The data was visually inspected for potential outliers and coding errors. Outliers were dealt with on a case by case basis. The variables of interest were inspected for normality and skewness and were reported to be in the normal range of +/-3 (Glasnapp & Poggio, 1985). The measures of interest were assessed for internal reliability at both time points to determine stability of the measures. The means, standard deviations, skewness and kurtosis are reported (see Table 1).

During the process of data cleaning, two participants were removed from the data set due to selecting the same response on every measure of the study; this left a sample of 491 participants. At Time 1, 491 participants completed the study, while at Time 2, 336 of these participants completed the follow-up, resulting in a 31.6% attrition rate between the time points. To assess if there was a potential bias in attrited between the two time points, a series of independent samples $t$-tests using a Bonferroni correction was run using the variables of interest (see Measures). The grouping variable was whether they were a completer or non-completer (non-completers at Time 2 were dummy coded to 0). A Bonferroni correction was used to minimize family-wise error rate (the increased likelihood of Type 1 statistical error as a result of running many analyses) and keep the alpha at .05 (Howell, 2010). Each $t$-test was assessed for homogeneity of variances using Levene’s Test and none were reported as statistically significant. As such, equal variance between the samples was assumed. Prior to using the Bonferroni correction, only two variables had statistically significant differences between completers and non-completers of Time 2. The variable of Time 1 PCL-S scores was statistically significant, $t(487) = -2.17, p = .030$. Non-completers ($M = 36.37$) had higher scores of PTSD symptom severity over completers ($M = 33.12$). However, when the Bonferroni correction ($p = .006$) the
scores of the Time 1 PCL-S were not statistically different between completers and non-completers.

Table 1

Descriptive Statistics of Measures of PTSD, Assumptive World, And Psychological Flexibility

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
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</thead>
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<tr>
<td>WAQ Control*</td>
<td>25.84</td>
<td>4.84</td>
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<td>-.14</td>
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<tr>
<td>WAQ CCP*</td>
<td>15.97</td>
<td>4.60</td>
<td>.60</td>
<td>.73</td>
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<tr>
<td>WAQ TGP*</td>
<td>20.93</td>
<td>4.74</td>
<td>-.23</td>
<td>-.14</td>
</tr>
<tr>
<td>WAQ Safety*</td>
<td>13.98</td>
<td>3.83</td>
<td>.16</td>
<td>-.40</td>
</tr>
<tr>
<td>WAQ*</td>
<td>76.74</td>
<td>12.18</td>
<td>.23</td>
<td>-.04</td>
</tr>
<tr>
<td>AAQ-II*</td>
<td>35.45</td>
<td>9.27</td>
<td>-.62</td>
<td>-.07</td>
</tr>
<tr>
<td>PCL-S*</td>
<td>33.12</td>
<td>14.82</td>
<td>.85</td>
<td>-.04</td>
</tr>
<tr>
<td>WAQ Control**</td>
<td>26.10</td>
<td>5.13</td>
<td>-.29</td>
<td>.53</td>
</tr>
<tr>
<td>WAQ CCP**</td>
<td>16.46</td>
<td>4.87</td>
<td>.40</td>
<td>.71</td>
</tr>
<tr>
<td>WAQ TGP**</td>
<td>21.37</td>
<td>4.85</td>
<td>-.19</td>
<td>.13</td>
</tr>
<tr>
<td>WAQ Safety**</td>
<td>14.63</td>
<td>4.10</td>
<td>.15</td>
<td>-.41</td>
</tr>
<tr>
<td>WAQ**</td>
<td>78.57</td>
<td>12.58</td>
<td>.11</td>
<td>.91</td>
</tr>
<tr>
<td>PCL-S**</td>
<td>26.86</td>
<td>12.84</td>
<td>1.53</td>
<td>-1.61</td>
</tr>
<tr>
<td>AAQ-II**</td>
<td>35.92</td>
<td>8.84</td>
<td>-.35</td>
<td>-.38</td>
</tr>
<tr>
<td>Prior traumas**</td>
<td>1.56</td>
<td>1.58</td>
<td>1.35</td>
<td>2.38</td>
</tr>
<tr>
<td>Sum of traumas**</td>
<td>1.72</td>
<td>1.73</td>
<td>1.35</td>
<td>2.17</td>
</tr>
</tbody>
</table>

Note. N = 328, * = Time 1 scores, ** = Time 2 scores.

The variable of the number of prior traumas between completers and non-completers was statistically significant, \( t(489) = -2.72, p = .007 \), and was not statistically significant difference after the correction. Non-completers (\( M = 1.56 \)) had more prior traumatic events compared to completers (\( M = 2.00 \)). After using the Bonferroni correction, only differences in there were no Time 1 variables that were statistically significant between completers and non-completers after the correction. Prior to running the analyses of interest, overall scores on the WAQ at Time 1 between individuals who had a prior trauma history (\( n = 236 \)) and those who did not (\( n = 99 \)) was accessed to determine if the groups were equivalent. An independent samples \( t \)-test was run on
and there were no statistically significant differences in the WAQ scores between groups, \( t(333) = -0.92, p = .358, 95\% CI [-4.21, 1.53]. \) The missing data due to attrition was removed based on a priori criteria of removal if 50% of the individual’s responses were missing and considered missing at random, 155 cases were removed from the sample. The sample reflected the diverse student population at the university.

Prior to running the analyses of interest in the study, the psychometric properties of the WAQ had to be assessed to determine the scale’s ability to measure the assumptive world and have an increased reliability over the WAS. The internal consistency of the WAQ was stable at Time 1 and at Time 2 as previously mentioned (Table 2).

**Table 2**

**Internal Reliability Coefficients and Test-Retest Reliability of the Measures of Interest**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbach’s Alpha Time 1</th>
<th>Cronbach’s Alpha Time 2</th>
<th>Test-Retest</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCL-S</td>
<td>.96</td>
<td>.97</td>
<td>.33***</td>
</tr>
<tr>
<td>WAQ</td>
<td>.83</td>
<td>.83</td>
<td>.65***</td>
</tr>
<tr>
<td>WAQ: S</td>
<td>.66</td>
<td>.72</td>
<td>.54***</td>
</tr>
<tr>
<td>WAQ: TGP</td>
<td>.78</td>
<td>.77</td>
<td>.72***</td>
</tr>
<tr>
<td>WAQ: CE</td>
<td>.74</td>
<td>.78</td>
<td>.62***</td>
</tr>
<tr>
<td>WAQ: CPP</td>
<td>.74</td>
<td>.80</td>
<td>.61***</td>
</tr>
<tr>
<td>AAQ-II</td>
<td>.90</td>
<td>.90</td>
<td>.66***</td>
</tr>
</tbody>
</table>

*Note. ***p < .001*

The subscales indicated adequate internal reliability at both time points (Table 2). The subscales and overall WAQ scores at Time 1 were correlated with scores at Time 2 to determine test-retest reliability (see Table 2), which reflected that the WAQ and four subscales had adequate test-retest reliability over the course of roughly eight weeks between the time points. Correlations between the WAQ and AAQ-II and PCL-S were low to moderate Pearson product moment correlations (Table 3). These correlations were statistically significant indicating that the WAQ was significantly negatively related to PTSD symptom severity and positively related to
psychological flexibility, while the PCL-S and AAQ-II were significantly negatively related to each other (Table 3). A confirmatory factor analysis (CFA) was performed on the Time 1 WAQ items for each of the corresponding four subscales. This CFA was performed before the removal of the two cases that removed for selecting the same responses on every measure. The CFA was not rerun since this removal would not drastically improve model fit. The item error variances were set to one and the parameters and the sampling error for each of the four hypothesized latent variables were estimated (Figure 1). The $\chi^2 (269) = 935.61, p < .001$ indicated that that model did not fit the data. The fit indices of the Aiken IC = 1065.61, and the Bayesian IC = -687.98. The subscales that were hypothesized to be uncorrelated each had statistically significant correlations with each other (Figure 1) indicating that more in depth psychometric analyses and a larger sample size were needed properly assess the four factor model of the WAQ.

To assess for changes in the WAQ subscale scores between time points and between the intervening trauma and control group, and avoiding the issues surrounding Lord’s Paradox, five separate multiple regressions were run to assess the impact of an intervening traumatic event. The means and standard deviations by subscale and group are reported on Table 4. The intervening variable of trauma was coded so that $0 = \text{no trauma}$ and $1 = \text{self-reported traumatic event}$. A regression model in which Time 2 WAQ scores were predicted by Time 1 WAQ scores and whether the participant had experienced an intervening trauma or not was conducted. The overall model was statistically significant, $F(2, 329) = 131.44, p < .001, R^2_{Adj} = .44$. The variable of Time 1 WAQ scores was statistically significant, ($\beta = .65, t = 15.89), p < .001$, squared semipartial correlation $= .43$, as was the intervening trauma variable ($\beta = -.13, t = -3.09), p = .002$, squared semipartial correlation $= .02$. 

36
Table 3

**Correlational Matrix of WAQ, AAQ-II and PCL-S**

<table>
<thead>
<tr>
<th>Variables</th>
<th>WAQ</th>
<th>AAQ-II</th>
<th>PCL-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAQ</td>
<td>1</td>
<td>0.38***</td>
<td>-0.31***</td>
</tr>
<tr>
<td>AAQ-II</td>
<td></td>
<td>1</td>
<td>-0.51***</td>
</tr>
<tr>
<td>PCL-S</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

*Note. Using the Time 1 scores. *p < .05, **p < .01, ***p < .001.*

---

**Figure 1.** Confirmatory factor analysis of the WAQ by hypothesized subscales. Reported are the unstandardized pattern coefficient (standard error estimate); r = correlation between factors; p = statistical significance test; WAQ = World Assumptions Questionnaire (each item); rectangles equal factor indicators; ellipses = Latent factors for each of the world assumptions; N = 338.
Table 4

Means and SD of WAQ and Subscales by Control and Intervening Trauma Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time 1 Control Means (SD)</th>
<th>Time 1 Trauma Means (SD)</th>
<th>Time 2 Control Means (SD)</th>
<th>Time 2 Trauma Means (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAQ Control</td>
<td>25.82 (4.90)</td>
<td>26.12 (4.49)</td>
<td>26.24 (5.04)</td>
<td>24.94 (5.69)</td>
</tr>
<tr>
<td>WAQ: CCP</td>
<td>15.88 (4.50)</td>
<td>16.70 (4.50)</td>
<td>16.56 (4.89)</td>
<td>15.51 (4.67)</td>
</tr>
<tr>
<td>WAQ: TGP</td>
<td>21.05 (4.81)</td>
<td>20.41 (4.36)</td>
<td>21.44 (4.86)</td>
<td>20.85 (4.85)</td>
</tr>
<tr>
<td>WAQ: Safety</td>
<td>14.08 (3.85)</td>
<td>13.26 (3.65)</td>
<td>14.84 (4.11)</td>
<td>12.79 (3.48)</td>
</tr>
</tbody>
</table>

Note. Control sample n = 294, Trauma sample, n = 40.

The four subscales of the WAQ (Safety, Control, CPP, and TGP) were assessed using the same multiple regression procedure as stated above. The subscale of Safety was statistically significant, $F(2, 332) = 73.83, p < .001, R^2_{Adj} = .30$. The variable of Time 1 WAQ Safety scores was statistically significant, ($\beta = .53, t = 11.60), p < .001, squared semipartial correlation = .28, the trauma variable was statistically significant, ($\beta = -.12, t = -2.77), p = .006, squared semipartial correlation = .01. The subscale of Control was statistically significant, $F(2, 331) = 108.31, p < .001, R^2_{Adj} = .39$. The variable of Time 1 Control scores was significant, ($\beta = .62, t = 14.59), p < .001, squared semipartial correlation = .39, and the trauma variable was statistically significant, ($\beta = -.09, t = -2.21), p = .027, squared semi partial correlation = .01. The trauma variable accounted for a small amount of variance. The subscale of Comprehensibility and Predictability of People (CPP) had a statistically significant omnibus regression, $F(2, 332) = 104.83, p < .001, R^2_{Adj} = .373$. The variable of Time 1 CPP scores was statistically significant, ($\beta = .62, t = 14.38), p < .001, squared semipartial correlation = .38, and the trauma variable was statistically significant, ($\beta = -.11, t = -2.47), p = .014, squared semi partial correlation = .01. The subscale of Trustworthiness and Goodness of People (TGP) was statistically significant, $F(2,
The variable of Time 1 TGP scores was statistically significant, ($\beta = .72, t = 18.74$), $p < .001$, squared semipartial correlation = .51. The trauma variable was not statistically significant, ($\beta = -.01, t = -.314$), $p = .754$, squared semipartial correlation = .00, and did not add to the ability to predict the variance in Time 2 TGP scores.

To assess the differences between Time 1 and Time 2 WAQ scores, paired samples $t$-tests with a Bonferroni correction were performed; one for the intervening trauma group ($n = 40$) and one for the control group that did not have an intervening trauma ($n = 293$). There was not a statistically significant difference in the means of the Time 1 WAQ scores and the Time 2 WAQ scores in the intervening trauma group $t(39)= 1.27, p = .210$, reflecting no change in WAQ scores from the trauma. The control group did have statistically different means at Time 1 and Time 2 $t(291) = -4.07, p < .001$, 95% CI [-3.50, -1.22], Cohen’s $d = .19$, with higher overall WAQ mean scores at Time 2. The Time 2 WAQ scores for the control and intervening trauma group were entered in an independent samples $t$-test. The Levene’s test for equality of variances was not statistically significant ($p = .960$), and the $t$-test had statistically significant results, $t(331) = -2.45, p = .015$, 95% CI [-9.29, -1.01], Cohen’s $d = .40$, reflecting a small to medium effect size. Figure 2 reports the means of the WAQ by group and time point. Reflecting a higher optimistic view of the world and self in the control group ($M = 79.19$) at Time 2 compared to the intervening trauma group ($M = 74.03$). Figure 2 reports the means of the WAQ by group and time point. To assess if the recency of an intervening trauma could impact the change in WAQ scores within the trauma group ($n = 40$), a correlation between the days of the traumatic event and Time 2 and the variable $\Delta$ WAQ (WAQ Time 1 scores – WAQ Time 2 scores). The correlation was not statistically significant, $r = .163, p = .327$. The recency of the intervening trauma to completion of Time 2 did not impact the change in overall WAQ scores.
Figure 2. Mean scores of the WAQ at Time 1 and Time 2 between intervening trauma and no trauma. Control ($n = 294$); Intervening trauma group ($n = 40$).

Figure 3. Hypothetical model of the impact of prior traumas on the assumptive world, psychological flexibility, and PTSD symptom severity. ΔWAQ is the Time 1 scores – Time 2 scores; $N = 41$; bootstrap = 481 iterations, and contains a point estimate and the 95% confidence interval.
Structural Equation Modeling

The hypothetical model (Figure 3) of the impact of prior traumas on WAQ change scores and the measure of psychological flexibility (AAQ-II) on Time 2 PCL-S scores in individuals who experienced an intervening trauma \( n = 41 \) were assessed through structural equation modeling using MPlus SEM software (Muthén & Muthén, 2007) (Table 5 reports the correlational matrix for SEM). The SEM analysis was performed before the removal of the two cases that removed for selecting the same responses on every measure. This analysis was not rerun due to the limited number of intervening trauma cases and the removal would not drastically improve model fit. The sample was bootstrapped and allowed 1,000 cases with replacement to be selected (see Efron, 1979, Chernick, 1999).

Table 5
Correlational Matrix of Delta WAQ, PCL-S, and AAQ-II for SEM

<table>
<thead>
<tr>
<th>Variables</th>
<th>Delta WAQ**</th>
<th>PCL-S*</th>
<th>Trauma Sum</th>
<th>AAQ-II*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta WAQ**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCL-S*</td>
<td>.11</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trauma Sum</td>
<td>.05</td>
<td>-.05</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>AAQ-II*</td>
<td>-.09</td>
<td>-.28</td>
<td>-.11</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. * = Time 1 scores used. ** = composite variable of Time 1 score subtracted by Time 2 score. None of the correlations were less than \( p = .050 \). \( n = 41 \).

The hypothesized model yielded a significant \( \chi^2 (6) = 14.88, p = .021 \), resulting in the model being statistically significantly different from the data. The fit indices were good, CFI = .99 and TLI = 1.00, and the Akiake index of comparison (AIC) = 1229.30 and the Bayesian index of comparison (BIC) = 1250.39 with a bootstrap of 481 resampling completed. The root mean square error of approximation (RMSEA) was acceptable with an estimate of 0.00, and the standardized root mean square residual (SRMR) had a value of 0.01, indicating a good fit.

Further investigation reported that the only indirect effect that was statistically significant was
the sum of the lifetime trauma to Time 2 PCL-S scores with an point estimate of 0.38, 95% CI [.01, .75], \( p = .044 \). The Delta WAQ did not have a statistical direct effect, point estimate = .03, 95% CI [-.36, .44], \( p = .844 \) or indirect effect, point estimate = -.06, 95% CI [-.24, .08], \( p = .335 \), as such there is no mediation or relationship with Time 2 PCL-S scores. The model without bootstrapping was attempted to look for potential model modifications, however there were no modifications that would improve the model fit. Figure 3 reports the estimates and standard errors of the model. The significant indirect effect between the sum of traumatic events and Time 2 PCL-S scores led to the development of a second hypothetical model including Time 2 AAQ-II, sum of traumatic events, and Time 2 PCL-S scores. The second model with the variable of Delta WAQ removed was assessed (Figure 3). The analysis reflected that the model did not fit the data, \( \chi^2 (3) = 11.02, p = .012 \). The CFI =1.00, TLI = 1.00, AIC = 901.68, BIC = 913.67, RMSEA = 0, and SRMR = 0, reflecting excellent fit, however, the direct effect from sum of traumatic events to Time 2 PCL-S scores was not statistically significant with an point estimate of 0.00, 95% CI [-2.43, 2.43], \( p = .999 \). The indirect effect of the sum of lifetime traumas through Time 2 AAQ-II to Time 2 PCL-S was statistically significant, point estimate = .00, 95% CI [ .00, .00], \( p < .001 \), as such there is no mediation or relationship with Time 2 PCL-S scores. The direct effect of Time 2 AAQ-II on the Time 2 PCL-S scores was trending towards significance, estimate = -.48, 95% CI [ -1.00, .04], \( p = .068 \). The mediation was not reported in the analyses, the indirect effects were all 0 and not statistically significant. Figure 4 reports the point estimates and 95% confidence level estimates, all contain 0 within the limits, indicating that the model did not fit the data. Alternative models that underwent modification failed to improve model fit. The model was run with modifications requested but no improvements were
found and other models failed to converge. When comparing Model 1 with Model 1 using the BIC and AIC, Model 2 was the better model in that these values were smaller (Kline, 2010).

**Figure 4.** Alternative model of AAQ-II mediating the relationship between trauma sums and PCL-S. $N = 41$; bootstrap = 1000 iterations; contains a point estimate and the 95% confidence interval.

**Figure 5.** Model of WAQ Time 1 scores and intervening trauma moderating Time 1 WAQ scores. $N = 336$; unstandardized beta weight (sampling error) reported.

**Model of Intervening Trauma and Time 1 WAQ Scores Moderating Time 2 WAQ Scores**

An alternative model of trauma and the assumptive world (Figure 5) was assessed with the full sample ($N = 334$) using hierarchical linear multiple regression to assess for moderation. The predictors of the Time 1 WAQ scores (centered, so the mean is 0) and if there was an intervening trauma (dummy coded) was entered into Block 1 and the interaction of the two was
entered into the second block in predicting the WAQ Time 2 scores. The first hypothetical block of intervening trauma and WAQ scores accounted for 44.4% of the variance in Time 2 WAQ scores $F(2, 329) = 131.44, p < .001$, with $R^2_{adj} = .441$. Time 1 WAQ centered had an unstandardized beta weight of .68 ($t = 15.88, p < .001$) and having an intervening trauma had an unstandardized beta weight of -4.91 ($t = -3.09, p = .020$). An intervening trauma had a -4.91 decrease in the Time 2 assumptive world scores while for each increase in Time 1 WAQ scores, there was an increase of .68 in Time 2 WAQ scores. The moderator of Time 1 WAQ scores and having an intervening trauma did not significantly increase the explained variance in Time 2 WAQ scores, $\Delta R^2 = 0.00, \Delta F(3, 328) = 0.12, \Delta p = .912$. This result reflected that there was no moderation in the Time 2 WAQ scores for intervening trauma and Time 1 WAQ scores (centered).

*Impact of Prior Traumas on Subsequent Traumas and the Assumptive World*

Prior to running the analysis to determine the impact of the number of traumas on an individual’s assumptive world, the frequencies were assessed on the number of traumas reported by the participants. Out of the entire sample ($N = 336$), 29.5% had no prior trauma, 28.3% reported one traumatic event, 19.3% reported two traumatic events, 11% reported three traumas, 7.1% reported four events, and 3.6% reported more than four traumas before completing Time 1 of the study. A bivariate correlation between prior traumas at Time 1 and Time 1 WAQ scores on the full data set ($N = 336$) was run. There was not a statistically significant correlation between these variables, ($r = -.07, p = .159$). Initially the assessment the impact of prior traumatic events with a current intervening trauma on the assumptive world, would involve the data set containing individuals who had experienced an intervening trauma ($n = 40$) and looking at change scores of the WAQ using an independent samples $t$-test. However, this analysis would have the same
potential issue of resulting in Lord’s paradox and would not allow comparisons of having a prior trauma history of the full sample. Of the small intervening trauma sample, 37 participants reported having at least one prior traumatic or stressful life event at Time 1.

To assess the impact of the number prior traumatic events on Time 2 WAQ scores, the complete data set was used in a multiple regression with these scores being predicted by Time 1 WAQ scores, the dummy coded intervening trauma variable, and the number of prior traumatic events collected at Time 1. This analysis was done on the overall WAQ Time 2 scores and on each of the four subscales. In the omnibus regression of Time 2 WAQ scores being predicted by Time 1 WAQ scores, the trauma variable and the number of prior traumatic events was statistically significant, $F(3, 328) = 90.91, p < .001, R^2_{adj} = .45$. The variable of Time 1 WAQ scores was statistically significant, ($\beta = .65, t = 15.77, p < .001$, squared semipartial correlation = .41, and the trauma variable was statistically significant, ($\beta = -.09, t = -2.22, p = .027$, squared semipartial correlation = .01. The variable of the number of prior traumas was statistically significant, ($\beta = -.11, t = -2.43, p = .015$, squared semipartial correlation = .01.

Each of the four subscales of the WAQ were assessed to determine where the significance in the overall scale was occurring. In the omnibus regression of Time 2 WAQ Safety scores being predicted by Time 1 WAQ Safety scores, the trauma variable and the number of prior traumatic events was statistically significant, $F(3, 331) = 51.86, p < .001, R^2_{adj} = .31$. The variable of Time 1 WAQ Safety scores was statistically significant, ($\beta = .52, t = 11.33, p < .001$, squared semipartial correlation = .26, and the trauma variable was trending towards statistically significance, ($\beta = -.09, t = -1.95, p = .052$, squared semipartial correlation = .01. The variable of the number of prior traumas was statistically significant, ($\beta = -.12, t = -2.40, p = .017$, squared semi partial correlation = .01. The regression of Time 2 WAQ Comprehensibility and
Predictability of People (CPP) scores being predicted by Time 1 WAQ CPP scores, the trauma variable and the number of prior traumatic events was statistically significant, $F(3, 331) = 70.41$, $p < .001$, $R^2_{Adj} = .38$. The variable of Time 1 CPP WAQ scores was statistically significant, ($\beta = .61$, $t = 14.39$), $p < .001$, squared semipartial correlation = .38, and the trauma variable was statistically significant, ($\beta = -.09$, $t = -2.00$), $p = .046$, squared semipartial correlation = .01. The variable of the number of prior traumas was not statistically significant, ($\beta = -.05$, $t = -1.16$), $p = .248$, squared semipartial correlation = .00. In the omnibus regression of Time 2 WAQ Trustworthiness and Goodness of People (TGP) scores being predicted by Time 1 WAQ TGP scores, the trauma variable and the number of prior traumatic events was statistically significant, $F(3, 331) = 121.51$, $p < .001$, $R^2_{Adj} = .52$. The variable of Time 1 WAQ TGP scores was statistically significant, ($\beta = .70$, $t = 18.50$), $p < .001$, squared semi partial correlation = .49, and the trauma variable was not statistically significant, ($\beta = .01$, $t = .46$), $p = .643$, squared semipartial correlation = .00. The variable of the number of prior traumas was statistically significant, ($\beta = -.10$, $t = -2.54$), $p = .011$, squared semipartial correlation = .01. In the regression of Time 2 WAQ Control scores being predicted by Time 1 WAQ Control scores, the trauma variable and the number of prior traumatic events was statistically significant, $F(3, 330) = 72.11$, $p < .001$, $R^2_{Adj} = .39$. The variable of Time 1 WAQ Control scores was statistically significant, ($\beta = .62$, $t = 14.58$), $p < .001$, squared semipartial correlation = .39 and the trauma variable was not statistically significant, ($\beta = -.08$, $t = -1.96$), $p = .050$, squared semipartial correlation = .01. The variable of the number of prior traumas was not statistically significant, ($\beta = -.02$, $t = -.47$), $p = .636$, squared semipartial correlation = .00.
Discussion

The primary hypothesis of this prospective study was to assess the psychometric properties of the World Assumptions Questionnaire (WAQ). The WAQ evidenced good internal reliability at both time points and the test-retest reliability overall and by subscales was adequate. The internal reliabilities of the WAQ subscales in the present study were slightly lower compared to the Kaler (2010) dissertation on the creation of the measure. There was a statistically significant negative correlation between PTSD symptom severity and the WAQ. Additionally, there was a positive relationship between the WAQ and the individual’s psychological flexibility (as reflected by the AAQ-II). The CFA indicated that the WAQ’s hypothesized model did not fit the data in a measurement model which could be the result of low sample size. A larger sample ($N = 500$) was needed for the power to properly assess the four hypothesized factors and their correlations. As such, the CFA results should be interpreted with caution. The WAQ could potentially be improved by the removal of low correlating items and a re-evaluation of the proposed assumptive world subscales.

The second hypothesis of differences in the assumptive world between the trauma and no trauma group was partially supported. The differences in the subscales by time and group were statistically significant in the overall WAQ scale and the subscales of Safety, Comprehensibility and Predictability of People (CPP), and Controllability over the Events (Control), but not with the subscale of Trustworthiness and Goodness of People (TGP). The intervening trauma variable was statistically significant and had small effects (squared semipartial correlations) in the overall WAQ scale and in the Safety and CPP subscales even after factoring in the scores from Time 1. Despite some noise in the data from poor items and potential measurement error, there were small effects detected. The result of the intervening trauma in the TGP subscale not being
statistically significant could reflect the notion that different assumptions may have been
impacted based on the details of the event that went outside the realm of the survey (e.g.,
perceived social support) or that the subscale need an improvement in the items measuring that
specific factor. An alternative explanation for the group differences in some subscales of the
WAQ is that there was not a large enough sample of all types of trauma to determine how the
particulars of trauma type can impact each subscale (see Table 6). When the control group and
intervening trauma WAQ subscale means were visually compared (Figure 6), individuals who
did not experience a trauma had slight improvements in the mean scores on the four WAQ
scores, whereas individuals who experienced an event did not evidence change. However, when
changes in the WAQ between Time 1 and Time 2 are examined, there is an improvement in
optimism in the control group and a decrease in WAQ scores in the trauma group, compared to
the control.

Table 6

*Frequencies of the Types of Intervening Trauma Reported on the Trauma History Questionnaire*

<table>
<thead>
<tr>
<th>Type of traumatic or stressful life event</th>
<th>Number of nominations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Abuse</td>
<td>23</td>
</tr>
<tr>
<td>In a situation where you felt helpless</td>
<td>6</td>
</tr>
<tr>
<td>Death a family member or friend</td>
<td>5</td>
</tr>
<tr>
<td>Sexual assault</td>
<td>3</td>
</tr>
<tr>
<td>Had a threatening life illness</td>
<td>2</td>
</tr>
<tr>
<td>Life threatening accident</td>
<td>1</td>
</tr>
<tr>
<td>Physical assault</td>
<td>1</td>
</tr>
<tr>
<td>Threatened with a weapon</td>
<td>1</td>
</tr>
<tr>
<td>Witnessing a death, injury, or assault</td>
<td>1</td>
</tr>
<tr>
<td>Physical force used against you in a robbery</td>
<td>0</td>
</tr>
<tr>
<td>Had a miscarriage</td>
<td>0</td>
</tr>
<tr>
<td>In a situation where your life was in danger</td>
<td>0</td>
</tr>
<tr>
<td>Other stressful life event</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note.* Three participants reported two intervening traumas between Time 1 and Time 2 resulting in 43 intervening traumas nominated from a sample of 40 participants.
This suggests that there could be a shattering of the assumptive world in the trauma group compared to the control over time. The improvement in the control group could be from participants going through the formative years of their lives. It is possible that individuals who at college are experience the world for the first time and if there are positive experiences with others and in their lives than that could impact the assumptive world to be more positive if there is no traumatic event. Potentially after the formative years, the assumptive world could be fully development and there may not be any further improvements. The correlation between the days since the intervening trauma occurred and the change WAQ scores was not statistically significant, which could reflect the notion that recency of the event is not related to larger changes in the assumptive world between the time points.

Figure 6. Bar graph of the trauma/no trauma group means on the four WAQ subscales. WAQ = World Assumptions Questionnaire; Control = Controllability of the Event subscale; CPP = Comprehensibility and Predictability of People subscale; TGP = Trustworthiness and Goodness of People subscale; Safety = Safety of the World subscale; Control = participants who did not nominate an intervening traumatic event; Trauma = participants who nominated an intervening traumatic event.
A recent study (Freh, Chung, & Dallos, 2013) applied the WAQ and the four subscales to understand the differences in the assumptive world in a sample of Iraqi civilians who had been exposed to bombings compared to a control group of citizens. The researchers reported that the bombing group had statistically significant differences in all WAQ subscale scores compared to the control group with the control group having a more optimistic view of the self and the world (Freh et al., 2013). The findings between the current study and the Freh et al. (2013) study offers supporting evidence of the WAQ differentiating between trauma and no trauma groups. The findings in the current study mildly support the tenets of shattered assumptions in that there were differences in the degree of optimism in the self and the world between those who had a traumatic event and those participants who did not. The original shattered assumptions theory posits that once the assumptive world has been shattered, there can never be an improvement in the assumptive world (Janoff-Bulman, 1992). The group with the intervening trauma did not have a statistically significant reduction of the optimism of the assumptive world between Time 1 and Time 2 scores as predicted by the theory. The reported improvements in the WAQ in the control group could stem from an alternative hypothesis that Posttraumatic Growth (PTG; Calhoun & Tedeschi, 1995; 1996) is more interwoven in shattered assumption theory than initially thought. This can lead to speculation that the assumptive world is temporarily reduced by trauma but it is more malleable and the individual will attempt to see the world in an optimistic manner in their daily lives, reflecting that the assumptions of the world more of a state rather than trait construct.

The third hypothesis of prior traumatic histories impacting the change WAQ scores and psychological flexibility acting as a mediator between the assumptive world and the PTSD symptom severity in the trauma subset was not supported by the SEM analysis. The sum of prior
traumas had no correlation with the change in overall WAQ scores and was subsequently dropped in a future model. Additionally there were no significant indirect effects to suggest mediation. There was a positive relationship between optimism of the assumptive world and the being psychologically flexibility. Participants with higher levels of optimism (higher WAQ scores) were more flexible, which supported the ACT integration with shattered assumptions theory. There were reported direct effects of higher flexibility and higher optimism of the self and the world with lower PTSD symptom severity (Figure 4). Alternative models failed to converge. A bootstrap was implemented due to the low sample size, it should be noted that in most of the relationships (see Figure 3 and Figure 4) the 95% CI contained zero and, as such, were not statistically significant, with the exception of the relationship of the Time 2 AAQ-II scores having a strong relationship with Time 2 PCL-S scores. While the bootstrapped analyses had excellent fit indices, the confidence levels reflect that these findings could be the result of sampling error, since bootstrapping can result in a less biased model but there would be large standard errors compared to a large data set (Kline, 2010). The mediation of the change in WAQ scores and Time 2 AAQ-II scores on PCL-S was not found. A larger sample with stricter criteria on trauma and homogeneity in the types of trauma is needed to fully assess this model of inoculation or sensitization. The model of the sum of traumatic events and PTSD symptom severity at Time 2 being mediated by the levels of psychological flexibility was not significant, and there was no significant relationship with this sum of traumas on PCL-S scores and AAQ-II scores, nor with Time 2 AAQ-II scores and Time 2 PCL-S scores, however the later was trending towards significance and theoretically hypothesized direction of more flexibility, the lower corresponding scores on the PCL-S.
The moderation model of having Time 1 WAQ scores and the dummy coded intervening trauma variable and the interaction did not moderate the Time 2 WAQ scores in the full data set as hypothesized. Both the intervening trauma and the Time 1 scores explained a substantial amount of variance in the Time 2 WAQ scores (44.4%), but the interaction term did not add any additional variance accounted for. There was a small effect of the intervening trauma on the change scores using the covariance analyses on the four subscales but there was no effect found in the influence of the number of prior traumas in the above SEM analysis. This suggested that the effects of a trauma on WAQ scores could be short lived.

The final hypothesis of the impact of having a prior traumatic history and an intervening trauma showing differences in the reduction of WAQ Time 2 scores was partially supported. It was hypothesized that the number of traumas would account for variance in the Time 2 WAQ and WAQ subscales and that there would be a negative relationship in that as the number of traumas reported at Time 1 and WAQ scores, regardless if there was an intervening traumatic event. This hypothesis was based on the original shattered assumption theory, that individuals rebuild their assumptive world and may be more resilient to future shattering if the beliefs were rebuilt to properly integrate the trauma. There were small statistically significant effects of the number of prior traumas in predicting Time 2 WAQ scores for the overall WAQ and the subscales of Safety and TGP. This could reflect partial support for the influence of past traumas on the assumptive world. In the overall WAQ scores, Time 1, having an intervening trauma, and the number of prior traumas were all statistically significant in predicting Time 2 WAQ scores and accounted for separate parts of the variance. This observed relationship matches with shattered assumptions theory in that having a traumatic event will negatively impact the individual’s assumptive world. In the subscale of Safety, the intervening trauma variable was no
longer a statistically significant predictor in accounting for Time 2 WAQ Safety scores when the number of prior traumas was added to the model. However, the subscale of Control had the intervening trauma variable was trending towards significance. The number of prior traumas did not have a statistically significant relationship with Time 2 scores. These findings could be from the type of trauma that was experienced or if it was a repeating traumatic event. A larger sample size is needed to assess the relationships between the number of traumas, intervening traumas, the types of traumas with each of the subscales to have a deep understanding on how the assumptions of the world are shattered.

There are two potential explanations for findings in the present study: the first is that any measurement of the individual’s assumptive world could be inherently flawed in that the original theory dictates that these assumptions are unarticulated and it is possible that in the process of having an individual consider their assumptive world creates a potential bias (Edmondson, Chaudoir, Mills, Park, Holub, & Bartkowiak, 2011; Janoff-Bulman, 1992). This bias could indicate wanting to retain a positive self-image or be forcing the individuals to quantify assumptions that have never been considered before. The second possible explanation is that the theory of shattered assumptions as it is currently operationalized in the present study was not in line with the original theory and the assumptive world is not a trait as first thought but is more a state belief. An alternative hypothesis is that the assumptive world could be an ever evolving construct that builds on information of the surroundings and the world at large and does not stabilize or become rigid as initially theorized (Janoff-Bulman, 1992). The overall change scores between the groups using the paired samples t-test reported that, on a whole, individuals who did not experience an intervening trauma between the data collection points had a statistically significant improvement in their assumptive world while there was no change in the intervening
group. Although these findings were in the opposite direction than hypothesized, it is an important finding in our understanding of how individuals thinking of the world, the self and others could improve overtime. An alternative theory for this finding is that the event is occurring during the formative years (e.g., college or young adult hood) and if no trauma happens, the assumptive world will become more optimistic.

Despite having a low sample size and being underpowered, there were small effects in explaining the variance of the Time 2 WAQ overall scores and subscale scores when there is an intervening trauma. This finding reflects the utility of the WAQ as a new measure of the individual’s assumptive world and a potential tool in understanding how perceptions of the self and world shift after a traumatic or stressful life event. An undergraduate convenience sample was used over a community or clinical sample to minimization of the likelihood that the sample is knowingly at high risk for the occurrence of a trauma (e.g., soldiers in the armed forces) and diversifies the types of trauma that could potentially occur so the study would be more generalizable to trauma that can occur in the overall population (Frazier et al., 2011). However, the use of this convenience sample created potential issues in that the different types of trauma and small reported numbers of occurrence created difficulty to compare the impact of traumas on the assumptive world. There was the potential for a selection bias in that of the original sample, \((N = 491)\) only 336 of the participants completed both time points.

The findings in the current study could be potentially caused by sampling error and the large diversity of the trauma and self-report. The participants in the current study were not interviewed and screened specifically for PTSD and the trauma history was self-report, so this is a limitation of the design. Future research should determine if these results are from sampling error or individuals exhibiting a practice effect of taking the measure a second time and recalling
some of their prior responses. Although some of these reported findings run counter to the initial
theory of shattered assumptions, the differences in how individuals perceive themselves, others, and their world after a traumatic event compared to those without a traumatic event are important in understanding how perceptions shift.

Although shattered assumptions has not had strong empirical support in the past due to measurement and methodology issues, the WAQ is a promising new measure of an individual’s assumptive world. In the current study, the tenets of the theory were based on the initial works of Janoff-Bulman (1992), potentially these tenets need to be integrated further with additional theories that would explain the potential findings in this study, such as PTG (Calhoun & Tedeschi, 1995; 1996) or the meaning making model (Park & Folkman, 1997). Future research can help shape the understanding of shifts in beliefs after a trauma and develop potential therapies that can help individuals take preventative action in future trauma. Whereas some individuals after a trauma may view the world as half empty, their shattered assumptions could be rebuilt to provide a greater meaning in life. It is up to the individual to reconstruct their perceptions of reality in to either come to see the world with all its goodness while being wary of what may lurk in the darkness or be in constant fear of the unknown.
REFERENCES


60


