Campus Shootings: Does Religious Faith and Relationship with Victims Affect Psychological Well-Being?

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Campus Shootings: Does Religious Faith and Relationship with Victims Affect Psychological Well-Being?

Melissa J. Gowen

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Clinical Psychology Seattle Pacific University School of Psychology, Family & Community March 2019

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Abstract

Active shooting incidents have become an increasing public safety concern and have a large impact on the communities in which these traumatic events take place. However, while understanding outcomes following these incidents is relevant for mental health providers, first responders, and policy creators, little is known about outcome trajectories and coping best practices due to practical and ethical research limitations. Using hierarchical linear modeling, we examined longitudinal psychological well-being (PWB; MHI; Veit & Ware, 1983) trajectories of students before and after an active shooting incident (N = 35). Furthermore, this study focused on examining the moderating effects of strength of religious faith (SRF; Plante & Boccaccini, 1997a, b) on PWB trajectories. The number of observations in the longitudinal dataset ranged from 1 to 7 (M = 3.24; SD = 1.76) and span 24.18 months prior to the campus shooting through 24.33 months following the campus shooting. Survey data was collected in up to seven waves, surrounding students’ participation in an education abroad program: 6 months pre-departure (estimated), 2 weeks pre-departure (estimated), and re-entry intervals of 2 weeks, 3 months, 6 months, 9 months, and 12 months. Results of our study indicated that while individuals experienced fluctuations in PWB, the group data was not best explained with a linear or quadratic model as a function of time. However, before the shooting, strength of faith had a significant, inverse effect on PWB, such that higher strength of faith was associated with lower PWB ($B_{01} = -0.776, p = 0.003$). The effect of exposure to the shooting was only observed in its interaction with aggregate strength of faith, such that following the shooting stronger faith was associated with increased PWB ($B_{22} = .522, p = 0.057$). These findings are consistent with
others suggesting heterogenous outcomes around the religiosity variable. Implications from our study include the importance of assessing individuals’ possible religiosity and religious meaning-making following active shooting incidents, as well as the importance of providing mental health supports for the communities affected.
Chapter I

Introduction

In the past 20 years, active shooter incidents have become an increasingly important national public safety concern, with the occurrence of such events on the rise (Blair & Schweit, 2014; Drysdale, Modzeleski, & Simons, 2010; Oksanen, Räsänen, Nurmi, & Lindström, 2010). Due to the unique contextual characteristics of these incidents (i.e., their sudden occurrence; ethical and practical research design issues), a paucity of empirical data exists that can help researchers understand the effects on individuals involved. Further, in trauma-related research, the focus of most studies has been the assessment of risk for subsequent psychopathology, such as symptoms of depression, anxiety, and posttraumatic stress. In recent years, Tedeschi and Calhoun (1995, 2004) have brought attention to the possibility of posttraumatic growth following traumatic events (Ryff, 2014). While the concept may seem counterintuitive, the literature supports the potential for positive changes that lead to greater well-being, following a variety of traumatic situations, in a plethora of settings and populations. Among these is PWB — a state of happiness, satisfaction, enjoyment, and a sense of belonging (Mancini, Littleton, & Grills, 2016; Tan, 2013).

Both contextual and person-level characteristics are important factors to consider when examining posttraumatic outcome trajectories. Regarding contextual factors, trauma severity, sometimes assessed as the physical or emotional proximity to the event, is a common contextual characteristic that has been shown to influence both adverse and positive posttrauma outcomes. This follows from the dose-response relationship theory that greater trauma exposure leads to more symptoms (Dohrenwend & Dohrenwend, 1974). But this linear relationship may not always be the case. In fact, research conducted following 9/11 found that a relationship existed
between trauma severity and PTG, such that an intermediate level of severity (i.e., posttraumatic symptoms) led to the most PTG (Butler, et al., 2005).

Individual differences also play a role in stress and traumatic response trajectories following significant life events; some individuals experience long-lasting changes, while others do not (Lucas, Clark, Georgellis, & Diener, 2003). One person-level factor that may be relevant is religiosity (Plante, 1996; Plante & Boccaccini, 1997a; Plante, Yancey, Sherman, & Guertin, 2000). Religion may be particularly salient for individuals following traumatic events due to its relevance for death and suffering. However, due to the complexity of religiosity, a heterogeneity of outcomes in the research is to be expected. Religious commitment has been associated with positive (Donahue & Benson, 1995; Plante & Boccaccini, 1997a) and negative (Shooka, Al-Haddad, & Raees, 1998; Plante & Canchola, 2004) changes in mental health outcomes. However, despite these discrepancies, research has indicated a modest inverse relationship between religiosity and depression (Smith et al., 2003), and a positive relationship between religious belief and PWB (Vilchinsky & Kravetz, 2005).

Thus, the purpose of my dissertation is to explore the relationship between emotional proximity to trauma and PWB over time, and to examine how strength of religious faith, moderates that relationship. In a manner consistent with Brickman and Campbell (1971) and Mancini, Bonanno, and Clark (2011), we hypothesized that the PWB trajectory after a campus shooting would decline, but then return to baseline in the months that follow. Additionally, we hypothesized that proximity to the victim would magnify this relationship. That is, the decrease in PWB would be deeper and the return to baseline would take longer. Further, we hypothesized that strength of faith would moderate this relationship such that those who reported a stronger faith would rebound more quickly.
In establishing the rationale for my dissertation, I first review mental health trajectories following trauma-in-general and with active shooter incidents. Next, I explore PWB after traumatic events. This is followed by assessing the effects of emotional proximity on traumatic outcomes. I conclude by exploring strength of religious faith’s impact on outcomes following trauma.

**Mental Health Trajectories Following Trauma**

**Post-Traumatic Reactions**

A person experiences a traumatic event when they are exposed to actual or threatened death, injury, or sexual violence of themself or witness it happening to others (American Psychiatric Association [APA], 2013). In the past, post-traumatic response trajectories were thought to correspond to an approximate normal distribution, with the most common trajectory being moderate distress and difficulty meeting everyday demands. Resiliency and elevated stress trajectories fell on either side, making up the tails of the distribution. However, a growing body of empirical evidence has called this early conceptualization into doubt. When responses to stress are examined, individual trajectories are exceedingly varied (Mancini, Bonanno, & Sinan, 2015). Indeed, Mancini, Bonanno, and Clark (2011), highlighted the “multiple and often divergent trajectories” that occur following adversive events (p. 144). Further, in the stress literature several “distinct longitudinal and prospective trajectories” following events like bereavement, disaster, and breast cancer have been identified (p. 144). Acute stress trajectories are typically hypothesized to follow five possible trajectories, (a) resilience, (b) gradual recovery, (c) chronic distress, (d) delayed distress, and (e) improvement (Mancini, Littleton, & Grills, 2016).
Mancini and colleagues have asserted that the most common acute stress response is resiliency. In fact, 56 to 59% of their sample of female Virginia Tech students showed low levels of distress before and after a campus shooting event, meaning individuals exhibited no statistically significant changes in either depression and anxiety trajectories from the pre-shooting timepoint to 12 months following the shooting. These findings, however, are controversial. When Infurna and Luthar (2016) attempted to replicate Mancini et al.’s results in a sample of former East and West German residents who had experienced spousal loss, divorce, or unemployment, their initial findings supported the notion that a majority of the sample experienced resilience. However, when statistical assumptions were relaxed, allowing greater variability within level of adjustment and change within classes of trajectories, resiliency was actually the least common response to acute stress. Additionally, researchers must clarify that while an individual may show resiliency in one domain, it does not mean that they are not experiencing continuing distress in other areas. Thus, “global resilience” should not be assumed when only one of its dimensions has been evaluated (p. 191).

Gradual recovery is the second trajectory, with a time limited dip in functioning around the event followed by a return to pre-trauma baseline levels of well-being. The notion that well-being returns to baseline following significant life events, both positive and negative, was defined by Brickman and Campbell (1971) as the “hedonic treadmill” (as cited in Mancini, Bonanno, & Clark, 2011, p. 144). However, while research has tended to support the theory that aversive and positive life events have ultimately "transient effects" on positive and negative outcomes, some findings contradicts this assumption. Mancini, Bonanno, and Clark (2011) reported that as a response to some positive and negative life events, individuals experienced both increases and decreases in subjective well-being (SWB). These trajectories ultimately
returned to baseline following some life events, but not for others. This research highlights the potential influence of both contextual and personal characteristics.

The third trajectory is chronic distress or high distress, which shows a sharp increase in symptoms like depression immediately following the traumatic event, which does not abate with time. Additionally, the fourth trajectory is a pattern of delayed distress, with symptoms increasing after a certain amount of time following the event. In the case of Mancini, Littleton, and Grills (2016), some individuals had a delayed onset of depression that increased anytime from 2 to 12 months following a shooting. Mancini, Bonanno, and Sinan (2015) highlighted that both chronic distress and delayed distress trajectories would be the hypothesized trajectories for individuals with mental health issues following traumatic events.

A pattern of improvement is the fifth trajectory that has been observed. Some individuals with elevated levels of depression and anxiety prior to the event showed significant reduction in symptoms following a shooting, and these effects remained up to a year later. Mancini, Littleton, and Grills (2016) reported that this type of reduction in symptoms occurred for approximately 7% to 13% of their sample and is consistent with other research, and not simply the result of low exposure to the trauma. The idea that traumatic events can have long-lasting positive ramifications such that previous symptoms are reduced is a hypothesis with little precedent, but one with significant potential clinical ramifications. The authors differentiated the improvement trajectory from post-traumatic growth, because their definition of improvement is a reduction in symptoms that were already present prior to the traumatic event, rather than an increase in positive outcomes. However, the reduction in symptoms of distress and the positive psychological change associated with post-traumatic growth can be difficult to differentiate.
Reponses to Active Shooter Events

“An active shooter incident occurs when an individual [is] actively engaged in killing or attempting to kill people in a populated area” (Barrett, 2014). Active shooter incidents impact and victimize witnesses and the general community in which they take place, not only those individuals who experienced the violence directly (Hawdon & Ryan, 2012). Data from the Federal Bureau of Investigation suggests that “active shooter incidents” are on the rise (Drysdale, Modzeleski, & Simons, 2010). From the years 2000 to 2013, there were 160 active shooter incidents. Within that timeframe, from 2000 to 2006, the United States averaged 6.4 active shooter incidents annually; however, from 2007 to 2013, the United States averaged 16.4 annually, highlighting the increasing prevalence of these traumatic events. This is an average of 11.4 killings of this kind per year, with about one in four active shooter incidents occurring in educational settings. During this time, 486 people were killed and 557 were wounded; this is a 10-fold increase from previous years (Blair, Pete, & Schweit, 2014; Vieselmeyer, Holguin, & Mezulis, 2016). Due to the increase in the occurrence of these types of events over the past two decades, and the amount of distress these incidents incite in the community (Friedman & Michels, 2013; Oksanen, Räsänen, Nurmi, & Lindström, 2010), it is increasingly important to examine trauma outcomes within the context of active shooter incidents.

While research is limited, the available literature suggests that mass shootings, school shootings, and active shooter incidents have similar impacts on their survivors as those exhibited following other traumatic situations. Similar to the trauma research discussed previously, school shootings are associated with both negative and positive outcomes (Smith, Abeyta, Hughes, & Jones, 2015; Sue & Chen, 2015). Research conducted following a variety of active shooter incidents emphasized a host of negative, posttraumatic consequences (Elklit & Kurdahl, 2013;
Nordanger et al., 2014) including depression and substance use problems (Su & Chen, 2015) as well as depression, anxiety, grief, and anger (Hughes et al., 2011). It also appears that violent crime and accidents have particular power as stressors with survivors experiencing posttraumatic stress symptoms, reduced PWB, and increased psychological distress (Kazantzis et al., 2010). These types of incidents may be particularly powerful because individuals subjectively perceive that their life was threatened (Nordanger et al., 2013, 2014).

However, while events like active shooter incidents are distressing, researchers have demonstrated that individual outcomes are diverse and variable over time (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Orcutt, Bonanno, Hannan, & Miron, 2014). Both Mancini et al. (2016) and Orcutt et al. (2014) analyzed trajectories following campus shooting incidents, and results indicated that outcome trajectories following shootings are similar to other trauma trajectories. While the resiliency trajectory was the most common (56-59%) in regards to depression and anxiety symptoms (Orcutt et al., 2014), the improvement trajectory occurred in about 13% of the sample for anxiety and 7% of the sample for depression, ultimately resulting in a decrease in symptoms for these individuals (Mancini et al., 2016). This improvement is remarkable because individuals exhibited significant improvement in their levels of pre-shooting symptoms following the traumatic event. Therefore, similar to other traumatic experiences, an increasing body of literature shows positive outcomes or changes following active shooter incidents (Mancini, Littleton, & Grills, 2016; Vieselmeyer, Holguin, & Mezulis, 2016).

Because the growth-oriented variable, PWB, was the outcome in our study, we turn now to its definition and then review literature that has predicted its post-traumatic trajectory.
Psychological Well-Being Following a Traumatic Event

An understanding of what makes people healthier, happier, and regain functioning is important within trauma-related research (Ryan & Deci, 2001; Ryff, 2014). While most agree that PWB is an important focus of study, researchers continue to define it in different ways and debate best practices for measuring PWB and its facets. For instance, some have argued that the theoretical grounding for early definitions of PWB was weak, causing researchers to neglect important components of well-being. Initial theorists did not account for different, often competing, notions of well-being that could be influenced by culture, history, ethnicity, or class (Coan, 1977). Despite these various debates, the structure of PWB “nearly always center[s] around the distinction between positive and negative affect and life satisfaction” (Ryff, 1989, p. 1069). Stewart, Ware, Sherbourne, and Wells (1992) provided a more restricted understanding of PWB focused on positive affect and happiness. They stated that positive affect and PWB are interchangable constructs. Accordingly, the definition of PWB includes feeling happy, cheerful, lighthearted, satisfied, a sense of enjoyment, and a sense of belonging. For the purposes of this study, the Stewart et al. (1992) definition of PWB was used.

With regard to post-traumatic outcomes, PWB falls within a larger clusters of variables related to post-traumatic growth and resiliency. Next I review literature related to the prediction of growth-oriented outcomes following at traumatic event. Predictors include the individual or combined effects of contextual and personal factors.

With regard to context, Calhoun and Tedeschi (2006) identified three global dimensions that facilitate resiliency trajectories. These include environments that (a) foster both physical and mental health, (b) nurture normative development, and (c) encourage social cohesion. Additionally, following 9/11, researchers noted that the relationship between trauma symptoms
and post-traumatic growth was curvilinear, such that an intermediate level of symptoms netted the most growth (Butler et al., 2005). Further, some researchers have indicated that social support is related to "stress-related growth" (p. 33).

The evaluation of data following a wide array of life events (i.e., bereavement, divorce, marriage) has supported the notion that variability due to person-level factors should not be ignored. Moran and Nemec (2013) suggested that characterological strengths may buffer adverse effects or encourage positive effects following traumatic events. The researchers hypothesized that individuals with greater positive-to-negative emotion experience ratios are more likely to fare better. However, some researchers have indicated that individuals with greater trauma and more negative outcomes, while likely having greater distress, may also have greater opportunity for post-traumatic growth (Vieselmeyer, Holguin, & Mezulis, 2016).

Researchers have also indicated the perception of a traumatic event may lead to positive outcomes in a variety of areas (Linley & Joseph, 2004; Calhoun & Tedeschi, 1999). “People who thought they were going to die were more likely to report personal growth as a perceived benefit soon after the disaster and at follow-up” (McMillen, Smith, & Fisher, 1997, p. 736). Therefore, both McMillen, Smith, and Fisher (1997) and Nordanger et al. (2013, 2014) indicated that perceived life threat, like which can occur during active shooter incidents, has the potential to cause both greater distress and, simultaneously, greater PTG.

Some theorists have suggested that post-traumatic growth occurs when there is cognitive effort to redefine worldview beliefs that have been challenged following traumatic experiences. If individuals take time to cope with a traumatic event, they may find meaning from what happened and experience increases in post-traumatic growth and life satisfaction (Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2011). The most successful individuals are those who have
been able to create meaning as a result of the trauma, and in turn, report greater post-traumatic growth, meaning in life, and life satisfaction (Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2011). Ultimately, individuals who were unable to take meaning from a traumatic event, experienced less positive outcomes.

Thus, more research is needed to understand how contextual and personal factors influence trauma outcomes (Moran & Nemec, 2013). We selected one each (emotional proximity to a campus shooting and strength of religious faith) and discuss each, in turn, next.

**The Effect of Emotional Proximity on Trauma Outcomes**

The stress-diathesis model (Abramson et al., 1989) has suggested that exposure to traumatic events causes individuals to be more vulnerable to trauma related symptoms, such as increased psychological distress, and decreased PWB (Kazantzis et al., 2010), while individual vulnerabilities or strengths may also play a part in predicting individuals’ outcomes post-trauma exposure (cited in Kazantzis et al., 2010). Additionally, traumatic exposure can be further complicated by learning about a close friend or relative who experienced a trauma, as well as witnessing details through indirect exposure (i.e., witnessing the aftermath of a violent event). These types of experiences may also be traumatic (APA, 2013).

The dose-response relationship theory offers an explanation for these posttraumatic trajectories (Dohrenwend & Dohrenwend, 1974). The model asserted that the higher the dose of trauma exposure, the greater the risk for posttraumatic stress symptoms. This theory has much support with research indicating that directly witnessing a traumatic event, being closer in physical proximity, or with longer exposure are all correlated with greater risk for posttraumatic stress outcomes (cited in Wilson, 2014). However, the sufficiency of this theory to explain the
complexities of trauma trajectories has been questioned, and researchers believe other factors are likely.

While trauma severity and exposure have been measured in a variety of ways (e.g., physical proximity, length of trauma or exposure, amount of exposures, level of the threat to one's life, or severity of injury) emotional or psychological proximity has also gained research focus. Emotional proximity is a measure of relational closeness that an individual has to victims or the perpetrator (i.e., family, friend, acquaintance) that were present at the traumatic event (Hughes et al., 2011; Vieselmeyer, Holguin, & Mezulis, 2016).

As previously mentioned, proximity has commonly been used as a physical or geographic-based measure of exposure (May & Wisco, 2016). In an extension of the construct, however, psychological or emotional proximity has been found to increase individuals’ vulnerability to negative outcomes following traumatic events (Curry, 2003; Galea et al., 2002; Hughes et al., 2011; Nordanger et al., 2013). This increasing evidence in the literature has led the construct to be expanded, categorizing proximity as either a physical proximity or emotional proximity measure (Vieselmeyer, Holguin, & Mezulis, 2016). Following the Virginia Tech shooting, as well as terror incidents in Europe, physical and emotional proximity have been used to better measure and predict trauma exposure and outcomes (Hughes et al., 2011; Nordanger et al., 2014). Both physical and emotional proximity following active shooter incidents and other traumatic violence are commonly held risk factors for PTSD (Nordanger et al., 2014).

Emotional proximity is associated with a variety of posttraumatic outcomes, and as emotional proximity to a traumatic event increases, so do negative outcomes (Brown & Goodman, 2005; Dekovic et al., 2008). Of particular importance, emotional proximity, such as having a personal connection to a victim or worrying about their safety, was found by one study
to be significantly associated with posttraumatic symptoms, while physical proximity was not (Thoresen et al., 2012). This highlights the importance of emotional proximity, specifically, as a construct of trauma severity. Knowing deceased victims following a traumatic event impacted the individuals' levels of posttraumatic stress, such that increased intimacy led to greater PTSD severity (Dyregrov, Frykholm, Lilled, Broberg, & Holmberg, 2003; Elklit & Kurdahl, 2013). This replicated earlier findings from a study following the Oklahoma City bombing, where children who lost a friend experienced more trauma-related symptoms than those who lost acquaintances (Pfefferbaum, et al., 1999). Furthermore, after the Oklahoma City bombing, Pfefferbaum et al. (1999) reported that even having a friend who knew someone hurt or killed was a predictor of post-trauma symptoms. This was similar in a study following the active shooter incident at Virginia Tech, with those who lost a friend reporting the highest adverse outcomes, like stress. These findings point to the significance of emotional proximity as a severity measure, and the possibility that it effects individuals at a variety of levels.

Possible hypotheses for the influence of emotional proximity in traumatic events abound. Some assert that grief processes from the loss of an family member or friend play a role, such as increased likelihood of depressive symptoms (Galea, et al., 2002). Another hypothesis is that high levels of emotional proximity are associated with early responses to the trauma, which are then associated with posttraumatic stress symptoms (Thoresen et al., 2012). Clearly, these results highlight the importance of understanding the effect of emotional proximity when studying posttraumatic outcomes. However, while emotional proximity is a relevant contextual characteristic, person-level traits, such as religiosity also play a part.
Strength of Religious Faith May Contribute to Divergent Outcomes Following Trauma

The seminal definition by Pargament (1997) defined religion as “beliefs, practices, feelings, or interactions in relation to a greater Being” (p. 25). With much of the world professing a religious affiliation or adherence to a religious tradition, as well as approximately 80% of the United States population belonging to a religion (Central Intelligence Agency, 2013), religious belief has become an important area of research (Plante & Canchola, 2004). Nevertheless, despite its prevalence, many researchers have claimed that religious belief is often neglected in psychological research (Plante, 1996; Plante & Boccaccini, 1997a; Plante et al., 2000). This neglect may be due, in part, to the challenging complexities of religion as a construct, or psychologists' lack of familiarity or comfort. However, despite this, a growing amount of research has explored religion in the context of medical conditions, depression, anxiety, trauma, life satisfaction, and other areas (Plante, Saucedo, & Rice, 2001). Ultimately, religion is unique because of "its concern with death, suffering, tragedy, evil, pain, and injustice" (Pargament, 1997, p. 27). This suggests that religion may have particular salience for individuals following traumatic events.

However, while religious issues within a psychological context have become more researched, the multifaceted nature of religion makes understanding its impact on psychosocial outcomes challenging. As a result, in studying PTG and other psychosocial outcomes, different aspects of religion have been explored. One of the most common variables used to study religion includes religious subtype, divided into intrinsic and extrinsic religiosity (Shaw, Joseph, & Linley, 2005). Allport's (1950) conceptualization of intrinsic and extrinsic religiosity hypothesized why an individual's religious subtype may ultimately have either positive or negative outcomes. Studies have shown that intrinsic religiosity was positively related to
depression remission, while church attendance and private religious activities were not (Plante, Saucedo, & Rice, 2001). Therefore, religious subtype is just one example of how religious constructs lead to divergent outcomes. As a result, a heterogeneity of outcomes when studying religiosity is to be expected.

For example, religious commitment is associated with positive changes to mental health in general (Donahue & Benson, 1995; Larson et al., 1992). However, while some research supports positive outcomes associated with religious belief, like decreasing depression (Catipovic, Ilakovac, Durjancek, & Amidzc, 1995; Cosar, Kocal, Arikan, & Isik, 1997; Plante & Boccaccini, 1997a), others report that religious faith can contribute to negative outcomes, such as anxiety (Plante & Canchola, 2004; Shooka, Al-Haddad, & Raees, 1998; Trenholm, Trent, & Compton, 1998).

After examining how the type of religiosity or the type of religious coping changes outcomes, it becomes more apparent that the meaning and interpretation individuals place on their religious beliefs influences psychological outcomes. Therefore, the nature of the relationship between religious faith and well-being has been varied and remains disputed in the research literature (Lun & Bond, 2013). In light of these multiple interpretations of religiosity as a construct, researchers have noted that religion’s relation to PWB is often ambiguous. Despite this ambiguity, researchers have supported a variety of positive outcomes associated with religiosity, religious faith, and religious behaviors (Plante & Boccaccini, 1997a). Overall, meta-analyses have supported a modest inverse relationship between religiosity and depression (Smith et al., 2003). In addition, Vilchinsky and Kravetz’s (2005) results support additional findings that religious belief and PWB are significantly, positively, correlated, and there is further
evidence that both physical and psychological well-being are positively correlated with religion (Lun & Bond, 2013).

Additionally, while many conclusions drawn about religiosity and its influence on PWB are correlational, several longitudinal studies support the hypothesis that the directionality of the relationship moves from religious belief to well-being (Chiriboga, 1982; Fatima, Sharif, & Khalid, 2018; Koenig, George, & Peterson, 1998; Tix & Frazier, 1998). In terminal cancer patients, more advanced religious faith was associated with better quality of life for the individual, both psychologically and spiritually, as well as for their family members. Witter, Stock, Okun, and Haring (1985) conducted a meta-analysis on the relationship between religiosity and psychosocial well-being. Findings indicated that religious faith was positively associated with happiness, life satisfaction, morale, PWB, and quality of life. Similar to variables like religious commitment, Ellison (1991) reported that greater religious faith was associated with greater life satisfaction, personal happiness, and fewer negative consequences of traumatic life events.

The relationship between religious faith and PWB becomes important within the context of trauma in particular. Fontana and Rosenheck (2004) stated “one of the most pervasive difficulties experienced by persons who have trouble coping with trauma is a loss of meaning or purpose to life that is often experienced as a weakening of religious faith” (p. 579). Pargament, Desai, and McConnell (2006) asserted that the severity of trauma, coping resources, and the individual's religious beliefs influence posttraumatic distress or growth. Researchers have demonstrated an inverse relation between strength of religious faith and the level of trauma symptoms (Calhoun, Cann, Tedeschi, & McMillan, 2000; Ogland-Hand, 1993; Rowgh, 2000). However, it also appears that following traumatic events, individuals with PTSD are more likely
(than those not diagnosed with PTSD) to rely on religious beliefs (Shaw, Joseph, & Linley, 2005). These posttraumatic outcomes involving religiosity are not necessarily contradictory. While strong religious faith may moderate negative posttraumatic symptoms, individuals who experience traumatic events may also have greater need for spiritual beliefs in order to cope.

Researchers have indicated that religion and spirituality usually benefit individuals following traumatic events and influence how people adjust or potentially grow (Shaw, Joseph, & Linley, 2005). For example, women with a trauma history found religion to be an important coping mechanism, and many asserted that spirituality was key for recovery (Fallot, 1997, cited in Shaw, Joseph, & Linley, 2005). In addition, in various studies, religious participation, religious practice, and spirituality have been found to be significantly associated with growth-oriented outcomes in a variety of samples, including women from diverse ethnic backgrounds with HIV/AIDS (Siegel & Schrimshaw, 2000), individuals who experienced a loss (Emmons, Colby, & Kaiser, 1998), students who experienced a significant negative life event (Tedeschi & Calhoun, 1996), adolescents (Milam, Ritt-Olson, & Unger, 2004), and parents of children who were murdered (Parapully, Rosenbaum, van den Daele, & Nzewi, 2002).

There are a plethora of hypotheses that the influence of religious faith on post-traumatic growth; however, due to the correlational nature of many of these studies, the causal pathways between these constructs of religion and post-traumatic growth are still in question.

Despite this, religious faith is thought to benefit posttraumatic outcomes through several possible pathways including social support and by providing paradigms for meaning making. Vilchinsky and Kravetz (2005) have concluded that meaning in life mediates the positive relation between religious belief and PWB, as well as the negative relation between religious belief and psychological distress. Plante and Boccaccini (1997a) reported results consistent with other
findings. They stated that individuals with higher faith had a variety of protective traits such as higher self-esteem and lower interpersonal sensitivity. Individuals also had beliefs about locus of control such as greater belief in extreme, unrealistic control and belief that God could be called upon to help with outcomes. When compared to individuals with lower faith, these traits and beliefs may be protective factors. In the context of distressing circumstances, religious faith may provide a source of hope that empowers individuals to cope.

Essentially, religious faith has the capacity to be helpful or harmful, and in the context of traumatic experiences, it is often disregarded despite its potential importance in understanding individual outcomes. As stated by Calhoun and Tedeschi (2006), “spirituality can play a critical role in the way traumas are understood, how they are managed, and how they are ultimately resolved...[they] can be a positive resource for posttraumatic growth or a source of struggle that may lead to growth or decline” (p. 121).

**Dissertation Purpose**

The purpose of this study was to model how the contextual characteristic of knowing a victim (i.e., one aspect of emotional proximity) and the person-level characteristic, strength of faith, affected the PWB trajectory following an active shooter incident. I hypothesized that the PWB trajectory following the campus shooting would decline, but then return to baseline in the months that followed. Additionally, we hypothesized that proximity to the victim would exacerbate the effect of the shooting on PWB, such that greater proximity would be associated with a deeper decrease in PWB and a longer time to return to baseline. Further, we hypothesized that strength of faith would moderate this relationship such that those who reported a stronger faith would rebound more quickly.
Chapter II

Method

Participant Characteristics

Participants included students who were at least 18 years old who were (a) enrolled in a longitudinal study associated with their participation to in either a traditional study abroad or a faith-based global service learning program and were (b) enrolled at SPU at the time of the shooting. A preliminary examination of the dataset suggested that 35 participants, contributing 114 observations, had data that met the minimal requirements (described below) for inclusion in the study. The number of observations in the longitudinal dataset ranged from 1 to 7 ($M = 3.24; SD = 1.76$) and span 24.18 months prior to the campus shooting through 24.33 months following the campus shooting. Gender, race, and ethnicity were collected unreliable due to merged data sets; however, in a similar project, SPU student study abroad demographics were collected, in which participants’ ages ranged from 18 to 24 ($M = 20.22, SD = 1.02$). The sample was 87% female and 72% Caucasian (5.4% Asian, 5.4% Hispanic, .7% American Indian/Native American, 6.8% Multi-racial, and 9.5% did not respond; Dykhouse, 2016).

Sampling Procedures

The data for this research project was assembled from multiple sources. Described first are the sources for the longitudinal collection of PWB and strength of faith. Three separate IRB-approved studies (i.e., GlobeTREK, GlobeSPRINT, and GLOabroad) collected longitudinal data from students participating in study abroad/global learning programs at SPU. Each of these studies collected data prior to departure through 12 months re-entry from the international host location. Thus, the data generally spanned 15-18 months of the student’s life. The earliest of these studies, (GlobeTREK) began in 2009; the most recent (GLOabroad) has IRB approval.
through 2019. Thus, for some participants the shooting occurred after they had completed all waves of the longitudinal study; for others, the shooting occurred during data collection; for others, the shooting occurred prior to the data collection.

The initial recruitment of participants to the GlobeTREK, GlobeSPRINT, and GLOabroad research studies occurred prior to their departure. Graduate assistants visited pre-departure workshops or courses with information on the study. Depending on the particular research study, participants were provided with links to online surveys in either SurveyMonkey (GlobeTREK, GlobeSPRINT) or Qualtrics (GLOabroad). Again, depending upon the particular study, the participants received invitations, with up to seven waves, surrounding their participation in the education abroad program: pre-pre-departure [GLOabroad only], pre-departure, 2 weeks re-entry, 3 months re-entry, 6 months re-entry, 9 months re-entry [GlobeTREK and GLOabroad] and 12 months’ re-entry). Regardless of whether the respondent had completed the previous survey, participants continued to receive e-mail invitations or reminders with survey links for all time points.

The longitudinal studies all had SPU IRB approval. GlobeTREK (SPUIRB#: 080902042) was originally approved 03/16/2009, and, after multiple revisions/renewals, expired 02/15/2013; GlobeSPRINT (SPUIRB#: 111202036) was originally approved 05/25/2012 and after multiple revisions/renewals, expired 01/26/2015. GLOabroad (SPUIRB#: 141502013) was originally approved 04/03/2015, and, after multiple revisions/renewals is set to expire 03/01/2019.

Data related to the proximity to the victims was collected in two ways. First, following the shooting, all SPU students who were enrolled at the time of the shooting were invited to participate in a campus-wide Post Traumatic Stress-Post Traumatic growth (PTS-PTG) study
The PTS-PTG study involved two waves. The first questionnaire was sent to students who were enrolled at the time of the campus shooting (which occurred during the last week of classes in the spring quarter), approximately four months after the incident (at the beginning of the next fall quarter). The first wave of the study PTS-PTG study included a host of outcome measures along with information about proximity to the victim and services received after the shooting. The second wave included a second administration of the outcome measures. Any participants in the PTS-PTG data collection who were also participants in the GlobeTREK and GlobeSPRINT studies were asked to provide permission to merge data from the two studies.

Due to a low response rate from longitudinal participants in the PTS-PTG study we pursued an alternate route for collecting proximity to victim data. Both the GlobeSPRINT (which was in its last year of data collection) and GLOabroad (in its first year of data collection) IRB applications were revised so that remaining waves of GlobeSPRINT and the first wave of GLOabroad were amended to include relevant supplementary items from the PTS-PTG study (e.g., proximity to the victim, geographic location at the time of the shooting, relationship to the institution and its people, resources accessed following the shooting). Specifically, students were asked if they were enrolled as a student at SPU in June 2015. If they answered yes, they were asked if they would be willing to answer a short series of questions about the campus shooting. Students who “opted in” were presented with these supplementary items.

**Sampling Size, Power, and Precision**

Sample size is a critical yet complex issue in multilevel models. In a multilevel model, power is a function of the number of clusters (e.g., participants), the number of measurements per cluster (e.g., the number of repeated measures), the intraclass correlation, and the effect size.
(McCoach, 2010). McCoach's summary of the literature suggested that while "a bare minimum of 10 clusters" (p. 129) could be sufficient, at least 30 clusters are required to produce unbiased estimates of variance components and at least 100 clusters are necessary to have reasonable estimates of the standard errors of the level-two variance components. Additionally, the number of repeated measures and degree of missingness in the longitudinal design can be problematic. This study included data from 114 repeated observations (L1 units) from 35 participants (L2 units). While this indicates that I met McCoach’s minimum criteria for multilevel modeling, my sample is not ideal, and is likely underpowered.

**Measures**

*Psychological Well-Being.* The Mental Health Inventory’s, psychological well-being subscale (MHI, PWB; Veit & Ware, 1983) is a 10-item self-report questionnaire for assessment of mental health though measuring PWB, and is designed for use in the general population. Questions are rated on a scale of 1 (*always*) to 6 (*never*). Sample items include "During the past month, how much of the time have you been a happy person?" and "How much of the time, during the past month, has your daily life been full of things that were interesting to you?" The mean score of the MHI was used as a composite of items, and calculated so that higher scores indicated more positive feelings and greater PWB. PWB was assessed at all waves of the study. The Cronbach’s alpha for PWB in my study was .91.

The MHI was tested, beginning in 1975, with four large diverse samples (*N* = 5,089) for the Rand Health Insurance Experiment. Exploratory and confirmatory factory analyses provided support for the two higher order factors of the MHI (psychological distress and well-being), as well as the five lower order factors. The reliability of the two higher order factors was satisfactory, between .92 to .96. Additionally, the lower order factors showed internal
consistency estimates (alphas) between .83 to .91. In a recent study conducted by Burris, Brechting, Salsman, and Carlson (2009), Cronbach’s alpha for the PWB subscale was .82.

*Relationship to Victim(s).* Items to measure participants’ relationship to victim(s), a proxy measure for emotional proximity to trauma, were adapted from Hughes et al. (2011). Two items were used to assess emotional proximity, first asking if the respondent knew the shooting victim(s), and then asking individuals to indicate the relationship status to victim(s). The scale was 0-3, (0 = *No/ I did not know the victim(s)*; 1 = *Acquaintance*; 2 = *Friend*; 3 = *Very close to me*). A higher score indicated greater emotional proximity to the traumatic stressor, with scores ranging from 0 to 3.

*Strength of Religious Faith.* The Santa Clara Strength of Religious Faith Questionnaire (SRF; Plante & Boccaccini, 1997a, b) is a 10-item measure used to assess students’ strength of religious faith. Participants responded to the stem, “Please rate your level of agreement or disagreement with the following statements.” Each item was rated on a four-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Example items include “My faith is an important part of who I am as a person” and “I enjoy being around others who share my faith.” In a sample of undergraduate college students (*N* = 102), Plante and Boccaccini (1997a) reported satisfactory estimates for internal reliability (= .95) and split-half reliability (*r* = .92). The Cronbach’s alpha for SRF in my study was .95.

**Research Design**

The longitudinal data collected for this dissertation was part of an ongoing research project examining psychosocial outcomes in students following study abroad or global service learning at Seattle Pacific University. The data is longitudinal in design with up to seven repeated measures per participant.
Analyses

The data were analyzed using hierarchical linear modeling where person was the clustering variable. Longitudinal studies produce data with a hierarchical structure in which the repeated measures (Strength of faith, PWB; Level 1 [LI]) are clustered within individuals (Relationship to victim; Level 2 [L2]). Hierarchical linear modeling with HLM 7 (Raudenbush, Bryk, & Congdon, 2004) was appropriate to use in this analysis because it allows for (a) the dependent nature of the repeated measures data, (b) differing numbers and observations within individuals (e.g., permitting missing data), and (c) unevenly spaced data collection. Using HLM, within- and between-person effects are simultaneously estimated; intercepts and slopes are predicted. Data was modeled with an unstructured covariance matrix and was estimated with full maximum likelihood.

We approached model development and evaluation in a systematic and sequential manner. This exploratory approach is consistent with recommendations to pursue model-generating approaches in complex models (e.g., Joreskog, 1993) by first understanding the relatively simpler relations between the variables (e.g., McCoach, 2010; O’Connell, Logan, Pentimonti, & McCoach, 2013) and assessing the viability of more complexity based on the results. Given our relatively small sample size ($N = 35$) with varying numbers of waves of data (ranging from 1 to 7; $M = 3.24$), we anticipated being limited in the number of variables we could add to each predictive model. Our a priori research hypotheses fell into two sets of questions that aligned with two distinct approaches to modeling. First, we assessed for the presence of linear and quadratic change over time (months) for the two study variables (i.e., strength of faith, PWB). Second, to best understand the compositional effects of the time-covarying variables on the dependent variable, we ran a model predicting PWB as a function of
strength of faith. Additionally, we included the L2 variable, relationship to the victims. To create a final model, we used statistically significant predictors from both the change-over-time and composite effects analyses.

Chapter III
Results

Data Preparation and Missing Data

Longitudinal data collection frequently results in large amounts of missing data at later waves; this was true in our circumstance. Fortunately, HLM can accommodate circumstances where participants have differing numbers of unevenly spaced observations. Even so, it is important to manage missing data in a systematic manner that maximizes power and minimizes bias. We began the process of evaluating and treating missing data for each wave, separately. Specifically, for each wave of data collected we first assessed the percentage of item-level missingness. Because multiple imputation can be an effective strategy for managing missing data with datasets of up to 24% missing data (Olinsky, Chen, & Harlow, 2003), we evaluated each case to see if any exceeded the 24% criteria. Although a number of our respondents missed entire waves, when they did complete a wave, they tended to answer the survey in its entirety. Consequently, none were deleted.

Correlations among variables and their means and standard deviations are presented in Table 1. At the outset we note that the aggregate mean of our predictor variable strength of faith \((M = 3.593)\), was higher than the midpoint of the 1 to 4 scaling of the measure. In contrast, the aggregate mean of relationship to victim(s) fell below the midpoint, with scaling of 0 to 3 \((M = .219)\). Similarly, the psychological well-being aggregate mean \((M = 2.486)\) fell below the midpoint of the 1 to 6 scale.
Table 1

*Correlations among Level 2 (Between Persons) Variables and the Aggregate of the Outcome Variable*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Relationship to Victim(s)</td>
<td>.219</td>
<td>.713</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Strength of Religious Faith</td>
<td>-.268</td>
<td>3.593</td>
<td>.512</td>
<td></td>
</tr>
<tr>
<td>3. Psychological Well-Being</td>
<td>.098</td>
<td>-.317</td>
<td>2.486</td>
<td>.723</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05

Assessing Longitudinal Growth Trajectories

Our first purpose was to identify a longitudinal growth trajectory by estimating the fit of linear and quadratic growth models to the repeated measures variables of interest (i.e., psychological well-being, strength of religious faith). We followed the model building approach recommended by O'Connell, Logan, Pentimonti, and McCoach (2013). We modeled each variable separately, beginning with an empty model (i.e., containing no predictors). This model (Model A) was used to determine how much variation existed between students, while ignoring time. In this model we fitted a baseline model with no growth; that is, the model contained random intercepts for all persons at L1 and no slope terms. Using the PWB variable as an example (Table 2), $\beta_{00} = 2.52$ was the estimated overall mean PWB score across all students and all occasions. Random error between students on the overall intercept is presented with the variance component; $r_{0i}$ and $e_{it}$ represent random error within students from their own mean score. Although this model does not describe growth, it is a useful starting point because it allows for the partitioning of between ($r_{0i}$) to total ($r_{0i} + e_{it}$) variance. The resultant interclass correlation (ICC) for PWB suggested that 65% of the variance lies between students; 35% is due to variation within students across occasions.
We counted time in months. Wave 1, the first survey, was coded 0. Subsequent survey dates were calculated by subtracting the automatic date-stamp of the online survey at each wave from the first survey date. For example, if someone took the first survey July 1, 2013, and completed the 2-week re-entry survey on July 15, 2013, they would have a time variable of .5 (i.e., approximately half a month). In Model B we added the Time variable (months since survey). This model included a random intercept (i.e., allowing participants to vary in levels of PWB when Time = 0) but a fixed slope (i.e., in this model students were assumed to grow in a linear fashion and at the same rate). In the Model B, $\beta_{10}$ was .011 ($p = .105$). Model C added a random (rather than fixed) slope to the model. Model D assessed for quadratic change by squaring the Time variable and adding it. In model D the intercept was random, but both slope and curvature were fixed. In Model E the slope was free to vary; in Model F, the curvature was free to vary. Although Model B provided some indication of a linear growth in PWB, a review of the remaining $\beta_{10}$ and $\beta_{20}$ coefficients makes it clear that neither linear nor quadratic growth models fit the data well. Yet, the significant variance components suggested that there was significant variance to model between and within participants. Had there been an identifiable growth model, the deviance statistic could have been used to compare changes in model fit.

Although the results were largely nonsignificant, the information was useful in addressing the first purpose of our study. That is, while individuals experienced increases and decreases in psychological well-being, the group data was not best explained with a linear or quadratic model as a function of time. The resulting information from this set of analyses was critical in guiding us to exclude time as a predictor variable in the next set of analyses.
Table 2

Evaluating the Fit of Linear and Quadratic Growth Models on Study Variables

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Variance Components</th>
<th>Deviance</th>
<th>Par</th>
<th>Mixed Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_{00}$</td>
<td>$\beta_{10}$</td>
<td>$\beta_{20}$</td>
<td>$r_{0i}$</td>
<td>$r_{1}$</td>
</tr>
<tr>
<td>Psychological Well-Being: ICC = 65%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>2.52</td>
<td></td>
<td>.389***</td>
<td>.213</td>
</tr>
<tr>
<td>B</td>
<td>2.46</td>
<td>.011</td>
<td>.382***</td>
<td>.208</td>
</tr>
<tr>
<td>C</td>
<td>2.46</td>
<td>.009</td>
<td>.358***</td>
<td>.001**</td>
</tr>
<tr>
<td>D</td>
<td>2.51</td>
<td>-.017</td>
<td>.001</td>
<td>.361***</td>
</tr>
<tr>
<td>E</td>
<td>2.51</td>
<td>-.021</td>
<td>.001</td>
<td>.357***</td>
</tr>
<tr>
<td>F</td>
<td>2.51</td>
<td>-.031</td>
<td>.002*</td>
<td>.390**</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>95% CI</td>
<td>p</td>
<td>148</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
<td>--------</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>A</td>
<td>3.55</td>
<td>.140***</td>
<td>.143</td>
<td>148.87</td>
</tr>
<tr>
<td>B</td>
<td>3.57</td>
<td>.142***</td>
<td>.141</td>
<td>148.49</td>
</tr>
<tr>
<td>C</td>
<td>3.57</td>
<td>.148**</td>
<td>.000</td>
<td>148.46</td>
</tr>
<tr>
<td>D</td>
<td>3.59</td>
<td>.145***</td>
<td>.140</td>
<td>148.32</td>
</tr>
<tr>
<td>E</td>
<td>3.58</td>
<td>.153**</td>
<td>.000</td>
<td>148.26</td>
</tr>
<tr>
<td>F</td>
<td>3.58</td>
<td>.175**</td>
<td>.001</td>
<td>147.63</td>
</tr>
</tbody>
</table>

Strength of Religious Faith: ICC = 50%

Note. Model A is intercept only. B includes Month with random intercept and fixed slope. C includes Month with random intercept and slope. D includes Month and Month^2 with random intercept but fixed slope and curvature. E includes Month and Month^2 with random intercept and slope but fixed curvature. F includes Month and Month^2 with random intercept, slope and curvature. † p < .10, * p < .05, ** p < .01, *** p < .001.
Modeling Discontinuity in Time

An identifiable event such as a campus shooting interferes with the appropriateness of a simple linear or curvilinear analysis of growth. Singer and Willett (2003) outline a process of fitting a taxonomy of multilevel models to evaluate the differences in the trajectories before and after a discontinuous event, such as a campus shooting. This entails a systematic process of including and excluding the months variable, the exposure to the shooting variable (before, after), and the interaction of the exposure to the shooting and months variable. We augmented this model by following Enders and Tofighi’s (2007) guidelines for evaluating the compositional effects of strength of faith by entering it as a L1 change over time variable as well as an aggregated L2 variable. Our proposed model was further complicated with the inclusion of proximity to the victim variable on L2. Naturally, this involved evaluating various combinations of variables.

In our final model months and the interaction MonthsXShooting (i.e., included as part of Singer and Willett’s [2003] process) were eliminated; the only remaining indicator of time (a L1 variable) was before and after the shooting. Strength of faith was retained in the model in its compositional form, entered both as a L1 variable and also as a L2 variable (aggregated over time). Proximity to the victim was entered as a L2 variable.

Level-1 Model

\[ MEANPWB_{it} = \pi_{0i} + \pi_{1i}(MEANSRF_{it}) + \pi_{2i}(SHOOT1_{it}) + e_{it} \]

Level-2 Model
\[
\pi_{0i} = \beta_{00} + \beta_{01}(AGGSRF_i) + r_{0i}
\]
\[
\pi_{1i} = \beta_{10} + \beta_{11}(AGGSRF_i) + r_{1i}
\]
\[
\pi_{2i} = \beta_{20} + \beta_{21}(PRXVIC_i) + \beta_{22}(AGGSRF_i) + r_{2i}
\]

As shown in Table 3, 2.58 was the estimated, average psychological well-being prior to the shooting, with no proximity to the victim, and at the mean of strength of religious faith. Strength of faith had a significant effect on psychological well-being, such that those who are 1 point higher in strength of faith are on average .78 points lower in psychological well-being. A 1-point fluctuation in strength of faith resulted in a corresponding .40 decrease in psychological well-being. Further, relative to other individuals, a 1 point increase aggregated strength of faith changed the degree of the slope by -1.48, such that fluctuations in strength of faith have a magnified effect on psychological well-being. The effect of exposure to the shooting was only observed in its interaction with aggregate strength of faith, such that following the shooting a 1-point increase in aggregate strength of faith resulted in a corresponding increase in psychological well-being of .52.
Figure 1. The moderating effects of proximity to the victim (PRVIC) and aggregate strength of faith (AGGSRF) on the relationship and aggregate between strength of faith (MEANSRF) and psychological well-being (MEANPWB).

Understanding the relations between these variables may be facilitated by reviewing associated graphs. As mentioned above, disregarding the shooting, strength of faith had a negative relationship with PWB. This meant that greater strength of faith (in aggregate and at any given point in time), meant lower PWB. This can be seen in Figure 1, especially in the “before shooting” column, and somewhat in the “after shooting” column. Similarly, in Figure 2, we see that PWB declined as strength of faith increased for all. The only exception was those who had the lowest overall strength of faith, these individuals showed consistent low PWB. Additionally, Table 3 shows that PWB did not change in a statistically significant manner in response to exposure to the shooting ($B_{20} = -0.010, p = .932$) nor proximity to the victim ($B_{21} = -0.039, p = .837$). However, any negative effects to PWB as a result of such were mitigated by
aggregate strength of faith \((B_{22} = 0.522, p = .057)\). This was the only context in which higher levels of faith were found to be protective.

![Figure 2](image)

**Figure 2.** The moderating effects of exposure to the campus shooting (SHOOT1) and aggregate strength of faith (AGGSRF) between strength of faith and psychological well-being.

Table 3

**Final estimation of fixed effects**

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx. d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, (\pi_0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, (\beta_{00})</td>
<td>2.580665</td>
<td>0.101618</td>
<td>25.396</td>
<td>33</td>
<td>&lt;0.001</td>
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<tr>
<td>AGGSRF, (\beta_{01})</td>
<td>-0.776243</td>
<td>0.240716</td>
<td>-3.225</td>
<td>33</td>
<td>0.003</td>
</tr>
<tr>
<td>For MEANSRF slope, (\pi_1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, (\beta_{10})</td>
<td>-0.399681</td>
<td>0.159716</td>
<td>-2.502</td>
<td>33</td>
<td>0.017</td>
</tr>
<tr>
<td>AGGSRF, (\beta_{11})</td>
<td>-1.483518</td>
<td>0.557322</td>
<td>-2.662</td>
<td>33</td>
<td>0.012</td>
</tr>
</tbody>
</table>
For SHOOT1 slope, $\pi_2$

<table>
<thead>
<tr>
<th>Random Effect</th>
<th>Standard Deviation</th>
<th>Variance Component</th>
<th>d.f.</th>
<th>$\chi^2$</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRCPT2, $\beta_{20}$</td>
<td>-0.010197</td>
<td>0.118030</td>
<td>-0.086</td>
<td>32</td>
<td>0.932</td>
</tr>
<tr>
<td>PRXVIC, $\beta_{21}$</td>
<td>-0.038686</td>
<td>0.186085</td>
<td>-0.208</td>
<td>32</td>
<td>0.837</td>
</tr>
<tr>
<td>AGGSRF, $\beta_{22}$</td>
<td>0.521614</td>
<td>0.264653</td>
<td>1.971</td>
<td>32</td>
<td>0.057</td>
</tr>
</tbody>
</table>

As demonstrated in Table 4, there was not a main effect of exposure to the shooting on psychological well-being. In this model 2.49 was the estimated average PWB prior to the shooting with no proximity to the victim. Neither exposure to the shooting ($B = 0.087, p = 0.486$) nor proximity to the victim ($B = -0.038, p = 0.841$) had a significant effect.
Table 4
Final estimation of fixed effects

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx. d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\pi_0$</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\beta_{00}$</td>
<td>2.485501***</td>
<td>0.108835</td>
<td>22.837</td>
<td>34</td>
<td>&lt;0.001</td>
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<tr>
<td>For SHOOT1 slope, $\pi_1$</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\beta_{10}$</td>
<td>0.086863</td>
<td>0.123321</td>
<td>0.704</td>
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<td>0.486</td>
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<td>-0.038443</td>
<td>0.189655</td>
<td>-0.203</td>
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<td>0.841</td>
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</table>

<table>
<thead>
<tr>
<th>Random Effect</th>
<th>Standard Deviation</th>
<th>Variance Component</th>
<th>d.f.</th>
<th>$\chi^2$</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRCPT1, $r_0$</td>
<td>0.42178</td>
<td>0.17790</td>
<td>21</td>
<td>61.21315</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SHOOT1 slope, $r_1$</td>
<td>0.40255</td>
<td>0.16205</td>
<td>20</td>
<td>37.18331</td>
<td>0.011</td>
</tr>
<tr>
<td>level-1, $e$</td>
<td>0.41614</td>
<td>0.17317</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^\dagger$ p < .10, * p < .05, ** p < .01, *** p < .001.

Chapter IV

Discussion

In recent years, the occurrence of active shooter incidents has become an increasing public safety concern. Individuals who have primary or secondary exposure to these events may experience a variety of post-traumatic outcome trajectories as a result (Bonanno, 2008). Due to the inherent limitations in the ability to research these types of events, little is known about possible characterological or contextual risk and protective factors following these incidents. I chose to quantitatively explore how students’ emotional proximity with victims impacted PWB trajectories following an active shooting incident. Further, I also sought to explore how students’ strength of faith moderated the relationship between emotional proximity to victims and PWB.
In terms of statistical significance and stability, the most salient finding was the inverse relationship between strength of faith and PWB for all but those whose overall strength of faith was low (in their case, PWB remained lower and flat). That is, in general, the stronger the participants’ faith (in the aggregate or at any given point in time), the lower their PWB. Contrary to the a priori hypotheses, there was not a consistent effect upon PWB as a result of exposure to the shooting or emotional proximity to the victim. Figure 1 suggests that PWB is lower for those who have closer proximity to the victim; however, these effects were small and not statistically significant. This is likely due to the limited number of observations ($n = 69$) which occurred after the shooting. Lastly, strength of faith had a curious, protective factor for exposure to the campus shooting in that possible negative effects to PWB were mitigated by aggregate strength of faith.

**Nonsignificant Effects for Exposure to the Campus Shooting and Proximity to the Victim(s)**

My results were contrary to the hypothesis that exposure to the campus shooting would result in a reduction of PWB. Visual examination of Figure 1 illustrates this curious finding. For those students with lowest aggregate SRF, post-shooting PWB appears to decline. In contrast, for those with moderate and high levels of SRF, PWB appears to increase. Thus, it is not a statistical surprise that when exposure to the campus shooting was added to the model, the effect was nonsignificant. From a research methodology perspective, it is likely that the spottiness of the data contributed to this finding; of the 114 repeated measures observations, only 69 occurred after the shooting.

Results also contradicted the hypothesis that proximity to the victim would result in decreased PWB. Examination of the “after the campus shooting” column in Figure 1 shows that at each level of strength of faith, PWB is slightly lower for those with any proximity to the
victim. Yet the statistical evaluation of this effect was not significant. Again, spottiness of the data likely contributed to this finding. Of the 35 participants, only 6 had any proximity to the victim(s).

Given these findings, the arguments regarding adjustment trajectories following traumatic events have support. As noted previously, Mancini, Bonanno, and Clark (2011), highlighted the “multiple and often divergent trajectories” that occur following adverse events (p. 144). While psychology as a field tends to focus on pathology, these results highlight the presence of resilience or resistant trajectories in individuals following traumatic events. This type of trajectory is frequently overlooked, even with increasing evidence that resilience is one of the most common outcome trajectories (Mancini, Bonanno, & Sinan, 2015; deRoon-Cassini, Mancini, Rusch, & Bonanno, 2010; Bonanno, 2008). Additionally, these resilient trajectories have also been found to be the most common trajectory in other studies following active shooting incidents specifically (Mancini et al., 2016; Orcutt et al., 2014).

Also of note, of the students involved in this study, many left for international immersion learning experiences to countries like Rwanda and Haiti, where they may have been exposed to other stressors, like witnessing extreme human suffering. These experiences and the timing of students’ international immersion learning trips may have further complicated various possible post-adjustment trajectories.

The Stronger the Religious Faith, the Lower the PWB

I had hypothesized that greater strength of religious faith would result in higher PWB; however, the opposite of this may be the most significant and stable finding. Prior to the shooting, greater strength of faith led to significantly lower levels of PWB. This was true at both aggregate (i.e., overall faith results in lower PWB) and at any given point in time (i.e., a
fluctuation in faith that is stronger, results in a decrease in faith). My research finding is yet another example of the heterogenous outcomes found when examining religiosity constructs. Various aspects of religiosity have been found to result in negative outcomes (Feder et al., 2013; Plante & Canchola, 2004; Shooka, Al-Haddad, & Raees, 1998; Zukerman, Korn, & Fostick, 2017). For example, Trenholm, Trent, and Compton’s (1998) research provided support that negative religious conflict may uniquely contribute to panic disorder due to anxious cognitions exacerbated by the need for perfection and approval.

Other research has highlighted that varied outcomes might be due to different aspects of religiosity (i.e., extrinsic vs. intrinsic; Stratta et al., 2012; Tait, Currier & Harris, 2016). In line with this thinking, Singh and Bano’s (2017) study showed that intrinsic religiosity was significantly positively correlated with PWB constructs like self-acceptance, while extrinsic religiosity was not significantly correlated with any PWB constructs. Positive religious coping has been associated with positive world assumptions, while the opposite was true for negative religious coping, which, in turn, was also associated with increased avoidance symptoms (Zukerman & Korn, 2014). This aligns with Allport’s (1950) understanding that different religious subtypes can lead to both positive or negative outcomes (Chan & Rhodes, 2013; Shaw, Joseph, & Linley, 2005; Zukerman, Korn, & Fostick, 2017). This result may be due, in part, to the complicated development of young adults’ religious beliefs, and the religious or spiritual cultures in which they were raised (Chan, Tsai, & Fuligni, 2015; Barry & Abo-Zena, 2014).

**Strength of Faith may be Protective**

Strength of religious faith may have been protective following the active shooting incident. That is, following the campus shooting, students who had greater strength of religious faith experiencing improved PWB. Considering this finding, perhaps Pargament (1997) was
correct that religiosity has particular salience following trauma due to "its concern with death, suffering, tragedy, evil, pain, and injustice" (p. 27). This finding supports other research that indicates religious-related cognitive schemas may be protective following traumatic events (Zukerman, Korn, & Fostick, 2017; Zukerman & Korn, 2014), and we may speculate that individuals’ with greater strength of religious faith possess schemas that protected them from negative outcomes following the shooting. Granted, this may differ from group to group, depending on how people make meaning following traumatic events.

**Clinical Implications**

Consistent with the local clinical scientist model, clinical practice informs research directions, and research provides information for clinical best practices. Implications from our study include the importance of assessing individuals’ possible religiosity and religious meaning-making following active shooting incidents. Diversity awareness and training for clinical practice is an important competency for psychologists and mental health providers; however, many might feel uncomfortable exploring this topic. Providers should carefully assess how individuals’ spiritual beliefs are contributing to their meaning-making of traumas like active shooting incidents, and how they might be alleviating or adding to the individuals’ presenting problems. This could be done through a cognitive-behavioral lens, exploring beliefs about self, others, and the world, such as is used in cognitive processing therapy, an evidence-based therapy for post-traumatic stress disorder.

**Strengths and Limitations**

Strengths of this study include its longitudinal design, which had participants’ data from up to two years prior to the shooting, and two years after. The longitudinal nature provides a more naturalistic view of PWB and its relationship with other variables, before and after the
shooting. Secondly, while religiosity is often neglected in research, from a local clinical scientist model, its inclusion in our study benefited those impacted by the active shooting incident for whom religiosity was salient.

Despite these strengths, my study’s limitations involve both size and sample characteristics, as well as challenges in measuring variables. Firstly, my sample size of 35 students, with 114 observations, while meeting the requirements set forth by McCoach (2010), is not ideal for longitudinal analysis because it is likely underpowered and the data were not consistently collected over time. That is, there are gaps in the data set such that the average number of observations in the longitudinal dataset was 3.24 (on a range from 1 to 7). Although HLM can handle this type of missingness, it is possible this missing data could have made it challenging to detect meaningful change over time. We also had a limited number of students who claimed to have some type of relationship with victims, which limited our ability to examine relationship with victims as a moderating variable. Lastly, students’ trajectories could have been further impacted and complicated by their international immersion learning experiences, impacting our study outcomes as a result.

**Future Directions**

Given the limited field of research on active shooting incidents, numerous future research possibilities exist. Specific to my study, examining different aspects of trauma severity, such as physical distance as well as relationships with victims or survivors could shed a light on how active shooting incidents have an impact on the surrounding community. Even with our limited data set, we were able to see the effect of how knowing victims decreased PWB; therefore, this type of relational proximity deserves further exploration.
Additionally, positive psychology constructs deserve more attention in research in general, and following active shooting incidents, specifically. Research following active shooting incidents should strive to assess outcomes holistically. Incorporating additional measures of positive psychology constructs, like PWB, could provide a more complete picture of outcomes following active shootings.

In conclusion, the research covering active shooting incidents is very limited and still requires deeper study. Despite this need, there are very real logistical limitations to researching outcomes effectively and ethically. Any future research will need to be championed by those who are willing to embrace the challenges of this area of study.
References


