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RELIGIOUS COPING AFTER NATURAL DISASTER: PREDICTING LONG-TERM
MENTAL AND PHYSICAL HEALTH IN SURVIVORS OF HURRICANE KATRINA

A Thesis Presented
by
MONICA ARKIN

Submitted to the Office of Graduate Studies,
University of Massachusetts Boston,
In partial fulfillment of the requirements for the degree of

MASTER OF ARTS

December 2021

Clinical Psychology Program

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MENTAL AND PHYSICAL HEALTH IN SURVIVORS OF HURRICANE KATRINA

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ABSTRACT

RELIGIOUS COPING AFTER NATURAL DISASTER: PREDICTING LONG-TERM MENTAL AND PHYSICAL HEALTH IN SURVIVORS OF HURRICANE KATRINA

December 2021

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Directed by Professor Jean Rhodes

Natural disasters are increasing with regards to both frequency and severity (CRED & UNDRR, 2015; NOAA National Centers for Environmental Information (NCEI), 2020). Exposure to natural disasters, in turn, increases the likelihood for the development of adverse mental and physical health outcomes (Augustinavicius et al., 2021). Religion and spirituality is an accessible form of coping that many people turn to during and after natural disasters, and may be especially valuable to those who face barriers to accessing mental health treatment or may not feel served by formal mental health institutions (Abu-Raiya & Pargament, 2015; Bryant-Davis & Wong, 2013). However, there are distinctions between positive religious coping (PRC) and negative religious coping (NRC) both conceptually and in their relation to mental health outcomes (Pargament, Feuille, & Burdzy, 2011). This study

utilized data from the Resilience in Survivors of Katrina (RISK) project, an ongoing longitudinal study of low-income, female, primarily Black Hurricane Katrina survivors, and drew on four waves of data from before the hurricane in 2005 through 2018 to explore the longitudinal relationship between religious coping and mental and physical health outcomes. Hierarchical linear regression analyses revealed that NRC was a significant predictor of post-traumatic stress, $b = .14, p < .05$, and general psychological distress, $b = .11, p = .05$, whereas PRC was a significant predictor of post-traumatic growth, $b = .34, p < .001$. Hierarchical logistic regression analyses revealed no significant associations between religious coping style and physical health outcomes. Better understanding the ways in which religious coping is associated with later mental and physical health is important for both clinicians and religious leaders to understand the coping processes of those they serve, especially during times of severe distress such as in the wake of a natural disaster.

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CHAPTER 1:
SPECIFIC AIMS

Goals

Overarching goal: To investigate the relationship between short-term religious coping strategies and long-term mental and physical health outcomes, and to explore how different types of religious coping (e.g. positive and negative) are associated with differential outcomes.

Goal #1: To determine associations between types of post-disaster religious coping patterns and long-term mental health outcomes.

Goal #2: To determine associations between types of post-disaster religious coping patterns and long-term physical health outcomes.

Hypotheses

Hypothesis #1: Positive religious coping will be positively associated with later post-traumatic growth; negative religious coping will be positively associated with later post-traumatic stress and general psychological distress.

Hypothesis #2: Positive religious coping will be negatively associated with later physical health problems, including headaches/migraines, back problems, digestive

problems, and worse global physical health; negative religious coping will be positively correlated with headaches/migraines, back problems, digestive problems, and worse global physical health.

CHAPTER 2: BACKGROUND & SIGNIFICANCE

Introduction

Weather-related disasters, including hurricanes, floods, and earthquakes, are challenging experiences that can place people under considerable stress. Some of the many stressors associated with natural disasters are losing loved ones, experiencing injuries, witnessing traumatic events, losing resources, and forced relocation. As a result, survivors of natural disasters are at risk for developing a range of mental and physical health problems (Cook, Watson, Buynder, Robertson, & Weinstein, 2008; Goldmann & Galea, 2014; Norris et al., 2002; Rhodes et al., 2010; Rubonis & Bickman, 1991). Marginalized groups such as women, racial and ethnic minorities, and people of low socioeconomic status (SES) are especially vulnerable to negative outcomes following natural disasters (Donner & Rodriguez, 2008; Enarson, 2012; Goldmann & Galea, 2014; Mohammad & Peek, 2019; Norris et al., 2002). As such, it is critically important to identify factors that shape risk and resilience among disaster-exposed vulnerable populations. This study will investigate how religious coping after a natural disaster affects later mental and physical health outcomes in a sample of low-income, female survivors of Hurricane Katrina.

Adverse events such as disaster, child abuse, sexual violence, and war propel us to cope in various ways. Coping with such events often involves managing distressing feelings as well as trying to formulate an explanation or underlying meaning for the event (Dodds, 2015; Joseph, Yule, & Williams, 1993; Park, 2010). Many people around the world turn to religion when confronted with adverse events (Bryant-Davis & Wong, 2013; Davis et al., 2019; Park, 2005). However, religious coping and explanations may be especially salient when we experience events that are, at least to some extent, outside of human control (J. Aten & Boan, 2016). This is often the case with natural disasters. There is a growing recognition of human influence on the advancement of climate change, and severe weather events that were previously classified as entirely “natural” are now often considered at least partially due to human actions (Dodds, 2015; Leiserowitz et al., 2019). However, Pew Research Center finds that a majority of U.S. adults understand that climate change is due to both human actions within our control and Earth patterns beyond our control (Funk & Hefferon, 2019). Therefore, while natural disasters may no longer be perceived as entirely outside of human responsibility, they are at least in some part due to natural patterns. This lack of total human control may make religious coping especially salient in natural disaster contexts. For example, a coal mine fire has been burning in Centralia, Pennsylvania since 1962, costing millions of dollars in damage and ultimately displacing almost the entire population. Although a vast majority of Centralia’s residents at the time identified as religious, a study conducted in the 1980s found that many did not turn to religion to cope with the fire because it was caused by humans (Kroll-Smith & Couch, 1987). To this point, one resident remarked, “It’s not a natural disaster. God has better things to do” (Kroll-Smith

& Couch, 1987, p. 31). On the other hand, research finds that many survivors of natural disasters such as hurricanes, earthquakes, tornadoes, and landslides – events for which at least some element is outside of human control – use religion as a framework to cope. To this end, a comparison of survivors of Hurricane Katrina and survivors of an earthquake in Chile found that attributing the disasters to God was among the most common explanations. Across both groups of survivors, the likelihood of turning to religion to make sense of the disaster increased when survivors had witnessed unpredictable, disruptive, and uncontrollable experiences (Stephens, Fryberg, Rose Markus, & Hamedani, 2012).

For many, religion brings comfort in times of uncertainty as one of its functions is to aid in the search for significance (K. I. Pargament & Abu-Raiya, 2007). This is especially salient during stressful circumstances, including trauma, where religion helps provide a framework for making meaning (Milstein, 2019). Yet religion is a broad concept, and is associated with other constructs that have been shown to influence well-being, such as social support and optimism (Ai, Park, Bu Huang, Rodgers, & Tice, 2007; C. S. Chan, Rhodes, & Pérez, 2012; Krause, Ellison, Shaw, Marcum, & Boardman, 2001; Peres et al., 2007). A more critical examination is required to determine which specific components of religiosity are protective and in what ways (Kucharska, 2020; Milstein, 2019). Of particular interest in natural disaster contexts is the way in which survivors draw upon religion to understand significant and potentially life-altering events. Pargament (1997) defines the multifaceted and dynamic process in which people draw upon sacred and spiritual beliefs in order to search for meaning and reduce distress as “religious coping.”

Much of the research on religious coping in monotheistic cultures examines the dichotomy of positive religious coping (PRC) and negative religious coping (NRC). PRC is characterized by a secure relationship with God, from which one can draw strength and comfort. NRC consists of spiritual struggles, such as questioning the power of God, or feeling that one has been punished or abandoned by God (Pargament, Feuille, & Burdzy, 2011). In the face of adversity, PRC is generally protective – predicting fewer mental and physical health symptoms – and NRC is a risk factor linked to more mental and physical health symptoms (Pargament et al., 2011). Research within monotheistic cultures has supported this dichotomy between PRC and NRC across diverse international contexts (e.g. U.S., Iran, Israel, Nigeria, Croatia, Pakistan), stressors (e.g. natural disasters, serious illness, terrorism, combat), and outcomes (e.g. post-traumatic stress, post-traumatic growth, depression, alcohol use, subjective quality of life, mortality, general psychological distress, somatic symptoms) – indicating that PRC is more often linked to positive outcomes and NRC is more often linked to negative outcomes (Ano & Vasconcelles, 2005; Bryant-Davis & Wong, 2013; Gerber, Boals, & Schuettler, 2011; Hamilton & Stampone, 2013; Henslee et al., 2015; Nikmanesh & Khagebafgi, 2016; K. I. Pargament, Koenig, Tarakeshwar, & Hahn, 2001; Smith, Pargament, Brant, & Oliver, 2000; Wadsworth, Santiago, & Einhorn, 2009; Watt et al., 2014; Zukerman, Korn, & Fostick, 2017). Emerging research with participants of the non-monotheistic Buddhist and Hindu traditions has also supported this dichotomy between outcomes associated with PRC and NRC (Abu-Raiya & Pargament, 2015).

The religious coping research focused on natural disaster contexts is no exception to this rule, and generally indicates that PRC is associated with positive outcomes post-disaster

while NRC is associated with negative outcomes post-disaster. For example, Chan and Rhodes (2013) found that, among low-income female survivors of Hurricane Katrina, PRC was associated with post-traumatic growth and NRC was associated with general psychological distress. Their study measured religious coping and mental health outcomes four years after the hurricane and was able to use pre-disaster data to control for baseline mental health. Other studies examining the role of religious coping after natural disaster have similarly found associations between components of NRC and negative psychological outcomes (e.g. Feder et al., 2013; Rosellini et al., 2014; Shannonhouse et al., 2019; Smith et al., 2000) and associations between components of PRC and positive psychological outcomes or resilience (e.g. Shannonhouse et al., 2019; Smith et al., 2000). Notably, all of these studies measured post-disaster religious coping and mental health functioning at the same point in time. While these findings are informative about patterns in religious coping and mental health outcomes, cross-sectional analyses limit our ability to infer directionality in these relationships. For example, it is possible that mental health outcomes are actually influencing religious coping styles, rather than vice versa.

Relatively few studies on the role of religious coping after natural disasters have taken a long-term perspective or included pre-disaster data. According to a recent review that included 10 studies on religious coping and/or meaning-making after natural disaster (Kucharska, 2020), only one study controlled for pre-disaster baseline data (i.e., Chan & Rhodes, 2013). Nonetheless, this study measured religious coping and mental health functioning concurrently, and thus did not establish a temporal relationship.

Particularly since both the frequency and severity of natural disasters are increasing (CRED & UNDRR, 2015; NOAA National Centers for Environmental Information (NCEI), 2020), there is a need to better understand how survivors' coping can impact their later mental and physical health. Understanding these patterns helps identify groups at risk of post-disaster psychopathology and/or health declines, and can provide insight into how interventions could promote positive mental and physical health outcomes. Namely, there is a growing need to identify how PRC and NRC may serve as protective and risk factors after natural disasters and determine how religious coping at one timepoint may predict health later on.

The Need for a Longitudinal Investigation of Religious Coping

Extant studies of religious coping typically measure PRC and NRC concurrently with target outcomes (e.g. Henslee et al., 2015; McElroy-Heltzel et al., 2018; Park, Sacco, & Mills, 2018; Zukerman et al., 2017) or within a relatively short period of time, such as six months (e.g. Smith et al., 2000; Wadsworth et al., 2009). The field is lacking studies that point to how religious coping is linked to long-term mental and physical health functioning (K. I. Pargament & Abu-Raiya, 2007; Peres et al., 2007). Further, there is a dearth of studies with baseline, pre-trauma data linking religious coping to post-trauma mental and/or physical health. A recent review of 79 quantitative studies examining the relationship between religiosity and psychological outcome after various types of trauma found that most studies utilized a cross-sectional design (Kucharska, 2020). Of the 11 studies that were longitudinal, only three included baseline data collected before the traumatic event. Among those three, only one study (Chan & Rhodes, 2013) focused on survivors of natural disasters. Having pre-

disaster data provides a clearer picture about post-disaster symptomology and associated risk and protective factors. For instance, Henslee and colleagues (2015) interviewed Hurricane Katrina survivors from southern Mississippi, another region in addition to Louisiana that was impacted, approximately one-and-a-half years after the storm. Within their sample of primarily non-Hispanic White adults (52% female, 49% male), they found that NRC was positively associated with depression, whereas PRC was negatively associated with depression. However, it is not known whether depressive symptoms developed after the disaster or if they were present before. If depressive symptoms existed before Hurricane Katrina, we would be unable to infer that post-disaster mental health is related to religious coping above and beyond pre-existing vulnerabilities. In other words, it is possible that participants who exhibited post-disaster NRC and depression were already depressed before the storm; their pre-disaster depression could have contributed to a negative coping style. Having pre-disaster baseline data allows us to factor in pre-existing strengths and vulnerabilities that may influence post-disaster outcomes regardless of, or in addition to, coping style.

There is also a lack of longitudinal studies on the physical health outcomes of natural disaster, independent of religious coping. Survivors of natural disasters may experience physical health declines as a direct result of the disaster, such as by injury or exposure to toxins. Declines in physical health may also be indirect outcomes of the disaster, due to disruptions in routine medical care or manifested as somatic symptoms that arise as a result of stress (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Cook et al., 2008; Schnurr & Green, 2004). Three specific somatic symptoms that have been linked to trauma in past

research are headaches/migraines, back problems, and digestive problems (Arcaya, Lowe, Waters, & Rhodes, 2019; Lowe, Willis, & Rhodes, 2014; Pacella, Hruska, & Delahanty, 2013; Wahlström, Michélsen, Schulman, Backheden, & Keskinen-Rosenqvist, 2013; Zukerman et al., 2017). In their meta-analysis of 62 studies examining the interactions between trauma, psychological outcomes, and physical health, Pacella, Hruska, and Delahanty (2013) note that a vast majority are cross-sectional. They explain that studying long-term health effects with multi-wave data is critical because physical health symptoms related to psychological distress may not appear until years after the onset of distress. Illustrating this point, a study of 1,101 Swedish travelers who were exposed to the 2004 Indian Ocean tsunami found that levels of general distress and post-traumatic stress 14 months post-disaster predicted later physical symptoms three years post-disaster (Wahlström et al., 2013). Along these lines, there is reason to believe that survivors of Hurricane Katrina may experience physical health symptoms such as headaches and migraines, digestive issues, and back pain several years after the disaster (Zacher et al., 2021). However, there is a noted paucity of longitudinal studies of health outcomes, especially those with pre-disaster data for comparison (Arcaya et al., 2019; Cook et al., 2008; Van Den Berg, Grievink, Yzermans, & Lebet, 2005). Within this line of inquiry, there is also a lack of research exploring the role of religious coping on physical health after potentially traumatic experiences. The limited research that does explore the role of religious coping on physical health tends to focus on health-related stressors such as hospitalization or severe illness (Cummings & Pargament, 2010). Within disaster contexts, most of the literature on religious coping looks exclusively

at mental health outcomes. There are no studies that have explored how PRC and NRC could serve to either perpetuate or mitigate physical health symptoms after a natural disaster.

The dearth of longitudinal studies on post-disaster health is especially pronounced when it comes to research that centers the experiences of people with marginalized identities. As mentioned previously, marginalized groups are especially vulnerable to negative outcomes after exposure to natural disasters. Pre-disaster inequality is exacerbated both during a disaster – in the emergency phase, and in its aftermath – during the recovery phase (Fussell, 2015; Tierney, 2007). This was illustrated in differentials by those affected by Hurricane Katrina in New Orleans: low-income residents were more likely to live in areas vulnerable to flooding and property damage, were less likely to have a car to enable evacuation, and received delayed disaster assistance compared to homeowners with private insurance (Fussell, 2015). When attention from the news media, researchers, and the public has diminished in the initial months and years following a disaster, marginalized communities may still be far from their pre-disaster baseline. Understanding how pre-existing vulnerability is magnified during and after disasters underscores the need for longitudinal research that is intentionally focused on survivors from marginalized groups (Fussell, 2015).

Current Study

The current study was designed to redress some of the limitations described above. As mentioned earlier, Chan & Rhodes (2013) is unique in its longitudinal framework and inclusion of pre-disaster baseline data on mental health functioning. The dataset from which that paper draws is the Resilience in Survivors of Katrina (RISK) project, an ongoing

longitudinal study of low-income, female, primarily Black Hurricane Katrina survivors that began in 2003 – two years before Hurricane Katrina made landfall in August 2005. Hurricane Katrina, which primarily affected northern Gulf coast communities in Louisiana and Mississippi, is on record as one of the most destructive natural disasters in U.S. history. In its immediate aftermath, the hurricane and subsequent flooding and destruction contributed to nearly 2,000 deaths (Knabb, Rhome, & Brown, 2006). New Orleans suffered extreme levels of damage as a failed levee system led to catastrophic flooding in the below-sea-level city. As a result, 70 percent of the housing units were flooded; low-income residents, particularly women and racial and ethnic minorities, were especially impacted by property loss and displacement (Fussell, 2015). The RISK dataset offers a holistic view into the lives of low-income women who resided in New Orleans at the time of Hurricane Katrina, capturing data across several timepoints (including pre-disaster) and including many diverse variables.

One of the variables that the RISK dataset captures is religious coping, which is particularly important given the high levels of religiosity in Louisiana. In 2014 Louisiana was ranked as the fourth most religious state in the U.S., a ranking that took into account residents' religious service attendance, frequency of prayer, belief in God, and perceived importance of religion in life. Seventy-one percent of Louisiana residents reported that religion is “very important” in their lives, compared to the national average of 53 percent (Pew Research Center, 2015). Among Black New Orleans residents, spiritual practice often draws from Christianity and African diasporic religions. The resulting traditions, such as second-line street parades and jazz funeral processions, greatly contribute to the local culture (Turner, 2017). Given the importance of religion for many Louisiana residents, and its

prominence in New Orleans culture, religious coping may be a valued resource for survivors of Hurricane Katrina. In an extension of the 2013 paper by Chan & Rhodes, the current study will draw on the fourth wave of data, which was collected between 2016 and 2018, 12 years post-disaster. This study will broaden the investigation in three strategic ways. First, it will extend the period of measurement for mental health outcomes from four years post-disaster to approximately 12 years post-disaster. Second, it will examine how religious coping affects physical health outcomes. Lastly, it will explore the role of religious coping as a prospective predictor of mental and physical outcomes, rather than a concurrent predictor.

CHAPTER 3:
RESEARCH DESIGN AND METHODS

Participants & Procedures

This investigation makes use of data from the Resilience in Survivors of Katrina (RISK) project, an ongoing longitudinal study of low-income, female, primarily Black Hurricane Katrina survivors. The project began as a prospective study of low-income parents enrolled in a community college educational support program (Brock & Richburg-Hayes, 2006). When Hurricane Katrina affected many of the New Orleans participants in 2005, the project shifted, and subsequent waves focused on life after the hurricane rather than the educational intervention program.

The RISK project includes five waves of data, but the current study draws from the four most recent waves. The initial wave of data (baseline) was collected before Hurricane Katrina between November 2003 and February 2005 via hard-copy surveys. The following wave of pre-Katrina data (PK) was collected in the months preceding the hurricane. PK was cut short when the storm began, and as a result only approximately half of the original sample responded (N = 492). For the purposes of this study, PK was used as the pre-Katrina comparison rather than the baseline wave. The reason for this decision is that certain variables required for the proposed analyses (optimism and religiosity) were not asked until

PK. This decision is consistent with the methods used in Chan & Rhodes (2013), an earlier paper that examined religious coping. The following three waves of data, which were collected after Katrina, include surveys conducted over telephone. The first post-Katrina, follow-up wave (F1) was gathered approximately one year after the storm, between March 2006 and March 2007. The second follow-up wave (F2) was gathered approximately four years post-Katrina, between March 2009 and April 2010. The third follow-up (F3), the most recent wave, was gathered approximately 12 years post-Katrina, between November 2016 and December 2018.

At baseline, parents between the ages of 18 and 34 who earned below 200% of the poverty line were recruited to participate. This yielded an original sample size of 1,019 at baseline. The sample size was 492 at PK, 711 at F1 (including 402 participants surveyed during PK), 752 at F2 (including 405 participants surveyed during PK), and 716 at F3 (including 373 participants surveyed during PK). Men and women completed the first four waves of data, but due to a relatively small sample of men, only mothers were recruited to participate in F3 data collection.

Measures

Religious coping

Religious coping was measured using the Brief-RCOPE, the most commonly used measure of religious coping (Pargament et al., 2011). This 14-item measure was developed from a larger initial measure of religious coping, the RCOPE, which consists of 105 items. Factor analysis of the RCOPE revealed two constructs, PRC and NRC, which are distinct from one another conceptually and in their associations with measures of well-being. The

resulting Brief-RCOPE was developed with two seven-item subscales to identify PRC and NRC. Most extant empirical studies utilizing the Brief-RCOPE have been conducted in the U.S. with Christian samples. The Brief-RCOPE has demonstrated good internal consistency across several study samples, including with African American women who are survivors of domestic violence and survivors of a large-scale disaster (residents of New York City after 9/11). Among a pooled sample consisting of participants from 30 studies of religious coping, of which 12 percent of the participants identified as Black and 33 percent affiliated as Protestant Christian, the median alpha for the PRC subscale was 0.92 and the median alpha for the NRC subscale was 0.81. Within this pooled sample, the PRC subscale has demonstrated good concurrent validity with measures of positive psychological and physical outcomes, whereas the NRC subscale has demonstrated good concurrent validity with measures of poor psychological and physical outcomes, such as mental health issues and pain.

Positive religious coping (PRC) was measured using the positive RCOPE subscale of the Brief-RCOPE (Pargament et al., 2011). The subscale contains seven items for which the respondent selected an option from a Likert scale ranging from 1 (a great deal) to 4 (not at all). An example item is, “Looked for a stronger connection with God.” A higher score indicates a higher level of positive religious coping. This scale was administered during F2. Cronbach’s alpha for this scale was .95 in the study sample.

Negative religious coping (NRC) was measured using the negative RCOPE subscale of the Brief-RCOPE. Like the positive RCOPE subscale, this subscale contains seven items for which the respondent selected an option from a Likert scale ranging from 1 (a great deal)

to 4 (not at all). An example item is, “Felt punished by God for my lack of devotion.” A higher score on this subscale indicates a lower level of negative religious coping. This scale was administered during F2. Cronbach’s alpha for this scale was .90 in the study sample.

Mental health

General psychological distress was measured using the K6 scale (R. C. Kessler et al., 2002). This scale contains six items assessing nonspecific psychological distress, for which the respondent selected an option from a Likert scale ranging from 1 (all the time) to 5 (none of the time). An example item is, “During the past 30 days, about how often did you feel nervous?” Previous validation studies have identified scores of 12 and above as indicating probable serious mental illness (Kessler et al., 2010). This scale was administered during PK and F3. Cronbach’s alpha for this scale was .69 at PK and .83 at F3.

Post-traumatic growth (PTG) was measured using the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). This scale contains 21 items, for which the respondent selected an option from a Likert scale ranging from 1 (not at all) to 5 (extremely). The 21 items are divided into five subscales: new possibilities, relating to others, personal strength, appreciation of life, and spiritual change. For this study, the two items consisting of the spiritual change subscale were removed in analyses in order to avoid confounding with religious coping. An example item from the new possibilities subscale (five items) is, “Since Katrina, I developed new interests.” An example item from the relating to others subscale (five items) is, “Since Katrina, I have more compassion for others.” An example item from the personal strength subscale (four items) is, “Since Katrina, I discovered that I’m stronger than I thought I was.” An example item from the appreciation of life subscale (3 items) is, “I

changed my priorities about what is important in life.” This scale was administered during F3. Cronbach’s alpha for this revised scale after removing the spiritual change subscale items was .95 in the study sample.

Post-traumatic stress (PTS) was measured using the Impact of Event Scale-Revised (IES-R) (Weiss & Marmar, 1997). This scale contains 22 items, for which the respondent selected an option from a Likert scale ranging from 0 (not at all) to 4 (extremely) about their reactions after Hurricane Katrina. The 22 items are divided into subscales for intrusion, hyperarousal, and avoidance reactions. An example item is, “I was jumpy and easily startled.” This scale was administered during F3. Cronbach’s alpha for this scale was .97 in this sample.

Physical health

Participants responded to four items assessing physical symptoms at PK and F3. *Back pain* was measured using a dichotomous item that asked, “In the past 12 months, have you had trouble with your back? For instance, pain in your lower or upper back?” Participants responded yes or no. *Digestive problems* were measured using a dichotomous item that asked, “In the past 12 months, have you had trouble with digestive problems? For instance, stomach ulcers, frequent indigestion, or frequent stomach upset?” Participants responded yes or no. *Frequent headaches or migraines* were measured using a dichotomous item that asked, “In the past 12 months, have you had trouble with frequent headaches or migraines?” Participants responded yes or no. *Global physical health* was measured using an ordinal item that prompted, “In general, would you say your health is...” Response options were excellent, very good, good, fair, or poor.

Covariates

Pre-Katrina demographics include race and ethnicity (categorical variable with response options of non-Hispanic White, non-Hispanic Black, Hispanic, and Other), age in years, number of benefits received by the individual or other members of their household (unemployment/dislocated worker benefits, supplemental security income (SSI) or disability income (DI), cash assistance or welfare (TANF), and/or food stamps), and number of children before Hurricane Katrina. This information was collected during PK.

Pre-Katrina religiosity was measured with two ordinal items about the frequency of religious service attendance (1 = never to 5 = several times per week) and the importance of religion in one's life (1 = not at all important to 5 = very important) before Hurricane Katrina. This information was collected during PK.

Perceived social support was measured with an abbreviated version of the Social Provisions Scale (Cutrona & Russell, 1987). Participants responded to 8 items with response options ranging from 1 (strongly disagree) to 4 (strongly agree). An example item is, "I have people in my life who value me." This scale was administered during PK for pre-Katrina social support and F3 for current social support. Including social support, a construct that is associated with religious involvement, as a covariate helps isolate the effects of religious coping from other factors that could also contribute to well-being. Cronbach's alpha for this scale was .82 at PK and .85 at F3 in this sample.

Optimism was measured using the Life Orientation Test-Revised (LOT-R) (Scheier, Carver, & Bridges, 1994). This measure consists of six items for which the respondent selected an option from a Likert scale ranging from 1 (strongly disagree) to 4 (strongly

agree). Half of the items are framed negatively (e.g. “If something can go wrong for me, it will”) and half of the items are framed positively (e.g. “I am always optimistic about my future”). Similar to social support, optimism is included as a covariate to help isolate the effects of religious coping from other constructs that could contribute to well-being. This information was collected during PK. Cronbach’s alpha was .54 in the study sample.

Hurricane exposure was measured using a survey designed by the Washington Post, the Kaiser Family Foundation, and the Harvard School of Public Health (Brodie, Weltzien, Altman, Blendon, & Benson, 2006). The survey asked participants whether they had any of the following 12 experiences as a result of Hurricane Katrina: went without fresh water, went without food, felt their life was in danger, lacked necessary medicine, lacked necessary medical care, had a family member who lacked necessary medical care, lacked knowledge of safety of their children, lacked knowledge of safety of other family members, death of family or friends, lose a house, lost a vehicle, lost a pet. All items were dichotomous and summed to create a composite score, with a higher score indicating more exposure to the hurricane (possible range = 0-12). This scale was administered during F1, approximately one year post-Katrina.

Data Analyses

Data were analyzed with SPSS Version 27. After creating the final analytical sample with listwise deletion, I compared participants removed and the remaining analytical sample to check for significant demographic differences between the groups. I then calculated descriptive statistics and frequencies of demographic variables, descriptive statistics of key

study variables, and created a correlation matrix for the independent and dependent variables analyzed in Aim #1.

To determine associations between post-disaster religious coping patterns and long-term mental health outcomes (Aim #1), I conducted six hierarchical linear regressions – measuring distinct associations with both PRC and NRC for each of the three outcome variables. In the first step, I entered several pre-Katrina covariates: demographics (race, ethnicity, age, number of benefits received, and number of children), religiosity, social support, optimism, and mental health (general psychological distress). Although each regression focused on a distinct mental health outcome variable (general psychological distress, PTG, and PTS), the covariate for pre-Katrina mental health used in each regression was PK general psychological distress. This is because the data do not include pre-disaster assessments of PTG and PTS. In the second step, I entered exposure to the hurricane. In the third step, I entered current social support. Concurrent social support was included in addition to PK social support since it is possible that perceived social support may have shifted after the hurricane, especially if participants were displaced from their communities. In the final step, I entered PRC and NRC as the independent variables, one at a time in separate regression analyses. This process was repeated three times, with regressions for both PRC and NRC as independent variables for each outcome variable: general psychological distress, PTG, and PTS. In cases of non-normality, dependent variables were transformed and models replicated to assess for divergences in the pattern of results.

To determine associations between post-disaster religious coping patterns and long-term physical health outcomes (Aim #2), I conducted eight hierarchical logistic regressions.

These analyses were nearly identical to those explained for Aim 1, except the independent variables were measures of physical health rather than mental health, and the pre-Katrina comparison variable was the corresponding physical health outcome rather than general psychological distress. In the first step, I entered pre-Katrina demographics (race, ethnicity, age, number of benefits received, and number of children), pre-Katrina religiosity, pre-Katrina social support, pre-Katrina optimism, and pre-Katrina physical health. The pre-Katrina variable was selected to match whichever outcome the current regression was assessing: back pain, digestive problems, headaches/migraines, or global physical health). In the second step I entered exposure to the hurricane. In the third step I entered current social support. In the final step, I entered PRC and NRC as the independent variables, one at a time in separate analyses. This process was repeated for all four physical health outcomes: back pain, digestive problems, headaches/migraines, and global physical health.

CHAPTER 4:

RESULTS

Preliminary Analyses

At PK, 82.1 percent of participants were Black, 9.8 percent were White, and 2.8 percent were Hispanic. When asked about the importance of religion in one's life on a scale from 0 (not at all important) to 4 (very important), the PK sample had a mean of 3.6 (SD = 1.2). This indicates that before Katrina, religion was important to many participants.

Listwise deletion yielded the sample size for the current study by only including participants who provided complete data on all variables needed for subsequent analyses. After removing cases for which relevant data were missing, the analytical sample for this study was 235 participants. Among the 284 participants who completed the PK survey and all three follow-up surveys, 49 (17%) were removed for missingness. Comparisons between the participants removed and the remaining analytical sample indicated no significant demographic differences between the groups. Comparisons consisted of independent samples t-tests and chi-square tests looking at age, race/ethnicity, number of benefits, income, highest educational attainment, number of children before Hurricane Katrina, and pre-Katrina religiosity (measured by both frequency of attendance at religious services and self-rated importance of religion in life).

The final sample is comprised of women who ranged in age from 19 to 35 at the time of Hurricane Katrina in 2005 ($M = 26.49$, $SD = 4.49$). A majority of the participants identified their race and ethnicity as Non-Hispanic Black (84.3%); the remaining participants identified as Non-Hispanic White (11.1%), Hispanic (3.4%), and Other (1.3%). Before Hurricane Katrina, only 6.4 percent of participants yielded scores indicating probable serious mental illness on the K6 measure of general psychological distress; whereas a vast majority (93.6%) yielded scores beneath the cutoff for serious mental illness. Participants reported experiencing a range of traumatic events in Hurricane Katrina; out of nine possible traumas listed the mean number of traumas experienced was 3 ($SD = 2.59$). Full descriptive statistics and frequencies for demographic variables can be found in Tables 1 and 2.

Participants in the analytical sample reported more PRC methods than NRC methods; among scores ranging from zero to 21, the mean score on the PRC subscale was 16.34 ($SD = 5.88$) and the mean score on the NRC subscale was 1.97 ($SD = 4.10$). All three continuous outcome variables measured in Aim 1 – general psychological distress, PTS, and PTG – yielded significant scores on the Shapiro-Wilk test and therefore were not normally distributed. General psychological distress and PTS were skewed down, whereas PTG was skewed high. For example, a majority of participants (88.5%) yielded scores below 13 on the K6 measure of general psychological distress, suggesting the absence of serious mental illness. Descriptive statistics for key study variables are presented in Table 3. Additionally, a correlation matrix of religious coping and the outcome variables of interest is presented in Table 4. PRC was significantly associated with PTG, whereas NRC was significantly associated with general psychological distress and PTS.

On a self-reported Likert scale of global physical health ranging from 1 (“excellent”) to 5 (“poor”), a majority of respondents were clustered toward the middle. The modal response was “good” (38.3%), followed in frequency by “very good” (26%) and “fair” (23.8%). Only 7.7 percent of participants described their health as “excellent” and only 4.3 percent described their health as “poor.” Reports of experiencing specific physical health outcomes within the previous 12 months showed good variability across participants: 49.4 percent reported back issues; 29.4 percent reported digestive issues; and 46.4 percent reported headaches and/or migraines.

Hierarchical Regression Analyses

Hypothesis #1

To test the hypothesis that PRC would be positively associated with later PTG and NRC would be positively associated with later PTS and general psychological distress, I ran several hierarchical linear regression analyses. A hierarchical linear regression analysis was calculated to predict PTG based on PRC, $b = .34$, $p < .001$, controlling for demographic variables, PK religiosity, PK and concurrent social support, optimism, PK general psychological distress, and exposure to Hurricane Katrina. A significant regression equation was found ($F(12,222) = 5.06$, $p < .001$) with an R^2 of .22. This pattern was maintained even after transforming the outcome variable into a more normal distribution by taking the square root of reflected values, $b = -.31$, $p < .001$; $F(12,222) = 4.86$, $p < .001$; $R^2 = .21$ (full results available upon request). Regression findings for all analyses involving PRC can be found in Table 5.

A hierarchical linear regression was also calculated to predict PTS based on NRC, $b = .14$, $p < .05$, controlling for the same variables as mentioned in the previous analysis. A significant regression equation was found ($F(12,222) = 5.25$, $p < .001$) with an R^2 of .22. Non-normality was not resolved via transformation, therefore the outcome variable was dichotomized into scores less than 1.5 versus scores greater than and equal to 1.5 to prepare for a binary logistic regression, as has been done in prior research (Raker et al., 2019). Although the parameters were reduced to non-significance, the regression on the dichotomized PTS variable yielded associations in the same direction as the regression on the original, untransformed PTS variable, $b = .01$, $SE = .04$, $Wald = .04$, $p = .85$ (full results available upon request).

The regression calculating the association between NRC and general psychological distress, controlling for the same variables as mentioned in the previous analyses, yielded a significance level of 0.051, which was rounded down to 0.05, $b = .11$, $p = .05$. This equation was considered significant ($F(12,222) = 8.47$, $p < .001$) with an R^2 of .31. After logarithmic transformation to achieve a more normal distribution, the parameters were reduced to non-significance. Nevertheless, the associations between NRC and general psychological distress remained in a positive direction, $b = .09$, $p = .12$; $F(12,222) = 7.75$, $p < .001$; $R^2 = .30$ (full results available upon request). Overall, all claims in Hypothesis #1 were supported: PRC was positively associated with later PTG, whereas NRC was positively associated with later PTS and general psychological distress. Regression findings for all analyses involving NRC can be found in Table 6.

Hypothesis #2

To test the hypothesis that PRC would be negatively associated with later physical health problems (headaches/migraines, back problems, digestive problems, and worse global physical health) and NRC would be positively correlated with later health problems, I ran several hierarchical logistic regressions. Results of the hierarchical logistic regression analyses revealed no significant associations between either religious coping style (PRC or NRC) and physical health outcomes. This includes dichotomous measures of specific health symptoms in the previous year (back pain, headaches/migraines, and digestive issues) as well as an ordinal item on global physical health. Overall, none of the claims in Hypothesis #2 were supported. That is, analyses found no significant associations between either religious coping style (PRC or NRC) and any of the measured physical health outcomes.

CHAPTER 5: DISCUSSION

Interpretation of Findings

The current investigation drew on a longitudinal dataset of low-income, female, primarily Black women who survived Hurricane Katrina to investigate the associations between post-disaster religious coping strategies (four years post-Katrina) and mental and physical health outcomes at a later point (12 years post-Katrina). As hypothesized, positive religious coping (PRC) four years post-Katrina was associated with post-traumatic growth (PTG) 12 years post-Katrina. Likewise, negative religious coping four years post-Katrina was associated with PTS and general psychological distress 12 years post-Katrina. It is interesting that PRC was exclusively associated with a positive aspect of mental health (PTG) whereas NRC was exclusively associated with negative aspects of mental health (PTS and general psychological distress). That is, PRC was not even negatively associated with negative mental health outcomes and NRC was not negatively associated with a positive mental health outcome. This suggests that both types of religious coping are likely to increase the likelihood of experiencing certain mental health outcomes, but there is no evidence in these findings to suggest that PRC may mitigate negative mental health outcomes

or that NRC may inhibit one's capacity to experience PTG. However, neither aspect of religious coping was found to predict later physical health.

The association between PRC and PTG is in line with previous research, which has found that PRC is typically associated with PTG in various contexts of trauma (García, Páez, Reyes-Reyes, & Álvarez, 2017; Gerber, Boals, & Schuettler, 2011; Kucharska, 2020; Prati & Pietrantoni, 2009; Schaefer, Blazer, & Koenig, 2008; Shaw, Joseph, & Linley, 2005). This is also consistent with findings from Chan and Rhodes (2013), which found a positive association between PRC and PTG in a cross-sectional measurement four years after Hurricane Katrina. Findings from the current study indicate that this relationship is maintained eight years later, such that PRC four years post-Katrina is associated with PTG 12 years post-Katrina. It is important to note that two items about spiritual change were removed from the measure of PTG to avoid confounding with religious coping. Thus, PTG here refers to other components of this construct including relating to others, new possibilities, personal strength, and appreciation of life; each of these four subscales were also positively related to PRC.

Chan and Rhodes (2013) also found positive, concurrent associations between NRC and general psychological distress, but did not find associations between NRC and PTS. In contrast, the current longitudinal study found positive associations between NRC and both general psychological distress and PTS. Reasons for this change from the Chan and Rhodes (2013) study to the current investigation may be due to methodological differences: the 2013 study utilized a measurement model and structural regression model whereas the current study relied on hierarchical linear regressions. Additionally, the RISK sample may have

changed over time due to some participants being lost to follow-up: the 2013 paper had an analytical sample of 386 whereas this current analytical sample is 235.

Previous longitudinal studies examining associations between religious coping at one timepoint and PTS at another are scarce and cover shorter periods of time between measurements than the current study—ranging six months to one year. Nevertheless, the association between NRC and PTS found in this study is consistent with previous longitudinal research, which more frequently points to a positive association between NRC and PTS (e.g. Currier, Holland, & Drescher, 2015; García et al., 2017; Harris et al., 2012; Wortmann, Park, & Edmondson, 2011) than a null finding (e.g. Wadsworth, Santiago, & Einhorn, 2009). Further, the findings regarding the association between NRC and PTS in this study suggest that this relationship persists even longer than previously examined. The association between NRC and general psychological distress is also in line with previous research indicating that components of NRC after various types of traumatic or stressful events are associated with increased psychological distress (Ano & Vasconcelles, 2005; Job Chen, Ortega Bechara, Worthington, Britt Davis, & Csikszentmihalyi, 2021; Kucharska, 2020; Pargament et al., 2011; Smith et al., 2000). Moreover, this association emerged even after controlling for pre-disaster psychological distress, indicating that NRC uniquely predicts change in distress over time across an eight-year period.

Findings of this study did not support the second hypothesis, that that PRC would be associated with fewer long-term physical health problems whereas NRC would be associated with more long-term physical health problems. Instead, analyses revealed no significant associations between either religious coping style (PRC or NRC) and physical health

outcomes, including headaches/migraines, back problems, digestive problems, and global physical health. Analyses using the RISK dataset have recently suggested that, although disaster-related traumatic experiences may increase the likelihood of developing somatic symptoms, these symptoms tend to resolve over time (Zacher et al., 2021). Within this study sample, there was little observed change among self-rated global health means from PK (2.22, SD=1.00) to F2 (2.64, SD=1.04) to F3 (2.91, SD=0.99). Thus, by 12 years post-disaster, the protective nature of PRC and the risk factors associated with NRC may be less influential on physical health outcomes than they are on mental health outcomes, which appear to persist longer post-disaster.

That the style of religious coping one reports four years after a natural disaster is associated with mental health 12 years post-disaster highlights the importance of considering religious coping style (e.g. PRC versus NRC), as the effects of these styles may persist for many years, and in ways that have differential associations with long-term well-being. It may not simply be that coping at one timepoint affects outcomes at a later timepoint; it is also possible that the coping style captured at one point remains constant, yielding similar short-term outcomes over time. It is not yet clear what influences religious coping style, but many religious perspectives reflect one's core beliefs about the world. Core beliefs on matters such as God's intentions and the fairness of the world tend to remain consistent throughout one's lifetime (Padesky, 1994). Future research should seek to understand not just how long mental and physical health effects persist after disaster, but also if and how religious coping styles are maintained over time.

Implications

Dichotomous Nature of Religious Coping

That PRC is associated with long-term PTG and NRC is associated with long-term PTS and general psychological distress supports the multifaceted, rather than unidimensional, nature of religious coping. Religion is a heterogeneous and complex construct, made of several components. As previous research has explained, it is not enough to consider whether someone simply has religion in their life. Instead, we must consider how one's experience with religion and spirituality influences their lived experience and understanding of the world (Milstein, 2019). Although both reflect aspects of religious coping, PRC and NRC are distinct ways that people use religion to cope with adversity and are associated with distinct mental health outcomes. Understanding this nuance will allow both researchers and clinicians to more accurately understand and predict the ways in which religious coping may influence mental health outcomes after disaster.

Prioritizing Spiritual Healing in Disaster Response

Given that PRC is associated with PTG, facilitating spiritual healing in the aftermath of disaster may be beneficial for those who are inclined to turn to faith to cope. Faith-based organizations and houses of worship should be restored as quickly as possible and considered community resources for mental well-being. Additionally, trained chaplains may help survivors of natural disasters find comfort in religious coping. To this end, the Red Cross has deployed Disaster Spiritual Care providers to disaster relief shelters since 2015 to more fully serve survivors' needs during crisis ("Meeting Emotional and Spiritual Needs," 2017). Although Disaster Spiritual Care providers are not permitted to influence the beliefs of their

clients, and therefore cannot ethically persuade those they serve to turn to PRC as opposed to NRC, they may play an important role in identifying NRC mechanisms that predict negative mental health outcomes. When providers recognize a heavy reliance on NRC, they may be able to refer clients to mental health services in an attempt to ameliorate PTS and general psychological distress.

Clinical Implications for Mental Health Clinicians and Faith Leaders

The American Psychological Association (APA) states that spiritual and faith traditions are a part of each client's unique worldview, and clinicians are ethically mandated to consider clients' belief systems as an aspect of diversity when developing treatment plans (American Psychological Association, 2017). Assessing for each client's relationship to religion and spirituality can help clinicians understand the ways in which religious coping may be a source of strength or vulnerability, and allowing space in treatment for conversations surround faith can enhance the therapeutic process and convey respect for the client (Hodge, 2013; Shafranske, 2016). Mental health workers may benefit from the *APA handbook of psychology, religion, and spirituality (Vol 2): An applied psychology of religion and spirituality* (K. Pargament, Mahoney, & Shafranske, 2013), which has guidance on incorporating religion and spirituality into assessment and practice within various types of theoretical orientations, for various symptom presentations, and with specific populations. Further, the directionality between NRC and negative mental health outcomes is still unknown. Just as NRC may influence mental health, it is possible that the relationship is bidirectional such that a negative mental state could inspire NRC. In this case, clinicians

should be aware of clients endorsing NRC and consider the possibility that it is a symptom, rather than a cause, of underlying mental health struggles.

There are also important takeaways for faith leaders who may encourage religious coping as a means of healing. Increasing awareness around the distinction between PRC and NRC, and their associated outcomes on mental health, can inform the strategies of faith leaders who work with others to bring about healing. Rather than encouraging religious coping in general, it would be more beneficial to foster components of PRC that have been shown to be protective against adverse mental health outcomes. Faith leaders who recognize elements of NRC in the views of those they serve may want to help reframe religious coping cognitions and behaviors to align more closely with those of PRC. In addition to understanding the difference between PRC and NRC, faith leaders can better serve their communities by partnering with licensed mental health professionals to supplement their spiritually-focused healing efforts with other evidence-based practices.

Limitations

Although the longitudinal design of this study helps establish a temporal association between religious coping at one timepoint and mental health outcomes at a later timepoint, this does not necessarily imply causality. Survivors may be more likely to turn to NRC when they are faced with extreme levels of stress; relationships among stress, religious coping, and mental health may be multidirectional (Kucharska, 2020). In other words, the stress associated with natural disasters may lead to a negative psychological state. This then may influence how individuals appraise situations. For example, a disaster survivor in despair may adopt a pessimistic outlook, which may align more closely with NRC. Although these

analyses controlled for disaster exposure via the number of hurricane-related stressors participants reported, this is a quantitative measure and does not accurately capture the qualitative, subjective psychological impact these stressors had. It is possible then that associations between NRC and negative psychological outcomes simply reflect the severity of the trauma (Wadsworth et al., 2009). It is also plausible that NRC and negative psychological outcomes are both driven by variables not measured in this study, such as pessimism, cynicism, and previous religious experiences. In order to establish a temporal relationship between religious coping and well-being, further research is needed on why some survivors turn to PRC and some turn to NRC, and whether the amount of distress experienced during and after a disaster influence one's religious coping style.

Another limitation of the current study is lack of generalizability. The surveys that participants completed did not ask about religious affiliation, but demographic data from Pew Research Center suggests that a majority of Black Americans affiliate with monotheistic faith traditions, especially Protestant Christianity (Mohamed, Cox, Diamant, & Gecewicz, 2021). The measure used to assess religious coping is also tailored to monotheistic believers. Therefore, the findings in this study are not generalizable to non-monotheistic cultures, in which religious coping may function differently. The sample of the current study, primarily comprised of low-income Black women, is also not representative of all disaster survivors. These findings reflect the experiences of a particular population in the context of a specific natural disaster. Even among the population of interest – low-income mothers residing in New Orleans during Hurricane Katrina – this study sample may not be entirely representative given that participants were in community college as baseline. Future research should seek to

understand whether the associations found in this study are replicated with other diverse samples.

The current investigation faces some methodological limitations. First, all data included in these analyses relied on participant self-report on quantitative measures. Although the measures used to assess general psychological distress and PTS have shown some reliability with clinical diagnoses, these measures are screening tools and are not substitutes for clinical diagnoses assigned by licensed mental health clinicians (R. C. Kessler et al., 2002; Weiss & Marmar, 1997). Finally, exclusive use of quantitative measures may not fully capture the complexity of the constructs studied. Despite empirically demonstrated construct validity for the RCOPE measure of religious coping styles (Pargament et al., 2011), religious coping is complex and personal. Inclusion of qualitative data in future research will allow for a more thorough investigation of participant experiences with religious coping.

Future Directions

More long-term, longitudinal studies are needed to fully understand the role of religious coping on mental health after natural disaster (J. D. Aten et al., 2019; K. I. Pargament & Abu-Raiya, 2007). Extending the length of post-disaster studies will help researchers, clinicians, and faith leaders understand how religious coping can facilitate or inhibit healing after trauma. Continuing to measure outcomes several decades after disaster is important given that the recovery phase can last many years, especially for marginalized groups (Fussell, 2015). This information may also be helpful for policymakers in determining what types of services should be made available to communities affected by disaster, and how long members of these communities should be eligible for aid. In addition to repeated

measurement of outcomes, repeated measurement of religious coping will provide a better understanding its role in recovery. One specific question to explore is whether PRC and NRC are consistent over time, or if individuals can vacillate from one to the other over time.

Future research should also aim to utilize a mixed-methods approach to capture both objective measures and subjective experiences related to religious coping. For example, if quantitative measures find that individuals may turn to PRC at one point in time and NRC at another point in time, it would be helpful to understand what influences this inconsistent religious coping style. Including participant voices in interviews could help researchers understand what influences religious coping style, such as religious affiliation and upbringing. This data may then be useful for mental health practitioners and faith leaders who want to inspire more PRC for their clients and community members.

APPENDIX A

Table 1. *Descriptive Statistics for Demographic Variables*

Variable	M(SD)	Range
Age at HK	26.49(4.49)	19.00-35.00
Number of benefits received (PK)	.87(.73)	0.00-3.00
Number of children (PK)	1.95(1.04)	1.00-7.00
Traumatic experiences during HK	3.00(2.59)	0.00-9.00
General psychological distress (PK)	5.51(4.03)	0.00-22.00

Notes: N=235. HK=Hurricane Katrina; PK=Pre-Katrina; F3=Follow-Up 3.

Table 2. *Frequencies of Demographic Variables*

Variable	Frequency (Percent)
Household income in previous year (F3)	
<\$10,000	21 (8.9)
\$10,000-\$19,999	28 (11.9)
\$20,000-\$34,999	53 (22.6)
\$35,000-\$49,999	39 (16.6)
>\$50,000	86 (36.6)
PK frequency of attendance at religious services	
Never	24 (10.2)
Several times a year	41 (17.4)
Once/twice a month	66 (28.1)
Once a week	50 (21.3)
Several times a week	54 (23.0)
PK self-reported importance of religion in life	
Not at all important	3 (1.3)
Not too important	2 (.9)
Somewhat important	29 (12.3)
Pretty important	29 (12.3)
Very important	172 (73.2)

Notes: N=235. PK=Pre-Katrina; F3=Follow-Up 3.

Table 3. *Descriptive Statistics for Key Study Variables*

Variable	M(SD)	Range
Religious coping*		
Positive religious coping (F2)	16.34(5.88)	0.00-21.00
Negative religious coping (F2)	1.97(4.10)	0.00-21.00
Mental health variables		
General psychological distress (F3)	5.94(4.95)	0.00-24.00
Post-traumatic growth (F3)	53.63(18.08)	0.00-76.00
Post-traumatic stress (F3)	14.97(20.05)	0.00-88.00

Notes: N=235. F2=Follow-Up 2; F3=Follow-Up 3.

*Higher score indicates more frequent use of religious coping style

Table 4. *Correlation Matrix for Independent and Dependent Variables (Aim #1)*

Variable	1	2	3	4	5
1. PRC ^a	—				
2. NRC ^b	.127	—			
3. General psychological distress	-.060	.192**	—		
4. PTS ^c	.075	.222**	.361***	—	
5. PTG ^d	.392***	.034	-.117	.087	—

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

***. Correlation is significant at the 0.001 level (2-tailed)

^aPRC = Positive religious coping

^bNRC = Negative religious coping

^cPTS = Post-traumatic stress

^dPTG = Post-traumatic growth

Table 5. Hierarchical Regression Analyses Predicting Mental Health Outcomes from Religious Coping:
Associations with PRC

Predictor	PTG			PTS			GPD		
	AR ²	β	SE B	AR ²	β	SE B	AR ²	β	SE B
Step 1	.10***			.08*			.17***		
Race/ethnicity		-.09	2.66		.05	2.98		.01	.70
Age		-.11	.27		.09	.30		.03	.07
Number of benefits		.07	1.61		.10	1.80		.05	.42
Number of kids		.11	1.17		.08	1.32		.03	.31
Frequency of religious services		.08	1.03		.08	1.16		-.10	.27
Importance of religion		.21**	1.60		.06	1.79		.08	.42
Social support (PK)		-.01	2.62		.04	2.94		.07	.69
Optimism (PK)		.10	.43		.08	.49		-.04	.12
Baseline GPD		.07	.32		.17*	.36		.38***	.08
Step 2	.01			.03*			.00		
Exposure to HK		.08	.46		.19*	.51		.02	.12
Step 3	.02			.09***			.14***		
Social support (F3)		.13	2.26		.31*	2.39		-.39***	.55
Step 4	.09***			.00			.00		
PRC		.34**	.20		.00	.23		-.05	.05

PTG=post-traumatic growth; PTS=post-traumatic stress; GPD=general psychological distress; PRC=positive religious coping
 Note: Beta coefficients are reported from the step at which the variable was entered.
 *** p < .001, ** p < .01, * p < .05

Table 6. Hierarchical Regression Analyses Predicting Mental Health Outcomes from Religious Coping:
Associations with NRC

Predictor	PTG			PTS			GPD		
	AR ²	β	SE B	AR ²	β	SE B	AR ²	β	SE B
Step 1	.10*						.17***		
Race/ethnicity		-.09	2.66		.05	2.98		.01	.70
Age		-.11	.27		.09	.30		.03	.07
Number of benefits		.07	1.61		.10	1.80		.05	.42
Number of kids		.11	1.17		.08	1.32		.03	.31
Frequency of religious services		.08	1.03		.08	1.16		-.10	.27
Importance of religion		.21*	1.60		.06	1.79		.08	.42
Social support (PK)		-.01	2.62		.04	2.94		.07	.69
Optimism (PK)		.10	.43		.08	.49		-.04	.12
Baseline GPD		.07	.32		.17*	.36		.38***	.04
Step 2	.01			.03***			.00		
Exposure to HK		.08	.46		.19**	.51		.02	.12
Step 3	.02			.09***			.14***		
Social support (F3)		.13	2.26		-.31***	2.39		-.39***	.55
Step 4	.00			.02*			.01		
NRC		.03	.29		.14*	.30		.11 [†]	.07

PTG=post-traumatic growth; PTS=post-traumatic stress; GPD=general psychological distress; NRC=negative religious coping
 Note: Beta coefficients are reported from the step at which the variable was entered.
 *** p < .001, ** p < .01, * p < .05, † p = .051

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