

7-22-2020

Factor Predicting Maternal Posttraumatic Stress Symptom Trajectories Following a Natural Disaster: Coping, Social Support, and Family Functioning

Jennifer Clare Piscitello

Louisiana State University and Agricultural and Mechanical College

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_dissertations



Part of the [Child Psychology Commons](#), and the [Clinical Psychology Commons](#)

Recommended Citation

Piscitello, Jennifer Clare, "Factor Predicting Maternal Posttraumatic Stress Symptom Trajectories Following a Natural Disaster: Coping, Social Support, and Family Functioning" (2020). *LSU Doctoral Dissertations*. 5345.

https://digitalcommons.lsu.edu/gradschool_dissertations/5345

This Dissertation is brought to you for free and open access by the Graduate School at LSU Digital Commons. It has been accepted for inclusion in LSU Doctoral Dissertations by an authorized graduate school editor of LSU Digital Commons. For more information, please contact gradetd@lsu.edu.

FACTORS PREDICTING MATERNAL POSTTRAUMATIC STRESS
SYMPTOM TRAJECTORIES FOLLOWING A NATURAL
DISASTER: COPING, SOCIAL SUPPORT, AND FAMILY
FUNCTIONING

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by
Jennifer Clare Piscitello
B.A., SUNY Stony Brook University, 2010
M.A., Louisiana State University, 2017
December 2020

Acknowledgements

I would first like to thank my mentor, Dr. Mary Lou Kelley, who has provided me with the support, guidance, and encouragement necessary to get to this point in my graduate education. I would also like to thank my committee members, Dr. Amy Copeland and Dr. Paul Frick for their direction and feedback on this research and challenging me to do my best work throughout my endeavors at LSU.

I would have never made it to this point without the constant, unwavering support of my peers, colleagues, and supervisors over the last decade. To Emily Robertson, Thanh Le, and Shelley Upton, I can't imagine graduate school without you. Your friendship means so much to me and I am better because I have you in my life. My internship supervisors and cohort have also been instrumental in pushing me through this last year – full of unprecedented circumstances. Dr. Allison Weinstein, I have learned so much from you in such a short time. I am grateful for the opportunities you have provided me throughout internship, allowing me to cultivate my passion for working with families impacted by trauma and adversity. I look forward to continuing our friendship and collaboration for years to come.

To my friends and family, there are no words that would allow me to adequately express my appreciation for you. In particular, thank you to my parents, Diane and Augie, and my sister, Valerie, for the countless hours you spent supporting me from afar. To my closest friends, thank you for your patience and love. You always believed in me and that is what kept me afloat throughout graduate school. Most of all, I want to express my gratitude to my partner, Toafa Cattell. Everything I have accomplished is because I have had you by my side. Thank you for balancing me, loving me, and supporting me. I am so grateful for you and I look forward to many more adventures together.

Table of Contents

Acknowledgements.....	ii
Abstract.....	v
Introduction.....	1
Methodological Issues	3
Posttraumatic Stress Symptom Trajectories and Predictors.....	6
Models of Post-Disaster Recovery: Coping & Psychosocial Factors.....	10
Current Study.....	14
Method.....	18
Participants.....	18
Procedure.....	20
Measures.....	21
Data Analysis.....	24
Results.....	25
Preliminary Analyses.....	25
PTS Symptom Trajectories.....	29
Predictors of Trajectory Membership.....	32
Discussion.....	35
Strengths.....	42
Limitations & Future Directions.....	44
Conclusions.....	46
Appendix A. Demographic Questionnaire.....	47
Appendix B. Hurricane-Related Traumatic Experiences Scale.....	49
Appendix C. Posttraumatic Diagnostic Scale.....	56
Appendix D. Brief COPE.....	59
Appendix E. Interpersonal Support Evaluation List.....	60
Appendix F. Behavior Assessment System for Children – Second Edition.....	62
Appendix G. Original Institutional Review Board Study Approval.....	66
Appendix H. Current Institutional Review Board Study Approval.....	67
References.....	68

Vita.....	76
-----------	----

Abstract

Natural disasters are sudden, large-scale events that are associated with significant mental health consequences. Although, most individuals demonstrate resilience, a significant subset of the population develops significant long-term distress (La Greca et al. 2013; Lai, et al., 2015; Lowe & Rhodes 2013; Self-Brown et al., 2014). Moreover, results from emerging longitudinal research suggests that symptom patterns are heterogenous. For example, some individuals recover over time or demonstrate a delayed onset. The most commonly studied post-disaster reaction in adults is posttraumatic stress (PTS) symptoms. However, the extant literature examining elevated PTS symptoms and related risk factors in disaster research has relied largely on cross-sectional post-hoc designs, with few studies examining PTS symptom trajectories from a longitudinal perspective. The current study sought to build upon post-disaster recovery theory, by examining PTS trajectories in a diverse sample of primarily low-income mothers impacted by Hurricane Katrina, as well as identifying predictor variables (i.e., prior trauma, hurricane exposure, coping behavior, social support, and family functioning) associated with specific symptom trajectories. Data was collected over two years following the Hurricane Katrina (2005-2007). Utilizing Latent Class Growth Analysis, results revealed that a three-trajectory model (i.e., recovering, chronic, and resilient) best fit the data. Significant risk and protective factors differentiating trajectory membership included prior trauma, hurricane-related loss and disruption, social support, and children's internalizing symptoms. Implications of study findings and directions for future research are discussed.

Introduction

Natural disasters are sudden, large-scale events (e.g., flooding, earthquake, hurricane), that have the potential to produce great damage and loss of life, suddenly disrupting daily patterns and routines, as well as access to vital resources (e.g., food, clothing, shelter, medical services; Furr, Comer, Edmunds, & Kendall, 2010; World Health Organization [WHO], 1971). There is evidence that disasters are increasing in frequency and severity (U.S. Global Change Research Program, 2016). In 2017, the United States government reportedly spent a record breaking \$306 billion on disaster recovery efforts in response to devastating hurricanes in Texas and Puerto Rico and wildfires in California to name a few (National Oceanic and Atmospheric Administration, 2017). According to the Center for Research on the Epidemiology of Natural Disasters, approximately 570 million people were impacted by natural disasters worldwide in 2016 (Guha-Sapir, Hoyois, Wallenmacq, & Below, 2017).

Accurate identification of symptom patterns following exposure to a natural disaster is necessary to determine which individuals are at increased risk for the development of the most chronic and severe response trajectories. Public health initiatives targeting the most vulnerable individuals for intensive treatment of chronic distress requires substantial time and financial resources. Therefore, it is of paramount importance to understand the risk and protective factors associated with different symptom trajectories, to ensure that those at highest need are appropriately targeted for intervention, as well as to understand factors related to resilience and recovery. This is particularly important for acute events, such as natural or man-made disasters, during which resources are limited and often disseminated quickly

The literature examining post-disaster psychological functioning, has revealed that individuals experience a range of post-disaster reactions (e.g., posttraumatic stress (PTS)

symptoms, depression, and anxiety), with most demonstrating resilience (e.g., La Greca et al. 2013; Lai, Kelley, Harrison, Thompson, & Self-Brown, 2015; Lowe & Rhodes 2013; Self-Brown, Lai, Harbin, & Kelley, 2014). Researchers have identified a variety of common risk and protective factors associated with post-disaster psychological functioning. For example, socio-demographic factors (e.g. being of younger age, having children, and being an ethnic minority), degree of trauma exposure, co-occurring stressors during the event (e.g., bereavement, pet loss, displacement), and ongoing post-trauma stressors (e.g., unstable housing, financial stress, and disrupted social support networks) have all been associated with elevated symptoms (Brewin, Andrews, & Valentine, 2000; Elliot & Pais, 2006; Gibbs, 1989; Goenjian et al., 2001; Lowe, Chan, & Rhodes, 2010; Lowe, Rhodes, Zwiebach, & Chan, 2009; Magdol, 2002; Morrow, 1997; Shore, Tatum, & Vollmer, 1986).

Although, there has been a proliferation of disaster-related research in the last two decades, this area is still evolving methodologically. Much of the research assessing post-disaster reactions and associated risk and protective factors is cross-sectional, substantially limiting our understanding of the long-term impact of such events. As such, little work has examined post-disaster reactions from a longitudinal perspective and even less has followed up with participants more than 12-months post-disaster (Cobham et al., 2016; Galtzaer-Levey, Hugan, Bonanno, 2018; Lai et al., 2017). Similarly, what we know about risk and protective factors is often in the context of clinically meaningful psychological symptoms at one time-point, without consideration of individual differences and response patterns over time.

To address some of these limitations, researchers have begun utilizing advanced statistical techniques such as structural equation modeling in longitudinal data to better understand post-disaster symptom patterns over time (e.g., La Greca et al., 2013; Lai et al., 2015; Self-Brown et

al., 2014). This approach allows researchers to map symptom trajectories over multiple time-points and examine the nuanced differences between trajectories, providing valuable insight into adaptive and maladaptive post-disaster functioning. The following review is four-fold: (1) to provide a description of the limitations and advances in longitudinal methodology examining recovery patterns in disaster-impacted samples; (2) summarize extant literature utilizing these techniques to better understand one of the most common post-disaster reactions, PTS symptoms; (3) review how this research fits within current theory of post-disaster recovery; and (4) describe the present study aimed to build upon current theory and research by investigating PTS trajectories in a sample of mothers impacted by Hurricane Katrina.

Methodological Issues

Given the unpredictability of disaster events, there are several limitations to researching post-disaster functioning. For example, many individuals, especially those who experience the most severe devastation, are often relocated. Thus, individuals most negatively impacted by natural disasters (e.g., loss of housing, access to vital resources) are the most difficult to reach and are often excluded from post-disaster research (Hansel, Osofsky, Osofsky, & Friedrich, 2013; Osofsky & Osofsky, 2013; Osofsky, Osofsky, Kronenberg, Brennan, & Hansel, 2009). This is an important note, as many studies identify severity of disaster exposure as one of the most significant predictors of post-disaster functioning (Johannesson, Arinell, & Arnberg; 2015; Pietrzak et al., 2013). Similarly, another limitation of disaster research is that samples are generally not nationally representative as they are often concentrated in one geographical location that has been devastated by the disaster under study. Thus, often times, samples are homogenous, and generalizability of results is limited.

Many studies rely heavily on post-hoc research designs (Benight & McFarlane, 2007). As such, researchers often lack access to information regarding pre-disaster functioning. This reduces insight into changes in behavior and symptomatology specifically due to the disaster experienced (Cobham McDermott, Haslam, & Sanders, 2016; Norris, 2002). This is particularly concerning, given that the few studies that have included pre-disaster data have found that preexisting psychopathology is one of the strongest predictors of post-disaster symptom elevations (Ginexi, Weihs, Simmens, & Hoyt, 2000; Lowe & Rhodes, 2013; Weems et al., 2007). The relation between disaster event and psychopathology is further conflated by additional previous or ongoing traumatic events, such as family and community violence or financial hardship (Kelley, Self-Brown, Le, Bosson, Hernandez, & Gordon, 2010; Salloum, Carter, Burch, Garfiinkle & Overstreet. 2011). Furthermore, observational methods are rarely used in post-disaster research and therefore researchers strongly rely on self-report measures, which are subject to response-bias (Cobham et al. 2016; Lai et al., 2017).

As noted earlier, much of the disaster literature has examined post-disaster reactions utilizing cross-sectional statistical techniques. Thus, little research has focused on post-disaster reactions from a longitudinal perspective and even less work has followed up with participants more than 12-months post-disaster (Cobham et al., 2016; Galtzaer-Levey, Hagan, Bonanno, 2018; Lai et al., 2017). Further, many researchers have taken a variable-centered approach to understanding post-disaster functioning using summary scores on continuous outcomes measures, binary diagnostic categories, or pre-determined trajectory categories based on previous research (Cobham et al., 2016; Lai et al., 2017; Norris, 2006). Although, an important first step in examining post-disaster psychopathology and functioning, this approach does not consider individual differences or the range of post-disaster responses (Orcutt, Bonanno, Hannan, &

Miron, 2014). As such, many researchers have advocated for the need to transition from a variable-centered approach (e.g., using summary scores at one or two time-points) towards a person-centered approach (e.g., mapping out symptom trajectories for each individual in the data; Muthen & Muthen, 2000) to strengthen our understanding of long-term post-disaster recovery (e.g., Lai, Lewis, Livings, La Greca, & Esnard, 2017).

Over the last decade there has been a surge in research utilizing longitudinal structural equation modeling to examine the long-term impact of posttraumatic events, such as Latent Class Growth Analysis (LCGA) and Latent Growth Mixture Modeling (LGMM). These are person-centered approaches where trajectory classes are produced based on participant responses, allowing for different estimates for latent classes within a sample and elucidation of differing trajectories (Nagin & Tremblay, 1999; Raudenbush & Byrk, 2002; Curran and Hussong 2003; Lai et al. 2013; Muthén & Asparouhov 2008; Self-Brown et al. 2013). Additionally, this approach allows researchers the opportunity to examine risk and protective factors associated with each trajectory. These methods are beginning to be applied more frequently to describe posttraumatic reactions in children and adults following exposure to natural disasters (e.g., Norris, Tracy, & Galea, 2009; Self-Brown, Lai, Thompson, McGill, & Kelley, 2013; Pietrzak, Van Ness, Fried, Galea, & Norris, 2013; Weems & Graham, 2014), providing crucial insight into the pattern and variability of post-disaster reactions.

Although longitudinal growth curve modeling and latent class analysis have been instrumental in contributing to theories explaining post-disaster reactions, it is not without limitation (Lai et al., 2017). For example, person-centered approaches are data-driven and thus results should be interpreted within the context of theory (Lai et al., 2017). The following section summarizes the existing literature examining posttraumatic stress symptoms in adults impacted

by natural disasters from a longitudinal perspective through the use of Latent Class Growth Analysis (LCGA) or Latent Growth Mixture Modeling (LGMM).

Posttraumatic Stress Symptom Trajectories and Predictors

The most commonly studied post-disaster reaction is posttraumatic stress (PTS) symptoms. Prevalence rates of significant PTS for adults following a natural disaster range from 20-30% for those directly exposed (Neria, Nandi, & Galea, 2008). According to the Diagnostic and Statistical Manual – 5th Edition (American Psychiatric Association, 2013), posttraumatic stress disorder (PTSD) develops in reaction to a potentially traumatic event, defined as exposure to actual or threatened death, serious injury, or violence. Common symptoms associated with PTSD include: re-experiencing (e.g., recollections, dreams, feelings of reoccurrence, distress at exposure to cues, physiological reactivity to cues), increased vigilance (e.g., sleep problems, irritability, difficulty concentrating, exaggerated startle response), and avoidance (e.g., thoughts, feelings, and conversations; places and people, inability to recall details, detachment; American Psychiatric Association, 2013). Four studies to date (c.f., Johannesson, Arinell, & Arnberg, 2015; Norris, Tracy, & Galea, 2009; Pietrzak et al., 2013; Self-Brown et al., 2014) have examined adult PTS reactions to natural disasters from a longitudinal perspective using growth modeling (i.e., used either LGMM or LCGA). The results of these studies are reviewed below.

Norris, Tracy, and Galea (2009) were the first to examine post-disaster PTS trajectories in two representative samples following the 1999 floods in Mexico and the September 11th terrorist attacks. Data were collected across four waves: one, six, 12, and 18 months post-disaster. Utilizing a semiparametric group-based mixture model (Nagin, 1999), researchers identified five trajectories in 561 participants during the first two years following the 1999 floods in Mexico. The trajectories were: resistant (34.5%); chronic: moderate (12.0%); chronic: severe (10.0%);

resilient (32.0%); recovering (11.4%). The resistant trajectory was characterized by low or mild stable symptoms over time. The chronic trajectories were characterized by stable symptoms over two years at either a stable moderate (endorsement of 4-8 PTSD symptoms) or severe (endorsement of ≥ 9 PTSD symptoms) level. The resilient and recovering trajectories were characterized by decreasing (severe to moderate) symptoms over time. The recovering trajectory demonstrated a more gradual decrease in symptoms, whereas the resilient group improved more quickly. This study did not examine predictor variables associated with each trajectory.

Pietrzak and colleagues (2013) examined PTS symptoms in a sample of 206 older adults (i.e., ≥ 60 years old) exposed to Hurricane Ike, a large-scale natural disaster occurring in September 2008 in Eastern Texas. Data was assessed over three waves (three, six, and 16 months post-disaster). Using LGMM, Pietrzak et al. (2013) identified three trajectories: resistant, chronic, and delayed. The resistant trajectory (78.7%) experienced low or no PTS symptoms. The chronic trajectory (16%) displayed persistently high levels of PTS symptoms across time-points. Finally, the delayed-onset trajectory (5.3%) demonstrated lower symptoms at initial data collection, followed by an increase in symptoms over time.

Additionally, Pietrzak and colleagues (2013) assessed a variety of risk and protective factors associated with each trajectory. They found that hurricane severity, number of traumas and stressors (e.g., financial problems) experienced since the hurricane were positively associated and education level was negatively associated with the chronic trajectory. They also found that number of traumas and stressors following Hurricane-Ike was associated with the delayed-onset trajectory.

Using LCGA, Self-Brown and colleagues (2014) identified three primary trajectories of posttraumatic stress (PTS) symptoms: (1) chronic (4%), (2) recovering (30%), and (3) resilient

(66%). Participants were primarily African-American, low-income mothers impacted by Hurricane Katrina, and symptoms were assessed at four waves: 3-7, 13-17, 19-22, and 25-27 months post-disaster. Individuals in the chronic trajectory started with and maintained high levels of PTS symptoms over the two years following Hurricane Katrina. The recovering trajectory initially displayed high levels of PTS symptoms, which decreased over the following three time-points. Finally, the resilient trajectory, maintained low levels of symptoms across all four time-points.

In this study, the number of previous traumatic events and severity of disaster exposure (i.e., perceived life threat, and immediate loss/disruption) were examined as predictors. Number of previous traumatic events significantly predicted classification in the recovering compared to the resilient trajectory. For every additional traumatic event reported, participants were 1.34 times more likely to fall into the recovering trajectory (CI = 1.12-1.60). None of the other factors significantly predicted trajectory membership. This is particularly surprising, since cross-sectional research has consistently identified disaster exposure/severity as a significant risk factor influencing PTS symptoms (e.g., Norris, Perilla. & Murphy, 2001; Weems et al., 2007).

Johannesson, Arinell, and Arnberg (2015) conducted a study following the 2004 Indian Ocean Tsunami, which included 2,268 Swedish tourists whom were present during the event but returned to their home country. PTS symptoms were assessed at one, three, and six years following the tsunami. Participants reported a range of disaster exposure and an indirect exposure comparison group was also included in the analyses. Using LGMM, Johannesson and colleagues (2015) identified four response trajectories: resilient (72.3%); severe: chronic (4.6%); moderate: chronic (11.2%); and recovering (11.9%) trajectory. The resilient trajectory was characterized by the maintenance of low symptoms across time-points. The resilient group

demonstrated a similar pattern of PTS symptoms to those who were indirectly exposed to the disaster (i.e., the comparison sample), with individuals in the resilient trajectory displaying slightly higher levels of PTS. The severe chronic and moderate chronic trajectories maintained high symptom levels over time. Finally, the recovering trajectory started with high levels of PTS, which decreased gradually from one to six years post-disaster.

Johannesson and colleagues (2015) also examined a range of predictors. In comparison to the resilient trajectory, participants in the three symptomatic trajectories (i.e., severe chronic, moderate chronic, and recovering) were more likely to be female and reported higher levels of life threat during the tsunami. Additionally, individuals in the symptomatic trajectories reported higher frequency of use of mental health services and reported lower satisfaction with social support. Individuals in the recovering trajectory were more likely to be younger, reported higher rates of pre-disaster symptoms, and were more likely to have experienced bereavement due to the disaster. Individuals in chronic trajectories were more likely to have a lower educational attainment. Compared to the moderate chronic trajectory, the severe chronic trajectory was more likely to be dissatisfied with social support and more likely to report additional traumatic events following the tsunami.

These studies shed light on the heterogeneity of post-disaster PTS reactions and provide initial evidence for the impact of several predictor variables (e.g., disaster severity, number of additional ongoing or previous stressors, perceived availability of social support). Findings from these studies align with the transactional framework of stress response (Lazarus, 1999; Lazarus & Folkman, 1984), which emphasizes individuals' perception of the severity of a stressor, as well as appraisal of available resources (e.g., social support) and confidence in one's ability to cope with a stressor in the development of significant clinical symptoms. Additionally, this

research represents an important shift in the methodological examination of the long-term impact of natural disasters, addressing some of the limitations associated with cross-sectional research. However, further examination of risk and protective factors (e.g., coping styles and psychosocial factors) associated with each symptom trajectory is necessary to further develop long-term post-disaster recovery theory and inform prevention and intervention programs aimed at reducing disaster-related distress and symptomatology.

Models of Post-Disaster Recovery: Coping & Psychosocial Factors

Several theories have been implicated in elucidating the onset and maintenance of significant PTS symptoms following a traumatic event (for a review see: Brewin & Holmes, 2003). One of the earliest theories of stress response was proposed by Lazarus (1966), which informed the transactional model of stress and coping (Pfefferbaum, Noffsinger, Wind, & Allen, 2014). This model posits that individual-level crisis factors (e.g., perception of the stressor, coping efficacy) and appraisal of psychosocial variables (e.g., social support, general resource availability, and cultural norms) significantly impact trauma recovery (Lazarus & Folkman, 1984). As such, stressful events are understood as a transaction between an individual their environment (Pfefferbaum et al., 2014).

Within the disaster context, this model proposes that the perceived impact of disasters (e.g., perceived life threat and disruption) is mitigated by individual and environmental antecedents (e.g., pre-disaster mental health functioning and number of prior traumatic experiences), as well as by an individual's recurring appraisal of disaster event and available coping resources (Pfefferbaum et al., 2014). This theory has been well supported in cross-sectional post-disaster literature, as many studies have reliably identified severity of disaster exposure, coping, and social support as significant risk-factors for the development of chronic

PTS symptoms (Adams & Boscarino, 2006; Neria et al., 2008). Despite this, little research has sought to substantiate this theory in regard to long-term PTS outcomes. For example, research has rarely included coping style and other psychosocial variables beyond social support, as predictors of adult PTS symptom trajectories in disaster impacted samples.

Coping. Coping refers to the behavioral and cognitive efforts individuals utilize when faced with threats to personal resources (Coyne et al., 1981). Adaptive and maladaptive coping styles are intrinsically linked to recovery from traumatic events. In general, research suggests that engaging in certain maladaptive coping behaviors, such as deliberative avoidance of intrusive thoughts and memories and thought suppression, increase risk for PTSD (Dunmore et al., 1999; Steil & Ehlers, 2000; Wenzlaff & Wegner, 2000). Similarly, maladaptive coping behaviors, such as avoidance and substance use, have been associated with increased PTS symptoms in first responders of the September 11th attacks and federal disaster responders (Feder et al., 2016; Loo et al., 2016).

Cross-sectional research has revealed that specific coping behaviors are associated with post-disaster psychopathology as well. For example, one study demonstrated that individuals with acute PTSD reported more frequent engagement in adaptive coping behaviors, such as focusing on the positive, and less frequent use of maladaptive coping behaviors, such as isolation and detachment, compared to individuals with chronic symptoms (Spurrell & McFarlane, 1993). This early work suggests, that certain coping behaviors may distinguish course of PTSD symptoms in post-disaster samples. Further, Benight and Harper (2002) found coping self-efficacy to significantly mediate the relation between acute stress response and long-term PTSD symptoms and general distress one year following a natural disaster. Finally, using path-analysis, Kelley et al. (2010) examined maladaptive coping in mothers impacted by Hurricane Katrina.

They found maladaptive coping to be significantly positively associated with hurricane-related loss and disruption, as well as overall maternal distress. This study also revealed that mothers' maladaptive coping impacted their parenting behavior (i.e., increased use of corporal punishment), which in turn impacted children's increased risk for PTS symptoms over a two-year period. Further research explicating the relationships between adaptive and maladaptive coping strategies and long-term PTS symptoms is warranted. To date, the relation between coping behavior and PTS symptom trajectories in a disaster-impacted sample has yet to be explored.

Social Support. Social support has been identified as a key protective factor against the development of trauma-related psychopathology and for the promotion of resilience (Brewin et al., 2000; Abramson et al., 2015; Bonanno et al., 2007; Bonanno, 2004, 2005; Kaniasty & Norris, 2009). Social support may take a variety of forms, such as emotional, informational, and tangible support (Platt, Lowe, Galea, Norris, & Koenen, 2016). Social support has consistently emerged as an important protective factor in disaster-impacted samples as well (Galea et al., 2007; Norris, Friedman, Watson, Byrne, Diaz & Kaniasty, 2002); however, much of this research has been cross-sectional and has not sought to identify how social support differentially impacts specific PTS trajectories in adults. To date, only one such study has included social support as a predictor variable. Results of this study indicated that lower satisfaction with social support differentiated symptomatic and resilient PTS trajectories (Johannesson et al., 2015). Further research is warranted to validate this pattern in long-term recovery outcomes in other disaster-impacted samples.

Family Functioning. Although some researchers have included social support when examining predictors of PTS symptom trajectories, no other psychosocial factors have

considered thus far. Emerging psychosocial models of disaster recovery (e.g., Weems et al., 2007) are influenced by theories of life-span human development (e.g., Bronfenbrenner, 1977) and risk and resilience (e.g., Hobfoll, 1989; Sandler, 2001). This has been particularly true of the literature examining child and adolescent post-disaster response trajectories, which often emphasizes the importance of understanding children within the context of their families, schools, and communities (Cobham et al., 2016; Weems et al., 2007). Surprisingly, the influence of the broader family environment has not similarly been examined in parents' (i.e., adults') response trajectories.

Recently, researchers interested in better understanding positive adjustment and resilience, have highlighted the importance of shifting focus from individual to family-centered models through an interactional systems framework of adjustment (Doty, Davis, & Arditti, 2017; Masten, 2018). Masten (2018) states that "positive adaptation of an individual parent or an individual child can alter how well a family is maintaining communication, emotional support, routines, and other family roles that reflect resilience or stress (pp. 16)." Thus, while it is necessary to understand how parents' psychological functioning impacts children, family-related variables are also relevant to the adaptability of parents post-disaster.

Additionally, researchers have emphasized the need for theory-driven research to better understand post-disaster family recovery and resilience (e.g., Cobham, McDermott, Haslam, & Sanders, 2016; Trickey et al., 2012; Alisic et al., 2011). A recent meta-analysis (Trickey et al., 2012) revealed parent psychopathology and poor family functioning as two significant post-disaster environmental risk factors impacting child outcomes. As such, it is necessary to examine parents' post-disaster response to be able to better serve children and the family as a whole following an event. Despite this call in the literature to improve our understanding of parents'

post-disaster reactions, parents are often overlooked as a vulnerable population, or when included in a study, family-related variables are rarely included.

Although a substantial amount of attention has been directed to the impact of parents' post-disaster reactions on children's functioning, to date, no researchers have examined how children's internalizing and externalizing problems relate to parent's symptoms over time. This is surprising given that research in non-disaster impacted samples, consistently document the bi-directional relationship between child and parent psychological functioning (e.g., Cappa, Gegle, Conger, Dumas, & Conger, 2011; McAdams et al., 2015; Neece, Green, & Baker, 2012). In a review, Cobham et al. (2016) notes that because most of the post-disaster work assessing the relation between parent and child psychopathology is unidirectional, results may be misleading. For example, it may be that children with increased internalizing and externalizing symptoms produce an additional co-occurring stressor for parents during a disaster, impacting their PTS response. Examining parents' post-disaster functioning within the family context, provides insight about broader family functioning (Cobham et al., 2016) and is consistent with psychosocial models of disaster recovery (Weems et al., 2007; Weems & Overstreet, 2008).

Current Study

The current study contributes to the extant literature by examining post-disaster outcomes in a diverse sample of low-income, mothers impacted by Hurricane Katrina. Hurricane Katrina, a category 5 hurricane, made landfall in southern Louisiana on August 29, 2005. The hurricane caused an estimated 1,500 deaths and \$108 billion of damage, destroying thousands of homes, businesses, and other properties (Knabb et al., 2005).

Within the theoretical context of the transactional stress model (Lazarus, 1999; Lazarus & Folkman, 1984), psychosocial theories of disaster recovery and family resilience (e.g., Weems

et al., 2007), risk factors (i.e., prior trauma exposure, hurricane-related loss and disruption, coping, social support, and children's internalizing and externalizing symptoms) will be examined as predictors differentiating PTS trajectories. These predictor variables are associated with PTS outcomes in cross-sectional research but have yet to be examined together in a longitudinal context. The current study has important implications for understanding the risk and protective factors that may influence recovery and maintenance of significant PTS symptoms in the aftermath of a natural disaster. Specific hypotheses are outlined below.

Hypothesis 1. It is hypothesized that correlational analyses will reveal that perceived hurricane-related loss and disruption will be positively correlated with PTS symptoms. That is, increased loss and disruption will be associated with increased symptoms. Similarly, the number of prior traumatic events will be positively associated with PTS symptoms. Social support will be negatively correlated with PTS symptoms, in that increased symptoms will be associated with lower levels of perceived social support. Additionally, it is hypothesized that increased PTS symptoms will be associated with increased levels of maladaptive coping strategies. Conversely, adaptive coping will be significantly negatively related to PTS symptoms. This is based on substantial evidence indicating the significant relationship between PTS symptoms and perceived availability of social support and coping behavior (Adams & Boscarino, 2006; Benight & Harper, 2002; Kelley et al., 2010; Neria et al., 2008; Spurrell & McFarlane, 1993). Finally, based on research identifying the bi-directional relationship of parent distress and children's problem behavior (e.g., Cappa, Gedge, Conger, Dumas, & Conger, 2011; McAdams et al., 2015; Neece, Green, & Baker, 2012), parent PTS symptoms will be significantly positively correlated with parent reported child externalizing and internalizing problems.

Hypothesis 2. Using LCGA, mothers' PTS trajectories will be identified. While PTS trajectories are not expected to differ significantly from previous research utilizing this data (c.f., Self-Brown et al., 2014), class probabilities may vary when additional predictors are included in the model. Consistent with previous research, it is hypothesized that three distinct trajectories will emerge. These trajectory classifications will represent individuals with chronic, recovering, and resilient PTS symptoms.

Hypothesis 3a. It is hypothesized that perceived social support will differentiate between resilient and symptomatic trajectory groups, in that individuals in the resilient trajectory will report higher levels of perceived social support than the recovering and the chronic. Similarly, it is expected that the recovering trajectory will demonstrate significantly higher levels of perceived social support compared to the chronic trajectory. This hypothesis is based on findings from Johannesson et al (2015) that dissatisfaction with social support was associated with the severe chronic trajectory group.

Hypothesis 3b. It is anticipated maladaptive coping strategies will significantly predict classification in the chronic trajectory compared to the resilient and the recovery trajectories, whereas the resilient and recovering trajectories will be associated with adaptive coping strategies. Consistent with previous cross-sectional research that has identified maladaptive coping to be significantly predictive of PTS symptoms (Benight & Harper, 2002; Kelley et al., 2010; Spurrell & McFarlane, 1993).

Hypothesis 3c. Based on the literature supporting the bi-directional relationship between children's behavior and parents' psychological functioning (e.g., Cappa, Gedge, Conger, Dumas, & Conger, 2011; McAdams et al., 2015; Neece, Green, & Baker, 2012), as well as theory underlying family resilience (Doty, Davis, & Arditti, 2017; Masten, 2018), it is hypothesized that

children's behavior (i.e., internalizing and externalizing behaviors) will be significantly related to parents' PTS symptom trajectories. Specifically, it is expected that classification in the chronic and recovering trajectories will be associated with increased parent-reported child externalizing and internalizing problems, compared to the resilient trajectory. Additionally, internalizing and externalizing symptoms will increase likelihood of being in the chronic trajectory over the resilient.

Method

Participants

Participants in the current investigation were drawn from a sample of mother-child dyads who participated in a larger multi-wave Department of Homeland Security (DOH) funded study investigating the long-term impact of children and parents following Hurricane Katrina. The original dataset included 426 parent-child dyads. Data was collected across four waves between 2005 and 2007 post-Katrina: Wave 1 was collected at 3-7 months; Wave 2 at 13-17 months; Wave 3 at 17-22 months; and Wave 4 at 25-27 months (cf. Kelley et al., 2010; Self-Brown et al., 2014; Lai et al., 2017). The current investigation included data collected across all four waves.

Because post-traumatic stress symptoms were a primary variable of interest, participants were only included in the study if they had a valid measure of PTS symptoms during at least one of the data collection waves. Sixty-four participants missing data on the PTS measure and two fathers were excluded. Therefore, 289 participants at Wave 1, 185 at Wave 2, 188 at Wave 3, and 172 participated at Wave 4. In total, 360 mothers were included in the subsequent analyses. Means differences on demographic variables were assessed to ensure that participants who were included in the study were not significantly different from those who were excluded from the analysis. Results revealed no significant differences between groups. Similarly, mean differences on study variables were also examined. Results of an independent samples t-test revealed significant differences ($t(316) = 4.97, p < .001$) between individuals excluded from the study ($M = 0.43, SD = .79$) and those included ($M = 2.09, SD = 1.58$). None of the other variables produced significant differences between groups.

At the first wave of data collection, a majority of the participants were displaced due to the Hurricane (76.1%). The sample was primarily comprised of individuals identifying as

Table 1. Demographic Statistics of Sample at Wave 1

	M (SD); Valid %	Max., Min
Displaced Status	76.1%	
Child Age	11.61 (1.55)	8 – 16
Child Gender	51.2% female	
Grade	5.93 (1.38)	3 – 8
Race		
Caucasian	25.6%	
Black/African American	67.2%	
Asian	4.1%	
Hispanic	2.2%	
Other	0.9%	
Mother's Age	38.94 (7.57)	23 – 67
Marital Status		
Single	55.3%	
Married	44.7%	
Mother's Education Level		
< HS graduate	14.7%	
HS graduate	42.4%	
Partial College	35.3%	
College/University Graduate	16.0%	
Graduate Professional Degree	6.1%	
Yearly Income Before Hurricane Katrina		
< \$25,000	53.3%	
\$25,000-34,999	13.7%	
\$35,000-49,999	10.0%	
\$50,000-74,999	16.0%	
> \$75,000	7.0%%	
Yearly Income After Hurricane Katrina		
< \$25,000	58.5%	
\$25,000-34,999	14.9%	
\$35,000-49,999	8.7%	
\$50,000-74,999	11.1%	
> \$75,000	7.0%	

Note. $N = 360$; M = Mean; SD = Standard Deviation.

African American (67.2%), with 25.6% Caucasian, and 7.2% other minority. Children ranged in age from 8 to 16 years old ($M = 11.61$ years; $SD = 1.55$). Mothers ranged in age from 23 to 67

($M = 38.94$, $SD = 7.57$). Median family income prior to Hurricane Katrina was below \$25,000 and 55.30% were single mothers with a median education level of some college or technical training.

Procedure

Upon receiving Institutional Review Board approval from Louisiana State University, children and adolescents were recruited from six Orleans Parish schools that reopened following Hurricane Katrina. Students and their parents were invited to participate through informational fliers brought home from school by their child. Interested parents completed parent and child consent forms and questionnaires. Participating families returned completed parent-completed questionnaire packets and signed consent forms. Approximately 36% of contacted parents completed the consent forms and questionnaires (Spell et al., 2008). Children signed assent forms and completed self-report questionnaires at their schools under the supervision of trained research staff and graduate students. Staff verbally administered questionnaires as necessary for younger children and those who demonstrated difficulty reading. Exclusion criteria included enrollment in special education or diagnosis of severe developmental disabilities or Autism Spectrum Disorder.

Questionnaires were administered at four time points: 3 months (Wave 1), 13 months (Wave 2), 19 months (Wave 3), and 25 months (Wave 4) post-Hurricane Katrina. During follow-up data collection points, questionnaires were mailed to participants and returned in pre-paid envelopes. At Wave 1, participants were compensated at the discretion of the school personnel by either entering a drawing to win \$5 or a class pizza party and at subsequent waves (i.e., Waves 2-4), families received compensation of \$25-\$50. Data collection procedures were consistent across all four waves.

Measures

Demographic Questionnaire. Participants completed a survey assessing a variety of demographic characteristics about themselves and their families, including race, age, education, income, and employment status.

Hurricane-Related Traumatic Experiences (HURTE; Vernberg et al., 1996).

Mothers completed the HURTE. This 23-item questionnaire was adapted from that used in similar studies assessing hurricane loss and exposure in youth samples (e.g., La Greca, Silverman, Wasserstein, 1998; Vernberg, La Greca, Silverman & Prinstein, 1996). The HURTE measures hurricane-related exposures (i.e., perceived and actual life threat) and other hurricane-related stressors (i.e., immediate and ongoing loss/disruption. Life-threatening experiences (7-items) and immediate loss/disruption (16-items) related to Hurricane Katrina on a dichotomous scale (i.e., yes/no). The life-threatening experiences and loss/disruptions scales combine to create a Total Exposure score. Example items include: “Did windows or doors break?” and “Did you family have trouble getting food or water?” The Loss/Disruption subscale was used for the current study. This measure was administered at Wave 1. Similar to previous studies, the Hurricane Loss/Disruption subscale was adequate ($\alpha = .79$) in the sample.

Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox & Perry, 1997). This 49-item self-report measure is used in research and clinical settings to measure severity of post-traumatic stress disorder (PTSD) symptoms. The PDS aligns with the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition-Text Revision (DSM-IV-TR; American Psychiatric Association, 2000) criteria for PTSD. The measure has four parts: Part 1 – trauma checklist; Part 2 – participants are asked to describe their most upsetting traumatic event; Part 3 – assesses 17 PTSD symptoms; Part 4 – assesses impairment caused by symptoms. The PDS yields a total

severity score (ranging from 0 to 51), as well as several subscales: symptoms of re-experiencing, avoidance, and arousal, and functional impairment. Total cut-off scores can be used to determine symptom severity: 1 to 10 mild, 11 to 20 moderate, 21-35 moderate to severe, >36 severe (McCarthy, 2008). Total scores on the PDS across all waves will be included in the proposed study. Additionally, the number of previous traumatic events from the trauma checklist (i.e., Part 1) will also be included as a covariate based on previous studies utilizing this data. Across all four waves, the PDS demonstrated acceptable to good reliability (Wave 1 $\alpha = .88$, Wave 2 $\alpha = .87$, Wave 3 $\alpha = .81$, Wave 4 $\alpha = .77$).

Interpersonal Support Evaluation List (ISEL; Cohen & Hoberman, 1983; Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The ISEL is a 40-item measure of perceived availability of social support in adults. Participants are asked to indicate whether the statements are “definitely false,” “probably false,” “probably true,” “definitely true,” or about themselves. Half of the items are phrased positively (e.g., “If I need help fixing an appliance or repairing my car, there is someone who would help me”) and half are negatively phrased (e.g., “I don’t often get invited to do things with others”). The measure produces a total score, with higher scores indicating increased perceived availability of social support. Additionally, the ISEL produces four subscales: Tangible Support, Self-Esteem, Appraisal, and Belonging. The “tangible” subscale is intended to measure perceived availability of material aid; the “appraisal” subscale, the perceived availability of someone to talk to about one’s problems; the “self-esteem” subscale, the perceived availability of a positive comparison when comparing one’s self to others; and the “belonging” subscale, the perceived availability of people one can do things with. However, for purposes of this study, total scores were utilized. Summary scores from Wave 1 were included in this analysis. The ISEL demonstrated excellent reliability in the current sample ($\alpha = .95$).

Brief COPE (Carver, 1997). This abbreviated measure was derived from the original COPE (Carver, Scheier, & Weintraub, 1989) It contains 28-items assessing 14 different types of coping consisting of two items each: Active Coping, Planning, Positive Reframing, Acceptance, Humor, Religion, Using Emotional Support, Using Instrumental Support, Self-Destruction, Denial, Venting, Substance Use, Behavioral Disengagement, and Self-Blame. Participants are asked to rate how often they engage in the behavior indicated each item on a four-point scale ranging from, “I haven’t been doing this at all” to “I’ve been doing this a lot.” Reliability estimates for this measure ranged from adequate to excellent. Additionally, Kelley and colleagues (2010) conducted a factor-analysis, which yielded two factors assessing demonstrating adaptive coping (16 items; $\alpha = .91$) and maladaptive coping (9-items; $\alpha = .82$). These two subscales will be used in the proposed study. Sample items for this measure include: “I’ve been turning to work or other activities to take my mind off things” and “I’ve been using drugs or alcohol to help get me through it.” Mean scores for adaptive and maladaptive coping from Wave 1 were included in this analysis. Cronbach’s alpha for adaptive coping ($\alpha = .91$) and maladaptive coping ($\alpha = .80$) were found to be excellent and good, respectively.

Behavioral Assessment System for Children, 2nd Edition (BASC-2; Reynolds & Kamphaus, 2004). The BASC-2 is a multi-method, multidimensional measure of child behavior assessing positive (adaptive) and clinical (negative) dimensions. The BASC-2 contains five components: Teacher Rating Scales; Parent Rating Scales (PRS); Self-Report of Personality (SRP); Structure Developmental History; Student Observation System. The BASC-2 contains age appropriate forms including one for adolescents (12-21 years old) and one for school age children (6-11 years old). The parent-report version (BASC-2: PRS) was utilized in the current investigation. The *Internalizing Problems* and *Externalizing Problems* composites of the BASC-

2: PSR were used for the purpose of this study. The *Internalizing Problems* component includes items assessing anxiety, depression, and somatization, while the *Externalizing Problems* composite assesses hyperactivity, aggression, and conduct problems. Reliability and validity information were reported to range from adequate to excellent (Reynolds & Kamphaus, 2004). T-scores scores from Wave 1 were included in this analysis.

Data Analysis

Mean-level analyses were conducted for each of the variables of interest. Descriptive statistics were conducted for the frequency of traumatic events endorsed on the PDS and the amount of hurricane-related loss/disruption endorsed on the HURTE. Additionally, summary statistics were calculated for social support (ISEL), maladaptive/adaptive coping (Brief COPE), and children's externalizing/internalizing behaviors (BASC-2). Bivariate correlations were used to examine the relationship between predictor variables and PTS symptoms over each wave. Similar to that outlined in Self-Brown et al. (2014), LCGA was utilized to test the goodness of fit of one to five unconditional trajectory models to determine the model that best represented the data. Then, a final conditional model was examined after regressing trajectories on relevant predictor variables (i.e., number of previously experienced traumatic events, hurricane-related loss and disruption, social support, coping, and child internalizing/externalizing behavior problems). Based on the final conditional model, associations between risk and protective factors and odds of membership in one of the maternal PTS symptoms trajectories were examined using multinomial logistic regression. Odds ratios were calculated comparing a designated trajectory group with a reference group. All analyses were completed utilizing SPSS Version 26 (IBM Corp, 2019) and Mplus Version 8 (Muthén & Muthén, 1998-2017).

Results

Preliminary Analyses

Descriptive Statistics. Summary statistics for variables of interest are provided in Table 2. According to the results, overall self-reported PTS symptoms, as measured by the PDS, decreased in severity over the four waves with average scores in Wave 1 ($M = 13.34$, $SD = 12.87$), Wave 2 ($M = 11.00$, $SD = 11.97$), and Wave 3 ($M = 11.23$, $SD = 11.03$) falling into the moderate range and scores in Wave 4 ($M = 9.51$, $SD = 10.33$) in the mild range. On average, mothers reported experiencing 2.24 ($SD = 2.08$) previous traumatic events ranging between 0 and 7, with 86.9% experiencing at least one previous additional traumatic event. Mothers' reported on average externalizing problems T-score of 50.84 ($SD = 12.25$) and internalizing problems of 49.88 ($SD = 10.73$). 20.4% of mothers' scores on the internalizing behavior composite and 13.5% on the externalizing behavior composite fell in the clinically at-risk to clinical range.

Table 2. Descriptive Statistics for Variables of Interest

	Mean (SD)	Min., Max.	Skew	Kurtosis
PTS Symptoms Wave 1	13.34 (12.87)	0, 48	0.80	-0.42
PTS Symptoms Wave 2	11.00 (11.97)	0, 50	1.08	0.18
PTS Symptoms Wave 3	11.23 (11.03)	0, 45	0.94	0.00
PTS Symptoms Wave 4	9.51 (10.33)	0, 49	1.38	1.51
Social Support	80.35 (20.29)	42, 140	-0.23	-1.14
Adaptive Coping	23.83 (13.88)	0, 55	-0.90	-0.96
Maladaptive Coping	4.55 (4.90)	0, 26	1.36	1.64
BASC-2: Externalizing T-Score	49.88 (10.73)	34, 100	1.58	3.60
BASC-2: Internalizing T-Score	50.84 (12.25)	30, 93	0.96	0.66
Number of Previous Traumas	2.08 (1.58)	0, 7	1.41	1.40
Hurricane Loss/Disruption	4.05 (2.68)	0, 10	-0.02	-1.11

Note. Min., Max. = Minimum and maximum observed scale scores; PTS = Posttraumatic Stress; BASC-2 = Behavior Assessment System for Children, Second Edition; Wave 1 = 3-7 months post-Katrina; Wave 2 = 13-17 months; Wave 3 = 17-22 months; and Wave 4 = 25-27.

Correlations. Correlational analyses are presented in Table 3. Significant correlations were identified between variables. Specifically, PTS symptoms as measured by the PDS were significantly and positively correlated across data collection waves. Wave 1 PDS scores were significantly positively correlated with Wave 2 ($r = .53, p < .01$), Wave 3 ($r = .53, p < .01$), and Wave 4 ($r = .32, p < .01$). Similarly, Wave 2 PDS scores were significantly positively correlated with Wave 3 ($r = .66, p < .01$) and Wave 4 ($r = .63, p < .01$). Wave 3 was also positively correlated with Wave 4 ($r = .71, p < .01$). In summary, increased symptoms at each wave were related to increased symptoms at the subsequent data collection waves. Hurricane related loss and disruption was significantly positively related to mothers' PTS symptoms across all four waves (W1 PDS: $r = .26, p < .01$; W2 PDS: $r = .21, p < .01$; W3 PDS: $r = .25, p < .01$; W4 PDS: $r = .25, p < .01$). As such, individuals with higher PDS scores also reported increased occurrence of hurricane-related loss and disruption.

Social Support, as measured by the ISEL, was significantly related to PDS scores across all four waves, in that higher levels of social support were negatively associated with lower PDS scores at Wave 1 ($r = -.25, p < .01$), Wave 2 ($r = -.28, p < .01$), Wave 3 ($r = -.25, p < .01$), and Wave 4 ($r = -.20, p < .01$). Further, social support was negatively associated with maladaptive coping, in that individuals who reported higher levels of social support also endorsed lower frequency of use of negative coping skills ($r = -.31, p < .001$). ISEL scores were not significantly related to use of positive coping strategies. However, social support was negatively associated with mothers' report of their children's externalizing ($r = -.25, p < .01$) and internalizing ($r = -.27, p < .01$) problems, as measured by the BASC-2. As such, mother's with increased social support reported less externalizing and internalizing symptoms in their children. Social support

at Wave 1 was unrelated to the number of previous traumatic events endorsed and the amount of loss/disruption experienced as a result of Hurricane Katrina.

Maladaptive and Adaptive coping were measured using the Brief COPE. Overall, mothers reported utilizing adaptive coping strategies over maladaptive strategies ($t(292) = -21.89, p < .001$). Adaptive and maladaptive strategies were significantly positively correlated ($r = .31, p < .001$), in that use of increased use of adaptive coping strategies were associated with increased use of maladaptive strategies. Maladaptive coping was positively related to PTS symptoms across all four waves (W1 PDS: $r = .44, p < .01$; W2 PDS: $r = .33, p < .01$; W3 PDS: $r = .34, p < .01$; W4 PDS: $r = .25, p < .01$), in that increased PTS symptoms co-occurred with increased use of maladaptive coping strategies. Similarly, adaptive coping was also positively associated with PDS symptoms at the first three waves of data collection (W1 PDS: $r = .36, p < .01$; W2 PDS: $r = .25, p < .01$; W3 PDS: $r = .20, p < .01$). However, the relationship between PTS symptoms and use of adaptive coping strategies was not found to be statistically meaningful at Wave 4. As

Furthermore, adaptive coping was significantly correlated with mothers' report of internalizing behavior problems ($r = .15, p < .05$) in their children, in that increased use of positive coping was associated with increased child internalizing symptoms. Maladaptive coping ($r = .19, p < .01$) and adaptive coping ($r = .30, p < .01$) were also significantly positively associated with hurricane-related loss and disruption. That is, as mothers' use of adaptive and maladaptive coping strategies increased, the level of hurricane-related loss and disruption also increased. Finally, positive coping was significantly correlated with mothers' reported number of previous traumatic events ($r = .18, p < .01$), in that mothers who reported more previous traumatic events in their lifetime also reported increased use of adaptive coping behaviors.

Table 3. Correlations Between Outcome and Predictor Variables of Interest

	1	2	3	4	5	6	7	8	9	10
1. W1 PDS	--									
2. W2 PDS	.53**									
3. W3 PDS	.53**	.66**								
4. W4 PDS	.32**	.63**	.71**							
5. W1 ISEL	-.25**	-.28**	-.25**	-.20*						
6. W1 Maladaptive Cope	.44**	.33**	.34**	.25**	-.31**					
7. W1 Adaptive Cope	.36**	.25**	.20*	0.15	0.06	.31**				
8. W1 BASC-2 Ext.	0.10	0.13	.18*	0.13	-.25**	0.11	-0.04			
9. W1 BASC-2 Int.	.27**	0.15	.28**	.22*	-.27**	.28**	.15*	.57**		
10. Prior Traumatic Events	.22**	.18*	0.00	-0.02	-0.07	0.04	.18**	0.12	0.09	
11. Loss/Disruption	.26**	.21**	.25**	.25**	-0.09	.19**	.30**	0.06	0.07	0.01

Note. * $p \leq 0.05$, ** $p \leq 0.01$, PDS = Posttraumatic Diagnostic Scale; ISEL = Interpersonal Support Evaluation List; BASC-2 = Behavior Assessment System for Children, Second Edition; Ext. = BASC-2 Externalizing Problems Composite; Int. = BASC-2 Internalizing Problems Composite; W1 = Wave 1 (3-7 months post-Katrina); W2 = Wave 2 (13-17 months); W3 = Wave 3 (17-22 months); W4 = Wave 4 (25-27 months).

Internalizing and externalizing problems were significantly positively correlated, in that mothers who reported increased externalizing behaviors in their children also reported increased internalizing behaviors ($r = .57, p < .01$). Internalizing symptoms were positively correlated with mothers' PDS symptoms (W1 PDS: $r = .27, p < .01$; W3 PDS: $r = .28, p < .01$; W4 PDS: $r = .22, p < .01$) at three of the four data collection waves. As such, increased PTS symptoms were associated with increased parent-reported child internalizing symptoms. Externalizing symptoms were similarly related to mothers' PTS symptoms at Wave 3 ($r = .18, p < .05$), in that increased externalizing symptoms were associated with increased PTS symptoms at the third wave. Child externalizing symptoms were unrelated to mothers' PTS symptoms at all other waves.

PTS Symptom Trajectories

Unconditional Model. PTS symptom trajectories were identified by utilizing LCGA to determine the best-fitting unconditional model (i.e., without covariates/predictor variables) for the current sample. LCGA, is a type of growth mixture modeling that does not allow variation around intercepts and slopes with trajectory groups (Jung & Wickrama, 2008; Nagin, 2005). Missing data were addressed using full-information maximum likelihood estimator with robust standard errors, using a numerical integration algorithm, which assumes all missing data is missing at random (Muthén, 2004). Multiple criteria were utilized to determine the number of appropriate classes, such as parsimony, theoretical justification, and interpretability (Jung & Wickrama, 2008). Fit indices were examined for best fit, including lower Akaike information criterion (AIC), lower Bayesian information criterion (BIC), lower sample size adjusted BIC, higher entropy, higher posterior probabilities, a significant Lo-Mendell-Rubin likelihood ratio test (LMR-LRT), and a significant bootstrap likelihood ratio test (BLRT) (Jung & Wickrama, 2008).

Table 4. Fit Indices and Group Assignment Accuracy for Unconditional and Conditional Models

	AIC	BIC	Sample Size Adjusted BIC	Entropy	Posterior Probabilities	LMR- LRT	BLRT
1 Trajectory	6477.09	6500.40	6481.368	1	1	N/A	N/A
2 Trajectories	6211.58	6246.56	6218.003	0.796	.91-.95	0.001	0.00
3 Trajectories	6132.41	6179.05	6140.978	0.798	.82-.95	0.023	0.03
4 Trajectories	6091.01	6149.30	6101.709	0.784	.52-.87	0.27	0.28
5 Trajectories	6059.65	6129.60	6072.491	0.748	.77-.88	0.03	0.03
Conditional							
3 Trajectories	16337.36	16628.82	16390.88	.824	.82-.95	N/A	N/A

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood ratio test; BLRT = Bootstrap parametric likelihood ratio test.

One through five linear unconditional models were tested to identify the best-fit model for the data. The results from these analyses are presented in Table 4. Based on the aforementioned criteria and theoretical foundation, the three trajectory model was selected for further analysis. As such, the three-trajectory model had a significant BLRT ($p < .05$) and had a lower AIC, BIC, and adjusted BIC compared to the two-trajectory model. Additionally, entropy was .78 and posterior probabilities ranged from .82 to .95.

This model resulted in 38 participants (10.56%) in the chronic, 86 (23.89%) in the recovering, and 236 (65.67%) in the resilient trajectories. Individuals in the chronic group started with a mean PDS symptoms score of 20.39 ($SD = 8.29$) at Wave 1 with symptoms subsequently increasing to 29.10 ($SD = 11.74$), 28.61 ($SD = 7.90$), and 31.30 ($SD = 6.72$) at Waves 2, 3 and 4, respectively. The recovering trajectory began with the highest PDS scores of the three trajectories, with a mean score of 30.72 ($SD = 8.87$) at Wave 1. Scores subsequently decreased across timepoints to 19.31 ($SD = 11.51$), 16.16 ($SD = 8.63$), and 11.97 ($SD = 6.55$), at Waves 2, 3, and 4, respectively. Finally, the resilient trajectory represented individuals with low scores across all timepoints: Wave 1 = 5.44 ($SD = 6.19$), Wave 2 = 4.28, ($SD = 5.89$), Wave 3 = 5.26 ($SD = 6.12$), and Wave 4 = 4.98 ($SD = 5.61$). These trajectories are represented in Figure 1.

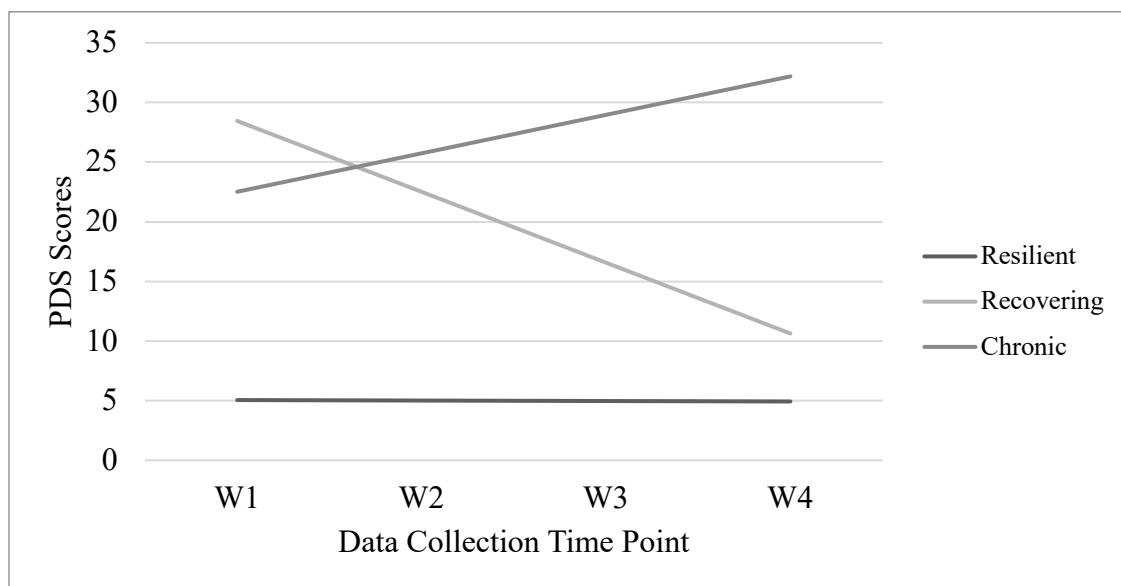


Figure 1. Mother Post-traumatic Stress Symptoms Three-Trajectory Unconditional Model.
Note. W1 = Wave 1 (3-7 months post-Katrina); W2 = Wave 2 (13-17 months); W3 = Wave 3 (17-22 months); W4 = Wave 4 (25-27 months). PDS = Posttraumatic Diagnostic Scale.

Conditional Model. A conditional model (i.e., trajectories regressed on relevant predictor variables) utilizing the three-trajectory model selected above was examined. The addition of covariates to the model helps determine if the unconditional model exhibits a stable trajectory model and improves trajectory classification (Muthen, 2004). Predictor variables included in the conditional model included hurricane-related loss/disruption, number of previous traumatic events, perceived social support, adaptive and maladaptive coping, and children's externalizing and internalizing problems.

Model fit statistics for the final conditional three-trajectory model are presented in Table 4. Results revealed a stable three-trajectory model fit for the current data. Symptom patterns were similar to the unconditional three-trajectory model with 239 (66%) individuals in the resilient group, 76 (21%) in the recovering group, and 45 (13%) in the chronic group. These trajectories are illustrated in Figure 2. Case distribution, intercepts, and slopes comparing the unconditional and conditional models are presented in Table 5.

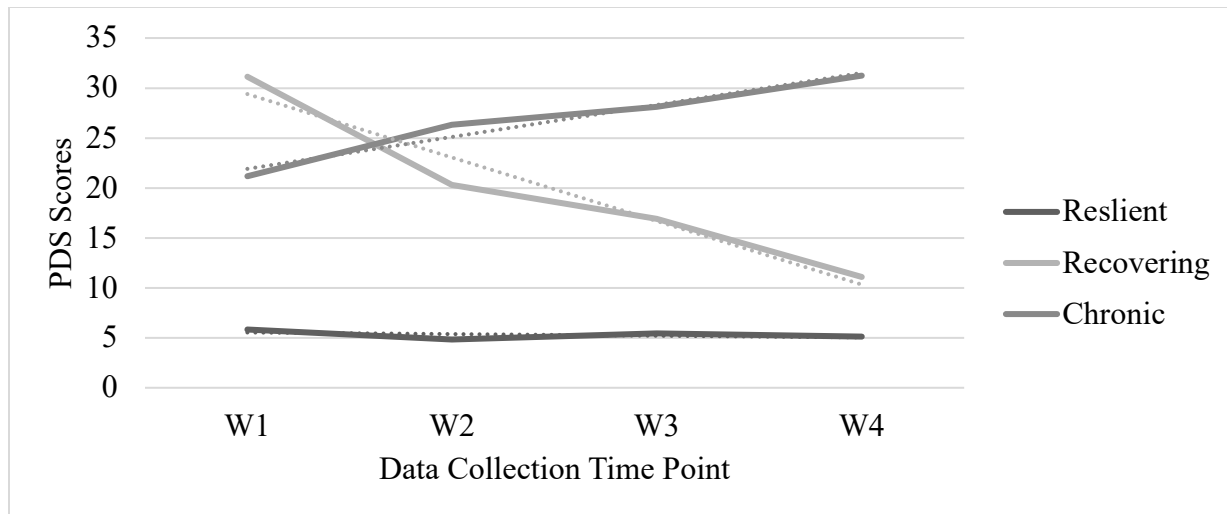


Figure 2. Mother Post-traumatic Stress Symptoms Three-Trajectory Conditional Model
Note. W1 = Wave 1 (3-7 months post-Katrina); W2 = Wave 2 (13-17 months); W3 = Wave 3 (17-22 months); W4 = Wave 4 (25-27 months); PDS = Posttraumatic Diagnostic Scale; dotted line represents linear path.

Table 5. Comparison of Unconditional and Conditional Three-Trajectory PTS Symptom Models

Trajectory	Unconditional Model			Conditional Model		
	n (%)	Intercept Estimate (SE)	Slope Estimate (SE)	n (%)	Intercept Estimate (SE)	Slope Estimate (SE)
Chronic	38 (11%)	21.24 *** (2.14)	0.44 *** (0.11)	45 (13%)	15.92 *** (5.05)	0.55 (0.31)
Recovering	86 (24%)	29.87 *** (1.87)	-.93 *** (0.14)	76 (21%)	24.85 *** (4.50)	-.82** (0.34)
Resilient	236 (66%)	5.26 *** (.48)	-0.01 (0.04)	239 (66%)	2.68 (4.13)	0.01 (0.30)

Note. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Predictors of Trajectory Membership

Based on the final conditional model, associations between risk and protective factors and odds of membership in one of the maternal PTS symptoms trajectories were examined using multinomial logistic regression. Odds ratios were calculated comparing a designated trajectory group with a reference group. Predictors included covariates from the conditional model: perceived social support, adaptive and maladaptive coping, and parent-reported children's

externalizing and internalizing problems, as well as hurricane related loss/disruption and number of previous traumas. Results are presented in Table 6.

Table 6. Odds Ratios for Risk Factors Predicting Trajectory Group Membership

Reference Group	Chronic		Recovering
	Resilient (95% CI)	Recovering (95% CI)	Resilient (95% CI)
Loss/Disruption	0.78* (0.635-0.966)	0.81 (0.636-1.018)	0.97 (.834-1.136)
Previous Trauma	1.24 (0.843-1.823)	1.42* (0.947-2.134)	0.87 (0.698-1.089)
Maladaptive Coping	0.95 (0.850-1.063)	0.92 (0.811-1.051)	1.03 (0.938- 1.130)
Adaptive Coping	.98 (0.938-1.021)	1.00 (0.950-1.044)	0.98 (0.953-1.013)
Social Support	1.05** (1.020-1.081)	1.04* (1.004-1.070)	1.01 (0.992-1.035)
Child Externalizing	1.00 (0.949-1.062)	0.99 (0.932-1.051)	1.01 (0.971-1.005)
Child Internalizing	0.99 (0.943-1.038)	1.04 (0.983-1.090)	0.96* (0.922-0.992)

Note. * $p < .05$, ** $p < .01$

Significant variables in the final model included hurricane-related loss/disruption, prior trauma history, social support, and children's internalizing symptoms. For every additional item endorsed on the loss/disruption subscale of the HURTE, the odds of membership in the resilient group verses the chronic group decreased by 0.78, while holding all other variables in the model constant (95% CI = 0.635-0.966). Thus, individuals with increased loss/disruption were more likely to fall into the chronic group over the resilient group. For every additional prior traumatic event, participants were 1.42 times more likely to be in the recovering group compared to the chronic group (95% CI = 0.947-2.134). In regard to perceived social support, for every unit increase in ISEL scores, participants were 1.05 (95% CI = 1.020-1.081) times more likely to be in the resilient group compared to the chronic group. Similarly, the odds of being in the recovering group compared to the chronic group increased by 1.04 (95% CI = 1.004-1.070) with every unit increase in ISEL scores. Finally, with every increase in child internalizing symptoms as measured by the parent-report BASC-2, the odds of being in the resilient group decreased by 0.96 (95% CI = 0.922-0.992). As such, given a one unit increase in child internalizing symptoms,

mothers were more likely to fall in the recovering over the resilient trajectory. Adaptive coping, maladaptive coping, and externalizing behaviors did not predict trajectory membership.

Discussion

There is evidence to suggest that natural disasters are increasing in frequency and severity (U.S. Global Change Research Program, 2016). These events have the potential to cause long lasting psychological distress and disruption (Furr et al., 2010; Guha-Sapir et al., 2017; WHO, 1971). Although most individuals impacted by a natural disaster will go on to recover, there is a significant minority who will go on to experience chronic and severe symptoms (e.g., La Greca et al. 2013; Lai et al., 2015; Lowe & Rhodes 2013; Self-Brown et al., 2014). Past research in this area has relied heavily on cross-sectional designs that have not been able to consider individual symptom patterns over time (Cobham et al., 2016; Galtzer-Levey et al., 2018; Lai et al., 2017). Thus, much of what we know about post-disaster recovery is based on research that compares individuals with high (or clinically significant) symptoms and low symptoms at one time-point. This greatly limits our understanding of how specific variables relate to the recovery or persistence symptoms over an extended period of time.

The present study sought to alleviate this gap in the literature by exploring distinct PTS trajectories in a diverse sample of mother's impacted by Hurricane Katrina over two years. Within the context of the transactional stress model (Lazarus, 1999; Lazarus & Folkman, 1984), psychosocial theories of disaster recovery (e.g., Cobham et al., 2016; Weems et al., 2007; Weems & Overstreet, 2008), and family resilience (Doty et al., 2017; Masten, 2018), a number of predictor variables were examined to determine the likelihood of belonging to a specific trajectory. Based on previous work (e.g., Self-Brown et al., 2014), it was hypothesized that three distinct trajectories of PTS would emerge and that several predictor variables (i.e., disaster exposure, prior trauma, social support, coping, and children's psychological functioning) would differentiate group membership. Relatedly, given that previous research has focused primarily on

differences between individuals with and without significant PTS symptoms, a major contribution of the present study, was the ability to explore differences between those with chronic symptoms and those who are able to recover.

First, the relationship between hypothesized predictor variables and mothers' PTS symptoms were examined. As hypothesized and consistent with the extant literature utilizing cross-sectional designs, significant correlations were observed between predictors and PTS symptoms over two years post-Katrina. In regard to disaster exposure, increased hurricane-related loss and disruption at three months post-Katrina was associated with increased PTS symptoms across all four data collection waves. This is consistent with prior research establishing the relationship between a high level of disaster-related impact and negative outcomes (Johannesson et al., 2015; Pietrzak et al., 2013; Furr et al., 2010). Additionally, prior trauma exposure is often considered a risk factor for future PTS symptoms in response to an acute event, such as a natural disaster (e.g., Johannesson et al., 2015). Results revealed that as the number of reported prior traumatic events increased, PTS symptoms also increased, but only at Wave 1 (3-6 months post-disaster) and Wave 2 (13-27 months post-disaster). In other words, for the current sample, prior trauma had a significant positive relationship with PTS symptoms during the first year of post-hurricane recovery.

In regard to coping behavior and social support, significant relationships with PTS symptoms were identified as well. Increased levels of perceived social support were associated with lower PTS symptoms across all four waves during the two years following Hurricane Katrina. This is consistent with prior research establishing the strong protective value of social support in promoting positive adjustment and recovery (Brewin et al., 2000; Abramson et al.,

2015; Bonanno et al., 2007; Bonanno, 2004, 2005; Johannesson et al., 2015; Kaniasty & Norris, 2009; Lai, Osborne, Piscitello, Self-Brown, & Kelley, 2018).

Coping skills, or the behavioral and cognitive tools utilized to mitigate a negative life experience (Coyne et al., 1981), were also examined in relation to PTS symptoms. According to results, maladaptive coping (e.g., avoiding negative thoughts, using substances) was positively related to PTS symptoms across all four waves, in that mothers who reported increased PTS symptoms also reported increased use of maladaptive coping strategies. This supports the hypothesis that use of strategies such as avoidance, substance use, and thought suppression increase risk for PTS symptoms (Dunmore et al., 1999; Feder et al., 2016; Loo et al., 2016; Steil & Ehlers, 2000; Wenzlaff & Wegner, 2000). Alternatively, it was hypothesized that use of adaptive coping strategies (e.g., concentrating efforts to change a difficult situation, accepting reality) would be related to lower PTS symptoms. Results did not support this hypothesis. In fact, adaptive coping was significantly positively correlated with PTS symptoms over the first three data collection waves (i.e., 17-22 months post-disaster). As such, mothers who reported higher PTS symptoms also reported using adaptive coping skills at a higher rate. This may be due to the fact that individuals who are experiencing elevated symptoms may be needing to use coping skills more often overall, compared to those with low symptoms.

An important aim of the current study was to explore the relationship between family-level variables on mothers' report of PTS symptoms. Within the theoretical framework of family resilience (Doty et al., 2017; Masten, 2018) and parent-child functioning (e.g., Cobham et al., 2016), it was hypothesized that there would be a significant relationship between parent and child psychological functioning post-Katrina. Contrary to the hypothesis, results revealed that child externalizing symptoms (e.g., aggression, conduct problems, hyperactivity) were only

significantly associated (albeit weakly) with mother's PTS symptoms at Wave 3 (i.e., 17-22 months post-disaster). Alternatively, parents who reported increased child internalizing symptoms (e.g., anxiety, depression, somatic symptoms) also reported increased PTS symptoms across three of the four data collection waves. Thus, the hypothesis that child internalizing symptoms would be related to parent PTS symptoms was supported and suggests that child internalizing symptoms may play a more significant role in parent PTS symptoms (and vice versa) compared to externalizing symptoms. However, this relationship warrants further examination, as a correlation does not imply a directional relationship between these variables.

In summary, all predictor variables were related to parent PTS symptoms to some degree and therefore were retained as predictors for further analysis. Even though the pattern of association varied among predictors and PTS symptoms across the four data collection waves, they were deemed worth keeping in the model for exploratory purposes and to further examine how these variables were related to PTS trajectories in mothers.

Following correlational analysis, the present investigation sought to determine distinct trajectories of mothers' PTS symptoms utilizing an LCGA approach. Consistent with previous work (e.g., Self-Brown et al., 2014), three distinct PTS trajectories were revealed: chronic (13%), recovering (21%), and resilient (66%). The chronic trajectory started with symptoms in the moderate to severe clinical range at three months post-Katrina, with symptoms increasing over the two years following. Final average PTS symptoms for this group maintained states in the moderate to severe clinical range. The recovering group interestingly started with the highest number of symptoms at three months, with symptoms consistently decreasing over each of the subsequent time points. Symptoms for this group started in the moderate to severe clinical range and ended with scores in the low end of the moderate range. Finally, the resilient group reported

low symptoms (in the mild range) across all four waves with very little variation in scores over time. After covariates (i.e., risk and protective factors) were added to the model, symptoms patterns remained constant. Thus, giving confidence that this is a robust stable model that fits the data well (Muthen, 2004). These patterns are similar to previous work in disaster impacted populations (Self-Brown et al., 2014; Pietrzak et al., 2013; Galatzer-Levy et al., 2018); however, Pietrzak and colleagues (2013) identified a delayed-onset trajectory following Hurricane Ike in 2008. The present study did not support evidence of a delayed-onset trajectory in the sample.

Interestingly and contrary to initial hypotheses, the recovering group started with higher PTS symptoms compared to the chronic group (although both fell within the moderate to severe clinical range). This is particularly noteworthy given that most cross-sectional research designs only examine data collected at one or two timepoints. Results from the present study provide evidence that this method may paint an inaccurate picture of individuals who are at the highest risk for developing the most chronic and severe symptoms. It is possible that if only looking at one time-point without consideration for change in symptoms over time, it can lead to misclassification of individuals and portray a skewed understanding of post-disaster functioning. Another important note is that group with low symptoms labeled “resilient” does not necessarily mean that this group did not experience other psychological distress, but only that this group did not experience high levels of PTS symptoms specifically. Future research may consider the implementation of a dual-factor model of mental health that does not only consider significant negative symptoms, but also includes a measure of well-being or positive adjustment (Suldo & Shaffer, 2008; Wang, Zhang, & Wang, 2011). Thus, conclusions about the resilient group should be taken in light of this limitation.

Finally, covariates were examined as predictors of group membership to determine potential targets for treatment and to identify risk and protective factors for specific trajectory membership. These variables included lifetime previous traumatic events, hurricane-related loss and disruption, coping (adaptive and maladaptive), social support, and children's internalizing and externalizing symptoms. Ultimately, the hurricane loss/disruption, previous traumas, social support, and children's internalizing symptoms were found to significantly differentiate class membership and are further discussed below.

Hurricane-related loss/disruption was found to be a significant risk factor in the current sample. For every additional loss and disruption item endorsed, mothers were more likely to be in the chronic trajectory and experience increasing PTS symptoms over time when compared to the resilient group. This is consistent with previous longitudinal research that indicates that increased trauma-related disruption/loss is related to increased symptomatology. For example, in their study on older adults' PTS response to hurricane Ike, Pietrzak and colleagues (2013), found that hurricane severity predicted membership in the chronic group. Surprisingly, hurricane-related loss/disruption did not differentiate individuals in the chronic compared to the recovering or the recovering compared to the resilient group as initially hypothesized. On average, participants endorsed approximately 4 items on the loss/disruption scale of the HURTE ($M = 4.07$, $SD = 2.68$). One potential explanation for the current finding, may be the fact that those families who were most impacted by Hurricane Katrina may have relocated following the event. Therefore, individuals with very high levels of loss/disruption may not have represented in the study.

Previous traumatic exposure was also supported as a significant risk factor. Specifically, for every additional lifetime traumatic event endorsed, individuals were more 1.42 times more

likely to be classified in the recovering group (over the chronic). That is, in the current sample, prior trauma exposure reported at three months post-disaster predicted the highest levels of symptoms (in the moderate to severe range) immediately following Hurricane Katrina; however, these individuals' symptoms improved over time. Previous research examining the influence of trauma history on PTS outcomes in disaster-impacted samples similarly found lifetime trauma exposure to predict membership in symptomatic trajectories (e.g., Self-Brown et al., 2014; Johannesson et al., 2015). Interestingly, mothers with a significant trauma history recovered over time. Perhaps individuals with previous traumatic events have experienced prior situations that provided them with the ability to feel efficacious in coping with the disaster and recover quicker. Relatedly, individuals in this group could be experiencing a phenomenon known as posttraumatic growth (PTG), where positive psychological change occurs despite experiencing highly challenging events (Calhoun & Tedeschi, 1999, 2001, 2004). Additional research assessing PTG and other variables associated with well-being would be helpful in further elucidating this relationship.

Consistent with previous cross-sectional and longitudinal research, the results highlight the importance of social support as a protective factor. For every unit increase in social support, mothers were more likely to be in the resilient and recovering trajectories over the chronic. Prior work has consistently established social support as a strong protective agent in the recovery from potentially traumatic events and in the promotion of resilience (Brewin et al., 2000; Abramson et al., 2015; Bonanno et al., 2007; Bonanno, 2004, 2005; Kaniasty & Norris, 2009). To date, only one study has examined social support from a trajectory-based longitudinal perspective. Results of this work revealed lower social support was related to the severe chronic trajectory

(Johannesson et al., 2015). Interestingly, social support did not differentiate the resilient and recovering trajectories, suggesting that each group displayed a similar rate of perceived support.

Finally, as hypothesized, parent-reported child internalizing symptoms significantly predicted mothers' membership in the recovering group (compared to the resilient group). It is possible that children with internalizing symptoms present a co-occurring stressor for parents and may lead to elevated symptoms post-disaster. Additionally, it was hypothesized that children's psychological and behavioral functioning would predict membership in the chronic group. Surprisingly, children's internalizing symptoms did not differentiate any other trajectories. One explanation for this may be that the present study only examined parent-reported child behavior at the first data collection wave. Future research may seek to further explicate this relationship by examining parent and child symptoms over time. For example, a cross-lag analysis may reveal ordering of this bidirectional effect and help to inform treatment priorities when working with families impacted by natural disasters.

Contrary to study hypotheses, maladaptive coping, adaptive coping, and children's externalizing symptoms were not supported as significant predictors in the final model. However, this does not mean that these variables are unrelated to parent's recovery post-disaster. Correlational results underscore the association between these predictors and PTS outcomes over-time. However, given that these variables were only examined at one time point, their influence on PTS symptoms trajectories may have been underestimated. Further assessment is warranted prior to excluding these variables as significant factors.

Strengths

The present study has a number of notable strengths. To the author's knowledge, this is the first study to examine a number of predictor variables within an LCGA model spanning

individual and family-level risk and protective factors, specifically in regard to mother's functioning post-disaster. Utilizing sophisticated longitudinal analytic techniques, this study was not only able to investigate the relationship between relevant predictor variables and symptomatic vs. asymptomatic PTS groups, but also able to examine differences between those with chronic symptoms compared to those who recover. This technique also addresses several limitations in the cross-sectional literature, which often rely on variable-centered approaches to understanding disaster recovery (Cobham et al., 2016; Lai et al., 2017; Norris, 2006). Furthermore, participants in the current study included a heterogeneous sample of mothers who were negatively impacted by Hurricane Katrina. Many of the families who participated in the study were low income, single parents, and identified with a minority race/ethnic group, a population largely underrepresented in psychological research.

A significant contribution of the present study is that children's post-disaster internalizing symptoms was found to be a risk factor for mother PTS symptoms (recovering trajectory). Prior research has often examined the predictive value of parents' symptomology on children's adjustment post-disaster (e.g., Pfefferbaum, Jacobs, Houston, & Griffin, 2015; Spell et al., 2008; Self-Brown et al., 2014). However, despite a substantial literature supporting the bidirectional relationship of child and parent functioning (e.g. Cappa, Gedge, Conger, Dumas, & Conger, 2011; McAdams et al., 2015; Neece, Green, & Baker, 2012), no studies have formally assessed the impact of child functioning on parents' post-disaster adjustment. As such, the current investigation is the first to examine the role of children's externalizing and internalizing symptoms on parent PTS symptoms over time. Results provide initial evidence for the family-based resilience model (Doty et al., 2017; Masten, 2018) and highlights the importance of considering family factors when examining post-disaster recovery of parents.

Limitations & Future Directions

Results of the present study should be taken in light of several limitations. Although, this study provides an important first step in further understanding the factors that influence PTS symptom patterns post-disaster, research supports heterogeneous outcomes following such an event (Galatzer-Levy et al., 2018). Future research may consider examining additional outcomes, such as anxiety, depression, and general distress. Additionally, comorbidity has yet to be addressed in disaster-impacted adult populations from a trajectory-based approach.

One goal of the current study was to identify factors that may distinguish between the two symptomatic groups to obtain a better understanding of how theorized risk and protective mechanisms impact symptom trajectories over time. The only salient predictors differentiating the recovering and chronic trajectories in the current study included prior trauma exposure and social support. None of the other hypothesized predictors distinguished these trajectories. Therefore, more research is needed to further explore the potential differences between these two groups. Future research may consider examining demographic variables, such as age, income and educational attainment, as these variables have been found to significantly differentiate group membership in longitudinal designs (e.g., Johannesson et al., 2015; Pietrzak et al., 2013). For example, when studying PTS symptom patterns in a sample of Swedish tourists impacted by the 2004 Indian Ocean Tsunami, Johannesson and colleagues (2015) found lower educational attainment to significantly predict membership in the chronic trajectory, while younger age was associated with membership in the recovering trajectory. However, these variables were not included in the present investigation. Understanding potential differentiating factors between those who recover and those who maintain significant PTS symptoms, can inform prioritization

of intervention targets and identify risk and protective factors associated with long-term outcomes.

Similarly, the only differentiating factor between the recovering and resilient group was children's internalizing symptoms, in that, an increase in symptoms was associated with increased likelihood in the recovering group. This finding provides initial evidence in support of a family resilience model (Masten, 2018). Future research may focus on including additional family-level variables, such as routines (e.g., Kelley et al., 2010; Botey & Kulig, 2013; Gil-Rivas & Kilmer, 2013; Sprague et al., 2015) and parenting behavior (e.g., Kelley et al., 2010), which have been found to be helpful in explaining children's post-disaster recovery. Additionally, it is possible that other factors may play a role in the recovery process that were not explored in the present study. For example, in the current investigation adaptive and maladaptive coping variables were extrapolated as subscales from the Brief COPE; however, it is unclear if there were specific coping strategies or whether coping efficacy may have aided in the recovery process or protected mothers from ever developing significant symptoms. It is also unknown as to whether mothers in the recovering group received therapeutic services during the two years following hurricane Katrina. This information would shed light on an important factor contributing to the observed decline in symptoms.

Another limitation of the present study is that predictor variables were only examined at the first wave of data collection. This is important in understanding how functioning directly after the hurricane predicts future PTS symptoms; however, it is likely that these variables also changed over time. Although the current study provides an essential first step in illuminating factors that differentiate membership in the three trajectories, additional analysis utilizing change scores across timepoints or a cross-lag approach may be more useful. For example, perhaps

mothers in the chronic group did not initially report high levels of child externalizing or internalizing symptoms at three months post-Katrina, but it may be likely that child and parents' symptoms worsened together over time. Finally, the current study relied solely on self-report data. There are inherent limitations to doing so, such as subjectivity and response bias.

Conclusions

The current study adds to the extant literature on PTS response in mothers impacted by a natural disaster by mapping out distinct symptom trajectories and exploring predictor variables associated with each trajectory. Social support was found to be a significant protective factor and increased likelihood of membership in the resilient trajectory. Hurricane-related loss/disruption was a significant risk factor increasing likelihood in the chronic trajectory. Prior trauma, children's internalizing symptoms, and social support predicted membership in the recovering trajectory. Results highlight the heterogeneous impact that each of these risk and protective factors have on specific PTS response patterns. This study has public health implications in increasing understanding of the mechanisms that may influence recovery and maintenance of significant PTS symptoms in the aftermath of a natural disaster. Further, by understanding specific constellations of risk factors associated within each trajectory, specific targets for intervention can be identified to propel positive change and promote recovery.

Appendix A

Demographic Questionnaire

Currently, what is the highest level of education you have completed?

<p>Yourself</p> <p>_____ 6th grade or less</p> <p>_____ Junior high school (7th, 8th, 9th grade)</p> <p>_____ Partial high school (10th, 11th grade)</p> <p>_____ High school graduate</p> <p>_____ Partial college (at least 1 year) or specialized training</p> <p>_____ Standard college or university graduate graduate</p> <p>_____ Graduate professional degree (Master's, Doctorate)</p>	<p>Your Spouse</p> <p>_____ 6th grade or less</p> <p>_____ Junior high school (7th, 8th, 9th grade)</p> <p>_____ Partial high school (10th, 11th grade)</p> <p>_____ High school graduate</p> <p>_____ Partial college (at least 1 year) or specialized training</p> <p>_____ Standard college or university</p> <p>_____ Graduate professional degree (Master's, Doctorate)</p>
--	---

What is the total and CURRENT annual income of your household? (Combine the income of all the people living in your house right now as well as any government assistance.)

_____ \$0-4,999	_____ \$15,000-24,999	_____ \$50,000-74,999
_____ \$5,000-9,999	_____ \$25,000-34,999	_____ \$75,000-99,999
_____ \$10,000-14,999	_____ \$35,000-49,999	_____ \$100,000 and up

If you are unable to say what your annual income is, what is your monthly income?
\$ _____

3. Please provide the following information about you and your spouse's job(s) CURRENTLY.

About You

What is your occupation/job title? (If you are retired, please write "retired" and your past occupation. If you do not work outside the home, write "unemployed." If your job is the same as it was before the hurricane, please write "same.")

If employed, what kind of industry or company? (For example, elementary school, clothing store, hospital, restaurant, etc.)

If employed, what are your job duties? (Please be specific)

If you are currently employed, are you currently seeking a new job? Yes/No

About Your Spouse

What is our spouse's occupation/job title? (If they are retired, please write "retired" and their past occupation. If they do not work outside the home, write "unemployed." If their job is the same as it was before the hurricane, please write "same.")

What kind of industry or company did they work for? (For example, elementary school, clothing store, hospital, restaurant, etc.)

What are their job duties? (Please be specific.)

If your spouse is currently unemployed, are they currently seeking a new job? Yes/No

Family: Please list the ages and sex of all those living in your household CURRENTLY, including yourself, your spouse, other relatives, and all children.

Relationship to you	Age	Sex
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female
_____	_____	Male/Female

What is the TOTAL number of people, including yourself, living in your home CURRENTLY?

What is the TOTAL number of adults over 18, including yourself, living in your home CURRENTLY? _____

What is the TOTAL number of children under 18 living in your home CURRENTLY?

Appendix B

Hurricane-Related Traumatic Experiences Scale

Since the hurricane:

1. Has almost all the damage to your house from the hurricane been fixed?
Yes No
2. Are you now living in the house you lived in before the hurricane?
Yes No
3. Are you living in a house that still has a roof that leaks because of the hurricane?
Yes No
4. Do you have to travel a lot longer to get to your child's school now than you did before the hurricane?
Yes No
5. How many times have you moved since the hurricane?
None Once Twice Three or more
6. How much are you bothered by:

a. Your current living situation	Not at all	A little	A lot	A whole lot
b. Your child's behavior problems	Not at all	A little	A lot	A whole lot
c. Problems with family members or close friends	Not at all	A little	A lot	A whole lot
d. Problem with getting your house repaired	Not at all	A little	A lot	A whole lot
e. Problems at work	Not at all	A little	A lot	A whole lot
f. Your child's current school situation	Not at all	A little	A lot	A whole lot
7. Are you currently out of a job because of the hurricane?
Yes No
8. Do you have to travel a lot longer to get groceries and other necessities than you did before the hurricane?
Yes No
9. Has it been hard to see friends since the hurricane because they or you have moved?
Yes No
10. Overall, how upset have you been about things since the hurricane?

Not at all A little A lot A whole lot

11. How much are you bothered by:

- | | | | | |
|--|------------|----------|-------|-------------|
| a. Your current living situation | Not at all | A little | A lot | A whole lot |
| b. Your child's behavior problems | Not at all | A little | A lot | A whole lot |
| c. Problems with family members or close friends | Not at all | A little | A lot | A whole lot |
| d. Problems with getting your house repaired | Not at all | A little | A lot | A whole lot |
| e. Problems at work | Not at all | A little | A lot | A whole lot |
| f. Your child's current school situation | Not at all | A little | A lot | A whole lot |

12. Which of the following best describes your CURRENT housing?

- g. Apartment
- h. 1-2 bedroom house
- i. 3 or more bedroom house
- j. Condo/townhouse
- k. Low-income housing
- l. Hotel/Motel
- m. Mobile Home/RV
- n. Tent
- o. Emergency Shelter
- p. Other: _____

13. Currently are you renting or buying a new place of residence?

- q. Rent
- r. Buy
- s. Neither
- t. I don't know
- u. Refuse

14. In the last year, how difficult has it been to find permanent housing?

Not at all A little A lot A whole lot

15. Currently, does your child live with members of your extended family?

- a. Yes
- b. No
- c. I don't know
- d. Refuse

16. Currently how would you describe your housing?

- a. Permanent (I have permanent housing and could stay there as long as needed)

- b. Temporarily settled (I have found housing for the next 6 months to a year, but don't plan to stay here)
- c. Very temporary (I have found housing for the next month or 2, but will have to find something else soon)
- d. Constantly in transition (I don't know where I will be living from week to week)
- e. I don't know
- f. Refuse

17. How many times have you moved since the hurricane?

None Once Twice 3 or more times

18. Currently are you still unable to locate family members that you were separated from since the hurricane?

- a. Yes
- b. No
- c. I don't know
- d. Refuse

19. If yes, which family members are you unable to locate?

- a. Parents
- b. Children
- c. Spouse
- d. Siblings

20. After the hurricane was your child a victim of violence or abuse?

- a. Yes
- b. No
- c. I don't know
- d. Refuse

21. How often has your child viewed TV news reports and/or photographs without you being present?

Never 1-2 times 3-4 times 5 or more

22. How often has your child viewed TV news reports and/or photographs with you present?

Never 1-2 times 3-4 times 5 or more

23. How often did your child see internet reports of the hurricane and its aftermath?

Never 1-2 times 3-4 times 5 or more

24. How often did your child see footage of the storm?

Never 1-2 times 3-4 times 5 or more

25. How often did your child see footage of people fleeing, crying, etc.?

Never 1-2 times 3-4 times 5 or more

26. How often did your child see images of death or injury?
Never 1-2 times 3-4 times 5 or more
27. How often did your child see images of heroics, helping, and/or rescue?
Never 1-2 times 3-4 times 5 or more
28. How often did your child see government officials address the state?
Never 1-2 times 3-4 times 5 or more
29. How many days of paid leave have you had to take from work since the hurricane?
_____ # of days
30. How many days of unpaid leave have you had to take from work since the hurricane?
_____ # of days
31. Have you received any financial assistance as a result of the Hurricane Katrina disaster?
a. Yes
b. No
c. I don't know
d. Refuse
32. Did you lose family heirlooms and pieces of family history as a result of the hurricane?
a. yes
b. No
c. I don't know
d. Refuse
33. Was your job relocated as a result of Hurricane Katrina?
a. Yes
b. No
c. I don't know
d. Refuse
34. If you have been unable to return to work, has your job continued to pay you?
a. Yes
b. No
c. I don't know
d. Refuse
35. Do you currently find a loss of time for adequate sleep?
a. Yes
b. No
c. I don't know
d. Refuse
36. Circle any of the following which have occurred since the hurricane:

- a. Your spouse or mate died
- b. You have gotten a divorce
- c. A close family member other than your spouse has died
- d. You have been seriously injured or ill
- e. You got married
- f. You have had family problems with your spouse or child
- g. You have had problems at work
- h. You have received a promotion or gotten a better job
- i. You have been reunited with estranged family or friends

37. Since the hurricane how hard has it been to:

- | | | | | |
|--|------------|----------|-------|-------------|
| a. Receive health care | Not at all | A little | A lot | A whole lot |
| a. Receive financial assistance due to hurricane related damages | Not at all | A little | A lot | A whole lot |
| b. Have access to housing | Not at all | A little | A lot | A whole lot |
| c. Been able to locate school information for your child | Not at all | A little | A lot | A whole lot |

38. Looking back now, how safe do you think you really were during the storm?

- a. Very safe
- b. Fairly safe
- c. Not too safe
- d. Not safe at all
- e. I don't know
- f. Refuse

39. In general, would you say that your health is:

- a. Excellent
- b. Very good
- c. Good
- d. Fair
- e. Poor
- f. Don't know
- g. Refuse

40. Are you currently considering seeking help from a mental health professional for personal or emotional problems since the hurricane?

- a. Yes, I am considering seeking help
- b. No, I am not considering seeking help
- c. Don't know
- d. Refuse

41. Are you actually receiving help?

- a. Yes, I am actually receiving help

- b. No, I am not receiving help
42. Who are you receiving help from?
- a. Physician
 - b. Psychiatrist
 - c. Psychologist
 - d. Counselor
 - e. Priest or minister
 - f. Social worker
 - g. Another type of mental health provider
 - h. I don't know
 - i. Refuse
43. Are you currently considering seeking help from a mental health professional for your child's emotional or behavior problems?
- a. Yes, I am considering seeking help for my child
 - b. No, I considered seeking help, but am not currently seeking help for my child
 - c. No, I am not considering it
 - d. Don't know
 - e. Refuse
44. Is your child currently receiving help?
- a. Yes, my child is currently receiving help
 - b. No, I considered it, but am not currently seeking help for my child
 - c. No, I am not considering it
 - d. Don't know
 - e. Refuse
45. Who is providing this help?
- a. A volunteer from a relief agency like Red Cross or a volunteer at a shelter
 - b. A teacher
 - c. A physician
 - d. School psychologist/counselor
 - e. Other psychologist/counselor
 - f. Psychiatrist
 - g. Minister/priest
 - h. Social worker
 - i. Other
 - j. Don't know
 - k. Refuse
46. In the last year, have you had thought of hurting yourself?
- Yes No
47. In the last year, have you tried to hurt yourself?
- Yes No

48. In the last year, have you had thoughts of killing yourself?

Yes No

49. In the last year, have you tried to kill yourself?

Yes No

50. In the last year, has a loved one or close friend tried to hurt them self?

Yes No

If yes, what relation was this person to you? _____

51. In the last year, has a loved one or close friend tried to kill themselves?

Yes No

If yes, what relation was this person to you? _____

52. In the last year, has your child had thoughts of hurting him/herself?

Yes No

53. In the last year, has your child tried to hurt him/herself?

Yes No

54. In the last year, has your child had thoughts of killing him/herself?

Yes No

55. In the last year, has you child tried to kill him/herself?

Yes No

56. In the last year how worthless have you felt?

Not at all A little A lot A whole lot

57. In the last year, how hopeless have you felt?

Not at all A little A lot A whole lot

Appendix C

Posttraumatic Stress Diagnostic Scale

Part 1: Many people have lived through or witnessed a very stressful and traumatic event at some point in their lives. Below is a list of traumatic events. Put a check mark in the box next to ALL of the events that have happened to you.

- ☐ 1. Serious accident, fire, or explosion for example an industrial, farm, car plane, or boating accident).
- ☐ 2. Natural disaster (for example, tornado hurricane, flood, or major earthquake).
- ☐ 3. Non-sexual assault by a family member or someone you know for example being mugged, physically attacked, shot, stabbed or
- ☐ 4. Non-sexual assault by a stranger (for example being mugged, physically attacked, shot, stabbed or held at gunpoint).
- ☐ 5. Sexual assault by a family member or someone you know (for example, rape or attempted raped).
- ☐ 6. Sexual assault by a stranger (for example, rape or attempted rape)
- ☐ 7. Military combat or war zone
- ☐ 8. Sexual contact when you were younger than 19 with someone who was 5 or more years older than you (for example, contact with genital, breasts)
- ☐ 9. Imprisonment (for example, prison inmate, prisoner of war, hostage)
- ☐ 10. Torture
- ☐ 11. Life-threatening illness
- ☐ 12. Other traumatic event
- ☐ 13. If you marked item 12, specify the traumatic event below.

Part 2:

14. If you marked more than one traumatic event in Part 1, put a checkmark in the box below next to the event *that bothers you the most*. If you marked only one traumatic event in Part 1, mark the same on below.

- ☐ Serious accident, fire, or explosion for example an industrial, farm, car plane, or boating accident).
- ☐ Natural disaster (for example, tornado hurricane, flood, or major earthquake).
- ☐ Non-sexual assault by a family member or someone you know for example being mugged, physically attacked, shot, stabbed or
- ☐ Non-sexual assault by a stranger (for example being mugged, physically attacked, shot, stabbed or held at gunpoint).
- ☐ Sexual assault by a family member or someone you know (for example, rape or attempted raped).
- ☐ Sexual assault by a stranger (for example, rape or attempted rape)
- ☐ Military combat or war zone

- ☐ Sexual contact when you were younger than 19 with someone who was 5 or more years older than you (for example, contact with genital, breasts)
- ☐ Imprisonment (for example, prison inmate, prisoner of war, hostage)
- ☐ Torture
- ☐ Life-threatening illness
- ☐ Other traumatic event
- ☐ If you marked item 12, specify the traumatic event below.

Below are several questions about the traumatic event you just described above.

15. How long ago did the traumatic event happen (circle ONE).

1. Less than 1 month
2. 1 to 3 months
3. 3 to 6 months
4. 6 months to 3 years
5. 3 to 5 years
6. More than 5 years

For the following questions circle Y for Yes or No for No.

During this traumatic event:

- | | | | |
|-----|---|---|---|
| 16. | Y | N | Were you physically injured? |
| 17. | Y | N | Was someone else physically injured? |
| 18. | Y | N | Did you think that your life was in danger? |
| 19. | Y | N | Did you think that someone else's life was in danger? |
| 20. | Y | N | Did you feel helpless? |
| 21. | Y | N | Did you feel terrified? |

Part 3: Below is a list of problems that people sometimes have after experiencing a traumatic event. Read each one carefully and circle the number 0 – 3 that best describes how often that problem bothered you IN THE PAST MONTH. Rate each problem with respect to the traumatic event you described in item 14.

- 0 = Not at all or only one time
 1 = Once a week or less/once in a while
 2 = 2 to 4 times a week/half the time
 3 = 5 or more times a week/almost always.

22. Having upsetting thoughts or images about the traumatic event that came into your head when you didn't want them to.
23. Having bad dreams or nightmares about the traumatic event.
24. Reliving the traumatic event, acting or feeling as if it was happening again.
25. Feeling emotionally upset when you were reminded of the traumatic event or example, feeling scared, angry, sad, guilty, etc.

26. Experiencing physical reactions when you were reminded of the traumatic event (for example, breaking out in a sweat, heart beating fast).
27. Trying not to think about, talk about, or have feelings about the traumatic event.
28. Trying to avoid activities, people, or places that remind you of the traumatic event.
29. Not being able to remember an important part of the traumatic event.
30. Having much less interest or participating much less often in important activities.
31. Feeling distant or cut off from people around you.
32. Feeling emotionally numb (for example, being unable to cry or unable to have loving feelings).
33. Feeling as if your future plans or hopes will not come true (for example, you will not have a career, marriage, children, or a long life).

APPENDIX D

Brief COPE

These items deal with ways you're been coping with the stress in your life since the hurricane. There are many ways to try to deal with problems. These items ask what you've been doing to cope with this one. Obviously, different people deal with things different ways, but I'm interested in how you've tried to deal with it. Each item says something about a particular way of coping. I want to know to what extent you've been doing what the item says. How much or how frequently. Don't answer on the basis of whether it seems to be working or not-just whether or not you're doing it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

- 1 = I haven't been doing this at all
2 = I've been doing this a little bit
3 = I've been doing this a medium amount
4 = I've been doing this a lot

- _____ 1. I've been turning to work or other activities to take my mind of things.
- _____ 2. I've been concentrating my efforts on doing something about the situation I'm in.
- _____ 3. I've been saying to myself "this isn't real."
- _____ 4. I've been using alcohol or other drugs to make myself feel better.
- _____ 5. I've been getting emotional support from others.
- _____ 6. I've been giving up trying to deal with it.
- _____ 7. I've been taking action to try to make the situation better.
- _____ 8. I've been refusing to believe that it had happened.
- _____ 9. I've been saying things to let my unpleasant feeling escape.
- _____ 10. I've been getting help and advice from other people.
- _____ 11. I've been using drugs or alcohol to help me get through it.
- _____ 12. I've been trying to see it in a different, to make it seem more positive.
- _____ 13. I've been criticizing myself.
- _____ 14. I've been trying to come up with a strategy about what to do.
- _____ 15. I've been getting comfort and understanding from someone.
- _____ 16. I've been giving up the attempt to cope.
- _____ 17. I've been looking for something good in what has happened.
- _____ 18. I've been making jokes about it.
- _____ 19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
- _____ 20. I've been accepting the reality of the fact that it has happened.
- _____ 21. I've been expressing my negative feelings.
- _____ 22. I've been trying to find comfort in my religion or spiritual beliefs.
- _____ 23. I've been trying to get advice or help from other people about what to do.
- _____ 24. I've been learning to live with it.
- _____ 25. I've been thinking hard about what steps to take.
- _____ 26. I've been blaming myself for things that happened.
- _____ 27. I've been praying or meditating.
- _____ 28. I've been making fun of the situation.

Appendix E

Interpersonal Support Evaluation List

This scale is made up of a list of statements each of which may or may not be true about you. For each statement check “definitely true” if you are sure it is true about you and “probably true” if you think it is true but are not absolutely certain. Similarly, you should check “definitely false” if you are sure the statement is false and “probably false” if you think it is false but are not absolutely certain.

0 = Definitely False

1 = Probably False

2 = Probably True

3 = Definitely True

1. There are several people that I trust to help solve my problems.
2. If I needed help fixing an appliance or repairing my car, there is someone who would help me.
3. Most of my friends are more interesting than I am.
4. There is someone who takes pride in my accomplishments.
5. When I feel lonely, there are several people I can talk to.
6. There is no one that I feel comfortable to talking about intimate personal problems.
7. I often meet or talk with family or friends.
8. Most people I know think highly of me.
9. If I needed a ride to the airport very early in the morning, I would have a hard time finding someone to take me.
10. I feel like I’m not always included by my circle of friends.
11. There really is no one who can give me an objective view of how I’m handling my problems.
12. There are several different people I enjoy spending time with.
13. I think that my friends feel that I’m not very good at helping them solve their problems.
14. If I were sick and needed someone (friend, family member, or acquaintance) to take me to the doctor, I would have trouble finding someone.
15. If I wanted to go on a trip for a day (e.g., to the mountains, beach, or country), I would have a hard time finding someone to go with me.
16. If I needed a place to stay for a week because of an emergency (for example, water or electricity out in my apartment or house), I could easily find someone who would put me up.
17. I feel that there is no one I can share my most private worries and fears with.
18. If I were sick, I could easily find someone to help me with my daily chores.
19. There is someone I can turn to for advice about handling problems with my family.
20. I am as good at doing things as most other people are.
21. If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me.
22. When I need suggestions on how to deal with a personal problem, I know someone I can turn to.
23. If I needed an emergency loan of \$100, there is someone (friend, relative, or acquaintance) I could get it from.

24. In general, people do not have much confidence in me.
25. Most people I know do not enjoy the same things that I do.
26. There is someone I could turn to for advice about making career plans or changing my job.
27. I don't often get invited to do things with others.
28. Most of my friends are more successful at making changes in their lives than I am.
29. If I had to go out of town for a few weeks, it would be difficult to find someone who would look after my house or apartment (the plants, pets, garden, etc.).
30. There really is no one I can trust to give me good financial advice.
31. If I wanted to have lunch with someone, I could easily find someone to join me.
32. I am more satisfied with my life than most people are with theirs.
33. If I was stranded 10 miles from home, there is someone I could call who would come and get me.
34. No one I know would throw a birthday party for me.
35. It would be difficult to find someone who would lend me their car for a few hours.
36. If a family crisis arose, it would be difficult to find someone who could give me good advice about how to handle it.
37. I am closer to my friends than most other people are to theirs.
38. There is at least one person I know whose advice I really trust.
39. If I needed some help in moving to a new house or apartment, I would have a hard time finding someone to help me.
40. I have a hard time keeping pace with my friends.

Appendix F

Behavior Assessment Scale for Children – 2nd Edition

Instructions: On the pages that follow are phrases that describe how children may act. Please read each phrase and mark the response that describes how this child has behaved recently (in the last several months).

- Circle **N** if the behavior **never** occurs.
 Circle **S** if the behavior **sometimes** occurs.
 Circle **O** if the behavior **often** occurs.
 Circle **A** if the behavior **almost always** occurs.

Please mark every time. If you don't know or are unsure of your response to an item, give your best estimate.

1. Shares toys or possessions with other children	N	S	O	A
2. Eats too much.	N	S	O	A
3. Has trouble following regular routines.	N	S	O	A
4. Gives good suggestions for solving problems.	N	S	O	A
5. Worries.	N	S	O	A
6. Cannot wait to take turn.	N	S	O	A
7. Is easily annoyed by others.	N	S	O	A
8. Teases others.	N	S	O	A
9. Has a short attention span.	N	S	O	A
10. Is easily upset.	N	S	O	A
11. Does strange things.	N	S	O	A
12. Worries about what teachers think.	N	S	O	A
13. Is too serious.	N	S	O	A
14. Recovers quickly after a setback.	N	S	O	A
15. Disobeys.	N	S	O	A
16. Makes friends easily.	N	S	O	A
17. Pays attention.	N	S	O	A
18. Complains about being teased.	N	S	O	A
19. Joins clubs or social groups.	N	S	O	A
20. Is unable to slow down.	N	S	O	A
21. Refuses to join group activities.	N	S	O	A
22. Has seizures.	N	S	O	A
23. Babbles to self.	N	S	O	A
24. Bullies others.	N	S	O	A
25. Will change direction to avoid having to greet someone.	N	S	O	A
26. Hits other children.	N	S	O	A
27. Eats things that are not food.	N	S	O	A
28. Cries easily.	N	S	O	A
29. Steals.	N	S	O	A
30. Expresses fear of getting sick.	N	S	O	A
31. Congratulates others when good things happen to them.	N	S	O	A

32. Worries about making mistakes.	N	S	O	A
33. Is easily soothed when angry.	N	S	O	A
34. Provides own telephone number when asked.	N	S	O	A
35. Acts in a safe manner.	N	S	O	A
36. Is a “self-starter.”	N	S	O	A
37. Worries about what parents think.	N	S	O	A
38. Disrupts other children’s activities.	N	S	O	A
39. Organizes chores or other tasks well.	N	S	O	A
40. Argues with parents.	N	S	O	A
41. Listens to directions.	N	S	O	A
42. Says, “Nobody understands me.”	N	S	O	A
43. Acts confused.	N	S	O	A
44. Worries about schoolwork.	N	S	O	A
45. Is fearful.	N	S	O	A
46. Adjusts well to changes in routine.	N	S	O	A
47. Breaks the rules.	N	S	O	A
48. Avoids competing with other children.	N	S	O	A
49. Pays attention when being spoken to.	N	S	O	A
50. Complains about not having friends.	N	S	O	A
51. Is good at getting people to work together.	N	S	O	A
52. Acts out of control.	N	S	O	A
53. Is chosen last by other children for games.	N	S	O	A
54. Complains of pain.	N	S	O	A
55. Repeats one thought over and over.	N	S	O	A
56. Argues when denied own way.	N	S	O	A
57. Is shy with other children.	N	S	O	A
58. Threatens to hurt others.	N	S	O	A
59. Has stomach problems.	N	S	O	A
60. Says, “Nobody likes me.”	N	S	O	A
61. Lies to get out of trouble.	N	S	O	A
62. Says, “I think I’m sick.”	N	S	O	A
63. Encourages others to do their best.	N	S	O	A
64. Tries too hard to please others.	N	S	O	A
65. Adjusts well to new teachers.	N	S	O	A
66. Speaks in short phrases that are hard to understand.	N	S	O	A
67. Sets realistic goals.	N	S	O	A
68. Is creative.	N	S	O	A
69. Is nervous.	N	S	O	A
70. Fiddles with things while at meals.	N	S	O	A
71. Volunteers to help clean up around the house.	N	S	O	A
72. Annoys others on purpose.	N	S	O	A
73. Is easily distracted.	N	S	O	A
74. Is negative about things.	N	S	O	A
75. Seems out of touch with reality.	N	S	O	A
76. Answers telephone properly.	N	S	O	A
77. Worries about things that cannot be changes.	N	S	O	A

78. Adjusts well to changes in family plans.	N	S	O	A
79. Deceives others.	N	S	O	A
80. Quickly joins group activities.	N	S	O	A
81. Is unclear when presenting ideas.	N	S	O	A
82. Says, "I don't have any friends."	N	S	O	A
83. Is usually chosen as a leader.	N	S	O	A
84. Is overly active.	N	S	O	A
85. Offers to help other children.	N	S	O	A
86. Has headaches.	N	S	O	A
87. Acts as if other children are not there.	N	S	O	A
88. Seeks revenge on others.	N	S	O	A
89. Shows fear of strangers.	N	S	O	A
90. Loses temper too easily.	N	S	O	A
91. Complains about health.	N	S	O	A
92. Says, "I want to die" or "I wish I were dead."	N	S	O	A
93. Sneaks around.	N	S	O	A
94. Gets sick.	N	S	O	A
95. Compliments others.	N	S	O	A
96. Seems unaware of others.	N	S	O	A
97. Is cruel to animals.	N	S	O	A
98. Has difficulty explaining rules of games to others.	N	S	O	A
99. Attends to issues of personal safety.	N	S	O	A
100. Will speak up if the situations calls for it.	N	S	O	A
101. Says, "I'm afraid I will make a mistake."	N	S	O	A
102. Interrupts others when they are speaking.	N	S	O	A
103. Has trouble fastening buttons on clothing.	N	S	O	A
104. Calls other children names.	N	S	O	A
105. Listens carefully.	N	S	O	A
106. Says, "I hate myself."	N	S	O	A
107. Hears sounds that are not there.	N	S	O	A
108. Is able to describe feelings accurately.	N	S	O	A
109. Says, "I'm not very good at this."	N	S	O	A
110. Is a "good sport."	N	S	O	A
111. Lies.	N	S	O	A
112. Avoids other children.	N	S	O	A
113. Tracks down information when needed.	N	S	O	A
114. Is sad.	N	S	O	A
115. Has a hearing problem.	N	S	O	A
116. Acts without thinking.	N	S	O	A
117. Tries to bring out the best in other people.	N	S	O	A
118. Has fevers.	N	S	O	A
119. Stares blankly.	N	S	O	A
120. Sleeps with parents	N	S	O	A
121. Has trouble making new friends.	N	S	O	A
122. Responds appropriately when asked a question.	N	S	O	A

123.	Is afraid of getting sick.	N	S	O	A
124.	Seems lonely.	N	S	O	A
125.	Breaks the rules just to see what will happen.	N	S	O	A
126.	Complains of being sick when nothing is wrong.	N	S	O	A
127.	Volunteers to help with things.	N	S	O	A
128.	Says things make no sense.	N	S	O	A
129.	Throws up after eating.	N	S	O	A
130.	Is clear when telling about personal experiences.	N	S	O	A
131.	Needs to be reminded to brush teeth.	N	S	O	A
132.	Makes decisions easily.	N	S	O	A
133.	Says, "It's all my fault."	N	S	O	A
134.	Interrupts parents when they are talking on the phone.	N	S	O	A
135.	Has toileting accidents.	N	S	O	A
136.	Is cruel to others.	N	S	O	A
137.	Falls down.	N	S	O	A
138.	Says, "I want to kill myself."	N	S	O	A
139.	Sees things that are not there.	N	S	O	A
140.	Accurately takes down messages.	N	S	O	A
141.	Worries about what other children think.	N	S	O	A
142.	Is stubborn.	N	S	O	A
143.	Sets fires.	N	S	O	A
144.	Prefers to be alone.	N	S	O	A
145.	Has trouble getting information when needed.	N	S	O	A
146.	Eats too little.	N	S	O	A
147.	Runs away from home.	N	S	O	A
148.	Has poor self-control.	N	S	O	A
149.	Shows interest in others' ideas.	N	S	O	A
150.	Vomits.	N	S	O	A
151.	Shows feelings that do not fit the situation.	N	S	O	A
152.	Has eye problems.	N	S	O	A
153.	Is shy with adults.	N	S	O	A
154.	Communicates clearly.	N	S	O	A
155.	Wets the bed.	N	S	O	A
156.	Changes mood quickly.	N	S	O	A
157.	Gets into trouble.	N	S	O	A
158.	Complains of shortness of breath.	N	S	O	A
159.	Says, "please" and "thank you."	N	S	O	A
160.	Acts strangely.	N	S	O	A

Appendix G

Original Institutional Review Board Study Approval



Institutional Review Board
203 B-1 David Boyd Hall
Louisiana State University and A&M College
Baton Rouge LA 70803

(225) 578-8692

FAX: 578-6792
irb@lsu.edu

LSU IRB ACTION ON PROTOCOL APPROVAL REQUEST

TO: Mary Lou Kelley
Psychology

FROM: Robert C. Mathews, Chairman
Institutional Review Board for Research with Human Subjects

DATE: November 30, 2005

RE: IRB# 2561

TITLE: "Predictors of Recovery in Children Evacuated from Hurricane Katrina"

New Protocol/Modification: M


Review type: Full _____ Expedited X _____ Review date: 11/30/2005

Approved X _____ Disapproved _____

Approval Date: 11/30/2005 Approval Expiration Date: 11/30/2006

Re-review frequency: (annual unless otherwise stated) _____

Number of subjects approved: 400

By: Robert C. Mathews 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING -- Continuing approval is **CONDITIONAL** on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.osr.lsu.edu/osr/comply.html>

Appendix H

Current Institutional Review Board Study Approval

ACTION ON EXEMPTION APPROVAL REQUEST



TO: Mary Lou Kelley
Psychology

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: December 10, 2019

RE: IRB# E12039

TITLE: Factors Predicting Maternal Posttraumatic Stress Symptom Trajectories Following a Natural Disaster

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu
lsu.edu/research

New Protocol/Modification/Continuation: New Protocol

Review Date: 12/10/2019

Approved X Disapproved _____

Approval Date: 12/10/2019 Approval Expiration Date: 12/9/2022

Exemption Category/Paragraph: 4b

Signed Consent Waived?: No

Re-review frequency: Three years

LSU Proposal Number (if applicable):

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –

Continuing approval is **CONDITIONAL** on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.**

* All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

References

- Abramson, D. M., Grattan, L. M., Mayer, B., Colten, C. E., Arosemena, F. A., Bedimo-Rung, A., & Lichtveld, M. (2015). The resilience activation framework: a conceptual model of how access to social resources promotes adaptation and rapid recovery in post-disaster settings. *The Journal of Behavioral Health Services & Research*, 42(1), 42-57.
- Adams, R. E., & Boscarino, J. A. (2006). Predictors of PTSD and delayed PTSD after disaster: The impact of exposure and psychosocial resources. *The Journal of Nervous and Mental Disease*, 194(7), 485.
- Alisic, E., Jongmans, M. J., van Wesel, F., & Kleber, R. J. (2011). Building child trauma theory from longitudinal studies: A meta-analysis. *Clinical Psychology Review*, 31(5), 736-747.
- American Psychiatric Association (2000). Diagnostic and statistical manual of mental disorders: DSM-IV-TR. American Psychiatric Association, Washington.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Benight, C. C., & Harper, M. L. (2002). Coping self-efficacy perceptions as a mediator between acute stress response and long-term distress following natural disasters. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, 15(3), 177-186.
- Benight, C. C., & McFarlane, A. C. (2007). Challenges for disaster research: recommendations for planning and implementing disaster mental health studies. *Journal of Loss and Trauma*, 12(5), 419-434.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 59(1), 20.
- Bonanno, G. A. (2005). Resilience in the face of potential trauma. *Current Directions in Psychological Science*, 14(3), 135-138.
- Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of Consulting and Clinical Psychology*, 75(5), 671.
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, 68(5), 748.
- Brewin, C. R. & Holmes, E. A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review*, 23, 339-376.

- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513.
- Cappa, K. A., Begle, A. M., Conger, J. C., Dumas, J. E., & Conger, A. J. (2011). Bidirectional relationships between parenting stress and child coping competence: Findings from the PACE study. *Journal of Child and Family Studies*, 20(3), 334-342.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International Journal of Behavioral Medicine*, 4(1), 92.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267-283.
- Cobham, V. E., McDermott, B., Haslam, D., & Sanders, M. R. (2016). The role of parents, parenting and the family environment in children's post-disaster mental health. *Current Psychiatry Reports*, 18(6), 53.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress1. *Journal of applied social psychology*, 13(2), 99-125.
- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. M. (1985). Measuring the functional components of social support. In *Social support: Theory, research and applications* (pp. 73-94). Springer, Dordrecht.
- Coyne, J. C., Aldwin, C., & Lazarus, R. S. (1981). Depression and coping in stressful episodes. *Journal of Abnormal Psychology*, 90(5), 439.
- Curran, P. J., & Hussong, A. M. (2003). The use of latent trajectory models in psychopathology research. *Journal of Abnormal Psychology*, 112(4), 526.
- Doty, J. L., Davis, L., & Arditti, J. A. (2017). Cascading resilience: leverage points in promoting parent and child well-being. *Journal of Family Theory & Review*, 9(1), 111-126.
- Dunmore, E., Clark, D. M., & Ehlers, A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy*, 37(9), 809-829.
- Feder, A., Mota, N., Salim, R., Rodriguez, J., Singh, R., Schaffer, J., ... & Reissman, D. B. (2016). Risk, coping and PTSD symptom trajectories in World Trade Center responders. *Journal of Psychiatric Research*, 82, 68-79.
- Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological assessment*, 9(4), 445.

- Furr, J. M., Comer, J. S., Edmunds, J. M., & Kendall, P. C. (2010). Disasters and youth: A meta-analytic examination of posttraumatic stress. *Journal of Consulting and Clinical Psychology, 78*(6), 765.
- Galatzer-Levy, I. R., Huang, S. H., & Bonanno, G. A. (2018). Trajectories of resilience and dysfunction following potential trauma: A review and statistical evaluation. *Clinical Psychology Review, 63*, 41-45.
- Galea, S., Brewin, C. R., Gruber, M., Jones, R. T., King, D. W., King, L. A., ... & Kessler, R. C. (2007). Exposure to hurricane-related stressors and mental illness after Hurricane Katrina. *Archives of General Psychiatry, 64*(12), 1427-1434.
- Ginexi, E. M., Weihs, K., Simmens, S. J., & Hoyt, D. R. (2000). Natural disaster and depression: a prospective investigation of reactions to the 1993 midwest floods. *American Journal of Community Psychology, 28*(4), 495-518.
- Guha-Sapir, D., Hoyois, P., Wallemacq, P., & Below, R. (2017). Annual disaster statistical review 2016: The numbers and trends. Brussels, Belgium: Center for Research on the Epidemiology of Natural Disasters.
- Hansel, T. C., Osofsky, J. D., Osofsky, H. J., & Friedrich, P. (2013). The effect of long-term relocation on child and adolescent survivors of hurricane Katrina. *Journal of Traumatic Stress, 26*(5), 613-620.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American psychologist, 44*(3), 513.
- IBM Corp (2019). IBM SPSS Statistics for Windows, Version 26.0. Amonk, NY: IBM Corp.
- Johannesson, K. B., Arinell, H., & Arnberg, F. K. (2015). Six years after the wave. Trajectories of posttraumatic stress following a natural disaster. *Journal of Anxiety Disorders, 36*, 15-24.
- Jung, T., & Wickrama, K. A. S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass, 2*(1), 302-317.
- Kaniasty, K., & Norris, F. H. (2009). Distinctions that matter: Received social support, perceived social support, and social embeddedness after disasters. *Mental health and disasters, 2009*, 175-200.
- Kelley, M. L., Self-Brown, S., Le, B., Bosson, J. V., Hernandez, B. C., & Gordon, A. T. (2010). Predicting posttraumatic stress symptoms in children following Hurricane Katrina: A prospective analysis of the effect of parental distress and parenting practices. *Journal of Traumatic Stress, 23*(5), 582-590.

- Knabb, D. R., Rhome, R. J., & Brown, P. D. (2005). *Tropical cyclone report: Hurricane Katrina 23-30 August 2005*. Miami FL: National Hurricane Center (National Oceanic and Atmospheric Administration).
- La Greca, A. M., Lai, B. S., Llabre, M. M., Silverman, W. K., Vernberg, E. M., & Prinstein, M. J. (2013). Children's postdisaster trajectories of PTS symptoms: Predicting chronic distress. *Child & Youth Care Forum*, 42(4), 351–369.
- La Greca, A. M., Silverman, W. K., & Wasserstein, S. B. (1998). Children's predisaster functioning as a predictor of posttraumatic stress following Hurricane Andrew. *Journal of Consulting and Clinical Psychology*, 66(6), 883-892.
- Lai, B. S., Kelley, M. L., Harrison, K. M., Thompson, J. E., & Self-Brown, S. (2015). Posttraumatic stress, anxiety, and depression symptoms among children after Hurricane Katrina: A latent profile analysis. *Journal of Child and Family Studies*, 24(5), 1262-1270.
- Lai, B. S., La Greca, A. M., Auslander, B. A., & Short, M. B. (2013). Children's symptoms of posttraumatic stress and depression after a natural disaster: Comorbidity and risk factors. *Journal of Affective Disorders*, 146(1), 71-78.
- Lai, B. S., Lewis, R., Livings, M. S., La Greca, A. M., & Esnard, A. M. (2017). Posttraumatic stress symptom trajectories among children after disaster exposure: A Review. *Journal of Traumatic Stress*, 30(6), 571-582.
- Lai, B. S., Osborne, M. C., Piscitello, J., Self-Brown, S., & Kelley, M. L. (2018). The relationship between social support and posttraumatic stress symptoms among youth exposed to a natural disaster. *European Journal of Psychotraumatology*, 9(sup2), 1450042.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. McGraw-Hill.
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York: Springer.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Loo, G. T., DiMaggio, C. J., Gershon, R. R., Canton, D. B., Morse, S. S., & Galea, S. (2016). Coping behavior and risk of post-traumatic stress disorder among federal disaster responders. *Disaster Medicine and Public Health Preparedness*, 10(1), 108-117.
- Lowe, S. R., Chan, C. S., & Rhodes, J. E. (2010). Pre-hurricane perceived social support protects against psychological distress: A longitudinal analysis of low-income mothers. *Journal of Consulting and Clinical Psychology*, 78(4), 551.

- Lowe, S. R., & Rhodes, J. E. (2013). Trajectories of psychological distress among low-income, female survivors of Hurricane Katrina. *American Journal of Orthopsychiatry*, 83(2pt3), 398-412.
- Lowe, S. R., Rhodes, J. E., Zwiebach, L., & Chan, C. S. (2009). The impact of pet loss on the perceived social support and psychological distress of hurricane survivors. *Journal of Traumatic Stress*, 22(3), 244-247.
- Magdol, L. (2002). Is moving gendered? The effects of residential mobility on the psychological well-being of men and women. *Sex Roles*, 47(11-12), 553-560.
- Masten, A. S. (2018). Resilience theory and research on children and families: Past, present, and promise. *Journal of Family Theory & Review*, 10(1), 12-31.
- McAdams, T. A., Rijdsdijk, F. V., Neiderhiser, J. M., Narusyte, J., Shaw, D. S., Natsuaki, M. N., ... & Lichtenstein, P. (2015). The relationship between parental depressive symptoms and offspring psychopathology: evidence from a children-of-twins study and an adoption study. *Psychological Medicine*, 45(12), 2583-2594.
- McCarthy, S. (2008). Post-traumatic stress diagnostic scale (PDS). *Occupational Medicine*, 58(5), 379-379.
- Muthén, B. (2004) Latent variable analysis: growth mixture modeling and related techniques for longitudinal data. In: Kaplan D (Ed.) Handbook of quantitative methodology for the social sciences (pp 345–368) Sage Publications, Newbury Park.
- Muthén, B., & Asparouhov, T. (2008). Growth mixture modeling: Analysis with non-Gaussian random effects. In G. Fitzmaurice, M. Davidian, G. Verbeke, & G. Molenberghs (Eds.), Longitudinal data analysis (pp. 143–165). Boca Raton, FL: Chapman & Hall/CRC.
- Muthén, L.K. and Muthén, B.O. (1998-2017). Mplus User's Guide. Eighth Edition. Los Angeles, CA: Muthén & Muthén
- Muthén, B., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*, 24(6), 882-891.
- Nagin, D., & Tremblay, R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. *Child Development*, 70(5), 1181-1196.
- Nagin, D. S. (1999). Analyzing developmental trajectories: a semiparametric, group-based approach. *Psychological Methods*, 4(2), 139.
- Nagin, D. S. (2005). Group-based modelling of development. Cambridge, MA: Harvard University Press.

- Neece, C. L., Green, S. A., & Baker, B. L. (2012). Parenting stress and child behavior problems: A transactional relationship across time. *American Journal on Intellectual and Developmental Disabilities, 117*(1), 48-66.
- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological medicine, 38*(4), 467-480.
- National Oceanic and Atmospheric Administration (NOAA). January 5th, 2018. Retrieved from: <https://www.ncei.noaa.gov/news/national-climate-201712>
- Norris, F. H. (2002). Disasters in urban context. *Journal of Urban Health, 79*(3), 308-314.
- Norris, F. H. (2006). Disaster research methods: Past progress and future directions. *Journal of Traumatic Stress, 19*(2), 173-184.
- Norris, F. H., Perilla, J. L., Ibañez, G. E., & Murphy, A. D. (2001). Sex differences in symptoms of posttraumatic stress: Does culture play a role? *Journal of Traumatic Stress, 14*(1), 7-28.
- Norris, F. H., Tracy, M., & Galea, S. (2009). Looking for resilience: Understanding the longitudinal trajectories of responses to stress. *Social Science & Medicine, 68*(12), 2190-2198.
- Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry, 65*, 207–39.
- Orcutt, H. K., Bonanno, G. A., Hannan, S. M., & Miron, L. R. (2014). Prospective trajectories of posttraumatic stress in college women following a campus mass shooting. *Journal of Traumatic Stress, 27*(3), 249-256.
- Osofsky, H. J., & Osofsky, J. D. (2013). Hurricane Katrina and the Gulf oil spill: Lessons learned. *Psychiatric Clinics, 36*(3), 371-383.
- Osofsky, H. J., Osofsky, J. D., Kronenberg, M., Brennan, A., & Hansel, T. C. (2009). Posttraumatic stress symptoms in children after Hurricane Katrina: Predicting the need for mental health services. *American Journal of Orthopsychiatry, 79*(2), 212-220.
- Pietrzak, R. H., Van Ness, P. H., Fried, T. R., Galea, S., & Norris, F. H. (2013). Trajectories of posttraumatic stress symptomatology in older persons affected by a large-magnitude disaster. *Journal of Psychiatric Research, 47*(4), 520-526.
- Pfefferbaum, B., Jacobs, A. K., Houston, J. B., & Griffin, N. (2015). Children's disaster reactions: the influence of family and social factors. *Current Psychiatry Reports, 17*(7), 57.

- Pfefferbaum, B., Noffsinger, M. A., Wind, L. H., & Allen, J. R. (2014). Children's coping in the context of disasters and terrorism. *Journal of loss and Trauma*, 19(1), 78-97.
- Phifer, J. F., & Norris, F. H. (1989). Psychological symptoms in older adults following natural disaster: Nature, timing, duration, and course. *Journal of Gerontology*, 44(6), S207-S212.
- Platt, J. M., Lowe, S. R., Galea, S., Norris, F. H., & Koenen, K. C. (2016). A longitudinal study of the bidirectional relationship between social support and posttraumatic stress following a natural disaster. *Journal of Traumatic Stress*, 29(3), 205–213
- Reynolds, C.R., & Kamphaus, R.W. (2004). *Behavior Assessment System for Children* (2nd edition). Circle Pines: AGS Publishing.
- Salloum, A., Carter, P., Burch, B., Garfinkel, A., & Overstreet, S. (2011). Impact of exposure to community violence, Hurricane Katrina, and Hurricane Gustav on posttraumatic stress and depressive symptoms among school age children. *Anxiety, Stress, & Coping*, 24(1), 27-42.
- Sandler, I. (2001). Quality and ecology of adversity as common mechanisms of risk and resilience. *American Journal of Community Psychology*, 29(1), 19-61.
- Self-Brown, S., Lai, B. S., Harbin, S., & Kelley, M. L. (2014). Maternal posttraumatic stress disorder symptom trajectories following Hurricane Katrina: an initial examination of the impact of maternal trajectories on the well-being of disaster-exposed youth. *International Journal of Public Health*, 59(6), 957-965.
- Self-Brown, S., Lai, B. S., Thompson, J. E., McGill, T., & Kelley, M. L. (2013). Posttraumatic stress disorder symptom trajectories in Hurricane Katrina affected youth. *Journal Of Affective Disorders*, 147(1-3), 198-204.
- Shore, J. H., Tatum, E. L., & Vollmer, W. M. (1986). Psychiatric reactions to disaster: The Mount St. Helens experience. *The American Journal of Psychiatry*, 143(5), 590-595.
- Spell, A. W., Kelley, M. L., Wang, J., Self-Brown, S., Davidson, K. L., Pellegrin, A., ... & Baumeister, A. (2008). The moderating effects of maternal psychopathology on children's adjustment post-hurricane Katrina. *Journal of Clinical Child & Adolescent Psychology*, 37(3), 553-563.
- Spurrell, M. T., & McFarlane, A. C. (1993). Post-traumatic stress disorder and coping after a natural disaster. *Social Psychiatry and Psychiatric Epidemiology*, 28(4), 194-200.
- Steil, R., & Ehlers, A. (2000). Dysfunctional meaning of posttraumatic intrusions in chronic PTSD. *Behaviour Research and Therapy*, 38(6), 537-558.

- Suldo, S. M., & Shaffer, E. J. (2008). Looking beyond psychopathology: The dual-factor model of mental health in youth. *School Psychology Review*, 37(1), 52-68.
- Trickey, D., Siddaway, A. P., Meiser-Stedman, R., Serpell, L., & Field, A. P. (2012). A meta-analysis of risk factors for post-traumatic stress disorder in children and adolescents. *Clinical Psychology Review*, 32(2), 122-138.
- U.S. Global Change Research Program (2016). Our changing planet: The U.S. global change research program for fiscal year 2017. Washington, DC.
- Vernberg, E. M., La Greca, A. M., Silverman, W. K. & Prinstein, M. J. (1996). Prediction of posttraumatic stress symptoms in children after Hurricane Andrew. *Journal of Abnormal Psychology*, 105(2), 237.
- Wang, X., Zhang, D., & Wang, J. (2011). Dual-factor model of mental health: Surpass the traditional mental health model. *Psychology*, 2(08), 767.
- Weems C. F. & Overstreet S. (2008). Child and adolescent mental health research in the context of Hurricane Katrina: An ecological needs-based perspective and introduction to the special section. *Journal of Clinical Child & Adolescent Psychology*, 37, 487–894.
- Weems, C. F., & Graham, R. A. (2014). Resilience and trajectories of posttraumatic stress among youth exposed to disaster. *Journal of Child and Adolescent Psychopharmacology*, 24(1), 2-8.
- Weems, C. F., Watts, S. E., Marsee, M. A., Taylor, L. K., Costa, N. M., Cannon, M. F., ... & Pina, A. A. (2007). The psychosocial impact of Hurricane Katrina: Contextual differences in psychological symptoms, social support, and discrimination. *Behaviour Research and Therapy*, 45(10), 2295-2306
- Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. *Annual Review of Psychology*, 51(1), 59-91.

Vita

Jennifer Piscitello, originally from Long Island, New York, completed her Bachelor of Arts with honors in Psychology and a second major in Political Science from SUNY Stony Brook University in 2010. During her undergraduate studies, she completed an honors thesis aimed at identifying discriminating factors between detected and undetected families with child physical abuse. Prior to attending graduate school, Jennifer worked in related positions, first as a Program Supervisor of a transitional housing facility for homeless families and then as a Research Assistant at Columbia University Medical Center. She also volunteered for several years at a disaster law and policy center. Jennifer's interest in clinical psychology and family functioning led her to Louisiana State University (LSU) in 2015, where she is completing her Doctor of Philosophy in Child Clinical Psychology under the supervision of Dr. Mary Lou Kelley. She received her Master of Arts in Psychology from LSU in 2017. Her current research interests broadly include family factors related to children's response and recovery to traumatic events (e.g., natural disaster, community and home violence), as well as longitudinal developmental pathways to child psychopathology. Jennifer is currently completing her pre-doctoral internship at the University of Miami/Miller School of Medicine and is anticipated to graduate in December 2020. She has accepted a National Institute on Drug Abuse T32 Post-doctoral Fellowship at Florida International University.