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Hurricane Katrina and Youth Anxiety: The Role of Parental Anxiety, Parental and Youth
Attachment Beliefs, and Parenting Behaviors

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
in
Applied Developmental Psychology

by

Natalie Marie Costa

B.A., University of New Orleans 2001
M.S., University of New Orleans 2004

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Abstract

The purpose of the current study was to investigate the effects of Hurricane Katrina on youth anxiety and Post Traumatic Stress Disorder symptoms (PTSD symptoms) by examining the roles of pre Katrina youth anxiety, parental anxiety, parental and youth attachment beliefs, and parenting behaviors. Seventy-four youth (ages 6 to 17, mean age: 11.34 years) and their parents were recruited for this study. Youth anxiety was assessed through the Revised Child Anxiety and Depression Scales (child and parent version). Youth PTSD symptoms were assessed through the PTSD Checklist. Parental anxiety was assessed through the Symptom Checklist-90-Revised (anxiety subscale). Child attachment beliefs to their parents were assessed with the Inventory of Parent and Peer Attachment and parental attachment beliefs to their romantic partner were assessed through the Experiences in Close Relationships. Parenting behaviors were assessed through the Children's Report of Parent Behavior Inventory. Results indicated that: (1) youth anxiety pre Katrina predicted youth anxiety/PTSD symptoms post Katrina, (2) youth pre Katrina levels of trust, communication, and secure attachment beliefs to mothers moderated the association between youth pre Katrina and post Katrina anxiety, (3) youth pre Katrina perceptions of acceptance moderated the association between youth pre Katrina and post Katrina anxiety, and (4) youth pre Katrina perceptions of firm control moderated the association between youth pre Katrina and post Katrina anxiety. The influence of age, gender, ethnicity, and number of traumatic events experienced in Hurricane Katrina is also presented. Findings are discussed in terms of identifying pre-disaster functioning variables that moderate the association between youth pre Katrina and post Katrina anxiety.

Introduction

In reaction to several devastating hurricanes striking parts of the United States over the years, a growing body of research has emerged examining the effects of hurricanes on youth. Hurricane Katrina had and will continue to have a powerful effect on the mental health of youth, given that the disaster wrought by the storm was one of the worst natural disasters in US history (Drye, 2005). Research suggests exposure to natural disasters and associated experiences (e.g., loss of home, witnessing flooding), such as Hurricane Katrina is often associated with post traumatic stress (PTS) in youth (e.g., La Greca et al., 1996; Lonigan et al., 1994; Vernberg et al., 1996). As part of the PTS response, researchers focus on the resulting emotional problems such as the symptoms associated with post traumatic stress disorder (PTSD; APA 1994). However, many other reactions to hurricanes are also common, in particular fears and levels of anxiety (e.g., Bolton, O’Ryan, Udwin, Boyle, & Yule, 2000; La Greca et al., 1998; Lonigan et al., 1994; Yule et al., 2002).

In addition to outcomes, examining factors that predict outcomes is particularly important. However, less empirical data exists concerning the factors that predict youth’s outcomes, such as variables that foster or protect (i.e., moderate) youth from the negative impact of a disaster. The nature of disasters makes prospective studies utilizing data collected pre-disaster rare and difficult to conduct. The present study had a unique opportunity to begin filling in this gap due to the presence of pre-disaster functioning variables. The next section reviews the current research on youths’ outcomes to natural disasters with a focus on hurricanes. The sections that follow review research and theory on possible moderators of reaction and develop the theoretical predictions for this study.

Youths' Reactions to Hurricanes

A number of studies have examined youth reactions to hurricane related disaster. For example, Hardin et al. (1994) examined the impact of Hurricane Hugo on 1,482 high school students (aged 13-18 years old) who were exposed to the hurricane. The students reported high levels of psychological distress such as anxiety, depression, and global mental distress. Lonigan et al. (1991) and Shannon et al. (1994) investigated the reactions of Hurricane Hugo in 5,687 school-aged children (aged 9-19 years old). Significantly higher anxiety scores and levels of PTSD symptoms were found in children exposed to the hurricane (Lonigan et al., 1991). Additionally, more than 5% of the youth met criteria for clinical diagnosis of PTSD (Shannon et al., 1994).

Vernberg et al. (1996) examined PTSD symptoms in 568 elementary school-age children 3 months after being exposed to Hurricane Andrew. Results indicated that: (1) 14% reported few or no PTSD symptoms; (2) 30% reported mild PTSD symptoms; (3) 26% reported moderate PTSD symptoms; (4) 25% reported severe PTSD symptoms; and (5) 5% reported very severe PTSD symptoms. La Greca et al. (1996) extended the work of Vernberg et al. (1996) by following a cohort of the children (N = 442 out of the original 568) who were initially assessed. Assessing children 7 and 10 months after Hurricane Andrew, La Greca et al. (1996) reported that although children's report of PTSD symptoms declined over time, a proportion of children continued to report high levels of symptoms at 7 and 10 months after the hurricane. For example, 18.1% of the children reported severe or very severe levels of symptoms at 7 months and 12.5% at 10 months. Lastly, Russoniello et al. (2002) examined 218 fourth-grade students between the ages of 9-12 years old 6 months after being exposed to Hurricane Floyd. Results indicated that

almost all of the children (95%) reported PTSD symptoms. Specifically, 24% reported mild, 36% moderate, 25.3% severe, and 9.3% very severe levels of PTSD symptoms.

Taken together, these results indicate that youth can be severely impaired by exposure to disaster related traumas, like hurricanes (La Greca & Silverman, 2006). Research indicates, however, that while some youth are severely impaired by exposure to trauma, others cope much more effectively. Identifying factors that influence youths' mental functioning in response to severe trauma can help answer the perennial question: "why do some youth respond well to trauma while others are severely affected?" However, less empirical data exists concerning the factors that foster or protect (i.e., moderate) youth's reactions. The present study has a unique opportunity to begin filling in this gap due to the presence of pre-disaster functioning variables, which will allow for testing of potential moderators between the association between pre and post Katrina anxiety and PTSD symptoms.

The theoretical background for the current study is guided by a broad theoretical model of risk and resilience to adversity (i.e., the moderators of adversity) proposed by Sandler (2001). Applying Sandler's model (2001) is important because it may help identify negative trajectories in emotional response from pre to post disaster. The rationale for picking the potential moderators tested in the current study was guided by La Greca and colleagues' (e.g., La Greca et al., 1996, 1998; La Greca & Silverman, 2006; Vernberg et al., 1996) overall framework of predictors and moderators of disaster reactions. However, very little research has evaluated La Greca's and colleague's framework for picking potential moderators.

Sandler's (2001) model and La Greca and colleagues' framework are complimentary in that one is a broader model of risk in the face of trauma (Sandler, 2001) while the second is specific to natural disasters (e.g., La Greca et al., 1996, 1998; La Greca & Silverman, 2006;

Vernberg et al., 1996). The goal in each is the same: to better understand various factors that may moderate youths' disaster reactions, particularly anxiety and PTSD symptoms. Although the models presented here are important to the disaster related literature, the goal of the current study is not to empirically test either model as a whole. A complete test of either model in a single test is impossible; rather these models provide guides for developing testable hypotheses. The main focus of the current study is to test *one particular aspect* of both models, social support in terms of the *parent-child relationship*.

The Moderators of Adversity

Sandler's (2001) risk and resilience model is focused on understanding the theoretical mechanisms that underlie the differences in children's outcomes when faced with an adverse condition, such as Hurricane Katrina. According to Sandler (2001), adverse conditions are characterized in terms of their *quality* and *ecology*. The quality of an adverse condition refers to how environmental conditions affect satisfaction of basic needs/goals. The ecology of an adverse condition is the time, place, and social context in which basic needs/goals are either satisfied, or in the case of Hurricane Katrina, threatened. In this model, Sandler (2001) delineates four basic needs/goals: physical safety, self-worth, control/efficacy, and inclusion in a positive social network. Theoretically, Sandler (2001) proposes that each of these needs/goals are potential moderators of children's reactions to adversity. The next section will discuss each of needs/goals and link them to the current study's variables of interest.

The first need/goal is *maintaining a sense of physical safety*, which involves avoidance of pain and maintenance of physical survival. The goal of maintaining physical safety in Sandler's (2001) model was clearly and severely disrupted by Hurricane Katrina. The second need/goal is *one's sense of self-worth*. Using a self-evaluation framework, one's sense of self worth is defined

by both positive and negative evaluations of the self. As reviewed by Sandler (2001), experiences that lead to positive self-evaluation lead to positive affect, while negative self-evaluation is accompanied by distress (see Dubois & Tevendale, 1999; Higgins 1987). Adverse conditions, such as those precipitated by Hurricane Katrina, might have threatened positive self-evaluations among youths in multiple ways, including the disruption of esteem supporting relationships (e.g., with teachers, peers, neighbors).

The third need/goal that is highlighted by Sandler (2001) is *control*. The need for control refers to a primary motivation to be an effective agent of change in one's environment and for one's self. Not being able to control events, particularly negative ones, can lead to a sense of helplessness, distress, depression, and anxiety (Seligman & Peterson, 1986). Adverse conditions threaten the sense of having control by presenting concrete evidence that bad experiences occur that are not desired and that may not be preventable. Having a sense of control over events in one's life can result in the experience of fewer mental health and social adaptation problems in the face of adversity (Kliewer & Sandler, 1992; Seifer et al., 1991). Additionally, effective control over internal levels of distress is associated with more adaptive outcomes than poor control over internal levels of distress, particularly anxiety (see Weems & Stickle, 2005). Hurricane Katrina threatened the sense of having control by showing that negative experiences can and do occur and may not always be preventable.

The fourth need/goal is *a sense of social relatedness*. Sandler's (2001) model suggests that an important factor that serves to help protect individuals from negative mental health symptoms, such as anxiety or PTSD symptoms, in the face of adversity (i.e., Hurricane Katrina) is the experience of social relatedness/positive social support network. Hurricane Katrina certainly disrupted one's experience of social relatedness and a positive social support network

in families. Failure to reestablish a stable and satisfying sense of social relatedness is strongly related to the development of mental health problems for children in adverse situations. In contrast, a positive, warm relationship characterized by frequent interactions following a trauma predicts fewer mental health problems for children (Wolchik et al., 2000).

La Greca and colleagues Predictors and Moderators of Disaster Reactions

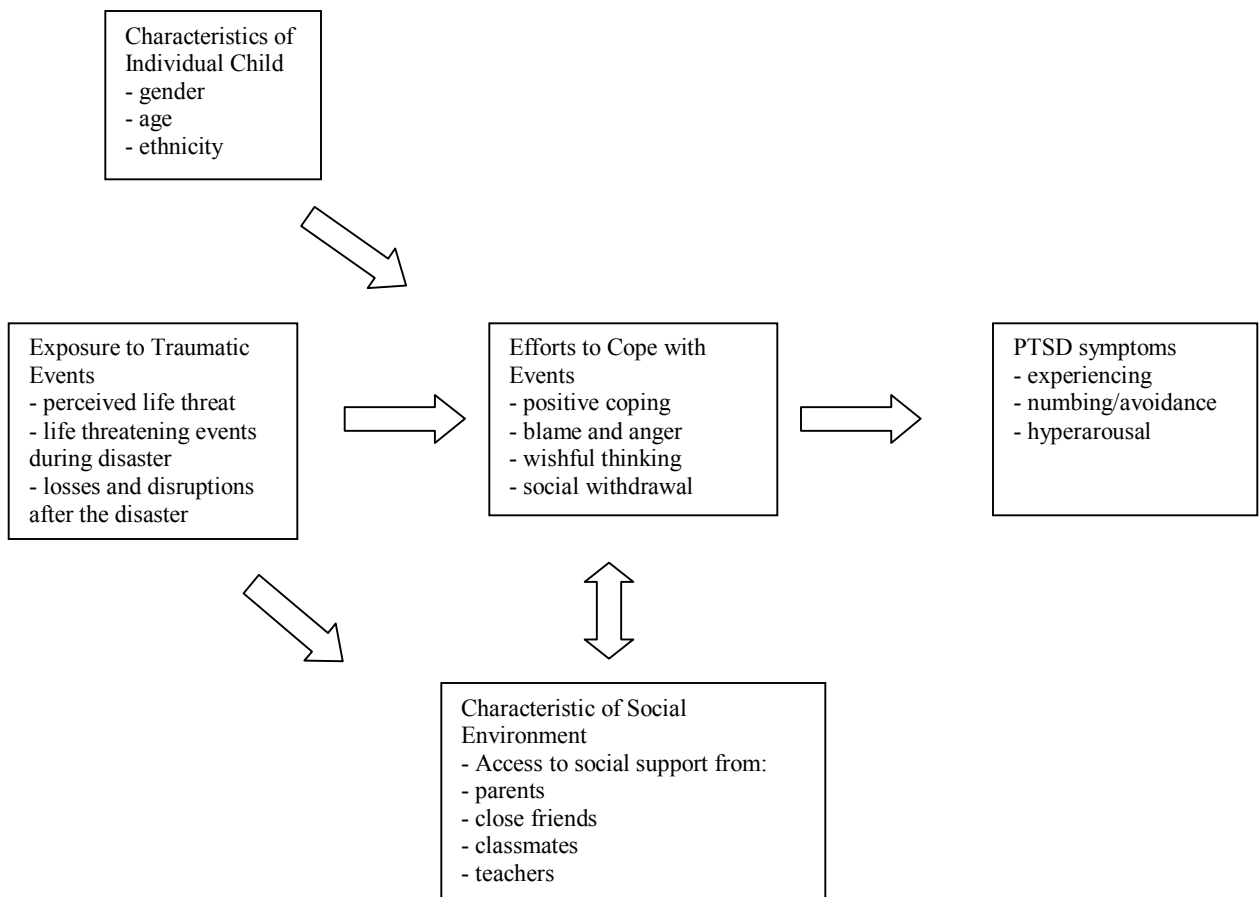
La Greca and colleagues (e.g., La Greca et al., 1996, 1998; La Greca & Silverman, 2006; Vernberg et al., 1996) further delineate the factors that may predict or moderate youths' disaster reactions. Accordingly, these factors fall within one of the four following categories: a) aspects of traumatic exposure, b) pre-existing characteristics of the child, c) characteristics of the post-disaster recovery environment, and d) the child's psychological resources. The theoretical framework proposed by La Greca and colleagues (e.g., La Greca et al., 1996, 1998; La Greca & Silverman, 2006; Vernberg et al., 1996) is depicted in Figure 1. Each one of these categories and the variables within each category are discussed in the following section.

Aspects of traumatic exposure

Several aspects of the traumatic exposure can significantly impact youths' reactions to a disaster, such as Hurricane Katrina. The first variable is the presence of perception of threat. The more children and adolescents perceive that their lives are threatened, the worse and more detrimental their reactions are (e.g., La Greca et al., 1996; Lonigan et al., 1991). The second variable is the death of a loved one (parent, friend, classmate). The third variable is the loss of possessions and the disruption of everyday life. Following destructive natural disasters like Hurricane Katrina, youth are faced with a series of life stressors that are set into motion by the disaster, which may last for months or years, such as the loss of one's home and/or possessions, a change of schools, shifts in parental employment and finances, and friends moving away. These

stressors may seriously challenge children’s adaptation and coping. Proximity to the disaster suggests that the more proximal children are to the disaster, the more intense or severe their reactions can be. The fifth and final variable is duration and intensity of the disaster (Vernberg & Varela, 2001). For example, the prolonged nature of certain disasters (i.e., hurricanes), in which no immediate relief is in sight, is very distressing to children (Jacobs et al., 2002).

Figure 1. La Greca and colleagues Conceptual Model for Predicting Children’s Reactions to Natural Disaster



Pre-existing Characteristics of the Child

Within this category, the most widely studied variables are youth pre-existing psychopathology, age, gender, and ethnicity. Youth pre-existing psychopathology, particularly, youth anxiety, was part of all main hypotheses in the current study, whereas age, gender, and ethnicity are examined through exploratory analyses. Research shows that children with greater levels of psychopathology prior to experiencing a trauma may be at greater risk for post traumatic stress reactions (La Greca et al., 1998; Vernberg & Varela, 2001). Due to inconsistent findings and a paucity of studies with large enough samples of youth of different ages, drawing generalizations regarding youths' reactions to disasters at different ages is difficult. For example, differences in PTSD symptoms after natural disasters have shown age differences in some studies (Lonigan et al., 1991; Shannon et al., 1994), whereas others have not replicated these findings (Earls et al., 1988; Green et al., 1991). Given the large age range of the current study, age-related differences are examined, but in the absence of a clear consensus regarding age differences, no directional hypotheses are posited.

Girls are often found to report more distress than boys following disasters (Green et al., 1991; Gurwitch et al., 2002; Korol et al., 2002; La Greca & Prinstein, 2002; Lonigan et al., 1991; Yule et al., 2002). Even when gender differences have emerged, their effect size is small to modest and their clinical significance is uncertain (La Greca & Silverman, in press; Vernberg et al., 1996). Ethnic differences, however, have been demonstrated in the disaster literature. For example, Lonigan et al. (1991) and Shannon et al. (1994) found that African American youth reported higher levels of PTSD symptoms following Hurricane Hugo than either Caucasian or other minority youth. Research suggests that African American youth tend to have more difficulty recovering from disasters than non-minority youth because they experience more hurricane-

related traumatic experiences (e.g., La Greca et al., 1996, 1998; Lonigan et al., 1994; see Rabalais, Ruggiero, & Scotti, 2002). Given that half of the sample in the current study is comprised of African American youth, ethnic differences are examined.

Characteristics of the Post-Disaster Recovery Environment

Variables of the post-disaster recovery environment such as the availability of social support, the presence of parental psychopathology, and the occurrence of additional life events or stressors, may moderate youths' reactions. Social support from significant others has been found to moderate the impact of natural disasters on youth (see La Greca & Prinstein, 2002). Parental psychopathology is likely to affect youths' post-disaster functioning. Green et al. (1991) found that parental psychopathology predicted higher levels of PTSD symptoms in youth following the Buffalo Creek dam collapse (also see Korol et al., 2002). In addition, mothers' distress in the aftermath of Hurricane Hugo was associated with persistent child post-disaster emotional and behavioral difficulties (Swenson et al., 1996). Lastly, youth who encounter major life events (e.g., death or hospitalization of a family member; parental divorce or separation) following a disaster, in addition to disaster-related life stressors, represent a high-risk group for severe and persistent PTSD symptoms.

Child's Psychological Resources

A child's own psychological resources, particularly, coping skills, have been linked to children's post-disaster reactions and recovery (Vernberg, 2002). Higher levels of negative coping strategies (e.g., anger, blaming others) are associated with higher levels of PTSD symptoms after natural disasters (La Greca et al., 1996). Moreover, children with negative coping strategies evidence greater persistence in PTSD symptoms over time (La Greca et al., 1996).

Although little is known about what variables may influence the relationship between pre and post disaster response, what is known is that pre-existing propensity to anxiety and other negative affect states are the single most important aspects in predicting PTSD symptoms after a disaster (Asarnow et al., 1999; Earls et al., 1988; La Greca et al., 1998; Lonigan et al., 1994; Nolen-Hoeksema, & Morrow, 1991). Levels of youth anxiety pre Hurricane Katrina is expected to predict youth anxiety/PTSD Symptoms post Katrina.

Drawing from Sandler's (2001) theoretical model and La Greca and colleagues' framework for picking moderators discussed above, and lack of empirical tests, there is a need to examine various moderators of the association between pre and post disaster emotional functioning especially in terms of anxiety. The following sections present the theoretical rationale for each of the moderators tested in this study, with a particular focus and attention on the parent-child relationship factors as potential moderators.

Level of Exposure

Research suggests that the more proximal children are to the disaster, the more intense or severe their reactions can be. As noted above, level of exposure is associated with PTSD symptoms and anxiety following the disaster. Given this, level of exposure is the most straightforward potential moderator of youth anxiety pre Katrina and youth anxiety post Katrina; however it is not clear whether level of exposure moderates the association between pre and post response.

Parental Anxiety Pre Katrina

Throughout the child anxiety literature, parental anxiety is one of the most consistently studied risk factors for the development of child anxiety. Repeatedly, parental anxiety has been linked to child anxiety symptoms (Hudson & Rapee, 2002; Moore, Whaley, & Sigman, 2004; Whaley, Pinto, & Sigman, 1999). In terms of how parental anxiety affects youths' disaster

reactions, MacFarlane (1987) surveyed 49 children (aged 7-14 years old) and their parents who were living in a survivor camp after being exposed to a destructive Australian bushfire. Children whose parents had more mental health problems were expected to have more PTSD symptoms and anxiety. At 2, 8, and 26 months after the bushfire, children's reports of PTSD symptoms at all three time points were more closely related to their mother's anxiety than to their level or severity of exposure to the bushfire. Green and colleagues (1991) assessed 179 children (aged 2-15 yrs) two years after experiencing the Buffalo Creek (West Virginia) dam collapse. Parental psychopathology was associated with the level of PTSD symptoms in their children. Parental anxiety prior to Hurricane Katrina is expected to moderate the association between youth pre Katrina anxiety and youth post Katrina anxiety.

Youth and Parental Attachment Beliefs Pre Katrina

It is believed that one of the main sources of social support for youth is the parent-child attachment relationship. Sandler's (2001) fourth need/goal characterizes social support as stable, frequent, positive interactions and communication or bond with a significant person(s). Theoretically, the social support description is very similar to attachment. Individuals with strong social support are generally able to cope more effectively with traumas than those without such resources (Cohen & Wills, 1985). Access to supportive social relationships following the trauma regularly emerges as a significant predictor of recovery (Vernberg et al., 1996). As described by Vernberg and Varela (2001), children, and in particular young children, are dependent on their parents for protection and security. After experiencing a trauma, children's need for protection increases. Having caretakers who maintain or re-establish a sense of security and safety within the parent-child relationship following a traumatic experience is imperative. Children with secure attachments may have a better chance of experiencing limited PTSD symptoms; however,

children with a history of poor attachments (i.e., insecure) may be most vulnerable for experiencing the effects of a trauma. Empirical research supports this notion. Vernberg et al. (1996) found fewer declines in children's PTSD symptoms from Time 1 to Time 2 among children with less social support. Bromet, Hough, and Connell (1984) studied families in the Three Mile Island nuclear accident and found that supportive family communication strongly moderated the relationship between immediate post-disaster stress and children's psychopathology and self-esteem two 2½ years later. Specifically, children's psychopathology after the accident was associated with lower subsequent self-esteem and more psychopathology in families without supportive communication. Youth attachment beliefs, characterized by trust, communication, and alienation, to their parents prior to Hurricane Katrina are expected to moderate the association between youth pre Katrina anxiety and youth post Katrina anxiety.

Parental attachment beliefs to their romantic partner are conceptualized on two continuous dimensions of interpersonal attachment-based cognitive styles (Bartholomew, 1990). The first dimension is the "Model of Self" (i.e., anxious attachment beliefs) and represents a continuum of rejection ranging from no fear and anxiety of rejection to intense fear and anxiety of rejection. The second dimension is the "Model of Others" (i.e., avoidant attachment beliefs) and ranges from interpersonal trust to intense interpersonal distrust, avoidance of others, and discomfort with interpersonal closeness. Recently, empirical studies have demonstrated significant associations between parental attachment beliefs to their romantic partner, in particular anxious attachment beliefs, and youth anxiety (e.g., Costa & Weems, 2005; Weems et al., 2002). Parental attachment beliefs to their romantic partner may be moderators of youth reactions to disasters. The current study has the opportunity to expand on this line of research in

the child anxiety literature while adding to the disaster literature by testing this novel pre-disaster functioning variable's role on youth reactions to Hurricane Katrina.

Parental attachment beliefs to their partner (or the parent-parent relationship) have the potential to affect youth response to a disaster. For example, adults who have anxious attachments tend to have negative views about themselves and/or others with regard to interpersonal relationships (Weems et al., 2002). These negative views and behaviors may directly and indirectly influence their children. For example, Vasquez, Durik, and Hyde (2002) found that parents with high levels of anxious and avoidant attachment beliefs were overly concerned, involved, dependent, and intrusive about all aspects of parenting. This over-involved, dependent, or intrusive behavior may hinder a parent's ability to successfully support their child (Menziez & Clarke, 1994; Rapee, 1997; Vasey & Dadds, 2001; Vasey & Ollendick, 2000). In the face of a trauma, such as Hurricane Katrina, the inability for parents to successfully support their child can be very detrimental to youth recovering from a disaster. For example, La Greca and Prinstein (2002) demonstrated that social support moderates the impact of natural disasters on youth (see La Greca & Prinstein, 2002). Parental attachment beliefs to their romantic partner prior to Hurricane Katrina are expected to moderate the association between youth pre Katrina anxiety and youth post Katrina anxiety.

Parenting Behaviors Pre Katrina

Parenting behaviors, particularly rejection/criticism, psychological control, and firm control are shown in research to be significant predictors of child anxiety (Dadds & Barrett, 1996; Costa & Weems, 2005; Hudson & Rapee, 2002). Rejecting parenting behaviors are characterized by a *lack* of interactional warmth/responsiveness, acceptance of children's feelings/behaviors, active listening, praising, and emotional and behavioral involvement in

children's lives and activities (e.g., Maccoby, 1992). Moreover, rejecting parenting behaviors are disapproving, judgmental, and dismissive. Parenting behaviors that do not demonstrate acceptance of their children's expressions of negative affect, in that they criticize and minimize their children's feelings, do not promote children's emotion regulation. Specifically, rejecting parenting behaviors do not grant children the opportunity to learn, through trial and error, how to deal with and tolerate negative affect (Gottman, Katz, & Hooven, 1997).

Psychologically controlling parenting behaviors include inducing guilt, instilling anxiety, withdrawing love, disappointment and shaming by parents, infantilizing children, encouraging emotional and psychological dependence on the parent, and restricting children to the psychological world of the parent (Barber & Harmon, 2001). Firm controlling behaviors are parenting behaviors that are overly restrictive and protective of a child's behaviors and activities. These controlling parenting behaviors are thought to: (1) convey the perception of the continual presence of threat and danger, (2) prevent children from facing fear-provoking events, and (3) hinder children's ability to develop solutions to face fear or successful coping mechanisms (Rapee, 1997; Vasey & Dadds, 2001; Vasey & Ollendick, 2000).

It is thought that potentially negative or harmful parenting behaviors can interfere with parents' ability to provide an effective social support system to their child in response to disasters, like Hurricane Katrina. Research examining the moderating role of parenting behaviors on youth subsequent functioning after experiencing a trauma such as Hurricane Katrina is scant (Pellegrin, 2006). However, the existing research on parenting behaviors in mother-child anxious dyads provides support for the notion that these parenting behaviors may affect youth disaster response. For example, in a study of anxious mothers and their 7-14 year old children, Whaley et al. (1999) showed that controlling parenting behaviors tend to be the most salient predictor of the

development of child anxiety. Moore et al. (2004) replicated the findings of the Whaley et al. (1999) study. Moreover, the authors demonstrated that rejecting parenting behaviors are related to the development and maintenance of child anxiety. Psychologically controlling, firm controlling, and rejecting parenting behaviors prior to Hurricane Katrina are expected to moderate the association between youth pre Katrina anxiety and youth post Katrina anxiety

Hypotheses

The current study evaluates the potential moderating roles of parental anxiety, youth and parent attachment beliefs and parenting behaviors on the association between youth pre Katrina and post Katrina anxiety. Youth with low anxiety who have parents with low anxiety, secure attachment beliefs (in the parent and/or child), and appropriate levels of parental acceptance and control prior to Hurricane Katrina should have lower levels of anxiety after Hurricane Katrina. Specifically, parents with low anxiety, secure attachment beliefs (in the parent and/or child), and appropriate levels of acceptance and control will be able to provide adequate and helpful levels of support for their children. In other words, lower levels of parental anxiety, parental anxious/avoidant attachment beliefs, youth insecure attachment beliefs, and controlling and rejecting parenting behaviors will enable parents to effectively help their children cope the face of Hurricane Katrina, in a warm, positive, and secure way.

In contrast, youth with more anxiety combined with parental anxiety, anxious/insecure attachment beliefs (in the parent and/or child), rejecting parenting behaviors, and inappropriate/high levels of parental control prior to Hurricane Katrina should be *more* likely to respond to the hurricane with higher levels of anxiety. Parents with more anxiety, anxious/insecure attachment beliefs (in the parent and/or child), rejecting parenting behaviors, and excessive/inappropriate control levels will be a negative source of support system for their children in the face of adversity. Specifically, higher levels of parental anxiety, parental anxious/avoidant attachment beliefs, youth insecure attachment beliefs, and rejecting and controlling parenting behaviors will theoretically hinder parents' ability to effectively help their children cope with the challenges of Hurricane Katrina. Higher levels of parental anxiety, parental anxious/avoidant attachment beliefs, youth insecure attachment beliefs, and rejecting

and controlling parenting behaviors are expected to act as moderators of the association between youth pre Katrina and post Katrina anxiety.

In summary it is first hypothesized that youth anxiety pre Katrina would predict youth anxiety/PTSD symptoms post Katrina and that level of exposure (i.e., number of traumatic experiences in Hurricane Katrina) would moderate the association. The next series of hypotheses state that the association between youth anxiety/PTSD symptoms pre Katrina and youth anxiety/PTSD symptoms post Katrina are moderated by:

Hypothesis 2: Youth attachment beliefs (trust, communication, alienation, and full attachment beliefs score)

Hypothesis 3: Youth perceptions of parenting behaviors (acceptance, psychological control and firm control)

Hypothesis 4: Parental anxiety

Hypothesis 5: Parental attachment beliefs to their romantic partners (anxious and avoidant attachment beliefs)

Supplemental analyses were computed to investigate the role of age, gender, and ethnicity on the association between youth pre and post Katrina anxiety/PTSD symptoms. Moreover, analyses were computed to investigate if these variables interacted with the variables in hypotheses 2-5 to predict youth post Katrina anxiety/PTSD symptoms.

Method

Participants

The sample for the current study was drawn from a pool of youth aged 6-17 years old ($N = 250$) and their families who resided in the New Orleans area before the storm and participated in a series of studies at the University of New Orleans Youth and Family Anxiety, Stress, and Phobia Lab (e.g., Costa & Weems, 2005; Weems et al., 2005). On average these children were assessed 17 months before the storm (range 6 to 20 months). In conjunction with Arizona State University Institute for Social Science Research (ISSR), the 250 families were beginning to be re-located to participate in a follow-up phone interview to assess their current family living situations, family functioning, and mental health symptoms. From November 2005 to April 2006, ASU contacted completed 52 phone assessments. From September 2006 till February 2007, the Youth and Family Anxiety, Stress, and Phobia Lab assessed an additional 26 families.

Seventy-four youth and their parents were able to be recruited for this study and were assessed via phone interviews either 5-7 months post Katrina by ASU ($N = 48$) or 12 months and later by UNO ($N = 26$). Parents were paid \$100.00 for every child with whom they participated in the study with. The sample was comprised of 42 males and 31 females, with a mean age of 11.34 years and an age range of 6 to 17 years at Time 1. Sixty percent of the families were Caucasian, 30% were African American, 8% were Hispanic, 1% were Asian, and 1% were of other ethnic backgrounds. Fifty-four percent of the families were married, 15% were divorced, 14% were single, 10% were re-married, 4% were widowed, 1% were separated, and 1% were unmarried, but living with their partner. The majority of the mothers in the families had either some college (47%) or college (32%) education level (14% had a high-school education and 7% had an advanced degree). The majority of the fathers in the families had either high school (44%)

or some college (27%) education level (19% had a college education, 6% had an advanced degree, and 4% were missing). The range of the participants' family income was as follows: 0 to \$11,999 (12%), \$12,000-\$20,999 (8%), \$21,000- \$30,999 (15%), \$31,000- \$40,999 (4%), \$41,000 - \$50,999 (12%), over \$51,000 (47%), and 2% did not report their present family income.

Out of the original sample of 250 families, thirty percent (N = 75) have been located and assessed. Fifty-two percent (N = 130) of our sample have not been located. Eighteen percent (N = 45) of our families were not interested in participating in the post Katrina phone assessment. Of the 75 families that were located, one family had to be excluded from the current study due to severe levels of developmental disabilities. Although this may seem to represent significant attrition these results are not unexpected given the massive devastation of the area and extensive diaspora of the residents of New Orleans. This rate of attrition from the sample pool is also similar to that of previous studies attempting to use pre-hurricane data (La Greca et al., 1998).

Measures Pre Katrina and Post Katrina

Demographic Information. Demographic information was collected from each family, including age, gender, race, marital status, level of education and occupation, and family income.

Youth Anxiety. Youth anxiety was assessed through the Revised Child Anxiety and Depression Scales, Child and Parent Version (RCADS-C and RCADS-P; Chorpita et al., 2000; Spence, 1997). Both versions were administered to youth and their parents (to complete about their child) at Time 1 and 2. The RCADS (child and parent) is a 47-item instrument that assesses symptoms of anxiety disorders and depression based on DSM-IV criteria (APA, 1994). The scale is scored 1 “Never”, 2 “Sometimes”, 3 “Often”, 4 “Always”. The RCADS is an adaptation of the Spence Anxiety Scales (Spence, 1997). Chorpita et al. (2000) modified the Spence scales for

DSM-IV and evaluated the RCADS by examining the measure's factorial validity in a school sample of 1,641 children and adolescents (aged 6.2 to 18.9 yrs), and its reliability and validity in an independent sample of 246 children and adolescents (aged 8.3 to 18.3 yrs). The results suggested an item set and factor definitions that were consistent with DSM-IV anxiety disorders and depression. Moreover, the RCADS demonstrated convergent validity with existing measures of childhood anxiety and depression (Chorpita et al., 2000). In the current study, the alpha for the RCADS-C (child report) anxiety scale was .92.

The parent version of the RCADS (RCADS-P) is designed to be identical to the RCADS with minor modifications (i.e., wording was changed from “I” to “My child”). Internal consistency estimates of the RCADS-P range from .92 to .97 (Weems, et al., in press). In the current study, the alpha for the RCADS-P (parent report) anxiety scale was .91.

The “youth anxiety” measure at pre and post Katrina was formed by computing a unit-weighted score from parental and child report of anxiety. Unit-weighted scores are computed as standardized deviation scores (z-scores) from the averaged sum of individual items identified as measuring a construct. The properties of unit-weighted factors are especially desirable for this study as this measurement approach capitalizes on integrating the sources (parent, child) and reduces the number of statistical tests of the main hypotheses (i.e., reduces the probability of Type 1 error) (Holmbeck et al., 2002). The composite youth pre and post Katrina anxiety score includes the aggregation of the standardized score of youth-rated anxiety items from the RCADS-C and the standardized score of parent-rated anxiety items on the RCADS-P.

Youth Posttraumatic Stress Symptoms (PTSD symptoms). The PTSD checklist (Amaya-Jackson et al., 1995) was administered pre and post Katrina to youth to assess pre and post Katrina PTSD symptoms. The PTSD checklist is a 28 item questionnaire that inquires about trauma exposure (e.g., Hurricane Katrina) and PTSD symptoms corresponding to the three

symptom clusters as specified in the DSM-IV (American Psychiatric Association, 1994) (B: re-experiencing, C: avoidance/numbing, and D: hyperarousal). Reliability estimates reported in the measure development studies range from .91 to .72 (see Amaya-Jackson et al., 2000). Each question was given either a 0 (absent) if youth reported “not at all” or a 1 (present) if youth reported “some of the time,” “most of the time,” or “all of the time.” Total PTSD symptoms scores were computed by summing youth responses. The alpha for the total PTSD symptoms score in the current study was .92. Although parents did complete the PTSD checklist about their child post Katrina, they did not complete the PTSD checklist about their child(ren) pre Katrina. Therefore, only youth report of PTSD symptoms was used in the study.

Level of Exposure in Hurricane Katrina. The Survey of Exposure to Hurricanes and their Aftermath (SEHA) is a survey of exposure to hurricanes and their aftermath. The survey was developed by Weems, Pina, Sandler, Scheeringa, La Greca, and Silverman (2006) due to the absence of an existing survey of hurricane exposure in the research literature. The SEHA asks about a number of hurricane related questions about the time *during* and *after* the storm (e.g., during the storm did you see windows and doors braking? during the storm did you hear about tornados in your area? after the storm, did you lose track of your relatives?). Respondents indicate ‘Yes’ or ‘No’ to whether they were exposed to the listed events or situations. A score was derived for events *during* and *after* separately. A total (sum of during and after) number of traumatic events score was also computed. The alpha for the total number of events reported by youth was .71.

Measures Pre Katrina

Parental Anxiety. Parents rated their level of anxiety on the Symptom Checklist-90-Revised at Time 1 (SCL-90; Derogatis, 1983). The SCL-90 is a widely used measure of anxious

symptoms and consists of 90 symptoms rated on a 5-point scale (0 = not at all, 4 = extremely). For purposes of this study, the anxiety subscale was used. The SCL-90 has good reliability estimates. For example, internal consistency has been reported to range from .79 to .90 for all subscales and test-retest reliability has been reported to range from .68 to .80 (Kaslow et al., 2004). In the current study, the alpha for the SCL-90 anxiety subscale was .91.

Youth Attachment Beliefs. Youth attachment beliefs were measured at Time 1 only using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenburg, 1987). The IPPA is a 60-item (20: mother, 20: father, 20: peers) self-report scale designed to assess children's attachment beliefs about their parents and peers. For purposes of this study, the 20-item attachment to mother and 20-item attachment to father scales are used. Each item is rated on a 5-point Likert scale ranging from "never true" to "always true." Attachment beliefs are measured through three subscales (Trust, Communication, and Alienation), where Attachment Beliefs = Trust + Communication - Alienation. Higher attachment belief scores indicate more secure attachment beliefs, whereas lower attachment belief scores indicate less secure attachment beliefs.

The IPPA has good reliability and validity estimates. For example, internal consistency of the three subscales ranges from .86 to .91 and test-retest reliability over a 3-week period was .93 (Armsden & Greenburg, 1987). The IPPA has also demonstrated convergent validity (i.e. correlation coefficients of .56, .52, and .78 with Family Environment subscales of Cohesion and Expressiveness and Family Self-concept; Armsden & Greenburg, 1987). In the current study the alphas were: .92 (Trust subscale), .85 (Communication subscale), .73 (Alienation subscale), and .81 (Attachment score) for the total sample reporting on their attachment beliefs to their *mother*. The alphas for each subscale when reporting on their attachment beliefs to their *father* were: .96

(Trust subscale), .90 (Communication subscale), .76 (Alienation subscale), and .90 (Attachment score). Correlations among the subscales for mother and father are presented in Table 1 (mother) and Table 2 (father).

Table 1. Correlations among IPPA Subscales for Mother

	Trust	Communication	Alienation	Attachment Beliefs
Trust	-	-	-	-
Communication	.80**	-	-	-
Alienation	-.54**	-.45**	-	-
Attachment Beliefs	.95**	.89**	-.72**	-

** p < .001

Table 2. Correlations among IPPA Subscales for Father

	Trust	Communication	Alienation	Attachment Beliefs
Trust	-	-	-	-
Communication	.85**	-	-	-
Alienation	-.29*	-.29*	-	-
Attachment Beliefs	.94**	.91**	-.53**	-

** p < .001, * p < .05

Parental Attachment Beliefs. The Experiences in Close Relationships (ECR; Brennan, Clark, & Shaver, 1998) was completed by the parent at Time 1 only. This is a 36-item self-report measure administered that assesses parent’s attachment beliefs to their romantic partner using a 7-point Likert scale ranging from “disagree strongly” to “agree strongly.” The ECR has two 18-question subscales labeled “Model of Self” (i.e., anxious attachment beliefs) and “Model of Others” (i.e., avoidant attachment beliefs). Higher anxious attachment belief scores indicate more anxiety about rejection by others and feelings of personal unworthiness regarding interpersonal relationships, where as higher avoidant attachment belief scores indicate more interpersonal distrust and avoidance of closeness with others. The ECR has demonstrated good

reliability estimates. For example, internal consistency and test-retest reliability for the two subscales have been reported at .94 and .90 for avoidance and .91 and .91 for anxiety, respectively (Brennan et al., 1998; Fraley, Waller, & Brennan, 2000). Convergent validity of the ECR has been demonstrated with the Current Relationship Interview (CRI; Crowell & Feldman, 1991). The correlation between the anxious and avoidant attachment beliefs scales in the current study was $r = .27$, $p < .05$. The alphas in the current study for the two subscales were .87 (anxious attachment beliefs) and .84 (avoidant attachment beliefs).

Parenting Behaviors. The Children's Report of Parent Behavior Inventory (CRPBI; Schluderman & Schluderman, 1970) was used at Time 1 to assess children's perceptions of their parents' accepting and controlling behaviors toward them. The 30-item questionnaire consists of three subscales: Psychological Control (PC), Firm Control (FC), and Acceptance. The CRPBI has good reliability estimates. For example, internal consistency ratings for these subscales have been found to range from .65-.74 (Schwartz, Barton-Henry, & Pruzinsky, 1985). In the current study, the alphas were: .80 (Psychological control), .53 (Firm Control), and .86 (Acceptance). Correlations among the subscales were: Acceptance-Psychological Control ($r = -.001$, $p = .95$), Acceptance-Firm Control ($r = -.26$, $p < .05$), Psychological Control-Firm Control ($r = .16$, $p = .21$).

Procedures

Informed consent was obtained from the parent and informed assent was obtained from youth at the pre Katrina assessment, as well as for the post Katrina phone survey. For the pre Katrina assessments, families were recruited through: (1) media outreach and advertisement (e.g., newspaper articles and advertisement, etc.), (2) recruitment via the adult students enrolled in courses at UNO, and (3) established relationships with the parent education center at UNO and area schools. Our recruitment efforts targeted any family with a child between the ages of 6-17.

Prospective families were informed that we were conducting a study of youth behaviors, emotions, and anxiety and that they can receive a free screening for anxiety related problems. However, potential subjects were told that families are eligible to participate regardless of whether they have anxiety problems or not.

Pre Katrina assessments took place at the Youth and Family Anxiety, Stress, and Phobia Lab on the University of New Orleans's campus and lasted approximately 2-½ hours. Upon arrival to the lab, research assistants went over the consent forms and all questionnaires with both the parent and youth before beginning the actual assessment. To ensure that respondents felt comfortable enough to answer honestly, the parent and youth were placed in separate rooms while completing the questionnaires. During the assessment, youth were administered the child questionnaire battery, which addressed youths' anxiety, fear, depression, behaviors, and relationships with others. Research assistants were present in the assessment room at all times in case the youth had questions. If youth were younger (under 12 years old), the questionnaires were read to him/her by a research assistant. Parents were also administered a parent questionnaire battery, which addressed the parental psychopathology and relationships with others, along with their feelings about their child's feelings and behaviors. The parent was instructed to ask any questions that he/she may have about the questionnaires.

At the conclusion of the study, parent and child were debriefed and given a small monetary reward.

Similar to Asarnow et al. (1999) phone interviews were conducted to collect post Katrina data. Post Katrina phone interviews were scheduled in advance of the interview to ensure an appropriate time and home setting for the interviews and that both the parent and youth were available. Interviews were conducted by trained personnel who monitored the conversation for signs of fatigue or inattention. Both the interviews for the parent and youth took approximately

20-30 minutes each. The parent phone interview asked parents about their experiences in Hurricane Katrina, their current psychopathology, and about their youth's current anxiety/PTSD symptoms. The youth interview asked youth about their experiences in Hurricane Katrina and their current level of anxiety/PTSD symptoms.

Results

Before conducting analyses to test the main hypotheses, several descriptive analyses were computed. First, the mean scores, standard deviations, and ranges on the anxiety, PTSD symptoms, attachment beliefs, and parenting behaviors measures pre Katrina were computed and are presented in Table 3. Post Katrina mean scores, standard deviations, and ranges on the anxiety, PTSD symptoms, and number of traumatic events are presented in Table 4. Examination of the scores on all measures indicated acceptable ranges for the planned analyses.

Table 3. Means, Standard Deviations, and Ranges Pre Katrina

	Mean	S.D.	Range
Youth Anxiety	-.20	1.45	-2.51- 4.40
Youth PTSD symptoms	8.80	8.84	0-26
IPPA Trust (Mom)	43.90	7.76	15-50
IPPA Communication (Mom)	20.08	4.76	7-25
IPPA Alienation (Mom)	9.85	4.09	5-21
IPPA Attachment Beliefs (Mom)	54.12	14.63	11-70
IPPA Trust (Dad)	42.77	10.09	10-50
IPPA Communication (Dad)	18.46	5.85	5-25
IPPA Alienation (Dad)	9.78	4.30	5-25
IPPA Attachment Beliefs (Dad)	52.07	16.38	10-70
CRPBI Acceptance	25.81	4.31	9-30
CRPBI Psychological Control	17.78	4.49	11-28
CRPBI Firm Control	21.65	3.45	13-30
Parental SCL-90 Anxiety	.33	.36	.00-1.70
Parental ECR Anxious Attachment Beliefs	2.73	.99	1.00-5.11
Parental ECR Avoidant Attachment Beliefs	2.56	.86	1.06-4.44

Youth Anxiety = Revised Child Anxiety and Depression Scales (Child & Parent Version combined), Youth PTSD Symptoms = PTSD Checklist, IPPA = Inventory of Parent and Peer Attachment, CRPBI = Children's Report of Parent Behaviors Inventory, SCL-90 = Symptom Checklist, ECR = Experiences in Close Relationships

Table 4. Means, Standard Deviations, and Ranges Post Katrina

	Mean	S.D.	Range
Youth Anxiety	.04	1.50	-2.51- 4.56
Youth PTSD symptoms	12.55	5.88	0-24
Youth Report of Total Traumatic Events	7.64	2.91	1-14
Parent Report of Total Traumatic Events	10.68	2.83	3-21

Youth Anxiety = Revised Child Anxiety and Depression Scales (Child & Parent Version combined), Youth PTSD Symptoms = PTSD Checklist, Youth Report of Total Traumatic Events & Parent Report of Total Traumatic Events = Survey of Exposure to Hurricanes and their Aftermath (SEHA)

Second, although the measures used in this study have favorable psychometric history, analyses of internal consistency were examined. As reported in the Measures section for each individual questionnaire and subscales, all measures/subscales showed favorable internal consistency.

Third, attrition analyses were computed. Consenters (N = 74) and non-consenters [(N = 172 (i.e., the families that did not participate in post Katrina assessments))] were compared through the use of Chi-squares to examine whether there were any systematic differences in demographic variables. Results indicated that the two groups only differed on family income [χ^2 , 5(N = 245) 21.89, $p > .001$]. Specifically, consenters had higher family income than non-consenters. Therefore, family income was controlled for in all main analyses. Independent sample t-tests were computed to examine whether there were any systematic differences in any of the study's constructs pre Katrina (RCADS, PTSD checklist, SCL-90, IPPA, ECR, CRPBI). No differences were found.

Fourth, given that the families who participated in the phone interviews by ASU were assessed approximately 5-7 months post Katrina (N = 47) vs. the families who participate in the phone interviews by UNO were assessed approximately 12 months and later post Katrina (N = 26), differences in demographic variables between these groups were examined through the use

of Chi-squares. Consistent with the findings above, results indicated that the two groups only differed on family income [χ^2 , 5(N = 74) 11.82, $p < .05$]. Specifically, those who participated in the earlier phone interview with ASU had higher family income than those who participated in the later phone interview with UNO. Therefore, family income was controlled for in all main analyses. Independent sample t-tests were computed to examine whether there were any systematic differences in any of the study's constructs pre Katrina (RCADS, PTSD checklist, SCL-90, IPPA, ECR, CRPBI). No differences were found.

Correlational Analyses

Correlations between youth anxiety/PTSD symptoms pre Katrina and post Katrina were computed. Youth anxiety pre Katrina was marginally significantly related to youth PTSD symptoms pre Katrina ($r = .24$, $p = .07$). Youth anxiety pre Katrina was significantly related to youth anxiety post Katrina ($r = .56$, $p < .01$) and to youth PTSD symptoms post Katrina ($r = .37$, $p < .01$). Youth PTSD symptoms post Katrina were significantly related to youth anxiety post Katrina ($r = .53$, $p < .01$). Youth PTSD symptoms pre Katrina was not significantly related to youth PTSD symptoms post Katrina ($r = .11$, $p = .37$), but was significantly related to youth anxiety post Katrina ($r = .30$, $p < .01$). This finding was not unexpected given that before Hurricane Katrina, not all youth reported a trauma. After Hurricane Katrina, all youth reported a trauma, Hurricane Katrina. Correlations between the variables of interest in the current study and youth anxiety and PTSD symptoms pre and post Katrina are presented in Table 5.

Table 5. Correlations among Youth Anxiety and PTSD Symptoms Pre and Post Katrina with all of the study's variables

	Youth Anxiety Pre Katrina	Youth PTSD Symptoms Post Katrina	Youth Anxiety Post Katrina	Youth PTSD Symptoms Post Katrina
IPPA Trust (Mom) Pre Katrina	-.14	-.07	-.15	-.05
IPPA Communication (Mom) Pre Katrina	.01	.14	-.15	.09
IPPA Alienation (Mom) Pre Katrina	.17	.15	.29*	.27*
IPPA Attachment Beliefs (Mom) Pre Katrina	-.13	-.04	-.23 [†]	-.10
IPPA Trust (Dad) Pre Katrina	-.19	.04	-.05	-.17
IPPA Communication (Dad) Pre Katrina	-.01	.13	.01	-.06
IPPA Alienation (Dad) Pre Katrina	.03	.19	.18	.16
IPPA Attachment Beliefs (Dad) Pre Katrina	-.14	-.02	-.09	-.12
CRPBI Acceptance Pre Katrina	-.03	.00	-.02	-.01
CRPBI Psychological Control Pre Katrina	.20	.36**	.24*	.03
CRPBI Firm Control Pre Katrina	.12	.10	.01	.04
Parental SCL-90 Anxiety Pre Katrina	.29*	.13	.27*	-.09
Parental ECR Anxious Attachment Beliefs Pre Katrina	.21	-.10	.04	-.13
Parental ECR Avoidant Attachment Beliefs Pre Katrina	.17	.11	.10	.16
Youth Report of Total Traumatic Events (Post Katrina)	.01	.06	.07	.35**
Parent Report of Total Traumatic Events (Post Katrina)	.22	.07	.04	.10

* p < .05, ** p < .01, [†] < .07

Youth Anxiety = Revised Child Anxiety and Depression Scales (Child & Parent Version combined), Youth PTSD symptoms = PTSD Checklist, IPPA = Inventory of Parent and Peer Attachment, CRPBI = Children's Report of Parent Behaviors Inventory, SCL-90 = Symptom Checklist, ECR = Experiences in Close Relationships, Youth Report of Total Traumatic Events & Parent Report of Total Traumatic Events = Survey of Exposure to Hurricanes and their Aftermath (SEHA)

Main Analyses

Hypothesis 1. In order to test if youth anxiety pre Katrina predicted youth anxiety post Katrina, a regression equation was computed. Youth anxiety post Katrina was the criterion variable, age, gender, ethnicity, and income were entered in the first step, and youth anxiety pre Katrina was entered in the second step. Youth anxiety pre Katrina predicted youth anxiety post Katrina (R^2 change = .19, $p < .001$). Similarly, a regression equation was computed to test if youth anxiety pre Katrina predicted youth PTSD symptoms post Katrina. Youth PTSD symptoms post Katrina was the criterion variable, age, gender, ethnicity, and income was entered into the first step, and youth anxiety pre Katrina was entered into the second step. Results indicated that youth anxiety pre Katrina predicted youth PTSD symptoms post Katrina (R^2 change = .06, $p < .05$). Given that youth PTSD symptoms pre Katrina were not related to youth PTSD symptoms post Katrina, a regression equation was not computed for this variable.

Moderation by the Number of Traumatic Experiences in Hurricane Katrina. The total number of traumatic experiences in Hurricane Katrina was computed by adding the number of traumatic experiences reported by youth *during* and *after* the storm. Table 2 shows the means, standard deviations, and ranges. These analyses were computed using parent- report of traumatic experiences in Hurricane Katrina and the results were virtually identical to the results when using child-report of traumatic experiences. The number of traumatic events did not moderate the association between youth pre and post Katrina anxiety (R^2 change = .01, $p = .52$) or youth pre and post Katrina PTSD symptoms (R^2 change = .00, $p = .88$). Additionally, the number of traumatic experiences in Hurricane Katrina did not interact with any of the other study's variables pre Katrina to affect youth post Katrina anxiety or PTSD symptoms.

Hypotheses 2-5. In order to test the moderating role of the proposed variables, a series of hierarchical regression analyses as outlined in Baron and Kenny (1986) were computed. As delineated in Baron and Kenny (1986), control variables were entered into the first step, the independent variable (centered) was entered into the second step of the regression. The moderator variable (centered) was then entered into the third step. Lastly, the interaction term (independent variable by the moderator variable) was entered into the last step. A significant change in R^2 produced by the interaction term entered on the last step would indicate that the moderator variable was influencing the association between the predictor and criterion variables. The following section will describe the regression equations in which the interaction term was statistically significant. As recommended by Holmbeck (2002), graphs of the slopes for each significant regression equation are depicted to clarify the nature of the interaction. Slopes were calculated among youth high (above the mean) versus low (below the mean) on the moderators. Relations between youth anxiety/PTSD symptoms pre Katrina and youth anxiety/PTSD symptoms post Katrina were then examined for youth at high and low levels of the moderator variables using Holmbeck's (2002) procedure for testing the significance of the slopes for youth in the high and low groups. Youth anxiety post Katrina and youth PTSD symptoms post Katrina will be described separately. Within each section, each hypothesis is presented if a significant interaction was demonstrated.

Youth Anxiety Post Katrina as the Criterion Variable

Hypothesis 2. Youth attachment beliefs (trust, communication, alienation, and full attachment beliefs score) to mother and father would moderate the association between youth pre Katrina and post Katrina anxiety. All subscales of youth attachment beliefs (trust, communication, and full attachment beliefs score) to mother yielded significant results, with the

exception of IPPA alienation, which did not moderate the association between youth pre Katrina and post Katrina anxiety. None of the youth attachment belief subscales (trust, communication, alienation, and full attachment beliefs score) to father were statistically significant.

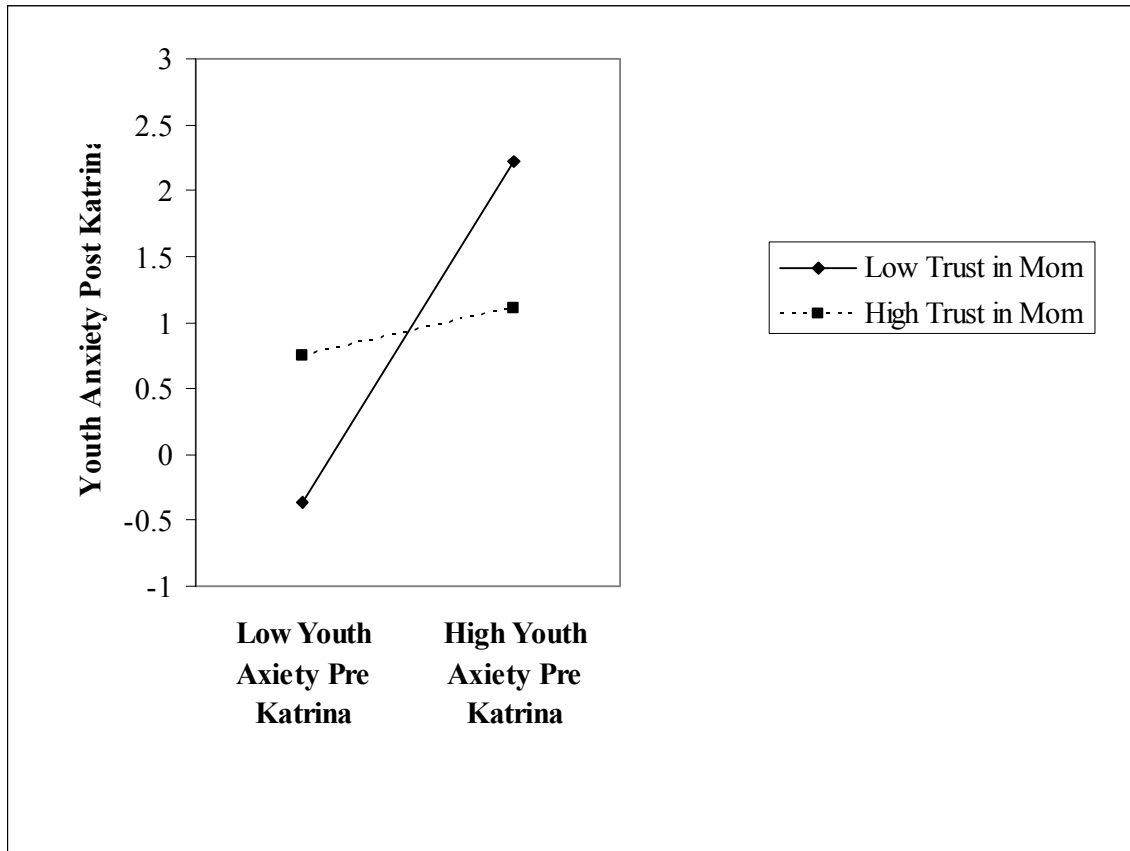
Trust in Mom. Youth anxiety post Katrina was the criterion variable and then age, gender, ethnicity, and family income were added into the model in the first step [change in $R^2 = .12$, F change (4, 74) = 1.88, $p = .13$]. Youth anxiety pre Katrina was entered into the second step [change in $R^2 = .19$, F change (1, 74) = 15.05, $p = .00$]. Youth IPPA Trust in mom was entered in the third step [change in $R^2 = .02$, F change (1, 74) = 1.37, $p = .25$]. The interaction term (youth anxiety pre Katrina X IPPA Trust in Mom) was entered into the fourth and final step. The interaction term was significant [change in $R^2 = .10$, F change (1, 74) = 9.23, $p = .00$]. The interaction is presented in Figure 2. Relations between youth anxiety pre Katrina and youth anxiety post Katrina were then examined for youth at high and low levels of IPPA Trust in Mom using Holmbeck's (2002) procedure for testing the significance of the slopes for youth in the high and low groups. Among children with low IPPA Trust in Mom, youth anxiety pre Katrina was significantly related to youth anxiety post Katrina ($\beta = .82$, $p = .00$); however, among children with high IPPA Trust in Mom, youth anxiety pre Katrina was not significantly related to youth anxiety post Katrina ($\beta = .51$, $p = .32$). Overall, the slopes of the regression lines show that the model predicts that those with high anxiety and low trust in their mother pre Katrina will have the highest post Katrina anxiety.

Table 6. Regression Analyses Predicting Youth Post Katrina from Youth Pre Katrina Anxiety, IPPA Trust in Mom, and their Interaction

	<u>B</u>	β	t	p
Age	-.07	-.17	-1.23	.22
Gender	-.32	-.11	-.95	.35
Ethnicity	.29	.19	1.42	.16
Income	-.01	-.02	-.11	.91
Youth Anxiety Pre Katrina	.51	.48	4.14	.00
Trust in Mom Pre Katrina	-.01	-.07	-.57	.57
Youth Anxiety Pre Katrina X Trust Pre Katrina	-.05	-.33	-3.04	.00

Note: B is the unstandardized coefficient and β is the standardized coefficient.

Figure 2. Slopes of Youth Anxiety Pre Katrina on Youth Anxiety Post Katrina as a Function of IPPA Trust to Mom



Note: Youth Anxiety Pre and Post Katrina scores are z-scores

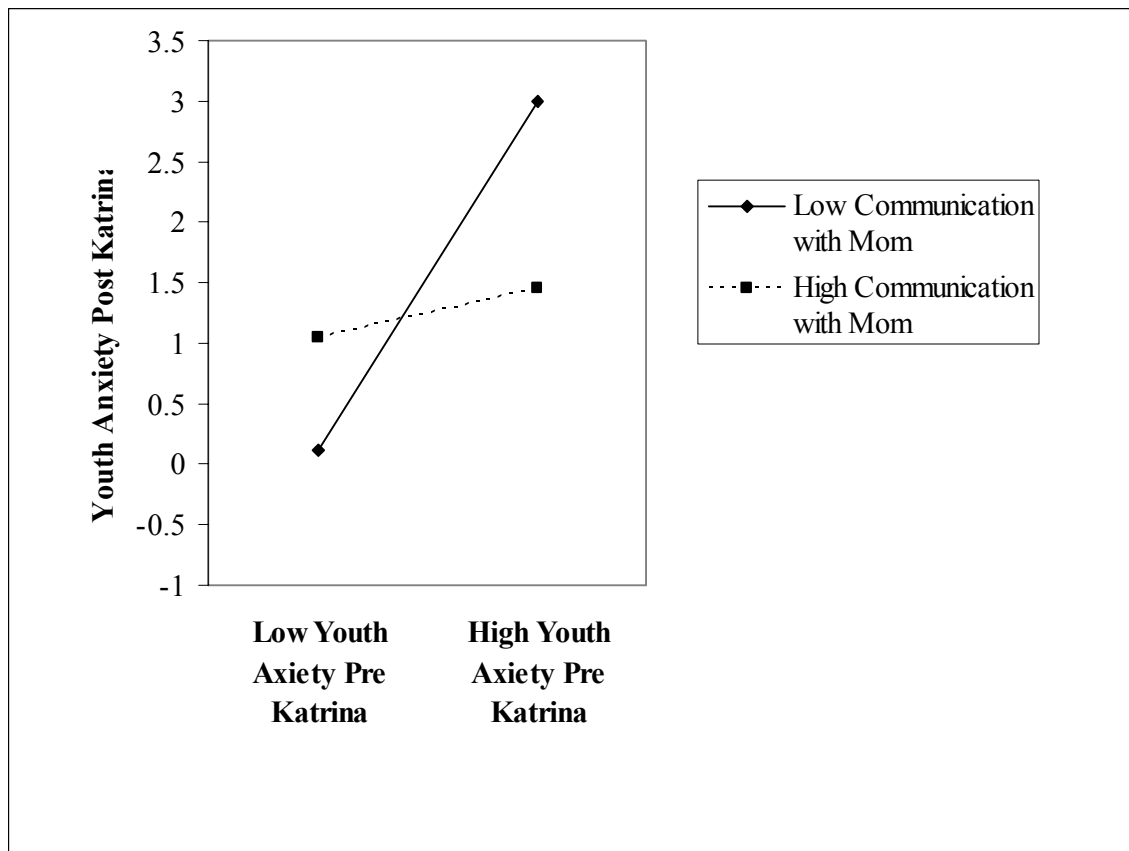
Communication with Mom. Youth anxiety post Katrina was the criterion variable and then age, gender, ethnicity, and family income were added into the model in the first step [change in $R^2 = .13$, F change (4, 74) = 2.14, $p = .09$]. Youth anxiety pre Katrina was entered into the second step [change in $R^2 = .20$, F change (1, 74) = 17.12, $p = .00$]. Youth IPPA Communication with Mom was entered in the third step [change in $R^2 = .03$, F change (1, 74) = 2.62, $p = .11$]. The interaction term (youth anxiety pre Katrina X IPPA Communication with Mom) was entered into the fourth and final step. The interaction term was significant [change in $R^2 = .14$, F change (1, 74) = 14.65, $p = .00$]. The interaction is presented in Figure 3. Relations between youth anxiety pre Katrina and youth anxiety post Katrina were then examined for youth at high and low levels of IPPA Communication with Mom using Holmbeck's (2002) procedure for testing the significance of the slopes for youth in the high and low groups. Among children with low IPPA Communication with Mom, youth anxiety pre Katrina was significantly related to youth anxiety post Katrina ($\beta = .96$, $p = .00$); however, among children with high IPPA Communication with Mom, youth anxiety pre Katrina was not significantly related to youth anxiety post Katrina ($\beta = .13$, $p = .34$). Overall, the slopes of the regression lines show that the model predicts that those with high anxiety and low communication with their mother pre Katrina will have the highest post Katrina anxiety.

Table 7. Regression Analyses Predicting Youth Post Katrina from Youth Pre Katrina Anxiety, IPPA Communication with Mom, and their Interaction

	<u>B</u>	β	t	p
Age	-.09	-.23	-1.84	.07
Gender	-.51	-.17	-1.64	.11
Ethnicity	.21	.13	1.10	.28
Income	-.01	-.01	-.08	.94
Youth Anxiety Pre Katrina	.57	.56	5.09	.00
IPPA Communication with Mom Pre Katrina	-.05	-.16	-1.52	.13
Youth Anxiety Pre Katrina X Communication Pre Katrina	-.10	-.38	-3.83	.00

Note: B is the unstandardized coefficient and β is the standardized coefficient

Figure 3. Slopes of Youth Anxiety Pre Katrina on Youth Anxiety Post Katrina as a Function of IPPA Communication with Mom



Note: Youth Anxiety Pre and Post Katrina scores are z-scores

Attachment Beliefs to Mom. Youth anxiety post Katrina was the criterion variable and then age, gender, ethnicity, and family income were added into the model in the first step [change in $R^2 = .12$, F change (4, 74) = 1.82, $p = .14$]. Youth anxiety pre Katrina was entered into the second step [change in $R^2 = .18$, F change (1, 74) = 13.45, $p = .00$]. Youth IPPA Attachment Beliefs to Mom were entered in the third step [change in $R^2 = .04$, F change (1, 74) = 2.94, $p = .09$]. The interaction term (youth anxiety pre Katrina X IPPA Attachment Beliefs to Mom) was entered into the fourth and final step. The interaction term was significant [change in $R^2 = .08$, F change (1, 74) = 6.62, $p = .01$]. The interaction is presented in Figure 4. Relations between youth anxiety pre Katrina and youth anxiety post Katrina were then examined for youth at high and low levels of IPPA Attachment Beliefs to Mom using Holmbeck's (2002) procedure for testing the significance of the slopes for youth in the high and low groups. Among children with low secure IPPA Attachment Beliefs to Mom, youth anxiety pre Katrina was significantly related to youth anxiety post Katrina ($\beta = .73$, $p = .00$); however, among children with high secure IPPA Attachment Beliefs to Mom, youth anxiety pre Katrina was not significantly related to youth anxiety post Katrina ($\beta = .19$, $p = .19$). Overall, the slopes of the regression lines show that the model predicts that those with high anxiety and low secure attachment beliefs to their mother pre Katrina will have the highest post Katrina anxiety.

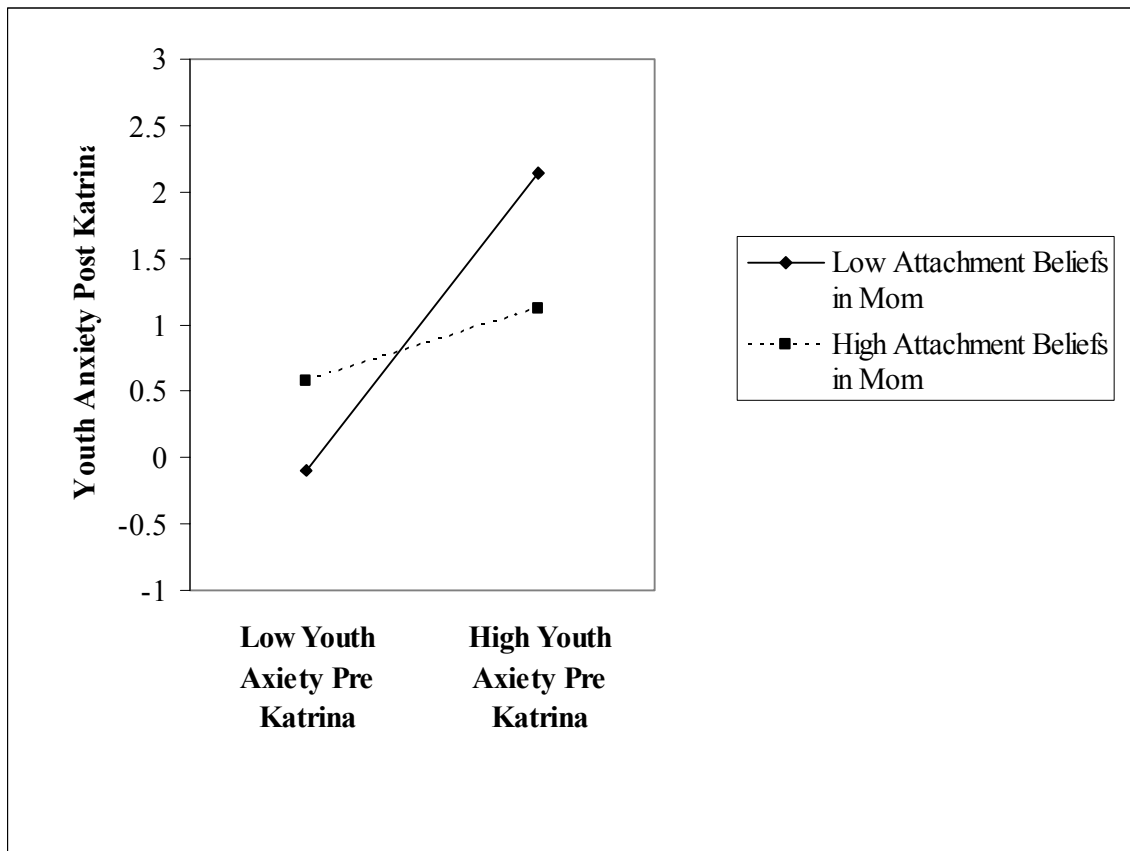
Hypothesis 3. Youth perceptions of parenting behaviors (acceptance, psychological control, firm control) would moderate the association between youth pre Katrina and post Katrina anxiety. Youth perceptions of acceptance and firm control yielded significant results. Youth perceptions of psychological control did not moderate the association between youth pre Katrina and post Katrina anxiety.

Table 8. Regression Analyses Predicting Youth Post Katrina from Youth Pre Katrina Anxiety, IPPA Attachment Beliefs to Mom, and their Interaction

	<u>B</u>	β	t	p
Age	-.07	-.18	-1.30	.20
Gender	-.42	-.14	-1.24	.22
Ethnicity	.27	.18	1.30	.20
Income	-.02	-.02	-.15	.88
Youth Anxiety Pre Katrina	.48	.46	3.87	.00
IPPA Attachment Beliefs to Mom Pre Katrina	-.01	-.12	-.98	.33
Youth Anxiety Pre Katrina X Attachment Beliefs Pre Katrina	-.02	-.29	-2.57	.01

Note: B is the unstandardized coefficient and β is the standardized coefficient

Figure 4. Slopes of Youth Anxiety Pre Katrina on Youth Anxiety Post Katrina as a Function of IPPA Attachment Beliefs to Mom



Note: Youth Anxiety Pre and Post Katrina scores are z-scores

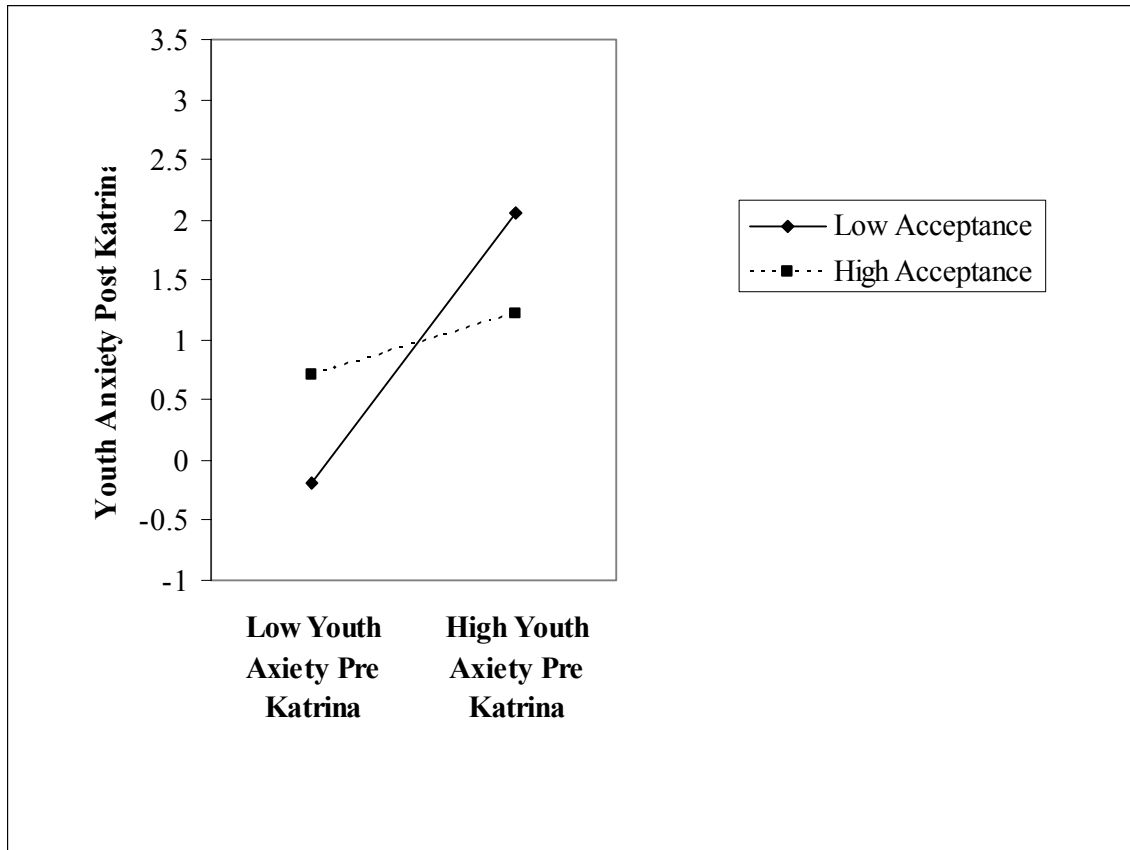
Acceptance. Youth anxiety post Katrina was the criterion variable and then age, gender, ethnicity, and family income were added into the model in the first step [change in $R^2 = .11$, F change (4, 74) = 1.67, $p = .17$]. Youth anxiety pre Katrina was entered into the second step [change in $R^2 = .21$, F change (1, 74) = 16.03, $p = .00$]. Youth CRPBI Acceptance was entered in the third step [change in $R^2 = .01$, F change (1, 74) = .75, $p = .39$]. The interaction term (youth anxiety pre Katrina X CRPBI Acceptance) was entered into the fourth and final step. The interaction term was significant [change in $R^2 = .09$, F change (1, 74) = 7.44, $p = .01$]. The interaction is presented in Figure 5. Relations between youth anxiety pre Katrina and youth anxiety post Katrina were then examined for youth at high and low levels of CRPBI Acceptance using Holmbeck's (2002) procedure for testing the significance of the slopes for youth in the high and low groups. Among children with low CRPBI Acceptance, youth anxiety pre Katrina was significantly related to youth anxiety post Katrina ($\beta = .76$, $p = .00$); however, among children with high CRPBI Acceptance, youth anxiety pre Katrina was not significantly related to youth anxiety post Katrina ($\beta = .18$, $p = .27$). The slopes of the regression lines show that the model predicts that those with high anxiety and low perceptions of acceptance pre Katrina will have the highest post Katrina anxiety.

Table 9. Regression Analyses Predicting Youth Post Katrina from Youth Pre Katrina Anxiety, CRPBI Acceptance, and their Interaction

	<u>B</u>	β	t	p
Age	-.09	-.21	-1.55	.13
Gender	-.35	-.12	-1.01	.32
Ethnicity	.18	.11	.85	.40
Income	.04	.06	.49	.67
Youth Anxiety Pre Katrina	.48	.47	4.02	.00
CRPBI Acceptance Pre Katrina	-.01	-.01	-.12	.90
Youth Anxiety Pre Katrina X Acceptance Pre Katrina	-.07	-.31	-2.73	.02

Note: B is the unstandardized coefficient and β is the standardized coefficient.

Figure 5. Slopes of Youth Anxiety Pre Katrina on Youth Anxiety Post Katrina as a Function of CRPBI Acceptance



Note: Youth Anxiety Pre and Post Katrina scores are z-scores

Firm Control. Youth anxiety post Katrina was the criterion variable and then age, gender, ethnicity, and family income were added into the model in the first step [change in $R^2 = .11$, F change (4, 74) = 1.67, $p = .17$]. Youth anxiety pre Katrina was entered into the second step [change in $R^2 = .21$, F change (1, 74) = 16.03, $p = .00$]. Youth CRPBI Firm Control was entered in the third step [change in $R^2 = .00$, F change (1, 74) = .01, $p = .94$]. The interaction term (youth anxiety pre Katrina X CRPBI Firm Control) was entered into the fourth and final step. The interaction term was significant [change in $R^2 = .05$, F change (1, 74) = 2.72, $p = .05$]. The interaction is presented in Figure 6. Relations between youth anxiety pre Katrina and youth anxiety post Katrina were then examined for youth at high and low levels of CRPBI Firm Control using Holmbeck's (2002) procedure for testing the significance of the slopes for youth in the high and low groups. Among children with high CRPBI Firm Control, youth anxiety pre Katrina was significantly related to youth anxiety post Katrina ($\beta = .73$, $p = .00$); however, among children with low CRPBI Firm Control, youth anxiety pre Katrina was not significantly related to youth anxiety post Katrina ($\beta = .16$, $p = .45$). The slopes of the regression lines show that the model predicts that those with high anxiety and high perceptions of firm control pre Katrina will have the highest post Katrina anxiety.

Hypothesis 4. Parental anxiety was expected to moderate the association between youth pre Katrina and post Katrina anxiety. However, parental anxiety did not moderate the association between youth pre Katrina and post Katrina anxiety.

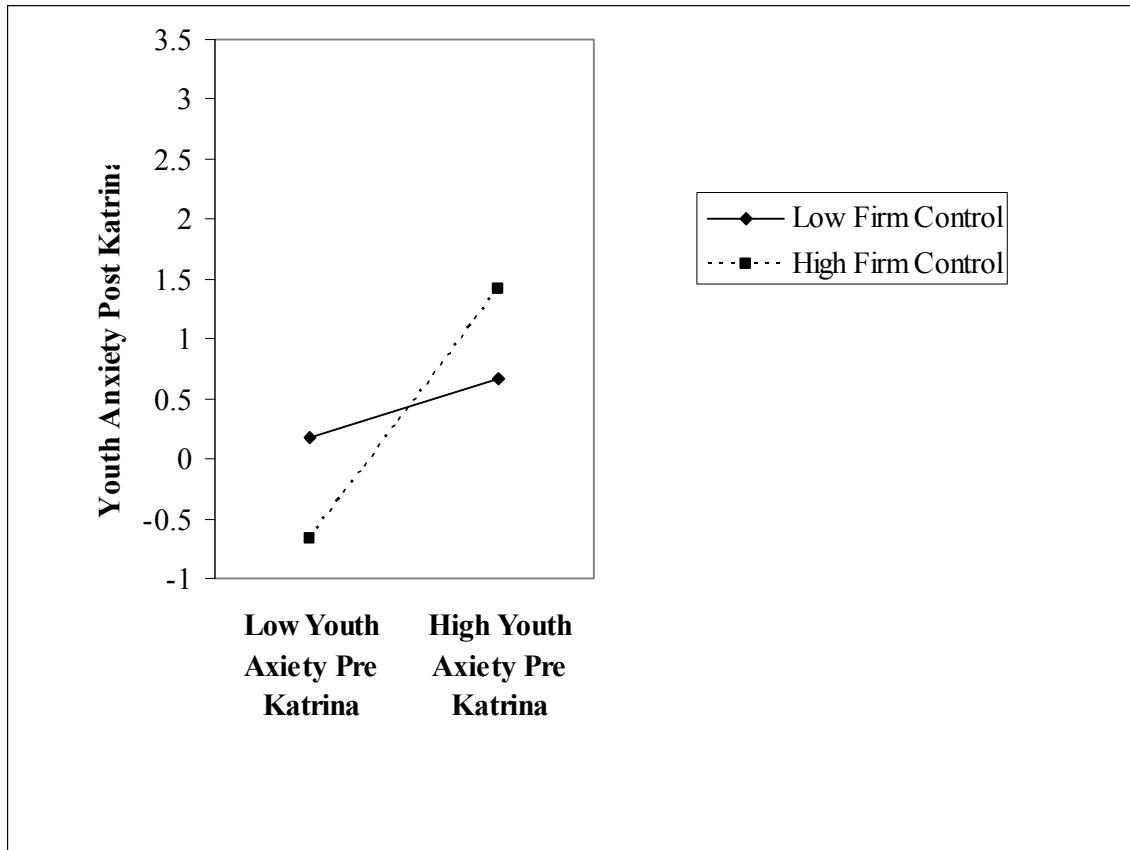
Hypothesis 5. Parental anxious attachment beliefs to their romantic partner did not moderate the association between youth pre Katrina and post Katrina anxiety. Parental avoidant attachment beliefs to their romantic partner did not moderate the association between youth pre Katrina and post Katrina anxiety.

Table 10. Regression Analyses Predicting Youth Post Katrina from Youth Pre Katrina Anxiety, CRPBI Firm Control, and their Interaction

	<u>B</u>	β	t	p
Age	-.07	-.17	-1.22	.23
Gender	-.13	-.04	-.34	.74
Ethnicity	.16	.10	.68	.50
Income	.05	.06	.42	.68
Youth Anxiety Pre Katrina	.45	.45	3.58	.00
CRPBI Firm Control Pre Katrina	.01	.02	.13	.90
Youth Anxiety Pre Katrina X Firm Control Pre Katrina	.08	.23	1.93	.06

Note: B is the unstandardized coefficient and β is the standardized coefficient.

Figure 6. Slopes of Youth Anxiety Pre Katrina on Youth Anxiety Post Katrina as a Function of CRPBI Firm Control



Note: Youth Anxiety Pre and Post Katrina scores are z-scores

Youth PTSD symptoms Post Katrina as the Criterion Variable

Hypothesis 2. Youth attachment beliefs (trust, communication, alienation, and full attachment beliefs score) to mother and father were expected to moderate the association between youth pre Katrina and post Katrina PTSD symptoms. None of the youth attachment belief subscales (trust, communication, alienation, and full attachment beliefs score) to mother or father were statistically significant.

Hypothesis 3. Youth perceptions of parenting behaviors (acceptance, psychological control, firm control) were expected to moderate the association between youth pre Katrina and post Katrina PTSD symptoms. No statistically significant interactions were found for youth perceptions of parenting behaviors.

Hypothesis 4. Parental anxiety pre Katrina was expected to moderate the association between youth pre Katrina and post Katrina PTSD symptoms; however, the results were not statistically significant.

Hypothesis 5. Parental anxious attachment beliefs to their romantic partner did not moderate the association between youth pre Katrina and post Katrina PTSD. Parental avoidant attachment beliefs to their romantic partner did not moderate the association between youth pre Katrina and post Katrina PTSD symptoms.

Supplemental Analyses

Supplemental analyses were conducted to investigate the role of: (1) age, (2) gender, and (3) ethnicity. These variables were investigated in three ways: (1) in terms of within group differences through the use of independent sample t-tests or Chi-squares, (2) in terms of their role on the association between youth pre and post Katrina anxiety and PTSD symptoms through the use of regression analyses, and (3) in terms of their interaction with the other variables pre

Katrina to effect youth's post Katrina anxiety and PTSD symptoms through the use of regressions.

Age

The sample was divided into 2 groups based on pre Katrina age: (1) 11 years old and younger and (2) 12 years old and older. These age groups were based on biological (i.e., pubertal) and cognitive changes (Marshall & Tanner, 1970; Piaget, 1983) that we reasoned might influence the hypothesized associations. Within group differences were evident and presented in Table 5. Age differences were demonstrated for youth anxiety post Katrina (parent report) in that parents reported more anxiety in children 11 years old and younger vs. children 12 years and older. Youth age pre Katrina did not significantly effect the association between youth pre and post Katrina anxiety or PTSD symptoms and did not interact with any of the other study's variables pre Katrina to affect youth post Katrina anxiety or PTSD symptoms.

Gender

Boys and girls differed on ECR Parental Anxious Attachment Beliefs [Mean difference = -0.477 , S.E. of the mean = $.23$; $t(74) = -2.11$, $p = .04$] and IPPA Alienation (Mom) [Mean difference = 2.207 , S.E. of the mean = $.96$; $t(74) = 2.29$, $p = .03$]. Girls and boys did not differ on anxiety or PTSD symptoms post Katrina. Youth gender pre Katrina did not significantly effect the association between youth pre and post Katrina anxiety or PTSD symptoms and did not interact with any of the other study's variables pre Katrina to affect youth post Katrina anxiety or PTSD symptoms

Table 11. Age Differences among Youth (11 years old & younger vs. 12 years old & older)

	N	Mean	S.D.	t	p
	Younger				
	Older				
Youth Anxiety Pre Katrina	33	.21	1.62	2.33	.02
IPPA Trust (Mom) Pre Katrina	34	-.60	1.14	2.15	.04
CRPBI Acceptance Pre Katrina	36	45.81	6.31	2.40	.02
CRPBI Psychological Control Pre Katrina	34	41.88	8.70	3.12	.00
Parental SCL-90 Anxiety Pre Katrina	37	26.92	3.27	3.91	.00
Parental ECR Anxious Attachment Beliefs Pre Katrina	31	16.03	3.98	2.69	.01
Parental ECR Avoidant Attachment Beliefs Pre Katrina	36	.17	.22	2.15	.04
Parent report of Traumatic Events Post Katrina	36	2.83	.87	2.01	.05
	37	2.30	.78		
	36	2.98	1.13		
	36	2.49	.78		
	37	11.32	3.15		
	37	10.03	2.34		

Youth Anxiety = Revised Child Anxiety and Depression Scales (Child & Parent Version combined), IPPA = Inventory of Parent and Peer Attachment, CRPBI = Children's Report of Parent Behaviors Inventory, SCL-90 = Symptom Checklist, ECR = Experiences in Close Relationships

Ethnicity

The sample was divided into Caucasian (N= 44) and African American (N= 23) because there were not enough Hispanic (N= 6), Asian (N= 1), or other (N = 1) families in the sample to run comparisons among all the races. Through the use of Chi-square statistics, differences between Caucasian and African American were found in three pre Katrina demographic variables: (1) father's education level [χ^2 , 4(N = 63) 10.24, $p < .05$], (2) marital status [χ^2 , 6(N =

67) 25.33, $p < .001$], and (3) family income [χ^2 , 5(N = 66) 23.65, $p < .001$]. Caucasian and African American youth differed on pre Katrina CRPBI Psychological Control [Mean difference = 3.97, S.E. of the mean = 1.59; $t(60) = 2.489$, $p = .02$]. Caucasian and African American youth did not differ on anxiety or PTSD symptoms post Katrina. Youth ethnicity did not significantly effect the association between youth pre and post Katrina anxiety or PTSD symptoms and did not interact with any of the other study's variables pre Katrina to affect youth post Katrina anxiety or PTSD symptoms.

Discussion

This study adds to the literature on natural disasters, such as hurricanes, by identifying pre-disaster functioning variables that moderate the association between youth anxiety pre Katrina and youth anxiety post Katrina. Results added incremental validity to the existing disaster research findings in that youth anxiety pre Katrina significantly predicted youth anxiety and PTSD symptoms post Katrina (Asarnow et al., 1999; Earls et al., 1988; La Greca et al., 1998; Lonigan et al., 1994; Nolen-Hoeksema, & Morrow, 1991; Weems et al., in press). The number of traumatic events was significantly related to youth PTSD symptoms post Katrina; however, the number of traumatic events experienced in Hurricane Katrina did not moderate the association between youth anxiety/PTSD symptoms pre Katrina and youth anxiety/PTSD symptoms post Katrina. Pre Katrina levels of trust, communication, and secure attachment beliefs to mothers moderated the association between youth pre Katrina and post Katrina anxiety. Pre Katrina perceptions of acceptance and firm control as reported by youth moderated the association between youth pre Katrina and post Katrina anxiety.

These above findings are consistent with the aspects of Sandler's (2001) model of adversity and La Greca and colleagues' (e.g., La Greca et al., 1996, 1998; La Greca & Silverman, 2006; Vernberg et al., 1996) model of predictors and moderators of disaster reactions that were focused on in the current study. Specifically, La Greca and colleagues (e.g., La Greca et al., 1996, 1998; La Greca & Silverman, 2006; Vernberg et al., 1996) *pre-existing characteristics of the child* category supported the theorizing and hypothesis regarding youth anxiety pre Katrina predicting youth anxiety post Katrina. Additionally, La Greca and colleagues' *aspects of the traumatic experience* category (i.e., level of exposure) supported the theorizing that youth PTSD symptoms post Katrina were related to youth report of the number of

traumatic experiences in Hurricane Katrina. Sandler's (2001) fourth need/goal, *a sense of social relatedness* and La Greca and colleagues' *characteristics of the post-disaster recovery environment* (i.e., availability of social support) category supported the theorizing and hypotheses that youth attachment beliefs and parenting behaviors moderate the association between youth pre Katrina and youth post Katrina anxiety.

Youth anxiety pre Katrina predicted the level of anxious and PTSD symptoms after Hurricane Katrina. This finding is consistent with previous research in the natural disaster literature. For example, La Greca et al. (1998) found that pre-exposure anxiety predicted PTSD symptoms both 3 and 7 months after exposure to Hurricane Andrew and Weems et al. (in press) demonstrated that youths' trait anxiety predicted PTSD symptoms. Given this finding, prevention efforts designed to mitigate the impact of natural disasters on youth may benefit from specifically considering youth with overall higher levels of anxiety before a disaster even occurs.

The number of traumatic events experienced in Hurricane Katrina was significantly related to youth PTSD symptoms post Katrina. However, the number of traumatic events did not moderate the association between youth pre and post Katrina anxiety or PTSD symptoms and did not interact with any of the other study's variables pre Katrina to affect youth post Katrina anxiety or PTSD symptoms. Possibly, of the participating families, higher income families may have facilitated easier evacuation. Hence, higher income children may have been exposed to fewer traumatic events. The majority of the sample that did not participate in the post-Katrina assessment had lower income levels, thereby potentially resulting in those families not having the resources to evacuate and deal with the effects of Hurricane Katrina. The number of traumatic events experienced in Hurricane Katrina did not moderate youth response should be interpreted with

caution given that families in the current study had higher incomes and therefore, may not be representative of the whole population that faced the hurricane.

Youths' levels of trust, communication, and secure attachment beliefs to their mother pre Katrina moderated the association between youth pre Katrina and post Katrina anxiety. This means that youth with higher levels of anxiety pre Katrina and *lower* levels of trust, communication, and secure attachment beliefs to their mother pre Katrina were at greatest risk for responding to a natural disaster, such as Hurricane Katrina, with increases in anxiety. This finding is consistent with Bromet et al. (1984) who found that supportive family communication strongly moderated the relationship between immediate post-disaster stress and children's psychopathology in families who experienced the Three Mile Island nuclear accident.

Vernberg and Varela's (2001) theorizing about parent-child attachment in the face of a trauma or disaster is supported by the above findings. For example, Vernberg and Varela (2001) describe youth as dependent on their parents for protection and security. After experiencing a trauma, this need for protection increases. Therefore, having caretakers who maintain or re-establish a sense of security and safety within the parent-child relationship following a traumatic experience is imperative. This sense of security and safety is a hallmark of the parent-child attachment relationship and may not be achieved without having trust and communication within the attachment relationship. Vogel and Vernberg (1993) note that even though attachment is thought to be primarily important for infants and younger children, after a disaster, it is likely to be just as important for older children. Secure parent-child attachments can serve as a buffer of the effects of a natural disaster. Prevention efforts designed to mitigate the impact of natural disasters on youths may benefit from specifically considering youth with insecure parent-child attachment relationships characterized by low levels of trust and communication.

In terms of youth perceptions of parenting behaviors, youths' perceptions of acceptance pre Katrina moderated the association between youth pre Katrina and post Katrina anxiety. Youth with higher levels of anxiety pre Katrina and *lower* levels of acceptance from their caregiver(s) are at greatest risk for responding to a natural disaster, such as Hurricane Katrina, with increases in anxiety. Lower levels of accepting parenting behaviors can be characterized by a *lack* of: (1) interactional warmth/responsiveness, (2) acceptance of children's feelings/behaviors, (3) active listening, (4) praising, and (5) emotional and behavioral involvement in children's lives and activities (e.g., Maccoby & Martin, 1983). These parenting behaviors do not demonstrate acceptance of their children's expressions of negative affect, in that they criticize and minimize their children's feelings and do not promote children's emotion regulation. Specifically, rejecting parenting behaviors do not grant children the opportunity to learn how to deal with and tolerate negative affect (Gottman, Katz, & Hooven, 1997). In the face of a natural disaster, not being able to express negative affect and ineffectively being able to regulate that negative affect can be very detrimental to youth and can result in disaster reactions characterized by anxiety and fear. Moreover, rejecting parenting behaviors can result in the inability of parents to provide an effective social support system to their child in response to Hurricane Katrina. Previous disaster research demonstrates that access to social support following the trauma regularly emerges as a significant predictor of recovery (Vernberg et al., 1996). Prevention efforts designed to mitigate the impact of natural disasters on youth may benefit from specifically considering youth who perceive their parents as being less accepting.

Youths' perceptions of firm control pre Katrina moderated the association between youth pre Katrina and post Katrina anxiety. Youth with higher levels of anxiety pre Katrina and *higher* perceptions of firm control from their caregiver(s) are at greatest risk for responding to a natural

disaster, such as Hurricane Katrina, with increases in anxiety. Firm controlling behaviors are parenting behaviors that are overly restrictive and protective of a child's behaviors and activities. In the face of a natural disaster, the consequences of firm controlling parenting behaviors can: (1) convey the perception of the continual presence of threat and danger and (2) prevent children from facing the disaster thereby, hindering children's ability to develop solutions to face the disaster, as well as successful coping mechanisms (Rapee, 1997; Vasey & Dadds, 2001; Vasey & Ollendick, 2000). Additionally, perceiving parent(s) as firm controlling can result in youth not feeling like they can use their parent as a source of social support in a time of crisis. The combination of the above consequences of perceptions of firm control can cause elevated anxiety after being exposed to a natural disaster such as Hurricane Katrina.

It is important to note that firm control, as measured in the current study, is different than other forms of control such as parental monitoring that have been found to have positive effects in youth (Brown et al., 1993; Patterson, Reid, & Dishion, 1992). Parental monitoring is defined as parental behaviors that involve attention to and tracking of a child's whereabouts, activities, and adaptations (Dishion & McMahon, 1998). Parental monitoring per se does not have a harsh or negative component in its definition or measurement, whereas firm control as measured in the current study is characterized in a harsher, negative type of control. Given this finding, prevention efforts designed to mitigate the impact of natural disasters on youths may benefit from specifically considering youth who perceive their parents as exhibiting harsh control.

Comparisons between older vs. younger, girls vs. boys, and Caucasian vs. African American revealed no significant differences on levels of anxiety or PTSD symptoms post Katrina, with the exception of parents reporting more anxiety post Katrina in children 11 years old and younger vs. children 12 years and older. Furthermore, age, gender, and ethnicity did not

significantly effect the association between youth pre and post Katrina anxiety or PTSD symptoms and did not interact with any of the other study's variables pre Katrina to affect youth post Katrina anxiety or PTSD symptoms.

Findings regarding age are consistent with previous research in this area in that some studies demonstrate differences (Lonigan et al., 1991 and Shannon et al., 1994), whereas others do not (Earls et al., 1988; Green et al., 1991). In terms of gender differences, girls often report more distress than boys following disasters, the effect sizes are small (La Greca & Silverman, in press; Vernberg et al., 1996). The lack of significant differences between girls and boys in the current study should be interpreted with caution given the small sample size. The findings regarding ethnicity are inconsistent with studies by Lonigan et al. (1991) and Shannon et al. (1994), who found that African American youth reported higher levels of PTSD symptoms following Hurricane Hugo than either Caucasian or other minority youth. However, this finding is consistent with studies by Earls et al. (1988) and Green et al. (1991). A possible reason for this finding is that the majority of the current study's sample had higher income levels than those who did not participate in the post Katrina assessment. Regardless of race, having a higher family income may provide the current study's families with more resources and opportunities to deal with the effects of Hurricane Katrina.

Limitations

The main limitation of the current study is the sample. The families that were recruited for the study may not have been representative of the whole community given that the families in the current study tended to have higher income levels. Having a higher income level affords you resources and abilities that other families with lower income levels may not receive. It is important to note that even though these families had higher income levels, their response to

Hurricane Katrina was similar to the responses demonstrated throughout the disaster literature. However, the full scope of responses to Hurricane Katrina may not have been captured in the current study given that it is quite possible that the families who were not able to be located after the hurricane may have been in the greatest danger during and after the storm. Caution should be used in drawing too wide of a generalization from the findings.

The current study is also limited by its sample size. Because the power to detect significant effects was low in this study, results of no significant findings should be interpreted with caution. In addition, the small sample size precluded conducting more complex analyses (e.g., structural equation modeling) to tease out the relative contribution of the predictors to the various outcome variables. The sample size limited the further testing of the moderational results, in that mean differences were not able to be tested due to the sample size. In addition, some of the study's pre-disaster functioning variables relied solely on youths' self-reports (i.e., IPPA and CRPBI). It might be the case that reports from other sources (i.e., parents) would result in additional information about the pre-disaster functioning variables. Another limitation of the present study concerns the clinical severity of youths' symptoms, which could have been ascertained by using a DSM-IV Axis V domain measure. Unfortunately, most studies in the child trauma literature do not report these data and rely on anxiety levels or PTSD symptom level counts, as does the present study. An additional limitation of this study is that we had little control over the post-disaster time frames examined. The extent of devastation made reassessment of youths immediately following Hurricane Katrina impossible. Data collected in various time frames following the storm could have helped clarify the temporal associations of youths' symptom reactions.

Strengths and Future Directions

One of the main strengths of the current study is the identification of pre-disaster functioning variables that predict or moderate youth response to natural disasters, such as Hurricane Katrina. As described above, youth anxiety pre-Katrina predicted youth anxiety and PTSD symptoms post-Katrina. Moreover, youths' level of trust, communication, secure attachment beliefs, and perceptions of acceptance and firm control pre-Katrina moderated the association between youth pre Katrina anxiety and youth post Katrina anxiety. These findings have significant implications for disaster prevention and intervention efforts with youth. Vernberg and Vogel (1993) recognize the need for a better understanding of how to respond to the psychological needs of children and families following natural disasters (i.e., intervention efforts). However, it may be more imperative to focus on prevention efforts, specifically targeting pre-disaster functioning variables implicated by the current study. This notion is supported by the literature in that the clinical importance of identifying targets for prevention is highlighted by the growing realization that response to trauma is not one-dimensional and that some interventions not only are ineffective but may be detrimental (McNally, Bryant, & Ehlers, 2003). Moreover, the majority of existing prevention efforts in response to a disaster focus on the physical versus the psychological needs of the community (Lebedun & Wilson, 1989). Although preventions focusing on physical needs are highly important, what the current study highlights is that prevention efforts may be more effective if they included a focus on the psychological needs of the community, in particular, youth.

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Appendix A. Approval for the Use of Human Subjects

**University Committee for the Protection
of Human Subjects in Research**

University of New Orleans

Campus Correspondence

Dr. Carl Weems
GP 2001

April 24, 2007

RE: Assessing child anxiety disorder symptoms and mechanisms

IRB# 05JAN02

Your requested changes/additions to your project have been approved. Thank you for keeping the IRB apprised of your activities.

Please remember that approval is only valid for one year from the approval date. Any additional changes to the procedures or protocols must be reviewed and approved by the IRB prior to implementation. Use the IRB number listed on this letter in all future correspondence regarding this proposal.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best of luck with your project!
Sincerely,

Laura Scaramella, Ph.D.
Chair, University Committee for the Protection of Human Subjects in Research

Vita

Natalie Costa was born in New Orleans, LA and received her B.A. in Sociology (minor in Psychology) from the University of New Orleans in December 2001. She was awarded the S. Thomas Elder Most Promising Undergraduate researcher award in April 2002. In 2002, she began the Applied Developmental Psychology Doctoral Program at the University of New Orleans. From 2002-2007, she conducted research with Dr. Carl F. Weems in the Youth and Family Stress, Phobia, and Anxiety Laboratory. Her specific research interests involve investigating the role of parent-child interactions, parenting behaviors, and attachment on the association between parental and child anxiety. In April 2005, she was awarded the Andrew S. Wensel Distinguished Graduate Student Award. The American Psychological Foundation awarded her the Elizabeth Munsterberg Koppitz Child Psychology Graduate Fellowship to conduct her dissertation research. After receiving her doctorate, she will be working as a Post Doctoral Fellow at Virginia Tech University with Dr. Thomas Ollendick. She plans on continuing her line of research and eventually working in academia.