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A comparison of the DSM-IV and proposed DSM-V PTSD criteria for youth: factor analyses conducted with a low socioeconomic status, hurricane-exposed sample

Valerie Paasch
Louisiana State University and Agricultural and Mechanical College

A COMPARISON OF THE DSM-IV AND PROPOSED DSM-V PTSD CRITERIA FOR YOUTH: FACTOR ANALYSES CONDUCTED WITH A LOW SOCIOECONOMIC STATUS, HURRICANE-EXPOSED SAMPLE

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Valerie Paasch
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M.A., Louisiana State University, 2007
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Abstract

Hurricane Katrina destroyed much of New Orleans, exposing residents to dangerous storms and significant flooding which resulted in the loss of many families' homes and possessions. One of the most common psychological disorders experienced by disaster victims, both adult and child, is Posttraumatic Stress Disorder (PTSD). Given the debate over the appropriateness of applying adult *DSM-IV-TR* criteria to children and the current formulation of *DSM-V* criteria, this study further explored the presentation of PTSD symptomatology in a sample of 276 youth who experienced Hurricane Katrina. Proposed *DSM-V* criteria were assessed with participant responses on the UCLA PTSD Index for DSM-IV and the Behavioral Assessment System for Children, Second Edition (BASC-2). Both symptom endorsement and PTSD factor structure (i.e. diagnostic clusters) were assessed. Findings indicated similar PTSD prevalence rates when comparing *DSM-IV* and proposed *DSM-V* diagnostic criteria. Based on confirmatory factor analysis findings, current *DSM-IV-TR* factor structure (i.e. diagnostic cluster presentation) was not found to be appropriate for this sample. Although a newly generated model and the proposed *DSM-V* model produced some indicators of acceptability for this sample, none of the tested models provided a consistently good fit. Finally, it was found that based on proposed *DSM-V* diagnostic criteria, PTSD symptoms significantly decreased over time (from 4-7 months post-hurricane to 25-28 months post-hurricane). Results of the analyses and a description of symptom endorsement are discussed in light of the developmental appropriateness of PTSD diagnostic criteria in youth and the implications for *DSM-V*.

Introduction

"Unlike other forms of trauma, a disaster is a public event that directly impacts on multiple individuals and families" (Saylor, Belter, & Stokes, 1997, p. 362). Natural disasters, such as hurricanes, earthquakes, floods, and tornadoes, result in a variety of stressors which can include destruction of a family's home, disruption of daily routines, community displacement and psychological distress (Silverman & La Greca, 2002; Terr, 1991). One of the most common psychological disorders experienced by disaster victims, both adult and child, is Posttraumatic Stress Disorder (PTSD; Blaze & Shwalb, 2009; LaGreca & Prinstein, 2002; Norris, 1992; Roberts, Mitchell, Witman, & Taffro, 2009; Terranova, Boxer, & Morris, 2009). The purpose of this study is to evaluate the current factor structure of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision* (*DSM-IV-TR*; American Psychiatric Association; APA, 2000) and the revised factor structure proposed by *DSM-V(*APA, 2010) as measured by the University of California at Los Angeles (UCLA) PTSD Index for DSM-IV (Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998) in a sample of Hurricane Katrina-exposed youth. Many victims of Hurricane Katrina were minority children of low socioeconomic status with remarkable levels of violence exposure prior to the hurricane. Previous studies have linked these variables to higher rates of PTSD (Fincham, Korthals Altes, Stein, & Seedat, 2009; Flannery, Singer, & Wester, 2001; Flannery, Wester, & Singer, 2004; Ginexi, Weihs, Simmens, & Hoyt, 2000La Greca, Silverman, Vernberg, & Prinstein, 1996; La Greca, Silverman, & Wasserstein,1998; Norris, Friedman, Watson, Byrne, Diaz, & Kaniasty, 2002; Terranova et al., 2009) indicating that this is a unique sample of youth in which to study PTSD symptom presentation. Given the debate over the appropriateness of applying adult *DSM-IV-TR* (APA , 2000) criteria to diagnose PTSD in children (Anthony, Lonigan, Vernberg, La

Greca, Silverman, & Prinstein, 2005; Ford, Elhai, Ruggiero, & Freuh, 2009; Lonigan, Phillips, & Richey, 2003; Pynoos, Goenjian, Tashjian, Karakashian, Manjikian, Manoukian, …Fairbanks 1993; Sack, Seeley, & Clarke, 1997) and the current formulation of *DSM-V* criteria (APA, 2010), this sample provides the opportunity to further explore the presentation of PTSD symptomatology in youth. This study reviews the literature on symptoms, assessment, and predictors of PTSD; the impact of Hurricane Katrina on the development of PTSD symptoms; and the developmental appropriateness of current *DSM-IV* symptom clusters; and the developmental appropriateness of proposed *DSM-V* symptom clusters and criteria for diagnosing PTSD in youth.

Hurricane Katrina

On August 29th, 2005, Hurricane Katrina, a category four storm, made landfall in Alabama, Mississippi and Louisiana, resulting in the third deadliest hurricane and one of the most costly natural disasters in United States (U.S.) history (U.S. Department of Homeland Security, 2006). The hurricane-force winds and flooding resulting from levy system breaks caused extensive financial damage, over 1600 deaths, and the evacuation of the majority of the New Orleans Metropolitan area (U.S. Census Bureau, 2006). Media news highlighted crime, theft, assault, and looting (Nossiter, 2005) as many individuals were separated from family members and taken via bus or airplane to various cities throughout the country (Gabe, Falk, McCarty, & Mason, 2005; U.S. Department of Homeland Security, 2006). The Census Bureau estimated that by December 2005, 500,000 individuals had been displaced, with approximately 160,000 of those under the age of 18 (U.S. Census Bureau, 2005) indicating that a significant number of families experienced the stress of losing homes, possessions, schools, and support systems (Froomkin, 2007). Prior to the storm, approximately 25% of Orleans Parish citizens

were at or below the poverty level (U.S. Census Bureau, 2004) with a median family income that is two thirds of the national average (U.S. Census Bureau, 2005), and 67.9% were African American (U.S. Census Bureau, 2004). Specifically, African Americans in New Orleans had a 35% poverty rate, which was the highest among large U.S. cities (U.S. Census Bureau, 2000), indicating that some of the most impacted by the storm were low income minority families who lacked the financial resources to rebuild the hurricane-induced damage. Although New Orleans suffered the most extensive damage in Louisiana, neighboring parishes felt the storm's effects as media images and displaced citizens flooded into cities.

PTSD Definition and Symptoms

PTSD is an anxiety disorder that may develop following exposure to a traumatic event during which physical harm or life-threat occurs. The definition of and criteria for PTSD have evolved with each edition of the *DSM* to reflect the field's growing understanding of this disorder. The *DSM-III* was the first edition to include the diagnosis of PTSD, defining it as a normal reaction to the abnormal circumstances of experiencing a traumatic event (APA, 1980). At that time, PTSD was primarily diagnosed in veterans who reported intense arousal and vivid war-related images or "flashbacks" (APA, 1980). Prior to the *DSM-III* (APA, 1980) little attention was given to identifying PTSD in children (Fletcher, 2003), and child-specific diagnostic criteria were not included until the *DSM-III-R* in 1987 (APA, 1987). No changes were made to diagnostic criteria between *DSM-IV and DSM-IV-TR.*

DSM-IV-TR's current definition of PTSD, including specifications made for diagnosing youth, is listed in Table 1. In addition to the requirement of experiencing a traumatic event (Criteria A1 and A2), a diagnosis of PTSD is based on five additional criteria including the presence of specific experienced symptom clusters: Recurrent thoughts and experiences

(Criterion B); avoidance or numbing (Criterion C); and increased arousal (Criterion D; See Table 1 for a list of specific symptoms). These symptoms must be present for at least 1 month (Criterion E) and must cause significant impairment in daily functioning (Criterion F; APA, 2000). The DSM also includes three specifiers for the diagnosis, saying that onset may be acute (present between 1-3 months), chronic (present greater than 3 months), or delayed (when a minimum of 6 months passes between the trauma and PTSD symptoms.

Table 1. *DSM-IV-TR* Diagnostic Criteria (A-D) for PTSD

Criterion A:

The person has been exposed to a traumatic event in which both of the following were present:

1. The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others.
2. The person's response involved intense fear, helplessness or horror. Note: In children, this may be expressed instead by disorganized or agitated behavior.

Criterion B:

The traumatic event is persistently reexperienced in one (or more) of the following ways:

1. Recurrent and intrusive distressing recollections of the event, including thoughts, images or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
2. Recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognizable content.
3. Acting or feeling as if the traumatic event were recurring. In young children, trauma-specific reenactment may occur.
4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
5. Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

Criterion C:

Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:

1. Effort to avoid thoughts, feelings or conversations associated with the trauma
2. Efforts to avoid activities, places, or people that arouse recollections of the trauma
3. Inability to recall an important aspect of the trauma
4. Markedly diminished interest or participation in significant activities
5. Feeling of detachment or estrangement from others
6. Restricted range of affect
7. Sense of a foreshortened future

(Table 1 cont.)
Criterion D:
Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:

1. Difficulty falling or staying asleep
2. Irritability or outbursts of anger
3. Difficulty concentrating
4. Hypervigilance
5. Exaggerated startle response

* According to the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (APA, 2000).

Childhood presentations of PTSD vary greatly depending on the age and developmental level of the child. For example, children under age five tend to display regressive behavior (Davidson & Smith, 1990; Laor, Wolmer, Mayes, Golomb, 1996; Osofsky, 1995) and may have trouble separating from their parents (Terr, 1991). School-aged children may display inattention, decline in school work, anxiety, depression, or withdrawal (Garbarino, 1991; Nader, Pynoos, Fairbanks, & Frederick, 1990; Terr, Bloch, Michel, Shi, Reinhardt, & Metayer, 1999). Adolescents display more "adult-like" responses to trauma including intrusive thoughts, hypervigilance, emotional numbing, sleep disturbances and nightmares, avoidance, substance abuse, or depression (Giaconia, Reinherz, Silverman, Pakiz, Frost, & Cohen, 1995; Realmuto, Matsen, Carole, Hubbard, Groteluschen, & Chun, 1992; Weisenberg, Schwartzwald, Waysman, Solomon, & Klingman, 1993). Many studies have found that for children, re-experiencing is the most commonly reported symptom of PTSD (Carrion, Weems, Ray, & Reiss, 2002; LaGreca et al., 1996), and in young children this symptom may be manifested by trauma-themed repetitive play (LaGreca et al., 1996; Russoniello, Skalko, O'Brien, McGhee, Bringham-Alexander, & Beatly, 2002). In addition to traditional symptoms, it is also possible for children to experience diminished hope about the future as well as physical symptoms, such as stomachaches and headaches (APA, 2000) or difficulties with concentration or schoolwork (Pane, McCafferry, Kalra, & Zhou, 2008; Rust & Troupe, 1991; Ward, Shelley, Kaase, & Pane, 2008).

Proposed Revisions for DSM-V

DSM-V, currently scheduled for distribution in 2013 (APA, 2010), attempts to address many flaws with *DSM-IV-TR's* current PTSD diagnostic criteria. *DSM-V's* most recently proposed criteria for diagnosing PTSD, including specifications made for diagnosing youth and proposed developmental considerations still under review, are listed in Table 2. In addition to the requirement of experiencing a traumatic event (Criteria A), the revised diagnosis of PTSD is based on six additional criteria including the presence of specific experienced symptom clusters: Intrusion (Criterion B); avoidance (Criterion C); negative cognitions (Criterion D); and increased arousal (Criterion E; See Table 2 for a list of specific proposed symptoms). These symptoms must be present for at least 1 month (Criterion F) and must cause significant impairment in daily functioning (Criterion G; APA, 2010).

The proposed *DSM-V* revision of PTSD criteria amends the definition of what constitutes a "trauma." Additionally, the proposed criteria make an effort to be more culturally sensitive and to provide more operational definitions and descriptors of what specific symptoms criteria represent. Additionally, new symptom criteria and new symptom clusters were also included to increase diagnostic specificity. Table 2 includes a complete list of changes incorporated into the proposed *DSM-V* criteria, although the APA acknowledges that many developmentally-appropriate alternatives are still being considered for youth (APA, 2010).

Table 2: Proposed *DSM-V* Criteria for PTSD and Changes from *DSM-IV*

Proposed *DSM-V* Criteria		Changes from *DSM-IV*
Criteria A:	The person was exposed to the following event(s): death or threatened death, actual or threatened serious injury, or actual or threatened sexual violation, in one or more of the following ways:** 1. Experiencing the event(s) him/herself 2. Witnessing the event(s) as they occurred to	1. Criteria A1 better distinguishes between traumatic and distressing events. 2. *DSM-IV* Criteria

(Table 2 cont.)	others 3. Learning that the event(s) occurred to a close relative or close friend 4. Experiencing repeated or extreme exposure to aversive details of the event(s) Note: Witnessing or exposure to aversive details does not include events that are witnessed only in electronic media, television, movies or pictures, unless this is part of a person's vocational role. Exposure to aversive details of death applies only to unnatural death.	A2 had no utility and was eliminated.
Criteria B:	Intrusion symptoms that are associated with the traumatic event(s) (that began after the traumatic event(s)), as evidenced by one or more of the following: 1. Spontaneous or cued recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). Note: In children, repetitive play may occur in which themes or aspects of the traumatic event are expressed. 2. Recurrent distressing dreams in which the content and/or affect of the dream is related to the event(s). Note: In children, there may be frightening dreams without recognizable content. *** 3. Dissociative reactions (e.g. flashbacks) in which the individual feels or acts as of the traumatic event(s) were recurring. Note: In children, trauma-specific reenactment may occur in play. 4. Intense of prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s) 5. Marked physiological reactions to reminders of the traumatic event(s)	1. Criterion B1: Better discriminates distressing memories from ruminations. 2. Criterion B2: More applicability across cultures 3. Criterion B3: Clarifies that flashbacks are dissociative experiences 4. Criterion B4 & B5: Minor to no changes
Criteria C:	Persistent avoidance of stimuli associated with the traumatic event(s) (that began after the traumatic event(s)) as evidenced by efforts to avoid 1 or more of the following: 1. Avoids internal reminders (thoughts, feelings, or physical sensations) that arouse recollections of the traumatic event(s). 2. Avoids external reminders (people, places,	1. Criteria C1: Mostly unchanged. Exclusive focus on avoidance of subjective reactions. 2. Criteria C2:

(Table 2 cont.)	conversations, activities, objects, situations) that arouse recollections of the traumatic event.	Mostly unchanged.
Criteria D:	Negative alterations in cognitions and mood that are associated with the traumatic event(s) (that began after or worsened after the traumatic event(s)), as evidenced by 3 or more of the following: Note: In children, as evidenced by 2 or more of the following: **** 1. Inability to remember an important aspect of the traumatic event(s) 2. Persistent and exaggerated negative expectations about one's self, others, or the world 3. Persistent distorted blame of self or others about the cause or consequences of the traumatic event(s). 4. Pervasive negative emotional state. 5. Markedly diminished interest or participation in significant activities. 6. Feeling of detachment or estrangement from others. 7. Persistent inability to experience positive emotions	1. New diagnostic cluster dividing *DSM-IV* Cluster C. 2. Criteria D1: More specific mention of psychogenic amnesia. 3. Criteria D2: Expanded explanation of fore-shortened future as negative expectations about self, others, and future. More cultural sensitivity. 4. Criteria D3: New. Focus on blame for traumatic event. 5. Criteria D4: New. Expands upon negative emotional states. 6. Criteria D5-D7: Unchanged.
Criteria E:	Alterations in arousal and reactivity that are associated with the traumatic event(s) (that began or worsened after the traumatic event(s)), as evidenced by 3 or more of the following: Note: In children, as evidenced by two or more of the following: **** 1. Irritable, angry, or aggressive behaviors 2. Reckless or self-destructive behavior 3. Hypervigilance 4. Exaggerated startle response 5. Problems with concentration 6. Sleep disturbance- for example, difficulty falling or staying asleep, or restless sleep 7.	1. Criteria E1: Focus on aggressive behavior. 2. Criteria E2: New. Focus on reckless or self-destructive behavior. 3. Criteria E3-E6: Unchanged.
Criteria F:	Duration of the disturbance (symptoms in Criteria B, C, D, and E) is more than one month.	1. Unchanged.

(Table 2 cont.)		
Criteria G:	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.	1. Unchanged.
Additional Comments & Considerations:	*Developmental manifestations of PTSD are still being developed. The term "developmental manifestation" in DSM-IV refers to age-specific expressions of one or another criteria that is used to make a diagnosis across age groups. ** For children, inclusion of loss of a parent or other attachment figure is being considered. *** An alternative is to retain DSM-IV criteria. ****The optimal number of required symptoms for both adults and children will be further examined with empirical data.	

*Note: According to www.dsm5.org (APA, 2010).

Assessment of PTSD in Youth

There is no "gold standard" in diagnosing PTSD in children (Cohen, 1998). Children have been found to be more reliable informants of internalizing symptoms parents or teachers as parents and teachers generally underestimate distress and fear while over-reporting behavioral symptoms experienced by child survivors of disasters (Earls, Smith, Reich, & Jung, 1988; Nader & Pynoos, 1989). Therefore, the typical assessment of PTSD in children involves more emphasis on self-report measures, with less emphasis placed on caregiver-completed measures. With age-appropriate means, even young children are capable of giving accounts of their experiences and reporting their personal levels of distress (Misch, Philips, Evans & Berelowitz, 1993). A variety of measures, including both structured interviews (Kaufman, Birmaher, Brent, Rao, Flynn, Moreci, Williamson, & Ryan, 1997; Lonigan et al., 2003; Nader, Kriegler, Blake, & Pynoos, 1994; Silverman & Albano, 1996) and self-report questionnaires (Briere, 1996;

Frederick, Pynoos, & Nader, 1992; Foa, Johnson, Feeny, & Treadwell, 2001; Pynoos et al., 1998), have been used to assess PTSD in children.

Current PTSD Prevalence, Course, and Associated Symptoms in Youth

A classic meta-analysis (Fletcher, 1994) of 2,697 children from 34 samples, found that an average of 36% of children, as composed to only 24% of adults (described in Kilpatrick & Resnick, 1993; and Smith & North, 1993) exposed to traumatic events are diagnosed with PTSD. More recent studies have estimated community PTSD prevalence rates to be between 5.2 to 8.8% for lifetime prevalence and 3.2 to 5.7% for prevalence in the past six months in adolescents (Ford et al., 2009). Studies examining child responses to a single-occurrence, non-abusive stressor find that PTSD symptoms peak within the first year of trauma (Becker, Weine, Vojvoda, & McGlashan 1999; Pfefferbaum, Gurwitch, McDonald, Leftwich, Sconzo, Messenbaugh, & Schultz, 2000) although many youth are symptomatic years later (Green, Grace, Vary, Kramer, Gleser, & Leonard, 1994; Green, Korol, Grace, Vary, Leonard, & Glesser, 1991; Hizli, Taskintuna, Isikli, Kilic, & Zileli, 2009; Tyano, Iancu, Solomon, Sever, Goldstein, Touviana, & Bleich, 1996; Yule, Bolton, Udwin, Boyle, O'Ryan, & Nurrish, 2000). A study by Yule et al. (2000) following the sinking of the ship *Jupiter* found that of the 111 youth participants who developed PTSD, the disorder was present for less than 1 year in 30.1%, 1-2 years for 16.4%, 2-3 years for 12.6%, 3-5 years in 14.4%, and greater than 5 years for 26.1% of respondents, indicating a variable prognosis for youth with PTSD. Typically the most endorsed symptoms in children occur in Criterion B (reexperiencing the trauma) including: feeling or showing distress at reminders of the trauma (51%); reenactment of significant parts of the event (40%); feeling as if the event were being relived (39%); and intrusive memories of the events (34%) (Fletcher, 1994). Additional symptoms with high endorsement rates included: affective numbing (Criterion

C; 47%); loss of interest in previously important activities (Criterion C; 36%); avoidance of reminders of the event (Criterion C; 32%), and difficulty concentrating (Criterion D; 41%) (Fletcher, 1994). This indicates that symptoms from Criterion D are far less common in children than symptoms from other clusters. Therefore, this information on symptom presentation must be considered when evaluating the developmental accuracy of proposed *DSM-V* diagnostic criteria.

A variety of psychological disorders and symptoms are also frequently comorbid with PTSD diagnoses in children. It has been suggested that multiple components of psychological distress, such as specific fear/phobias (Dollinger, O'Donnell, & Staley, 1984), general anxiety (Asarnow, 1999; Costa, Weems, & Pina, 2009; La Greca et al., 1998; Pina, Villalta, Ortiz, Gottschall, Costa, &Weems, 2008), depression (Asarnow, 1999; Nolen-Hoeksema & Morrow, 1991; Papadatos, Nikou, & Potamianos, 1990; Suliman, Mkabile, Finchaam, Ahmed, Stein, & Seedt, 2009; Vigil & Geary, 2008), and externalizing features of inattention, behavioral problems, conduct problems and disruptive behavior (Belter, Dunn, & Jeney, 1991; La Greca et al., 1998; Marsee, 2008; Shaw, Applegate, Tanner, Perez, Rothe, Campo-Bowen, et al., 1995; Vigna, Hernandez, and Kelley, 2009) are present in children post-trauma. Additionally, youth may display a decline in school performance (Lonigan, Shannon, Finch, Daugherty, & Taylor., 1991; Lonigan Shannon, Taylor, Finch, & Sallee, 1994; Pane et al., 2008; Vincent, La Greca, Silverman, Wasserstein, & Prinstein, 1994; Ward et al., 2009) and peer adjustment difficulties (Asarnow, 1999) following a trauma. Given the prevalence of comorbidity, *DSM-V* must make an effort to increase diagnostic specificity and sensitivity in order to most accurately capture the prevalence of PTSD.

Predictors of PTSD and Symptom Expression in Youth

Numerous studies have examined variables that may predict a diagnosis of or exacerbate symptoms of PTSD. LaGreca and colleagues (1996) identified four broad categories impacting post-disaster psychological outcome in youth. These categories are: 1) elements of traumatic exposure (i.e. life threat, loss, disruption); 2) preexisting characteristics of the child (i.e. demographic variables and pre-disaster functioning); 3) characteristics of the post-disaster recovery environment (i.e. social support, stressors, major life events); and 4) the child's psychological resources (i.e. coping skills).

Elements of Traumatic Exposure. Perceived life threat appears to be key in the development of PTSD symptoms in children, with higher threat perception related to higher endorsement of PTSD symptoms (Green et al., 1991; La Greca et al. 1996, 1998; Lonigan et al., 1991). Close proximity to the traumatic event is also associated with more severe reactions (La Greca et al., 1996; Lengua, Long, Smith, & Meltzoff, 2005; Pynoos & Nader, 1988), as are financial loss, exposure duration, perceived safety, degree of injury, and loss of loved ones (Allwood, Bell-Dolan, & Husain, 2002; Blaze & Shwalb, 2009; Lonigan et al., 1991; March, Amaya-Jackson,Terry, & Costanzo, 1997; Weems, Pina, Costa, Watts, Taylor, & Cannon, 2007; Yule et al., 2000). Displacements from school and home, loss of personal possessions, and disruption of family routines have been identified as contributors to PTSD symptoms (Blaze & Shwalb, 2009; La Greca et al., 1996; Vernberg, La Greca, Silverman, & Prinstein,1996). Many children report feelings of distress following a traumatic event (Fletcher, 1994) and the amount of fear experienced during exposure to negative stressors has been associated with the level of posttraumatic stress (Rossman, Bingham, & Emde, 1997; Terranova, Boxer, & Morris, 2009). Traumatic events that are ongoing or chronic tend to result in more severe outcomes than short,

non-abusive events (Terr, 1991) and events that are perceived as uncontrollable tend to yield worse reactions post-trauma (Weigel, Wertlieb, & Feldstein, 1989), as are multiple traumas (Suliman et al., 2009).

Stressors can be classified as "acute, non-abusive stressors," including traumatic events such as floods, fires, or transportation accidents while excluding physical or sexual abuse, or as "chronic or abusive stressors," including ongoing or multiple stressors such as war, chronic illness, repeated surgeries, and/or physical or sexual abuse (Terr 1991). Survivors of chronic stressors are more likely to meet *DSM-IV* Criterion C of avoidance or numbing than those suffering from acute stressors, more avoidance of reminders of the event, more numbing affect, and more regressive behavior (Fletcher, 2003). Additionally, these children are more distressed by reminders of their experiences, more likely to avoid reminders of their trauma, more likely to have trauma-related bad dreams, more likely to meet Criterion D of overarousal, and more likely to display a startle reflex than those suffering from an acute stressor (Fletcher, 2003). They are also more likely to display irritability, have more guilt, have more pessimistic attitudes about the future, and more depression (Fletcher, 2003). Survivors of an acute stressor are more likely to report intrusive memories, have more hypervigilance, have more anxiety, have more somatic complaints, have a decrease in activity participation, and have more social withdrawal (Fletcher, 2003).

Pre-existing Characteristics of the Child. Several child characteristics act as potential risk-factors for the development of PTSD. The effects of a child's age on PTSD have been variable. While some researchers have found younger children to be at greater risk for severe post-disaster reactions (Anthony, Lonigan, & Hecht, 1999; Lonigan et al., 1991; Shannon, Lonigan, Finch, &Taylor, 1994) and some have found older youth to be more at risk (Saul,

Grant, & Carter, 2008), others have found minimal or no significant differences between age groups (Green et al., 1991). Generally, females are found to report greater levels of PTSD symptoms (Birmes, Raynaud, Daubisse, Brunet, Arbus, Klein, …Schmitt, 2009; Garrison, Bryant, Addy, Spurrier, Freedy, & Kilpatrick, 1995; Green et al., 1991; Pynoos et al., 1993; Roussos, Goenjian, Steinberg, Sotiropoulou, Kakaki, Kabaos, et al., 2005; Russonielleo et al 2002; Saul, Grant, & Carter, 2008; Shannon et al., 1994; Terranova, Boxer, & Morris, 2009; Vernberg et al., 1996; Weems et al., 2007).

Some studies have found that minority youth report greater PTSD symptom severity following a disaster (Fincham et al., 2009; Garrison, Weinrich, Hardin, Weinrich, & Wang, 1993; La Greca et al., 1996, 1998; Lengua et al., 2005; Lonigan et al., 1991; Shannon et al., 1994; Stein, Jaycox, Elliott, Collins, Berry, Marshall, Klein, …Schuster, 2004; Terranova, Boxer, & Morris, 2009), while other studies find that race and ethnicity have no effect on PTSD (Jones, Frary, Cunningham, Weddle & Kaiser, 2001; Russoniello et al., 2002). For example, La Greca and colleagues (1996) 's study following Hurricane Andrew found significant differences between ethnic groups, with Hispanic American and African American children reporting levels of posttraumatic stress that was half a standard deviation higher than levels reported by European American children. Some research has shown that Caucasians are less personally traumatized and less exposed to neighborhood trauma than Latinos and African Americans, and therefore, severity of exposure may be linked to the experienced posttraumatic stress (Perilla, Norris, & Lavizzo, 2002).

Low socioeconomic status (SES) has also been associated with increased risk for PTSD. In a review of post-disaster research, Norris and colleagues, 2002 found that 93% of included studies linked lower SES with greater posttraumatic stress following a disaster. Additionally,

Phifer (1990) and Ginexi and colleagues (2000) found that as SES decreases, adverse effects of disaster exposure increase. Given the relationship between race and SES, it can be difficult to assess whether race, low SES, or a combination of both variables contributes to the prediction of PTSD in trauma victims (Rivera & Miller, 2007).

Exposure to community violence has also been linked to PTSD (Fincham et al., 2009; Flannery, Singer, & Wester, 2001; Flannery, Wester, & Singer, 2004). For example, a study by Overstreet, Dempsey**,** & Graham (1999) found that nearly one third of children exposed to community violence between the ages of 10 and 15 displayed symptoms consistent with all PTSD symptom clusters. Another study of 12-17 year olds found that instead of sensitizing to violence exposure, adolescents displayed increased PTSD and delinquent behaviors after violence exposure (McCart, Smith, Saunders, Kilpatrick, Resnick, & Ruggiero, 2007). Specifically, community violence was more associated with PTSD than other types of violence (McCart et al., 2007). Evidence indicates that a history of stressful life events is also associated with the development of high levels of PTSD following exposure to traumatic stressors (Conte & Schuerman, 1987; Kiser, Ackerman, Brown, Edwards, McColgan, Pugh, & Pruitt, 1988; Mannarino, Cohen, & Berman, 1994; Sulliman et al., 2009), although past experience with overcoming threatening experiences may help protect the child from developing PTSD when exposed to a later stressor (Fletcher, 2003).

Characteristics of the Post-disaster Recovery Environment. Social support given to children and their families following disasters is likely to reduce post-disaster distress (La Greca et al. 1996; Pina et al., 2008; Vernberg et al., 1996; Vigna, Hernandez, Paasch, Gordon, and Kelley, 2009). Some studies have shown that certain populations, especially minorities and

those with lower education status, may receive less social support and assistance following a disasters (Kaniasty & Norris, 1995; Pina et al., 2008).

The Child's Psychological Resources. Psychological resources may include personal characteristics, such as a strong sense of self-efficacy, an internal locus of control, positive coping strategies, and social skills (Vernberg, 1999; Hirschel & Schulenberg, 2009). Individual and family coping behavior (La Greca et al., 1996; Pina et al., 2008; Terranova, Boxer, & Morris, 2009; Vernberg et al., 1996; Vigil & Geary, 2008; Vigna et. al, 2009b), self esteem (Blaze & Shwalb, 2009), maternal psychopathology (Birmes et al., 2009; Swenson, Saylor, Powell, Stokes, Foster, & Belter, 1996), and social support (La Greca et al., 1996; Moore & Varela, 2010; Pina et al., 2008; Vernberg et al., 1996) have all been found to be associated with severity of PTSD symptom presentation and a component of resiliency (Silverman and LaGreca, 2002). However, pre-existing negative affect (Weems et al., 2007) and peer victimization (Terranova, Boxer, & Morris, 2009) have been found to have a negative impact on PTSD. Parenting practices have also been linked to a child's expression of PTSD. A child's reaction to trauma is usually closely related to the child's parents' reactions to the trauma (Ajdukovic, 1998; Winje & Ulvik, 1998). Children with positive, nurturing parents who enforce limits in a constructive manner are usually more stress-resilient than children of rigid, less warm caregivers (Wyman, Cowen, Work, Raoof, Gribble, Parker, G.R., & Wannon, 1992; Wyman, Cowen, Work, & Parker, 1991). Additionally, family discord (Pelcovitz, Libov, Mandel, Kaplan, Weinblatt, & Septimus, 1998; Wasserstein & La Greca, 1998; Wyman et al., 1991, 1992), financial difficulties (Shannon et al., 1994; Vila, Witowski, Tondini, Perez-Diaz, Mouren-Simeoni, & Jouvent, 2001), and having a family with three or more children (Birmes et al., 2009) can be associated with PTSD or distress in children.

Prevalence of PTSD Post-Hurricane

Natural disasters such as hurricanes, floods, earthquakes, and tornados are traumatic events associated with high levels of PTSD (APA, 1994). Post-hurricane assessment of youth has found variable rates of PTSD ranging from 7% to 56%, with highest prevalence rates occurring in neighborhoods that were most impacted by loss and danger (Garrison et al., 1995; La Greca et al., 1996; Norris et al., 2002; Pina et al., 2008; Shaw et al., 1995; Warheit, Zimmerman, Khoury, Vega, & Gil, 1996). In a study of fourth grader reactions post-Hurricane Floyd, 95% endorsed symptoms of PTSD with 71% of the sample reporting moderate-to-very-severe symptoms (Russoniello et al., 2002). The variables most associated with severe post-hurricane PTSD symptoms included female sex (45%) and flooding in the home (46%) (Russoniello et al., 2002).

PTSD symptoms have been found to linger in children. Garrison and colleagues (1993) found that one year post-Hurricane Hugo, only 2-6% of adolescents met full PTSD criteria, with 20% exhibiting reexperiencing symptoms, 9% exhibiting avoidance symptoms, and 18% exhibiting symptoms of hyperarousal. Following Hurricane Andrew, a substantial level of PTSD symptoms were still present in youth up to 10 months post-disaster (LaGreca et al., 1996). La Greca and colleagues (1998) found that three months post-disaster, hurricane exposure, predisaster anxiety, inattention, and academic skills best predicted PTS symptoms. Seven months post-disaster African American ethnicity and predisaster ethnicity predicted PTS symptoms (La Greca et al., 1998), indicating that both exposure and pre-existing child characteristics are predictors of post-disaster functioning.

Initial research following Hurricane Katrina has found elevated rates of adult PTSD ranging from14.9%-30.3% (Galea, Brewin, Gruber, Jones, King, King, et al., 2007; Galea, Tracy, Norris, & Coffey, 2008; Kessler, Galea, Gruber, Sampson, Ursano, Wessely, 2008) with

rates of PTSD increasing over time (Kessler et al., 2008). Terranova and colleagues' 2009 study examined PTSD reactions in a group of rural sixth graders in southeastern Louisiana post-Hurricane Katrina. The sample consisted of primarily low income, female, and Caucasian youth who were participating in a larger peer victimization study. Children were assessed using the HURTE and The Child Posttraumatic Stress Disorder Checklist (PTSD Checklist; Amaya-Jackson, McCarthy, Cherney, & Newman, 1995). Males in the study reported lower levels of hurricane exposure, symptoms of PTSD, and fear. Minority participants reported higher symptoms of PTSD symptoms 8 months-post Hurricane Katrina. Although demographic variables were found, sex and ethnicity did not predict PTSD when controlling for other risk factors. Other studies have found PTSD rates post-Katrina to be 16.9- 46% (Blaze & Shwalb, 2009; Moore et al., 2010; Pina et al., 2008) with higher mean scores for symptoms in the avoidance symptom cluster (Pina et al., 2008). Additional studies found that children exposed to Hurricane Katrina experienced more negative intrusive thoughts than non-exposed children (Sprung, 2008), lower self-esteem (Vigil & Geary, 2008), more distress and depression (Vigil & Geary, 2008), more emotional dysregulation or disturbance (Marsee, 2008; McLaughlin, Fairbank, Gruber, Jones, Lakoma, Pfefferbaum, …Kessler, 2009), and more reactive aggression (Marsee, 2008). Displaced students had increased problems, such as non-enrollment or poor attendance at school (Pane et al., 2008), psychological and/or behavioral problems at school (Pane et al., 2008; Ward et al., 2008), increased suspensions and expulsions (Ward et al., 2008), and impacted academics (Pane et al., 2008; Ward et al., 2008). Other studies have found that mental health symptoms (e.g., anxiety, depression, PTSD) have increased 44-104% following the hurricane with many of the children (56%) still experiencing psychological symptoms two years

later (Roberts et al., 2009). These findings indicate that Hurricane Katrina had a significant and unique impact on children affected by the storm.

Controversies in PTSD Diagnosis and Symptom Presentation in Youth

Despite the vast number of studies on PTSD, there continues to be much scrutiny over the current *DSM-IV-TR* PTSD criteria, especially when discussing its appropriateness for diagnosing youth (Anthony et al., 1999 & 2005; Ford et al., 2009; Lonigan et al., 2003; Pynoos et al., 1993; Pynoos, Steinberg, layne, Briggs, Ostrowski, & Fairbank, 2009; Sack et al., 1997; Saul et al., 2008), and as the publication of *DSM-V* nears, an increased number of studies have begun examining criteria for PTSD as they apply to children. It is important for those screening children for PTSD to have clear guidelines regarding normal and pathological responses in children following a trauma (Lonigan, Anthony, & Shannon, 1998), and it may be beneficial to identify distinctive PTSD symptoms in youth in order to do so. For example, Garrison and colleagues (1993, 1995) found that fewer children met criteria for the numbing/avoidance cluster than for other symptom cluster criterion. While the predictive power of the numbing/avoidance cluster was higher than that of any single symptom, reexperiencing and increased arousal symptom clusters have been found to be poor single index indicators of a PTSD diagnosis, indicating that those meeting criteria for numbing/avoidance were also likely to meet criteria for the remaining two symptom clusters (Lonigan et al., 1998). Based on these findings, the numbing/avoidance cluster may be the key in determining whether a child has PTSD, thereby indicating a "pathological" response to trauma. The majority of symptoms from the arousal cluster have less than moderate diagnostic efficacy in children (Lonigan et al., 1998), indicating that arousal in children may not manifest in the most straightforward manner. Other studies have found that adolescent symptoms of avoidance, intrusive thoughts, and physiological responsivity

were most associated with a PTSD diagnosis (Sack et al., 1997), while anhedonia and fear of reoccurrence were not individually predictive of PTSD diagnosis (Lonigan et al., 1998). Another study found that children having either bad dreams, emotional numbing, repetitive intrusive thoughts about the hurricane, emotional avoidance, or behavioral avoidance were eighteen times more likely to have a PTSD diagnosis than children without the target symptom (Lonigan et al., 1998). These studies indicate potential markers of a "pathological" trauma response in children that should be considered when further assessing proposed criteria for *DSM-V*.

Given these findings and the knowledge of developmental differences between adults and children, it is logical to question whether adult criteria for symptom endorsement should be applied to children. For example, some researchers believe that requiring three symptoms of Avoidance in children may be too restrictive (Schwarz & Kowalski, 1991). On the contrary, Anthony and colleagues' (1999) support the requirement of more symptoms from the Increased Arousal and Numbing/Avoidance clusters than from the Reexperiencing cluster. Although there is no consensus on the exact numbers of symptoms that should be present, this indicates that there is debate over whether current *DSM-IV-TR* criteria are appropriate for children. These guidelines can be utilized when assessing developmentally-appropriate symptom requirements for *DSM-V*.

Another area of debate regards *DSM-IV-TR* symptom cluster presentation in youth with PTSD. Pynoos and colleagues (1987) conducted a factor analysis of the 16 PTSD –RI following the school shooting at Columbine High School, and three factors emerged, accounting for 50% of the variance. The first factor included symptoms from Criterion B (reexperiencing the trauma) and Criterion C (avoidance of reminders of the trauma/affective numbing); the second factor encompassed Criterion D (overarousal as defined by fears of reoccurrence, jumpiness and

exaggerated startle response, and fear of thoughts about the shooting); and the third factor represented other symptoms of overarousal, such as sleep disturbance and difficulty concentrating. While these findings indicate that many of the same PTSD symptoms are experienced by both children and adults, the findings also show that application of adult symptom criterion clusters to children may not be the most developmentally-appropriate diagnostic method.

Anthony and colleagues (1999) further studied PTSD symptom clusters in youth by conducting a confirmatory factor analysis (based on responses on the Frederick Reaction Index for Children; RI; following Hurricane Hugo) of eight models of PTSD dimensionality that were previously proposed in the literature, in addition to the current *DSM-IV* criteria. Findings showed that the best-fitting model of PTSD in youth is composed of three symptom clusters: Intrusion/Active Avoidance, Numbing/Passive Avoidance, and Arousal (Anthony et al., 1999). The differences between this proposed model and current *DSM* criteria are apparent in two main ways. First, avoidance symptoms would be separated into "active" (i.e. purposefully engaging in activities unrelated to the trauma to avoid thinking about it) and "passive" (i.e. not engaging in social or affective things) avoidance in the Anthony et al. (1999) proposed model. Additionally, the Anthony and colleagues' 1999 model differs from the DSM-*IV* model in the placement of the symptom of "fear of reoccurrence/hypervigilance", in the Intrusion/Active Avoidance cluster instead of in the Arousal cluster. Findings also indicated that the previous *DSM-III-R* model incorporated physical reactivity into the Increased Arousal cluster was superior to the *DSM-IV* model which includes physical reactivity in the Reexperiencing cluster (Anthony et al., 1999). A follow-up 2005 study by Anthony and colleagues reassessed the robustness of their three-factor model in a sample of 396 fifth graders exposed to either Hurricane Andrew or Hurricane Hugo.

Results indicated that their previously proposed model (Anthony et al., 1999) maintained utility of describing PTSD symptom presentation in youth better than the current *DSM-IV* model (Anthony et al., 2005).

Additional studies have further elaborated upon PTSD symptom cluster presentation in children and adolescents. Ford and colleagues (2009) assessed the PTSD factor structure in 12-17 year olds in a community sample. Findings indicated that a two-factor model and a four-factor model were superior to the *DSM-IV* three-factor model at depicting PTSD symptom clusters (Ford et al., 2009). Overall it was determined that the two-factor model, after removing items overlapping other depression and anxiety disorder symptom criteria, was superior for illustrating PTSD symptom cluster presentation in a community sample (Ford et al., 2009).

An additional PTSD model has been proposed by Saul and colleagues (2008) for adolescents who have experienced at least one traumatic event (e.g., witnessing violence, abuse, accident, natural disaster, etc.). Their findings indicated that a four-factor model, consisting of reexperiencing, avoidance, numbing, and arousal, best depicted PTSD symptom clusters in this sample. The main difference between this model and current *DSM-IV* criteria is that numbing and avoidance are viewed as separate symptom factors, similar to the current proposed *DSM-V* model (APA, 2010). The authors also recognize that given overlapping symptoms, there is the potential for comorbid diagnoses may also affect analyses of factor structures (Saul et al., 2008). Saul and colleagues (2005) also acknowledged that while their four-factor model provided the best fit for their model's PTSD symptom expression, the current *DSM-IV* model (APA, 2000) and the model proposed by Anthony and colleagues (1999, 2005) also provided a good fit.

In addition to the previously discussed models, Bulut (2004) proposed a five-factor model of symptom presentation based on youth who experienced a tornado. These factors

included: blocking/vigilance; affective/adjustment difficulties; re-experiencing/intrusion; somatic/attachment; and sense of foreshortened future (Bulut, 2004). Despite numerous criticisms of the current *DSM-IV* model, Bal & Jensen (2007) found that the current *DSM-IV* symptom clusters maintain utility in their sample of earthquake-exposed Turkish youth; however, the researchers recognize that they may have been biased in selecting the specific assessment items that were included in the factor analysis. These findings of varied factor structures indicate that a child or adolescent's PTSD symptoms may manifest differently than what is seen in adults. Give the wide variety of findings regarding PTSD symptom clusters in children, it is especially important to ensure that the proposed *DSM-V* model is in fact the best fit for symptom presentation in children.

Overall, it is important to identify primary and secondary symptoms that manifest in children in order to provide the most empirically-based guidelines for diagnostic criteria in the upcoming *DSM-V*. Anthony and colleagues (1999, 2005) and Foa and colleagues (2001) call for further assessment of factor structure of PTSD in youth regarding different populations, types of trauma, and assessment methods that might help assess which criteria are most applicable to children. One recommendation for improving upon *DSM-IV-TR* criteria in *DSM-V* is utilizing a continuous, dimensional model (i.e. varying severity dimensions of the disorder) as opposed to the current dichotomous, categorical (i.e. diagnosed with PTSD or not diagnosed with PTSD) model (Anthony et al., 1999; Anthony et al., 2005; Putnam, 1998;). Another suggestion is to define a "subclinical" level of PTSD indicating that diagnostic criteria has been met, minus one symptom of avoidance and one symptom of overarousal (Vila, Porsche, & Mouren-Simeoni, 1999). A final suggestion for amending diagnostic criteria, already being incorporated in the proposed *DSM-V* model (APA, 2010), is to create developmental stage-specific criteria for

PTSD, as children from different developmental stages may display varying degrees of symptom clusters (Cohen et al., 1998). Overall, it is apparent that extensive study of proposed *DSM-V* PTSD diagnostic criteria is warranted in order to avoid the mishaps previously experienced with *DSM-IV*'s criteria.

Study Rationale

The purpose of this study is to evaluate and compare the factor structure of *DSM-IV and DSM-V* models of PTSD symptom presentation as measured by the UCLA PTSD Index for DSM-IV (Pynoos et al., 1998) and relevant items from the Behavioral Assessment System for Children, Second Edition (BASC-2, Reynolds & Kamphaus, 2004) in a sample of hurricane-exposed youth. Previous research has questioned the appropriateness of current *DSM-IV-TR* criteria for PTSD symptoms and diagnostic clusters in youth, and currently developmentally-appropriate diagnostic criteria are under formulation and undergoing assessment for *DSM-V*. Because of these anticipated changes, further evaluation of the factor structure of PTSD in youth is warranted in order to formulate the most developmentally-appropriate diagnostic criteria before publication. The current study will conduct both confirmatory factor analyses (based on *DSM-IV* and proposed *DSM*-V symptom clusters) and exploratory factor analyses of UCLA PTSD Index responses made four to seven months post-hurricane, with supplementary responses provided from the BASC-2 to incorporate newly proposed *DSM-V* diagnostic criteria. These measures will be utilized because the assessment questions closely map onto current *DSM-IV-TR* diagnostic criteria and many of the proposed *DSM-V* criteria. This assessment will provide information about the appropriateness of the application of current and newly proposed diagnostic symptom criteria in children and adolescents. In addition, an evaluation of symptom endorsement will also be conducted based on various demographic variables, such as age, sex,

ethnicity, and income. Since many victims of Hurricane Katrina were minority children of low socioeconomic status who were at least temporarily displaced from their homes, this sample may have been uniquely impacted by the hurricane. Lastly, this study evaluates PTSD symptom severity at 4 to 7 months and at 25-28 months post-Katrina to assess the stability of symptoms over time.

Hypotheses

The following hypotheses are put forth in this study:

1. No hypotheses are put forth regarding specific type and frequency of PTSD symptom endorsement in the sample. However, based on previous research it is hypothesized that younger, female, minority, and low pre-hurricane income youth will report greater symptoms over all. Findings will be discussed in light of cultural and gender sensitivity as related to proposed *DSM-V* criteria.
2. No hypotheses are put forth regarding the factor structure (i.e. symptom cluster presentation) supported by exploratory factor analysis (EFA). However, an EFA will be conducted based on the history of the varying findings of previous research on PTSD symptom presentation in youth. An in depth discussion will be put forth in light of EFA findings and recommendations regarding the developmental appropriateness of newly proposed symptom for *DSM-V,* should the model differ from current *DSM-IV-TR* or proposed *DSM-V* models. The sample size of 276 youth is adequate for conducting factor analysis based on previous research on sample size and factor analysis by Gorsuch (1983 in MacCallum, Windaman, Zhang, & Hong, 1999; requiring a minimum of 100 subjects for analysis), Guilford (1954 in MacCallum et al., 1999; requiring a minimum of 200 subjects for analysis); Cattell (1978 in MacCallum et al., 1999; requiring three to six

subjects per item with a minimum of 250 participants for analysis), Comrey & Lee (1992; identifying that including 200 subjects is fair, 300 subject is good, and any number of participants above that is very good for analysis), and Everitt (1975 in Arrindell & van der Ende, 1985; requiring a minimum of 10 subjects per item for analysis).

3. Based on previous research it is hypothesized that the current three-factor structure of the UCLA PTSD Index for DSM-IV (i.e. current *DSM-IV-TR* symptom clusters) will not be supported by the confirmatory factor analysis (CFA). This analysis replicates and extends previous research (i.e. Anthony et al., 2005; Ford et al., 2009; Saul et al., 2008) by assessing the presentation of PTSD symptom clusters in hurricane-exposed youth. The sample of 276 youth is adequate for conducting factor analysis.
4. Based on previous research, it is hypothesized that proposed *DSM-V* four-factor criteria clusters will provide a better model fit based on confirmatory factor analysis. This analysis replicates and potentially extends upon currently proposed *DSM*-V PTSD criteria by testing the factor structure in youth. The sample size of 276 youth is adequate for conducting factor analysis.
5. It is hypothesized that PTSD prevalence rates based on *DSM-IV* criteria will be higher than rates based on proposed *DSM-V* criteria given the attempts to increase diagnostic specificity with revised criteria. This analysis will extend upon previous research on PTSD prevalence rates in youth (i.e. Pina et al., 2008; Norris et al., 2002; Russoniello et al., 2002; Blaze & Shwalb, 2009; Moore et al., 2010) by comparing previous and currently proposed PTSD diagnostic criteria to see if significant differences in prevalence rates occur. For this analysis, a dependent *t*-test will be used to compare *DSM-IV* and

DSM-V criteria. Based on power analysis, the sample size of 276 is adequate for this analysis.

6. It is hypothesized that PTSD symptom severity will decrease between Time 1 (4-7 months post-hurricane) and Time 2 (25-28 months post-hurricane). This analysis replicates and extends upon previous longitudinal research on PTSD symptom presentation in youth following natural disasters (i.e. LaGreca et al., 1996, 1998; Terranova et al., 2009). For this analysis, a dependent *t*-test will be used to compare Time 1 and Time 2 PTSD rates. Based on power analysis, the sample size of the 210 youth completing both waves of the study is adequate for this analysis.

Method

Participants

Participants included 276 children recruited from public schools in New Orleans and the surrounding areas affected by Hurricane Katrina four to seven months post-hurricane. Children unable to comprehend questions were excluded from the study. The majority of the sample (88.9%) was at least temporarily displaced following evacuation after the hurricane. At the time of initial recruitment, child participant ages ranged from 8 to 16 years old (M =11.57) and with a mean grade of 6.06 (range = 3rd-8th grade). The sample consisted primarily of minority children (66.8% African American, 24.3% Caucasian, 5.0% Asian, 2.7% Hispanic) from low-income (M =$15,000- $34,999) families. Females made up 54.9% of the sample. Demographic information is presented in Table 3.

Table 3: Demographic Characteristics

	N	%
Child Age		
Mean (SD)	11.57 (1.65)	
Child Grade		
Mean (SD)	6.06 (1.31)	
3rd	2	.8
4th	33	12.7
5th	60	23.2
6th	61	23.6
7th	58	22.4
8th	45	17.4
Gender		
Male	121	45.1
Female	147	54.9

(Table 3 cont.)

Race		
African American	173	66.8
Caucasian	63	24.3
Hispanic	7	2.7
Asian	13	5.0
Other	3	1.2
Pre-Hurricane Income		
No Answer	39	14.1
$0- 14,999	92	33.4
$15,000- 34,999	75	27.2
$35,000- 49,999	24	8.7
$50,000- 99,999	40	14.5
$100,000 +	6	2.2
Parent Marital Status:		
Never married	58	23.1
Married	118	47.0
Divorced	34	13.5
Separated	17	6.8
Widowed	3	1.2
Cohabitating	21	8.4

Measures

Demographic Questionnaire. A demographic questionnaire was administered to obtain information about child participant age, grade, gender, and parent income and education (See Appendix A). Mother participants completed the questionnaire.

Hurricane-Related Traumatic Experiences (HURTE). The HURTE is a measure of hurricane-related exposure and traumatic experiences (Vernberg, LaGreca, Silverman, & Prinstein, 1996; See Appendix B). Child participants answered questions as "yes" or "no" based on trauma experienced during the hurricane. These responses yield the factor scales of Threat and Loss. This measure has shown good reliability in samples of youth (Vernberg et al.,1996). Information regarding evacuation was taken from this questionnaire.

UCLA PTSD Index. The UCLA PTSD Index (Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998; See Appendix C) is a revised version of the widely used Child PTSD Reaction Index (CPTSD-RI; Nader, Pynoos, Fairbanks, & Frederick, 1990). The measure was designed for administration to youth aged 7 to 18, and it is recommended that instructions and questions be read aloud to children under 12 years of age or to children with impaired reading comprehension (Steinberg, Brymer, Decker, & Pynoos, 2004). This 22-item measure was developed to screen for the occurrence of a traumatic event and resulting *DSM-IV* PTSD symptoms, although, this screening instrument is not intended to establish a PTSD diagnosis. Part I of this measure screens for lifetime trauma exposure (community violence, medical trauma, natural disaster, etc.), and items are scored as "present" or "absent." A brief review of the traumatic event is provided by the child responder, which assists in documenting endorsement of *DSM-IV* Criterion A1 and in answering follow-up questions regarding the trauma. Part II of the measure further assesses Criterion A1 and A2 regarding trauma exposure, while Part III assesses the frequency of occurrence of post-traumatic symptoms over the past month. Twenty items assess specific PTSD criteria, while two items assess trauma-related symptomatology (fear of reoccurrence and trauma-related guilt; Items 14 and 20). These questions are rated on a Likert scale from 0 (none of the time) to 4 (most of the time) and directly assess DSM Criterion B, C, and D. Only 17 items (corresponding to DSM-IV criteria) compose the total score. This measure generates scores for the three PTSD symptom clusters: Reexperiencing of the traumatic event (Criterion B), Avoidance of stimuli and numbing of responses (Criterion C), and Increased arousal (Criterion C), in addition to an Index Summary Score and a Diagnosis Score. This measure has demonstrated high internal consistency, test-retest reliability, as well as sensitivity and specificity (Pynoos et al., 1998; Rodriguez, Steinberg,

Saltzman, & Pynoos, 2001; Steinberg et al., 2004) and cross-cultural sensitivity (Ellis, Lhewa, Charney, & Cabral, 2006; Pat-Horenczyk, Abramovitz, Peled, Brom, Daie, & Chemtob, 2007). Since it has been established that all child participants were exposed to a traumatic event (i.e. Hurricane Katrina), participants completed only Part III of this measure and were instructed to answer all questions based on their experience with Hurricane Katrina. Cronbach's $\alpha = .93$ for the measure with internal consistency for subscales ranging from .63 to .84.

Behavior Assessment System for Children, Second Edition, Self Report of Personality (BASC-2 SRP; Reynolds & Kamphaus, 2004). The BASC-2 SRP is a self-report measure for children. It has multiple forms, dependent on a child's age: children aged 8-11 years (BASC-2 SRP- Child; BASC-2 SRP-C; see Appendix D), children aged 12-21 years (BASC-2 SRP-Adolescent; BASC-2 SRP-A; see Appendix E), and young adults aged 15-25 years. The first two versions (BASC-2 SRP-C and BASC-2 SRP-A) will be utilized in the current study. The BASC-2 SRP is composed of fourteen to sixteen primary scales and five composite scales. The composite scales consist of: School Problems, Internalizing Problems, Inattention/Hyperactivity, Personal Adjustment, and the Emotional Symptoms Index. Specific items from the BASC-2 SRP will be utilized in this study. Specifically, "I feel depressed" (from both the BASC-2-SRP-C and BASC-2-SRP-A forms) will be used to assess Criterion D4, and "I am afraid I might do something bad" (from the BASC-2-SRP-C form) and "I like to experiment with new things" (from the BASC-2-SRP-A) will be used to assess criterion E2.

Procedure

The data used in the current study is part of a larger data set evaluating family psychological functioning following Hurricane Katrina. After receiving Institutional Review Board and school board approval in Orleans and Jefferson Parish, schools were contacted and

provided information regarding the current study. For the initial phase of data collection (Time 1), students in the 4th through 8th grades were recruited and flyers and parent questionnaire packets were sent home to families. Packets included information about the study, parent consent forms, contact information for the purpose of psychological referrals, the Demographic Questionnaire, and other measures included in a larger grant-funded research project. Once parental consent was obtained for child participation, child assent forms were signed (see Appendix F). Children completed the above-mentioned measures, as well as additional questionnaires included in a larger grant, under the supervision of trained members of the research team on the child's school campus. Researchers read aloud measures to children who experienced difficulty with reading comprehension. Follow-up phone calls took place with participants' mothers to confirm participation status and to provide mental health referral information if requested and/or warranted. Depending on preferences of school personnel, various incentives and forms of compensation were utilized including a $5 cash prize or pizza parties for students who participated. Mother participants were either entered into a drawing for a cash prize or paid $20 individually for participation

For the final phase of data collection (Time 2; 25-28 months post-hurricane) mothers were contacted regarding continued interest in study participation and asked to provide updated contact information. Researchers re-administered the UCLA PTSD Index, BASC-2 SRP, and other questionnaires to student participants on-site at their schools. For Time 2, families received $25.00 compensation. All identifying information was removed from responses for Time 1 and Time 2 and packets were identified through codes that matched participant data.

Results

PTSD Symptom Frequency

Specific type and frequency of proposed *DSM-V* PTSD symptoms were assessed in the sample based on demographic variables such as gender, grade, race, and income. Responses on the UCLA PTSD Index questionnaire and applicable items on the BASC-2-SRP (assessing *DSM-V* criteria) endorsed at least "some of the time" were utilized to calculate symptom endorsement frequencies. (See Tables 4, 5, and 6 for mean scores and standard deviations based on symptom clusters). Overall, symptoms in proposed *DSM-V* response clusters D and E were most endorsed by participants, while symptoms in clusters B and C were least endorsed at a significant level. The three most endorsed symptoms as occurring at least "some of the time" in participants were Criterion E3: Hypervigilance (50.0%), Criterion D4: Pervasive negative emotional state (45.6%), and Criterion B4: Prolonged distress related to the trauma (45.3%). Items that were the least endorsed by participants were Criterion C2: Avoiding external reminders of the event (24.5%), Criterion D3: Distorted blame related to the trauma (24.6%), and Criterion B3: Dissociative reactions (25.2%). All categories depict proposed *DSM-V* criteria.

Significant differences in response rates were found for numerous demographic variables. No significant gender differences were found in overall PTSD symptom endorsement, $t(266)=.-1.22$, $p > .05$. After utilizing a Bonferroni correction (adjusting criterion for significance to $p < .01$; Field, 2005) to account for multiple *t*-tests, a gender response difference was found for Criterion C1: Avoiding internal reminders of the trauma, $t(266)= -3.28$, $p < .001$, with significantly more females than males endorsing this symptom. Other gender differences approaching significance were found for Criterion B4: Prolonged psychological distress, $t(266)= -2.01$, $p < .05$ and Criterion E1: Irritable, angry, or aggressive behavior, $t(266)= -2.36$, $p < .05$.

Table 4: *DSM-V* Criteria B and Criteria C PTSD Symptom Endorsement, By Demographic Characteristics

	Criterion B1	Criterion B2	Criterion B3	Criterion B4	Criterion B5	Criterion C1	Criterion C2
Mean (Standard Deviation)							
Total Sample							
Endorsement Frequency	32.8%	31.0%	25.2%	45.3%	28.5%	40.6%	24.5%
Mean (Standard Deviation)	1.25 (1.38)	1.08 (1.40)	.86 (1.33)	1.59 (1.41)	1.00 (1.34)	1.42 (1.49)	.90 (1.31)
Gender	***ns***	***ns***	***ns***	***ns***	***ns***	***p=.001****	***ns***
Male (n=121)	1.14 (1.28)	1.04 (1.42)	.75 (1.23)	1.38 (1.35)	.89 (1.31)	1.07 (1.33)	.73 (1.20)
Female (n=147)	1.37 (1.45)	1.12 (1.40)	.94 (1.41)	1.73 (1.45)	1.10 (1.36)	1.65 (1.53)	1.03 (1.37)
Race	***ns***	***p=.003****	***ns***	***ns***	***p=.035***	***ns***	***p=.035***
African American (n=173)	1.42 (1.43)	1.32 (1.47)	.99 (1.41)	1.66 (1.48)	1.16 (1.42)	1.45 (1.55)	1.06 (1.38)
Caucasian (n=63)	1.34 (1.33)	.70 (1.21)	.62 (1.17)	1.59 (1.31)	.71 (1.03)	1.39 (1.35)	.65 (1.09)
Asian (n=13)	.62 (.96)	.54 (.88)	.62 (1.12)	.92 (.95)	.69 (1.32)	1.46 (1.20)	.31 (.48)
Hispanic (n=7)	.29 (.49)	.00 (.00)	.14 (.38)	.57 (.79)	.00 (.00)	.14 (.38)	.00 (.00)
Other (n=3)	.50 (.71)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	1.50 (.00)	.50 (.71)
Grade	***ns***	***p=.017***	***p=.038***	***ns***	***p=.022***	***ns***	***p=.001****
3rd (n=2)	2.00 (1.41)	.50 (.71)	.50 (.71)	1.50 (.71)	1.00 (1.41)	2.00 (1.41)	3.00 (1.41)

(Table 4 cont.)

4th (n=33)	1.55 (1.48)	1.46 (1.48)	1.00 (1.41)	2.15 (1.62)	1.21 (1.45)	1.64 (1.60)	1.33 (1.47)
5th (n=60)	1.52 (1.48)	1.57 (1.50)	1.27 (1.51)	1.82 (1.43)	1.45 (1.55)	1.42 (1.48)	1.33 (1.39)
6th (n=61)	1.89 (1.42)	.92 (1.36)	.90 (1.34)	1.43 (1.29)	.75 (1.09)	1.54 (1.49)	.65 (1.18)
7th (n=58)	1.07 (1.27)	.83 (1.29)	.52 (1.17)	1.30 (1.34)	.76 (1.27)	1.19 (1.41)	.53 (1.03)
8th (n=45)	1.09 (1.26)	.84 (1.33)	.60 (1.12)	1.42 (1.42)	.78 (1.15)	1.29 (1.46)	.67 (1.24)
Pre-Hurricane Income	***ns***	***p=.037***	***ns***	***ns***	***p=.044***	***ns***	***p=.029***
No Answer (n=39)	1.10 (1.43)	1.03(1.39)	.85 (1.25)	1.62 (1.46)	1.05 (1.41)	1.56 (1.60)	.82 (1.35)
$0- 14,999 (n=92)	1.47 (1.41)	1.45 (1.49)	1.05 (1.46)	1.86 (1.52)	1.29 (1.50)	1.52 (1.57)	1.26 (1.47)
$15,000-34,999 (n=76)	1.27 (1.38)	1.00 (1.38)	.80 (1.29)	1.40 (1.27)	.80 (1.19)	1.35 (1.45)	.74 (1.15)
$35,000-49,999 (n=23)	1.35 (1.53)	.70 (1.26)	.96 (1.36)	1.70 (1.46)	1.22 (1.41)	1.30 (1.33)	.87 (1.39)
$50,000-99,999 (n=40)	.78 (1.07)	.70 (1.29)	.53 (1.20)	1.28 (1.28)	.55 (.96)	1.30 (1.44)	.50 (.99)
$100,000+ (n=6)	1.21 (1.47)	.68 (.53)	.48 (.82)	1.43 (1.50)	.83 (1.17)	1.24 (1.17)	.65 (.81)

Table 5: *DSM-V* Criteria D PTSD Symptom Endorsement, By Demographic Characteristics

	Criterion D1	Criterion D2	Criterion D3	Criterion D4	Criterion D5	Criterion D6	Criterion D7
Mean(Standard Deviation)							
Total							
Endorsement Frequency	40.1%	34.2%	24.6%	45.6%	33.9%	39.4%	31.7%
Mean(Standard Deviation)	.89 (1.32)	.68 (1.14)	.55 (1.11)	.74 (.98)	.69 (1.16)	.88 (1.31)	.69 (1.19)
Gender	***ns***	***ns***	***ns***	***ns***	***ns***	***ns***	***ns***
Male (n=121)	1.00 (1.41)	.69 (1.09)	.57 (1.08)	.72 (1.01)	.75 (1.20)	.88 (1.32)	.71 (1.16)
Female (n=147)	.78 (1.20)	.68 (1.19)	.53 (1.13)	.77 (.97)	.64 (1.15)	.87 (1.30)	.68 (1.23)
Race	***p=.046***	***ns***	***ns***	***ns***	***ns***	***ns***	***ns***
African American (n=173)	1.02 (1.37)	.77 (1.23)	.64 (1.19)	.80 (1.04)	.75 (1.22)	.94 (1.35)	.79 (1.27)
Caucasian (n=63)	.58 (1.07)	.59 (1.04)	.21 (.54)	.66 (.84)	.64 (1.02)	.71 (1.14)	.58 (1.07)
Asian (n=13)	.54 (.78)	.39 (.51)	.62 (1.19)	.77 (.83)	.54 (1.13)	.85 (1.28)	.46 (.97)
Hispanic (n=7)	.00 (.00)	.38 (.76)	.00 (.00)	.29 (.49)	.00 (.00)	.57 (1.51)	.29 (.76)
Other (n=3)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Grade	***p=.004***	***p=.003*****	***p=.007***	***ns***	***ns***	***ns***	***ns***
3rd (n=2)	1.50 (.71)	2.00 (.00)	1.00 (1.41)	.50 (.71)	2.00 (2.83)	2.00 (.00)	.50 (.71)

(Table 5 cont.)

4th (n=33)	1.49 (1.72)	1.07 (1.38)	.99 (1.48)	.97 (1.29)	.97 (1.38)	1.36 (1.56)	1.03 (1.31)
5th (n=60)	1.15 (1.30)	.93 (1.31)	.79 (1.33)	.79 (1.03)	.62 (1.17)	.85 (1.36)	.87 (1.41)
6th (n=61)	.77 (1.27)	.62 (1.11)	.41 (.95)	.59 (.97)	.61 (.98)	.72 (1.05)	.51 (1.02)
7th (n=58)	.57 (.94)	.36 (.81)	.24 (.66)	.69 (.82)	.72 (1.23)	.90 (1.33)	.67 (1.18)
8th (n=45)	.58 (1.14)	.40 (.69)	.38 (.81)	.80 (.81)	.53 (.97)	.67 (1.24)	.51 (1.04)
Pre-Hurricane Income	***ns***	***ns***	***p=.048***	***ns***	***ns***	***ns***	***ns***
No Answer (n=39)	.90 (1.43)	.72 (1.23)	.81 (1.36)	.59 (.94)	.56 (1.21)	1.10 (1.47)	.69 (1.15)
$0- 14,999 (n=92)	1.01 (1.31)	.83 (1.28)	.72 (1.25)	.87 (1.07)	.79 (1.21)	.88 (1.27)	.90 (1.33)
$15,000-34,999 (n=76)	.97 (1.46)	.68 (1.13)	.51 (1.05)	.77 (1.08)	.64 (1.21)	.81 (1.33)	.63 (1.26)
$35,000-49,999 (n=23)	.87 (1.29)	.42 (.65)	.39 (.99)	.70 (.76)	1.00 (1.41)	1.22 (1.62)	.65 (1.07)
$50,000-99,999 (n=40)	.55 (.99)	.48 (.96)	.15 (.53)	.58 (.68)	.45 (.71)	.70 (1.07)	.40 (.78)
$100,000+ (n=6)	.48 (.53)	.45 (.50)	.09 (.22)	.50 (.84)	.78 (.98)	.15 (.34)	.11 (.28)

Table 6: *DSM-V* Criteria E PTSD Symptom Endorsement, By Demographic Characteristics

	Criterion E1	Criterion E2	Criterion E3	Criterion E4	Criterion E5	Criterion E6
Mean (Standard Deviation)						
Total						
Endorsement Frequency	33.1%	37.7%	50.0%	38.3%	26.7%	36.5%
Mean(Standard Deviation)	1.18 (1.37)	1.35 (1.12)	1.80 (1.47)	1.37 (1.44)	.99 (1.30)	1.34 (1.52)
Gender	***ns***	***ns***	***ns***	***ns***	***ns***	***ns***
Male (n=121)	.96 (1.25)	1.26 (1.09)	1.80 (1.50)	1.25 (1.36)	.98 (1.27)	1.28 (1.52)
Female (n=147)	1.35 (1.43)	1.47 (1.15)	1.77 (1.44)	1.46 (1.50)	1.00 (1.32)	1.40 (1.51)
Race	***ns***	***ns***	***ns***	***p=.032***	***ns***	***ns***
African American (n=173)	1.23 (1.40)	1.36 (1.17)	2.01 (1.54)	1.41 (1.47)	.98 (1.30)	1.42 (1.56)
Caucasian (n=63)	1.20 (1.31)	1.31 (1.01)	1.50 (1.30)	1.41 (1.44)	1.13 (1.26)	1.30 (1.43)
Asian (n=13)	.69 (.95)	1.77 (.93)	1.15 (.80)	.62 (.77)	.69 (1.18)	1.08 (1.50)
Hispanic (n=7)	.71 (1.50)	1.43 (1.13)	.86 (.69)	.43 (.53)	.14 (.38)	.00 (.00)
Other (n=3)	.50 (.71)	.00 (.00)	2.00 (.00)	2.50 (.71)	.00 (.00)	1.00 (.00)
	ns	***p=.045***	***ns***	***p=.044***	***ns***	***ns***

(Table 6 cont.)

Grade						
3rd (n=2)	.50 (.71)	.50 (.71)	.50 (.71)	.50 (.71)	1.00 (1.41)	.00 (.00)
4th (n=33)	1.46 (1.60)	1.48 (1.35)	1.76 (1.54)	1.55 (1.62)	1.18 (1.55)	1.52 (1.52)
5th (n=60)	1.08 (1.27)	1.01 (1.06)	1.95 (1.51)	1.82 (1.43)	.93 (1.27)	1.60 (1.64)
6th (n=61)	1.12 (1.25)	1.24 (1.09)	1.83 (1.46)	1.34 (1.53)	.84 (1.11)	1.16 (1.39)
7th (n=58)	1.12 (1.33)	1.58 (1.08)	1.62 (1.44)	1.12 (1.31)	1.19 (1.36)	1.43 (1.52)
8th (n=45)	1.31 (1.53)	1.51 (1.01)	1.87 (1.38)	1.02 (1.27)	.82 (1.11)	.96 (1.36)
Pre-Hurricane Income	***p=.038***	***ns***	***ns***	***ns***	***ns***	***ns***
No Answer	1.08 (1.36)	1.18 (1.17)	1.59 (1.41)	1.44 (1.52)	1.23 (1.58)	1.21 (1.54)
$0- 14,999 (n=92)	1.49 (1.42)	1.41 (1.17)	1.97 (1.56)	1.40 (1.42)	1.02 (1.27)	1.37 (1.44)
$15,000-34,999 (n=76)	1.02 (1.35)	1.47 (1.09)	1.68 (1.43)	1.19 (1.45)	1.09 (1.42)	1.33 (1.58)
$35,000-49,999 (n=23)	1.39 (1.62)	1.35 (1.07)	2.30 (1.26)	1.74 (1.60)	.96 (1.26)	1.74 (1.76)
$50,000-99,999 (n=40)	.88 (1.04)	1.28 (1.09)	1.63 (1.50)	1.45 (1.38)	.63 (.84)	1.25 (1.43)
$100,000+ (n=5)	.20 (.48)	.67 (1.03)	1.13 (1.14)	.73 (.86)	.33 (.51)	1.06)

Significant differences were found in overall symptom severity based on race, $F(5, 253)= 3.06$, $p < .05$. After utilizing a Bonferroni correction (Field, 2005) to account for multiple analyses, racial response differences were found for Criterion B2: Distressing dreams, $F(5, 253)= 3.74$, $p < .01$. Other racial response differences that were approaching significance were: Criterion B5: Physiological reactions, $F(5,253)= 2.44$, $p < .05$; Criterion C2: Avoiding external reminders of the trauma, $F(5, 253)= 2.44$, $p < .05$; Criterion D1: Dissociative amnesia, $F(5, 253)= 2.29$, $p < .05$; and Criterion E4: Exaggerated startle response, $F(5, 253)= 2.48$, $p < .05$.

Significant differences were found in overall endorsement of PTSD symptoms based on grade, $F(5, 253)= 2.45$, $p < .05$. After utilizing a Bonferroni correction (Field, 2005) to account for multiple analyses, symptom endorsement based on grade level differed for the following diagnostic symptoms: Criterion C2: Avoidance of external reminders of the trauma, $F(5, 253)= 5.13$, $p < .001$; and Criterion D2: Persistent negative expectations, $F(5, 253)= 3.77$, $p < .01$. Other grade-level differences in responses that were approaching significance were: Criterion B2: Distressing dreams, $F(5, 253)= 2.83$, $p < .05$; Criterion B3: Dissociative reactions, $F(5,253)= 2.39$, $p < .05$; Criterion B4: Psychological distress, $F(5, 253)= 2.67$, $p < .05$; Criterion D1: Dissociative amnesia, $F(5, 253)= 3.52$, $p < .01$; Criterion D3: Distorted blame, $F(5, 253)= 3.25$, $p < .01$; Criterion E2: Reckless or self-destructive behaviors, $F(5, 253)= 2.31$, $p < .05$; and Criterion E4: Exaggerated startle response, $F(5, 258)= 2.31$, $p < .05$.

Significant differences were found in overall endorsement of PTSD symptoms based on income, $F(5, 270)= 2.84$, $p < .05$. After utilizing a Bonferroni correction (Field, 2005) to account for multiple analyses, no significant differences were found for individual symptoms. Symptoms that were approaching significance based on income differences were: Criterion B2: Distressing dreams, $F(5, 270)= 2.41$, $p < .05$.; Criterion B5: Physiological reactions, $F(5,270)= 2.32$, $p < .05$;

Criterion C2: Avoiding external reminders of the trauma, $F(5, 236)=2.54$, $p < .05$; Criterion D3: Distorted blame, $F(5, 270)= 2.27$, $p < .05$; and Criterion E1: Irritable, angry, or aggressive behavior, $F(5, 270)=2.40$, $p < .05$.

Exploratory Factor Analyses

Principle axis factoring (PAF) exploratory factor analyses with a varimax orthogonal rotation was used. Factor solutions were based on eigenvalues of 1.0 or greater, factor loadings of .40 or greater, simple structure, and a reasonable theoretical relationship (Comrey & Lee, 1992). The scree plot indicated a two-factor solution. Further analyses were conducted forcing two, three, and four factors. A three-factor solution produced the simplest factor structure and explained 48.1% of the variance. Items with factor loadings equal to or greater than .40 were retained (Floyd & Widaman, 1995). Based on this criterion, three items were eliminated (Criterion E2: Reckless/ Self-destructive behavior, Criterion E3: Hypervigilance, and Criterion E4: Exaggerated startle response) due to low factor loading. Two items (Criterion E1: Irritable, angry, or aggressive behavior and Criterion B5: Physiological reactions) loaded on to more than one factor. Table 7 presents items and loadings for all factors.

Factor I: Intrusion and Avoidance includes 9 items that assess reoccurring distress, physical responses, and avoidance of trauma reminders ($\alpha=.89$). Factor II: Negative Response includes 7 items that assess negative emotions, diminished interest, and difficulty with memory and/or concentration ($\alpha=.83$). Factor III: Reactive State is composed of 3 items that measure physiological reactions, distorted blame, and dissociative amnesia ($\alpha=.73$). Internal consistency for all scales was acceptable and ranged from .73-.89 (Field, 2005).

Table 7: Factors and Factor Loadings Based on PAF with Varimax Rotation

Item Description	Factor I: Intrusion & Avoidance	Factor II: Negative Response	Factor III: Reactive State
Criterion B4: Psychological distress	**.71**	.22	.16
Criterion B1: Distressing memories	**.66**	.21	.24
Criterion B2: Distressing dreams	**.60**	.32	.20
Criterion C1: Avoiding internal reminders of the trauma	**.59**	.16	.02
Criterion C2: Avoiding external reminders of the trauma	**.58**	.23	.39
Criterion B3: Dissociative reactions	**.58**	.34	.29
Criterion E1: Irritable, angry, or aggressive behavior	**.56**	**.41**	.09
Criterion B5: Physiological reactions	**.55**	.23	**.44**
Criterion E6: Sleep disturbance	**.42**	.38	.26
Criterion D6: Detachment from others	.28	**.78**	.16
Criterion D2: Persistent negative expectations	.25	**.54**	.31
Criterion D4: Pervasive negative emotional state	.16	**.52**	.24
Criterion D5: Diminished interest in activities	.23	**.49**	.17
Criterion D7: Inability to experience positive emotions	.28	**.47**	.22
Criterion E5: Concentration problems	.34	**.47**	.30
Criterion D3: Distorted blame	.15	.39	**.67**

(Table 7 cont.)

Criterion D1: Dissociative amnesia	.26	.37	**.52**
Eigenvalue	3.60	2.87	1.70
% Variance	21.20	16.89	10.00
α	.89	.83	.73

Confirmatory Factor Analyses

CFAs were conducted to assess data fit to the current *DSM-IV* three-factor model (with and without new diagnostic symptoms included), the proposed *DSM-V* four-factor model (with and without new diagnostic symptoms included), and the three-factor model generated by the previously conducted EFA. Newly proposed symptoms were included (and excluded) from both *DSM* models to assess their overall contribution to both a three-factor and four-factor model. Fit was assessed through a non-significant chi-square statistic, root mean square error of approximation (RMSEA) value of less than or equal to .06 (Hu & Bentler, 1999), a comparative fit index (CFI) of at least .95 (Hu & Bentler, 1999; Kline, 2011), a normed fit index (NFI) of at least .95 (Schreiber, Stage, King, Nora, & Barlow, 2006), and a Standardized Root Mean Squared Residual (SRMR) below .08 (Hu & Bentler, 1999).

Overall, the current *DSM-IV* three-factor model provided a poor fit χ^2=615.54, RMSEA=.10, CFI=.79, NFI= .74). Based on analysis, two models produced at least two indications of acceptable fit: the three-factor model generated by the preliminary EFA and the four-factor model proposed for *DSM-V* (including the new diagnostic symptoms). Both models produced significant chi-square statistics (χ^2=241.97, $p < .001$ and χ^2=310.62, $p <. 001$ respectively) indicating a probable poor fit, although this statistic may have been negatively

affected by the sample size (Brown, 2006). NFI values (.89 and .86 respectively) were below .95, indicating questionable fit. However the RMSEA (.06 for both) and SRMR (.05 and .06 respectively) for both models indicates good fit. The CFI from the EFA model (.95) indicates acceptable fit, while the CFI for the proposed *DSM-V* model (.93) is approaching acceptability.

Akaike Information Criterion (AIC) values are also included as an indicator of model complexity. AIC fit indices may be used to make comparisons among non-nested, competing models utilizing the same data (Kline, 2011). Models with smaller AIC statistics are favored because they demonstrate more model parsimony and/or provide a better model fit (Kline, 2011; Saul, Grant, & Carter, 2008). Based on AIC comparisons, the novel EFA-generated model provides the best fit to the data. Fit indices for each model are presented in Table 8.

Table 8: Fit Indices for PTSD Factor Models

Factor Model	*Df*	χ^2	RMSEA	CFI	NFI	SRMR	AIC
Novel: 3-Factor Model Generated by EFA	114	221.57	.06	.95	.89	.05	299.57
DSM-IV: 3-Factor							
Without New Diagnostic Symptoms	169	615.54	.10	.79	.74	.16	380.61
With New Diagnostic Symptoms	166	394.07	.07	.89	.83	.06	513.37
DSM-V: 4-Factor							
Without New Diagnostic Symptoms	167	554.06	.09	.82	.76	.16	392.23
With New Diagnostic Symptoms	164	319.62	.06	.93	.86	.05	446.90

PTSD Prevalence Rates

PTSD prevalence rates were assessed and compared based on both *DSM-IV* and proposed *DSM-V* diagnostic criteria. Overall mean levels of proposed *DSM-V* criteria symptom severity are significantly higher than mean levels of *DSM-IV* symptom severity, t (275)= -18.95, $p < .001$, although no significant differences exist between prevalence rates for PTSD based on *DSM-IV* criteria (21.8% met diagnostic criteria) as compared to proposed *DSM-V* criteria (21.0%). Table 9 depicts the percentage of the sample endorsing criterion from each symptom cluster as well as the overall percentage meeting PTSD criteria based on each set of diagnostic guidelines.

Table 9: Number of Symptoms Significantly Endorsed and Percentage Meeting PTSD Diagnostic Criteria, A Comparison of *DSM-IV* and Proposed *DSM-V* Criteria

Number of Diagnostic Criteria Significantly Endorsed/ Met	*DSM-IV* Criteria	*DSM-V* Criteria
Cluster B		
0 Criterion	38.8%	38.8%
1 Criterion	19.6%	19.6%
2 Criterion	12.0%	12.0%
3 Criterion	10.1%	10.1%
4 Criterion	10.5%	10.5%
5 Criterion	9.1%	9.1%
Diagnostic Criteria Met	**61.2%**	**61.2%**
Cluster C		
0 Criterion	38.4%	53.6%
1 Criterion	21.7%	28.3%
2 Criterion	10.9%	18.1%
3 Criterion	8.3%	----
4 Criterion	9.8%	----
5 Criterion	5.4%	----
6 Criterion	3.3%	----
7 Criterion	2.2%	----
Diagnostic Criteria Met	**29.1%**	**46.4%**

(Table 9 cont.)

Cluster D	28.6%	51.1%
0 Criterion	18.5%	15.6%
1 Criterion	19.2%	6.5%
2 Criterion	14.5%	9.1%
3 Criterion	13.0%	10.1%
4 Criterion	6.2%	4.0%
5 Criterion	----	1.8%
6 Criterion	----	1.8%
7 Criterion	**52.9%**	**33.3%**
Diagnostic Criteria Met		
Cluster E		
0 Criterion	----	22.5%
1 Criterion	----	17.4%
2 Criterion	----	18.5%
3 Criterion	----	17.0%
4 Criterion	----	11.2%
5 Criterion	----	9.8%
6 Criterion	----	3.6%
Diagnostic Criteria Met		**60.1%**
Overall PTSD Diagnostic Criteria		
0 Criteria	30.9%	22.8%
1 Criteria	21.1%	16.1%
2 Criteria	26.2%	18.4%
3 Criteria	21.8%	21.7%
4 Criteria	----	21.0%
PTSD Diagnostic Criteria Met	**21.8%**	**21.0%**

Changes in PTSD symptom severity and prevalence rates were also assessed for the 210 youth participating in both the first (4-7 months post-hurricane; Time 1) and final (25-28 months post-hurricane; Time 2) wave of data collection. PTSD prevalence rates, based on proposed *DSM-V* criteria, at Time 1 were 21.0%, as compared to a PTSD prevalence rate of 6.7% at Time 2. Additionally, overall symptom severity significantly decreased from Time 1 to Time 2, $t(207) = 7.66$, $p < .001$. Table 10 depicts the percentage of the sample endorsing criterion from each symptom cluster as well as the overall percentage meeting PTSD criteria based on each set of diagnostic guidelines for both Time 1 and Time 2.

Table 10: Number of Symptoms Significantly Endorsed and Percentage Meeting PTSD Diagnostic Criteria, a Comparison of Time 1 and Time 2 Responses

Number of Diagnostic Criteria Significantly Endorsed/ Met	Time 1	Time 2
Cluster B		
0 Criterion	38.8%	69.2%
1 Criterion	19.6%	11.4%
2 Criterion	12.0%	10.0%
3 Criterion	10.1%	4.7%
4 Criterion	10.5%	2.4%
5 Criterion	9.1%	2.4%
Diagnostic Criteria Met	**61.2%**	**30.8%**
Cluster C		
0 Criterion	53.6%	78.9%
1 Criterion	28.3%	12.2%
2 Criterion	18.1%	8.9%
Diagnostic Criteria Met	**46.4%**	**21.1%**
Cluster D		
0 Criterion	51.1%	71.0%
1 Criterion	15.6%	11.9%
2 Criterion	6.5%	7.6%
3 Criterion	9.1%	4.3%
4 Criterion	10.1%	1.9%
5 Criterion	4.0%	1.4%
6 Criterion	1.8%	1.0%
7 Criterion	1.8%	1.0%
Diagnostic Criteria Met	**33.3%**	**17.1%**
Cluster E		
0 Criterion	22.5%	27.0%
1 Criterion	17.4%	28.4%
2 Criterion	18.5%	18.1%
3 Criterion	17.0%	14.4%
4 Criterion	11.2%	6.0%
5 Criterion	9.8%	4.2%
6 Criterion	3.6%	1.9%
Diagnostic Criteria Met	**60.1%**	**44.6%**
Overall PTSD Diagnostic Criteria		
0 Criteria	22.8%	57.9%
1 Criteria	16.1%	15.9%
2 Criteria	18.4%	12.5%
3 Criteria	21.7%	7.0%
4 Criteria	21.0%	6.7%
PTSD Diagnostic Criteria Met	**21.0%**	**6.7%**

Discussion

This study was unique in that it evaluated PTSD symptom and factor presentation in hurricane-exposed youth based both on current *DSM-IV* diagnostic criteria as well as proposed *DSM-V* diagnostic criteria. Given previous concern about the appropriateness of current criteria for youth (i.e. Sack et al., 1997; Lonigan et al., 2003; Anthony et al., 1999 & 2005; Ford et al., 2009; Saul et al., 2008), it is imperative to assess developmental considerations of the diagnostic criteria for PTSD as the formulation of *DSM-V* continues. This study's findings indicated similar PTSD prevalence rates when comparing *DSM-IV* and *DSM-V* diagnostic criteria, although higher symptom severity was found when utilizing *DSM-V* criteria. Additionally, current *DSM-IV* factor structure (i.e. symptom cluster presentation) was not found to be appropriate for this sample. Alternative models (i.e. *DSM-V* model and a newly generated model) also provided a questionable fit. Finally, it was found that based on proposed *DSM-V* diagnostic criteria, PTSD symptoms significantly decreased over time (from 4-7 months post-hurricane to 25-28 months post-hurricane). This study's findings are further discussed in the following sections.

Type of PTSD Symptoms Endorsed

Overall, symptoms in Criteria D (Negative cognitions and mood) and Criteria E (Alterations in arousal and reactivity) were endorsed most frequently by participants, while symptoms in Criteria B (Intrusive symptoms) and Criteria C (Avoidance) were least endorsed at a significant level. Despite the frequency of symptom endorsement, a higher percentage of youth met diagnostic criteria for Criteria E and Criteria B, with the lowest percentage meeting diagnostic criteria for Criteria D. These findings are contrary to previous research findings

(Fletcher, 1994). One possibility for this difference in symptom endorsement is the unique nature of this sample and their potential previous experience with disaster and trauma. Additionally, this sample was predominantly African American. Research has shown high levels of religious and active coping strategies in the African American population (Chapman & Steger, 2010; Salloum & Lewis, 2010), which may have impacted overall coping and symptom endorsement. Another explanation could be that the symptoms included in Criteria D and E appear to be more broad, less trauma-specific (i.e. sleep disturbance, problems with concentration, negative emotional state, diminished interest in activities), and overlap with diagnostic criteria for other psychiatric disorders (i.e. Attention-Deficit/ Hyperactivity Disorder, depression, anxiety). In future examinations of criteria for *DSM-V* it will be important to assess symptom endorsement by youth with known comorbid diagnoses to further assess the sensitivity and specificity of the PTSD diagnostic criteria. Furthermore, it will be important to assess the base rates of these symptoms in non-trauma-exposed youth to determine their specificity to the diagnosis of PTSD.

The EFA shed additional light on the appropriateness of proposed and current diagnostic criteria. For example two proposed items (D3: Distorted blame and D4: Negative emotional state) both proved to be a good fit with current diagnostic criteria while three criteria from cluster E proved to be a poor fit with other diagnostic criteria: E2: Reckless or self-destructive behavior (newly proposed), E3: Hypervigilance (current criteria), and E4: Exaggerated startle response (current criteria). A variety of explanations can exist for this finding. First, there is the possibility that these criteria are less applicable and less critically seen in children who have experienced a trauma. Therefore, these criteria, and/or this symptom cluster, may not be developmentally appropriate for youth and may be better suited for adults. Another explanation

is that participants in this sample may have an atypical presentation of PTSD symptoms following a trauma. A final explanation is that additional means of assessing these criteria are needed as they may not have been appropriately captured by the current assessment materials, particularly Criterion E2 since it was assessed with the BASC-2-SRP instead of included on a PTSD assessment measure. Overall, further study of PTSD expression in children, particularly of newly proposed symptoms, is needed to further determine the developmental appropriateness of diagnostic criteria in children.

Results indicated that many demographic variables were found to affect total PTSD symptom endorsement. A child's grade level, race, and pre-hurricane income were the assessed demographic variables that significantly affected overall PTSD symptom endorsement, while child gender was not found to significantly affect overall symptom severity. Hypothesis 1 was partially confirmed. This study further extends upon previous literature by examining the effect of demographic variables on the endorsement of individual diagnostic criteria. For example, a child's grade level was found to have the most effect on specific symptom in *DSM-V* Criteria B, C, and D, while gender had some effect on symptom endorsement in Criteria C. Race was found to have the most effect on symptom endorsement in Criteria B and C. This finding may be related to the adaptive and active coping styles preferred by African American families (over avoidant coping) following Hurricane Katrina (Salloum & Lewis, 2010) since Criterion B and C represent intrusive symptoms and avoidance of trauma-related reminders. Finally, income was found to have the most effect on specific symptom endorsement in Criteria B.

Variable effects of age (i.e. Anthony et al., 1999; Saul et al., 2008) and income on PTSD are consistent with previous literature, although a lack of gender (i.e. Terranova et al., 2009) effect is contrary to previous findings. One possible explanation for these findings could be the

variable, and sometimes small, group sizes in the study. Given the use of a Bonferroni correction, findings may be conservative estimates of actual differences. Another explanation would be that the magnitude of Hurricane Katrina and the lingering post-hurricane recovery led to atypical symptom presentation. While *DSM-V* diagnostic criteria appear to be more gender-sensitive, additional developmentally-appropriate and culturally-sensitive modifications should still be considered.

PTSD Symptom Presentation

This study's factor analyses supported previous research that questioned the appropriateness of current *DSM-IV* PTSD factor structure (i.e. Anthony et al., 1999; Anthony et al., 2005; Ford et al., 2009; Saul et al., 2008). Analyses confirmed that out of five models tested, the current *DSM-IV* three-factor model typically provided the poorest scores on measures of fit (0 out of 5 indices of good fit). Two models produced at least two indices of acceptable fit. The first of these is the currently proposed *DSM-V* model (similar to Saul et al., 2008 with the addition of new diagnostic symptoms) that classifies symptoms into four diagnostic clusters: Intrusive symptoms, Negative cognitions and mood, Avoidance, and Alterations in arousal and reactivity. The second model that showed promise was generated by the EFA and classified PTSD symptoms into three criteria clusters: Intrusion and Avoidance; Negative Response; and Reactive State. This model is unique and dissimilar to models previously presented in the literature. The *DSM-V* model produced 2 out of 5 indices of good fit while the three-factor EFA-generated model generated the most significant fit indices (3 out of 5), in addition to the lowest AIC score among tested models. While these two models show minor signs of progress as compared to the current *DSM-IV* model, none of the tested models provided a consistently good

fit for this sample. Therefore Hypotheses 3 is confirmed (no indicators of good fit), and Hypothesis 4 is partially confirmed (i.e. the model produced two indices of good fit).

The lack of support for the current *DSM-IV* PTSD model further provided support for revisions to the diagnosis, although support for the proposed *DSM-V* model remains questionable. The inclusion of the additional *DSM-V* symptom criteria assessing PTSD improved fit for both *DSM-IV* and *DSM-V* models, indicating that this addition is a positive step toward assessing PTSD in youth. Further examination and elimination of included PTSD criteria may yield a better model fit since none of the tested models provided an ideal fit for the data. Further assessment with additional youth of both the three-factor EFA-generated model and the four-factor *DSM-V* proposed model should be conducted. These alternative samples should be composed of youth of varying ages (extending beyond this 3rd to 8th grade sample) in addition to assessing youth exposed to a variety of traumas (beyond natural disasters) to further assess model fit.

PTSD Prevalence

Findings indicated no significant differences in prevalence rates based on current *DSM-IV* versus proposed *DSM-V* criteria. Therefore, Hypothesis 5 was not supported. This finding indicates no significant changes in diagnostic rates, despite the addition of potential symptoms and the restructuring of symptom presentation. At this time the required number of present symptoms in youth is still being considered and is typically lower than the number of symptoms required for adults but comparable to or lower than the number of symptoms required by *DSM-IV*. Therefore specific cutoff criteria should be further assessed in the formulation of *DSM-V* if increased specificity and sensitivity are a diagnostic goal.

The PTSD prevalence rate in this study was approximately 21% four to seven moths post-hurricane, which is within the range of previously reported post-Katrina PTSD prevalence rates ranging from 17% to 46% (Blaze & Shwalb, 2009; Pina et al., 2008; Moore et al., 2010). Consistent with previous literature (i.e. Pfefferbaum et al., 2000; Becher et al., 1999) symptom severity for participants significantly decreased over time to 6.7%. One possibility for this decrease in symptoms is that a positive post-recovery environment with high levels of social support (Vigna et al., 2009) led to child resiliency. Another possibility is that symptom endorsement naturally decreased with time. Therefore, Hypothesis 6 was confirmed.

Strengths and Limitations of the Current Study

There are many strengths to the current study. First, this study provided a preliminary empirical assessment of the developmental appropriateness of proposed *DSM-V* diagnostic criteria for PTSD. Given the numerous criticisms of *DSM-IV*, it is especially important to empirically evaluate diagnostic criteria before publication of *DSM-V*. Additional information was provided regarding PTSD's presentation in youth, which can assist in directing the formulation of the disorder in *DSM-V*. This study also utilized proposed *DSM-V* criteria to provide further validation for previously conducted PTSD research, showing the stability of certain features of the diagnosis across time and different versions of the *DSM*.

Despite this study's strengths, there are also limitations. First, a very specific sample was utilized for this assessment of PTSD criteria. Different results may be found based on non-disaster trauma victims, different age ranges (i.e. young children or children in high school), or higher income levels. While efforts were made to conduct comparisons between demographic sub-groups, the low representation of certain age ranges and races may lead to differing findings

with more demographically-balanced participant groups. Conservative statistics may have also minimized significant findings. Another potential limitation of the study is that while many youth participated in both Time 1 and Time 2 data collection, not all participants were retained. Therefore Time 2 estimates may not accurately reflect PTSD estimates. Finally there are limits to the assessment measures used. The UCLA PTSD Index is used as a screening instrument and therefore cannot officially diagnose PTSD. Additionally, given the revisions to proposed PTSD criteria, multiple measures had to be combined to assess participants, with a particular weakness in the assessment of newly added criteria E2: Reckless or self-destructive behavior. Therefore the possibility remains that a measurement error may have influenced some findings in this study.

Implications for DSM-V

Overall it appears that the formulation of new diagnostic criteria for *DSM-V* is progress toward a more developmentally-appropriate presentation of PTSD in youth. The reformulation of diagnostic clusters and addition of new symptom criteria appear to have improved the appropriateness of diagnostic specifications for youth. However, additional follow up assessment is needed to address the specificity of these diagnostic criteria, as many criterion still overlap with other psychiatric disorders. Further assessments should be conducted to specify the symptom severity needed for endorsement (i.e. as opposed to current language of "as evidenced by") and to finalize the number of required criteria from each symptom cluster needed in order to be awarded a PTSD diagnosis. The current study should be viewed as a preliminary assessment of proposed *DSM-V* criteria that can guide and streamline the future assessment of PTSD in youth.

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Appendix A: Demographic Questionnaire

DEMOGRAPHIC QUESTIONNAIRE

ABOUT YOU AND YOUR FAMILY

Please fill out the following background information about yourself and your family. Read each item carefully.

Your age: _____
Your spouse's age: _____
Your child's age: _____
Your child's sex: _____

Your Child's School History:
Your child's current grade: _____
School your child attended BEFORE the hurricane? _____
(Circle one: Public or Private)
School your child attends NOW, after the hurricane? _____
(Circle one: Public or Private)

Race:

____ White
____ Black
____ Hispanic
____ Asian
____ Native American
____ Pacific Islander
____ Other

Marital Status:

____ Never Married
____ Married
____ Separated
____ Divorced
____ Widowed

Education: What is the highest level of education completed by?

Yourself

____ 6th grade or less
____ Junior High school (7th, 8th, 9th grade)
____ Partial high school (10th, 11th grade)
____ High school graduate
____ Partial college (at least 1 year) or specialized training
____ Standard college or university graduate
____ Graduate professional degree (Master's, Doctorate)

Your Spouse

____ 6th grade or less
____ Junior High school (7th, 8th, 9th grade)
____ Partial high school (10th, 11th grade)
____ High school graduate
____ Partial college (at least 1 year) or specialized training
____ Standard college or university graduate
____ Graduate professional degree (Master's, Doctorate)

Past Income: What was the total annual income of your household BEFORE the hurricane? (Combine the income of all the people living in your house right now as well as any government assistance.)

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

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

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

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

Past Occupation: Please provide the following information about you and your spouse's job(s) BEFORE the hurricane.

<u>About You</u>

What was your occupation/job title? (If you were retired, pleased write "retired" and your past occupation. If you did not work outside the home, write "unemployed.")

_____

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

_____

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

_____

_____

If you were unemployed before the hurricane, were you seeking a new job? Yes / No

<u>About Your Spouse</u>

What was your spouse's occupation/job title? (If they were retired, pleased write "retired" and their past occupation. If they did not work outside the home, write "unemployed.")

_____

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

_____

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

_____

_____

If your spouse was unemployed before the hurricane, were they seeking a job? Yes / No

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

About You

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

_____

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

_____

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

_____

_____

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

About Your Spouse

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

_____

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

_____

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

_____

_____

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

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

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

What was the TOTAL number of people, including yourself, living in your home BEFORE the hurricane? _____

What was the TOTAL number of adults over 18, including yourself, living in your home BEFORE the hurricane? _____

What was the TOTAL number of children under 18 living in your home BEFORE the hurricane? _____

Appendix B: Hurricane Exposure Questionnaire
Hurricane-Related Traumatic Experiences (HURTE)

What Happened to You During the Hurricane - Child

During the Hurricane

1. Where were you during the hurricane? (you can check more than one)

_____ in my home	_____ in a closet
_____ in a friend's or relative's home	_____ in a bathroom
_____ in a shelter	_____ in a hallway
_____ out of town (evacuated)	_____ in a car
_____ in a hotel/motel	_____ in an attic

_____ other (describe) _____

2. Did windows or doors break in the place you stayed during the hurricane?
a. Yes b. No

3. Did you get hurt during the hurricane?
a. Yes b. No

4. At any time during the hurricane, did you think that you might die?
a. Yes b. No

5. Did you see anyone else get hurt badly during the hurricane?
a. Yes b. No

6. Did you have to go outside during the hurricane because the building you were staying in was badly damaged?
a. Yes b. No

7. Did a pet you liked get hurt or die during the hurricane?
a. Yes b. No

8. Did you get hit by anything falling or flying during the hurricane?
a. Yes b. No

9. Was your mother or father with you during the hurricane?
a. Yes b. No

10. Overall, how scared or upset were you during the hurricane?
a. Not at all b. A little c. A lot d. A whole lot

11. Did you have to be rescued from the place you stayed during or after the hurricane?
a. Yes b. No

What Happened to You After the Hurricane

After the Hurricane

1. Was your home damaged badly or destroyed by the hurricane?
a. Yes b. No

2. Did you have to go to a new school because of the hurricane?
a. Yes b. No

3. Did you move to a new place because of the hurricane?
a. Yes b. No

4. Did one of your parents lose his or her job because of the hurricane?
a. Yes b. No

5. Has it been hard to see your friends since the hurricane because they moved or you moved?
a. Yes b. No

6. Did your family have trouble getting enough food or water after the hurricane?
a. Yes b. No

7. Were your clothes or toys ruined by the hurricane?
a. Yes b. No

8. Did your pet run away or have to be given away because of the hurricane?
a. Yes b. No

9. Did you have to live away from your parents for a week or more because of the hurricane?
a. Yes b. No

10. Has your family had to move in with friends or relatives since the hurricane?
a. Yes b. No

11. Overall, how upset about things have you been since the hurricane?
a. Not at all b. A little c. A lot d. A whole lot

Appendix C: Consent and Assent Forms

Informed Consent Form

1. Study Title. Predictors of Recovery in Children Evacuated from Hurricane Katrina

3. **Performance Sites**: Schools in Louisiana

3. **Names and Telephone Numbers of Investigators**: The following investigators are available for questions about this study, M-F, 8:00 a.m.-4:30 p.m.:
Mary Lou Kelley, Ph.D. (225)578-4113

4. **Purpose of the Study**: The purpose is to study the effects of Hurricane Katrina on the adjustment of children and their parents and identify factors that aid adjustment.

5. **Participant Inclusion**: Mothers and their children ages 7-14

6. **Number of Participants**: 400

7. **Study Procedures**: You and your child will spend approximately 1.5 hours completing several questionnaires, and return them to the researchers. You and your child may be asked to participate in a structured interview subsequent to completing the questionnaires. You and your child will be asked to complete the questionnaire packet at three, six and twelve month time periods. Your child's teacher will also be asked to complete two questionnaires as well.

8. **Benefits**: A greater understanding of variables related may be a possible benefit. Also, in the case of a needed referral for psychological services if you desire, will be available. Such referrals may include Baton Rouge Mental Health (225-922-9445) or the Psychological Services Center (225-578-1494). Some participants may even find it beneficial to have an opportunity to describe and recall their experiences during and after Hurricane Katrina. Each mother and child pair who complete a packet of questionnaires may be compensated with a monetary and/or other form of reward.

9. **Risks**: You and your child may become upset while completing the questionnaires because there are questions related to your experiences associated with Hurricane Katrina. We will give referral cards for further psychological services to all participants in the case that they may become emotionally upset. Also, as a mandated reporter of abuse and neglect, **any disclosure or threat of abuse revealed during data collection will be reported to Child Protective Services immediately. You will be verbally notified of this risk prior to data collection. Also, the clinician will inform you if a report is warranted.**

10. **Right to Refuse**: Participants may choose not to participate or to withdraw from the study at any time without penalty.

11. **Right to Privacy**: Results of the study may be published, but no names or identifying information will be included in the publication. Participant identity will remain confidential unless disclosure is required by law.

This study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about participants' rights or other concerns, I can contact Robert C. Matthews, Chairman, LSU Institutional Review Board, (225) 578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.

_____ _____

Signature of Parent Participant Date

The study participant has indicated to me that he/she is unable to read. I certify that I have read this consent form to the participant and explained that by completing the signature line above, the participant has agreed to participate.

_____ _____

Signature of Reader Date

I grant permission for this study's researchers to access my child's past academic records, including his or her school lunch status, placements, and achievement test scores. I understand that my child's identifying information will be removed and coded to ensure privacy of the information. Also, I understand that by consenting to my and my child's participation in this study, I grant my permission for my child's teacher to complete questionnaires regarding my child's behavior and functioning.

_____ _____

Signature of Parent Participant Date

Assent Form

1. Study Title: Predictors of Recovery in Children Evacuated from Hurricane Katrina

4. **Performance Sites**: Schools in Louisiana

3. **Names and Telephone Numbers of Investigators**: If you have any questions about the study, you can call Dr. Mary Lou Kelley at (225)578-4113 during the day.

4. **Purpose of the Study**: This study will look at how you, your family, and other children and families may have been affected by Hurricane Katrina.

5. **Participant Inclusion**: Mothers and their children ages 7-14

6. **Number of Participants**: 400

7. **Study Procedures**: You and your mother will spend about 1.5 hours answering some questions in a packet. Then you and your mom will return them to the researchers. You may be asked to answer more questions than others. Also, you will complete a question packet at three, six and twelve months. Your teacher will also be asked some questions as well.

8. **Benefits**: A better idea of how a hurricane may affect children and families. Also, you and your mom may get a reward after you and she complete your packets of questions.

9. **Risks**: You may become upset after thinking about what happened to you and your family during Hurricane Katrina. In case of this, we will give you cards with phone numbers and addresses of clinics that may help you if you do become upset. **Also, if you tell us that you have been abused, we will tell your mother as well as Child Protection**.

10. **Right to Refuse**: You may choose not to complete the packets or quit the study at any time without any problem.

11. **Right to Privacy**: This study may be published, but your and your mom's names not be included in any publication.

_____Child Participant's Age

_____	_____
Child Participant's Name	**Child Participant's Signature**
_____	_____
Date	Witness

Vita

Valerie Paasch graduated *Magna Cum Laude* from Millsaps College in May 2003 with a Bachelor of Science in psychology. She completed her graduate training in child clinical psychology at Louisiana State University, receiving her Master of Arts degree in May 2007 and her Doctor of Philosophy degree in December 2010. Valerie completed her pre-doctoral internship in pediatric psychology at the Kennedy Krieger Institute and Johns Hopkins University School of Medicine. She will begin her post-doctoral fellowship there in November 2010.