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The effects of community violence exposure on children affected by Hurricane Katrina

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THE EFFECTS OF COMMUNITY VIOLENCE EXPOSURE ON
CHILDREN AFFECTED BY HURRICANE KATRINA

A Thesis

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

in

The Department of Psychology

by
Audrey Baumeister
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Abstract

Hurricane Katrina was one of the most disastrous natural occurrences to ever hit the United States. It is known that increased adjustment difficulties have been found among children following a disaster. Further, community violence exposure has been linked to several areas of negative psychological functioning including PTSD, depression, and anxiety. This study examines the predictive value of level of exposure to the hurricane, level of community violence exposure, and gender, in examining PTSD symptomatology following Hurricane Katrina. Participants were 230 mother-child dyads recruited from various public and private elementary and middle schools within Orleans Parish, Jefferson Parish, and East Baton Rouge Parish 4-7 months post Hurricane Katrina. Children completed the UCLA PTSD Reaction Index, the Hurricane-Related Traumatic Experiences, and the Screen for Adolescent Violence Exposure, in addition to other measures utilized in a larger grant funded research project. Hierarchical regression analyses revealed that hurricane exposure and community violence exposure each were significant predictors of PTSD symptoms in children following the hurricane. Gender did not serve as a predictor of PTSD symptoms. Clinical implications and suggestions for future research are discussed.

Introduction

Recent studies have suggested that disaster exposure increases risk for a wide range of mental health and physical-health reactions such as Posttraumatic Stress Disorder (PTSD), depression, and anxiety, as well as increased substance abuse and smoking (e.g., Galea et al., 2002, 2003; Vlahov et al., 2002; Vlahov, Galea, Ahern, Resnick, & Kilpatrick, 2004; see Norris et al., 2002). Research has documented high rates of PTSD symptoms in children subsequent to experiencing a natural disaster (LaGreca & Prinstein, 2002). However, only a limited number of studies in the disaster research literature have specifically examined children.

Hurricane Katrina struck the Gulf Coast of the United States on August 29th, 2005. Prior to the strike, New Orleans, Louisiana was the 35th largest city in the United States (U.S. Census Bureau, 2004). The night before the storm, approximately 1.1 million people were issued a mandatory evacuation (Froomkin, 2007). As discussed in our National Institute of Mental Health Grant (Kelley, 2006) which examines predictors of recovery in children evacuated from Hurricane Katrina, many residents remained in the city as they were disabled or poor and lacked privately owned transportation needed to leave. National news coverage displayed the horrific conditions people suffered as crime ran rampant while residents awaited food, water, and rescue. With hurricane force winds and a breach in the levee system which caused flooding in nearly 80% of the city, roughly 1,000 lives were lost and nearly 500,000 homes were destroyed (Hurricane Katrina, 2005). Families lost homes, possessions, schools, and support systems, and many were separated from their families during evacuations and rescues. Approximately 500,000 residents remained displaced four months after the storm (Froomkin, 2007). Hurricane Katrina proved to be one of the most devastating natural disasters ever to hit the United States

with widespread destruction of homes and businesses that spanned Louisiana, Alabama, and Mississippi.

Approximately 25% of Orleans Parish citizens are at or below the poverty level, and 67.9% are African American (U.S. Census Bureau, 2004). Given post-disaster risk factors for PTSD, including personal threat, resource loss, and other key characteristics of hurricane exposure (Asarnow, 1999; Bradburn, 1991; LaGreca, Vernberg, Silverman, & Prinstein, 1996), as well as minority status (LaGreca et al.; Lonigan, Shannon, Finch, Daugherty, & Taylor, 1991), victims of Hurricane Katrina may be at greater risk for experiencing PTSD symptoms.

Research on children's reactions to traumatic events did not receive much attention until the publication of the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III; American Psychiatric Association, 1980) in 1980 (Mash & Barkley, 2003). In 1987 the DSM-III-Revised (DSM-III-R; American Psychiatric Association, 1987) added child-specific symptoms of PTSD, enabling researchers to explore child reactions post-disaster. Since publication of the DSM-IV (DSM-IV; American Psychiatric Association, 1994), some researchers have questioned the validity of the diagnostic criteria for younger children (Scheeringa, Zeanah, Drell, & Larrieu, 1995). The history of research examining children's reactions post-disaster may be considered short, and many questions remain.

Due to the unpredictable nature of traumatic events, it is difficult to study the associated factors and psychological consequences. This study examined how hurricane exposure, community violence exposure, and gender are all explanatory factors in the development of posttraumatic stress disorder. The following review discusses the diagnostic criteria and previous research on posttraumatic stress disorder in children. Additionally, a review of disaster research and community violence exposure is provided.

Posttraumatic Stress Disorder (PTSD)

Posttraumatic Stress Disorder (PTSD) is a debilitating condition with a host of negative symptoms that emerge after exposure to a traumatic event (American Psychiatric Association, 2000). PTSD was first recognized by the American Psychiatric Association in the DSM-III (American Psychiatric Association, 1980) in 1980. The disorder was initially diagnosed in Vietnam combat veterans who described the recurring traumatic experiences that interfered with their daily functioning (Roberts et al., 2000). In a meta-analysis by Fletcher (1994), which included 2,697 children from 34 samples, it was found that an average of 36% of children exposed to traumatic events are diagnosed with PTSD. Traumatic events may include exposure to war, physical or sexual abuse, and natural disasters. Symptoms of PTSD have been reported in children following hurricanes Andrew and Hugo (Vernberg, LaGreca, Silverman, & Prinstein, 1996; Burton, Foy, Bwanausi, Johnson, & Moore, 1994), and researchers believe that exposure to a traumatic event such as a hurricane is a major factor in the development of PTSD (Vernberg et al., 1996).

According to the DSM-IV (DSM-IV, American Psychiatric Association, 1994), in order to meet criteria for PTSD, the individual's response to the traumatic event must include a specific number of symptoms from each of the three broad categories: re-experiencing, avoidance/numbing, and increased arousal. These criteria are described in Table 1. Symptoms must follow the experience of or witnessing of an event involving actual or threatened death or serious injury. The person's response to the event must involve intense fear, helplessness, or horror. Further, the duration of the disturbance must be greater than one month, and cause clinically significant distress or impairment in social, occupational, or other important areas of functioning (American Psychiatric Association, 1994).

Table 1.

Diagnostic Criteria for PTSD

Criterion	Symptoms
One or more of the following re-experiencing symptoms	<ol style="list-style-type: none"> 1. Recurrent, intrusive distressing recollections of the event, including images, thoughts, or perceptions -in young children, repetitive play may occur which includes themes or aspects of the trauma 2. Recurrent distressing dreams of the event-in children this may include distressing dreams without recognizable content 3. Acting or feeling as if the traumatic event were recurring-in young children, this may include trauma-specific reenactment 4. Intense psychological distress when exposed to internal or external cues which symbolize or resemble an aspect of the traumatic event 5. Physiological reactivity following exposure to internal or external cues which symbolize or resemble an aspect of the traumatic event

(table cont'd)

Criterion	Symptoms
Three or more of the following symptoms related to avoidance of stimuli associated with the trauma	<ol style="list-style-type: none"> 1. Avoidance of thoughts, feelings or conversations associated with the trauma 2. Avoidance of activities places or people that bring recollections of the trauma 3. Inability to recall an important aspect of the trauma 4. Diminished interest in significant activities 5. Feeling of detachment from others 6. Restricted range of affect 7. Sense of foreshortened future
Two or more of the following symptoms of increased arousal	<ol style="list-style-type: none"> 1. Difficulty falling or staying asleep 2. Irritability 3. Difficulty concentrating 4. Hypervigilance 5. Exaggerated startle response

Note. From Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, by American Psychiatric Association, 1994, Washington, DC: American Psychiatric Association.

For children, re-experiencing is the most commonly reported symptom of PTSD (LaGreca et al., 1996). In young children this may be manifested by trauma themed repetitive play (Russoniello et al., 2002; LaGreca et al., 1996). LaGreca et al. found that over three quarters of children reported at least one re-experiencing symptom 10 months post-disaster.

Typically the assessment of PTSD in children involves self-report, with less emphasis placed on parent-completed measures. It is well established that parents and teachers generally underestimate distress experienced by child survivors of disasters (Earls, Smith, Reich, & Jung,

1988; McFarlane, 1987; Galante & Foa, 1986). Given age-appropriate means, very young children are able to give graphic accounts of their experiences and report their own levels of distress (Misch, Philips, Evans & Berelowitz, 1993).

Studies that assessed PTSD in children have used a variety of measures. Prevalence rates and symptom severity may vary with the type of assessment instrument used. Both structured interviews and questionnaires have been employed.

Measures of PTSD: Structured Interviews

The Clinician Administered PTSD Scale for Children (CAPS-C; Nader, Kriegler, Blake, & Pynoos, 1994) is a semi-structured clinical interview employing prompt questions as well as supplementary follow-up questions that assess all DSM-IV criteria for PTSD and has been used in numerous studies (Meiser-Stedman, Yule, Smith, Glucksman, & Dalgleish, 2005; Stallard, Velleman, & Baldwin, 2001). The CAPS-C has adequate internal consistency estimates and adequate concurrent validity estimates (Amaya-Jackson, McCarthy, Cherney, & Newman, 1995; Nader, Pynoos, Fairbanks, & Frederick, 1990; Nader et al., 1996; Newman & Ribbe, 1996; Pynoos et al., 1987). Saltzman et al. (2003) assessed PTSD using the CAPS-C and found significant correlations among symptom cluster ratings over time.

Other studies examining PTSD among youth have used the Anxiety Disorders Interview Schedule (ADIS) for DSM-IV (Silverman & Albano, 1996), a structured interview specifically designed to provide diagnoses for a range of anxiety, mood, and somatoform disorders (Silverman & Albano, 1996). The format of the ADIS includes screening questions for each diagnostic category, and participant responses are used to determine whether more specific, symptom-related questions are required. The ADIS has demonstrated good psychometric

properties for the assessment of anxiety disorders in youth (Silverman & Albano; Silverman, Saavedra, & Pina, 2001).

The administration of semi-structured or structured interviews requires extensive training and adequate financial resources. Moreover, the assessment of a large number of individuals through use of such interviews is costly. Given this, the assessment of a large sample of children may be more efficiently conducted through the use of self-report questionnaires.

Measures of PTSD: Self-report Questionnaires

Numerous studies have assessed PTSD with the use of self-report questionnaires, such as the Trauma Symptom Checklist for Children (TSCC-A; Briere, 1996; e.g., Flowers, Lanclos, & Kelley, 2002). The TSCC-A is comprised of 44 items which include six subscales measuring constructs associated with the development of PTSD. The TSCC-A has demonstrated adequate internal consistency, convergent validity, and construct validity (Briere; Flowers, Lanclos, & Kelley). Although the questionnaire measures constructs associated with PTSD, it does not directly measure PTSD symptoms.

The Reaction Index (RI; Frederick, Pynoos, & Nader, 1992) is an extensively used 20-item PTSD assessment questionnaire which yields a severity classification rating scale from *doubtful* to *severe*. It has shown good psychometric properties with high inter-rater reliability, inter-item agreement, internal consistency, and strong correlation with established cases of PTSD (Frederick, Pynoos, & Nader, 1992).

The UCLA PTSD Reaction Index (UCLA PTSD-RI; Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998) is a 22-item, revision of the widely used RI. Like the RI it is used to screen for the diagnosis of PTSD in children and adolescents according to the DSM-IV. The measure yields separate scores for each symptom cluster (re-experiencing, of the traumatic event,

avoidance, and increased arousal), as well as an Index Summary Score and Diagnosis Score.

This measure has high internal consistency and test-retest reliability, as well as high sensitivity and specificity (Pynoos, Goenjian, & Steinberg, 1998; Rodriguez, Steinberg, Saltzman, & Pynoos, 2001; Steinberg, Brymer, Decker, & Pynoos, 2004). This measure was used by Thienkrua et al. (2006) to identify PTSD in relation to proximity to the 2004 Tsunami. The UCLA-PTSD-RI is ideal for the detailed study of a large sample of children.

Prevalence of Community Violence Exposure

Community violence exposure has reached epidemic proportions and has emerged as a major subject of research (Self-Brown et al., 2006; Guterman, Cameron, & Staller, 2000). As much as 46% to 66% of urban adolescents have been directly victimized by means of physical assault, sexual assault, and robbery (Dempsey, Overstreet, & Moely, 2000; Springer & Padgett, 2000). Reports from elementary school children of witnessing a shooting or stabbing have ranged from 18% to 30% (Bell & Jenkins, 1993; Osofsky, Wewers, Hann, & Fick, 1993; Richters & Martinez, 1993). Furthermore, Self-Brown et al. (2006) found that approximately half of their study's sample of inner city adolescents reported hearing gunshots in their neighborhood.

Measures of Community Violence Exposure

Measures of community violence vary in the scope of situations included. Some studies have defined "community" as an individual's neighborhood, schools, recreation areas, shops, and streets near to the home (Guterman et al., 2000). Other studies have narrowed the scope to include only the home, school, and neighborhood (Singer, Anglin, Song, & Lunghofer, 1995). In terms of defining violence, definitions have ranged in specificity. Guterman et al. reports that

many studies define youth violence exposure to include acts such as rapes, assaults, knifings, and gun shootings.

Assessment of community violence exposure has included census data, examiner-created questionnaires, as well as standardized measures of violence. A limited number of psychometrically sound questionnaires measuring community violence are available. The most commonly used include: the Children's Report of Exposure to Violence (CREV; Cooley, Turner, & Beidel, 1995), the Survey of Exposure to Community Violence (SECV; Richters & Saltzman, 1990), and the Screen for Adolescent Violence Exposure (SAVE; Hastings & Kelley, 1997).

The CREV is a 29-item self-report questionnaire which assesses children's exposure to community violence in terms of deliberate acts intended to cause physical harm. Responses are made on a 5-point Likert scale assessing frequency of lifetime exposure through modes such as media, hearsay, direct witness, or direct experience. The CREV has acceptable 2-week test-retest reliability, internal consistency, and construct validity (Cooley et al., 1995). Cooley-Quille and Lorion (1999) used the CREV to examine the relationship between community violence exposure and sleep disturbance in urban youth. They found exposure to community violence to be positively related to sleep disturbance. While the CREV has proven to be psychometrically sound, its construct validity is questionable given its inclusion of media violence.

The SECV is a 36 item measure of community violence exposure with adequate test-retest reliability and internal consistency. (DuRant, Caldenhead, Pendergrast, Slavens, and Linder, 1994; Richters & Martinez, 1990). Using the SECV, Sams and Truscott (2004) found that adolescents' levels of community violence exposure were significantly correlated with increased violent behavior. Using a modified, parent report version of the SECV, Osofsky et al. (1993) examined the effects of community violence in youth in New Orleans, Louisiana. They

found a significant relationship between exposure to community violence and the overall stress symptoms observed in children.

The SAVE is a 32 item measure that assesses violence exposure in three different settings (school, home, and neighborhood). This measure includes three violence exposure factors for each setting scale: Traumatic Violence (severe victimization experiences), Indirect Violence (witnessing or being informed of a less severe interpersonal violence), and Interpersonal Aggression (threatened harm directed at the participant). The SAVE has been found to successfully classify low- and high-violence groups and demonstrated good construct validity, internal consistency, test-retest reliability, and validity. High rates of community violence exposure as measured by the SAVE have been associated with higher levels of adolescent externalizing and internalizing problems (Hastings & Kelley, 1997).

Community Violence and Psychological Symptoms

Community violence has been linked to negative psychological functioning including PTSD, depression, anxiety, dissociation, self-destructive behavior, aggression, and anger (e.g., DuRant, Getts, Cadenhead, Emans, & Woods, 1995; Flannery, Singer, & Wester, 2001; Flannery, Wester, & Singer, 2004; Self Brown et. al). It has also been linked to diminished positive affect (Larzman & Swisher, 2005). As youth living in high-crime areas are more frequently exposed to death and injury and at young ages, they may lack social support from their own parents, as their parents are dealing with their own grief (Osofsky et al., 1993). Patchin, Hubner, McCluskey, Varano, and Bynum (2006) found that youth exposed to neighborhood violence reported lower levels of parental supervision and school attachment and were more likely to associate with delinquent peers.

Children exposed to community violence have demonstrated a higher prevalence of overall stress symptoms (Osofsky et al., 1993). Overstreet et al. (1999) found that nearly one-third of children between ages 10 and 15 exposed to community violence displayed symptoms consistent with all PTSD symptom clusters. They also found 10% of these children to have clinically significant symptoms of depression. Self-Brown, LeBlanc, and Kelley (2004) found that adolescents who experienced higher levels of daily stress and violence exposure reported higher levels of internalizing and externalizing problems. However, adolescents who reported lower levels of daily stress did not show a significant relationship between violence exposure and negative psychological symptoms. Further, Self-Brown et al. (2006) found that females endorse higher levels of psychological symptomatology following community violence exposure, when compared to males.

Prevalence of Psychological Symptoms after a Natural Disaster

Approximately 7% of the U.S. population each year is exposed to extreme stressors such as natural disasters, driving accidents, and acts of terrorism (Norris, 1988). Much research has assessed the impact of trauma and disaster on individuals, families, and communities, focusing mainly on the development of Acute Stress Disorder and PTSD. Natural disasters such as hurricanes, floods, earthquakes, and tornados are some of the most traumatic events that may cause PTSD (American Psychiatric Association, 1994).

Following Hurricane Andrew, LaGreca et al. (1996) examined symptoms of posttraumatic stress in 3rd-5th grade children. After three months, 39.1% of the children experienced severe symptoms of PTSD. Although symptoms reported by children declined, a substantial level of symptoms was observed up to 10 months post-disaster. Findings also showed that major life events (e.g., death, or hospitalization of a family member) occurring in the months

following the hurricane made significant contributions to children's continued post-disaster distress.

Following Hurricane Floyd, researchers reported on the levels of PTSD experienced by 4th grade children 6 months post-hurricane (Russoniello, et al., 2002). They found that almost 95% of children reported symptoms of PTSD. Moreover, they found the variables most associated with severe PTSD symptoms included being female (45%) and experiencing flooding at home (46%). Those children who reported flooding of their homes were three times more likely to report symptoms than those whose homes were not flooded.

After the 1999 flooding in Mexico, researchers sampled participants from various affected cities at four time periods post-disaster. At wave 1, PTSD was highly prevalent (24% across entire study), especially in cities that experienced mass casualties and displacement. At wave 2, PTSD symptoms declined, though shortly after stabilized (Norris, Murphy, Baker, & Perilla 2004). In the city of Tezuitlan, a more severely impacted area, the prevalence of PTSD at 6 months post-disaster (46%) was over three times higher than the prevalence observed in low impact areas. Consistent with other studies, the prevalence of PTSD declined over time, however, the prevalence remained high enough to be a public health concern (Norris et al.; LaGreca et al., 1996).

Shaw et al. (1995) compared the prevalence of PTSD in school-aged children who were in the direct pathway of the Hurricane Andrew to a group of children in less affected areas (Shaw et al., 1995). At eight weeks post-hurricane, the researchers did not find significant differences between the two schools. However, at the 32 week follow up, children with greater exposure to Hurricane Andrew were more likely to have severe symptoms of posttraumatic stress than the

less exposed group. The researchers concluded that psychological distress is correlated with proximity to the zone of impact.

Several factors have been associated with increased adjustment difficulties in children following a disaster. As mentioned in our National Institute of Mental Health Grant (Kelley, 2006) these factors include maternal distress (Green, 1991; Swenson, 1996), parent somatization (Rustemli & Karanei, 1996), maternal symptoms of PTSD (Jones, Ribbe, Cunningham, Weddle, & Langley, 2002; Mirzamani & Bolton, 2002), pre-disaster psychological adjustment (Asarnow, 1999; Earls et al., 1988), past exposure to violence or traumatic events (Garrison et al., 1995), female gender (Lonigan et al., 1991; Garrison, Weinrich, Hardin, Weinrich, & Wang, 1993), and minority status (LaGreca et al., 1996; Lonigan et al., 1991).

Numerous conceptual models have been proposed to explain the post-disaster development of PTSD in children (Karol, Green, & Glessner, 1999; Jones et al., 2002; LaGreca et al., 1996). Karol et al. (1999) identified four factors which interact to determine short and long-term functioning post-disaster: individual characteristics, environmental characteristics, characteristics of the stressor (loss, perceived threat), and cognitive processing of the event.

Based on previous research (Green, 1991; Karol, 1990; Pynoos & Nader, 1988) LaGreca et al., (1996) created a conceptual model for predicting children's reactions to natural disasters (see Figure 1).

Given the model above and current literature regarding children's reactions to natural disasters, a blatant lack of examination of variables exists in the literature. The majority of studies have focused on trauma exposure and prevalence, or stability of PTSD symptoms. Few studies have examined children's pre-disaster functioning or more specifically, their prior trauma exposure. Of note, African American ethnicity has been correlated with higher levels of PTSD,

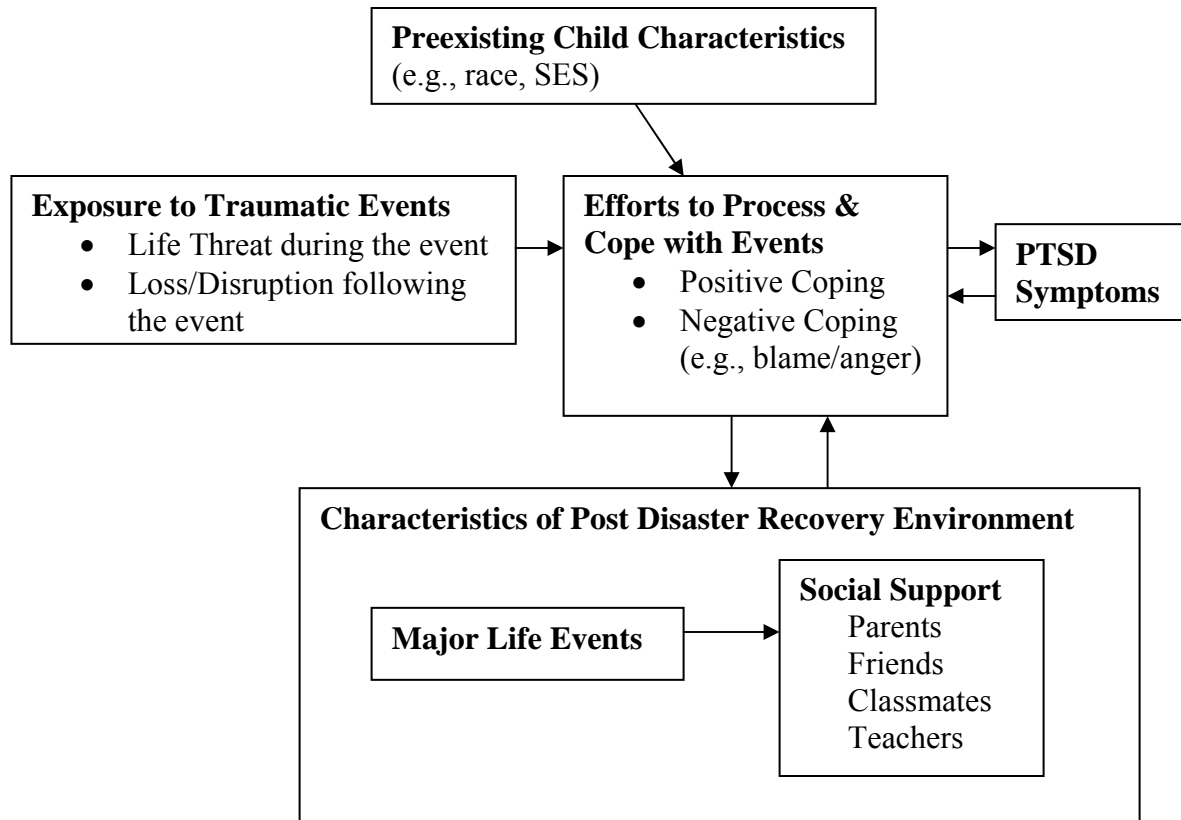


Figure 1. LaGreca et al.'s (1996) conceptual model for children's post-disaster reactions.

however, past research would suggest that low SES African Americans are exposed to higher levels of violence exposure. Therefore violence exposure may serve as a more precise predictor of PTSD symptoms as opposed to income and ethnicity.

Summary and Purpose

Published reports regarding posttraumatic stress in children after natural disasters are on the rise (e.g. Roussos et al., 2005; Bulut, Bulut, & Tayli, 2005; Kreuger & Stretch, 2003).

Symptoms in children after natural disasters have included poor concentration, bad dreams, poor sleep, and feelings of distress (Vernberg et al., 1996; Lonigan et al., 1994; Yule, 1998).

Hurricane Katrina is a unique disaster in that it has resulted in the displacement of the majority of residents in New Orleans. Such displacement may contribute substantially to increased

psychological symptoms in children. The loss of a home has a deep personal meaning for children and families, as this circumstance typically involves loss of material possessions as well as social support (Klingman, 2002). Despite high reports of loss following disasters, there has not been adequate investigation into the psychological effects on children (Erol, Simsek, Oner, & Munir, 2005). Most studies that have done so, have examined this relationship within the context of war and have found a positive relationship between displacement and psychosocial difficulties (Gragic, Mandic, Koic, & Knezevic 2002; Erol et al.).

This study will examine levels of exposure to the hurricane, levels of community violence exposure, and gender and their associated relationship to the development of PTSD symptoms following Hurricane Katrina. In agreement with Vernberg et al. (1996), it is hypothesized that (1) level of exposure to the hurricane will serve as a predictor of PTSD symptoms. In accordance with Self-Brown et al. (2006), and Overstreet et al. (1999), it is hypothesized that (2) level of community violence will serve as a predictor of PTSD symptoms. Similar to the findings of Lonigan et al. (1991), and Garrison et al. (1993), it is hypothesized that (3) gender will serve as a predictor of PTSD symptomatology.

Methods

Participants

Participants were 230 mother-child dyads recruited from various public and private elementary and middle schools within Orleans Parish, Jefferson Parish, and East Baton Rouge Parish 4-7 months post Hurricane Katrina. Participants were either displaced by Hurricane Katrina (the majority of the Orleans Parish and Jefferson Parish participants) or not displaced (East Baton Rouge Parish participants and remaining Orleans and Jefferson Parish participants). Demographics of the sample are displayed in Table 2. Most have likely been exposed to high levels of violence given that the majority of participants were low-income African-Americans (Gorman-Smith, Henry, & Tolan, 2004). Children unable to comprehend questionnaires were excluded. Ages of the children ranged from 9 to 16 years.

Table 2.

Characteristics of the Sample: Means, Standard Deviations, and Frequencies					
Variable	Entire Sample (n=230)	Displaced (n=180)	Non- displaced (n=50)	F statistic	Significance level
<i>Age</i>					
M	12.55	12.45	12.90	F(1, 229)=6.12	<i>p</i> = .01
SD	1.2	1.2	1.1		
<i>Gender</i>					
male	103	73	30	F(1,229)=6.09	<i>p</i> = .01
female	127	107	20		
<i>Race</i>					
white	64	52	12	F(1,225)=.04	<i>p</i> = .39
black	142	105	37		
Hispanic	5	5	0		
Asian	13	12	1		
other	1	1	0		
<i>Family Income</i>					
0	1	1	0	F(1,201)=.04	<i>p</i> =.83
\$0-4,999	33	30	3		
\$5,000-9,999	23	13	10		
\$10,000- 14,999	23	17	6		
\$15,000- 24,999	32	25	7		
\$25,000- 34,999	34	28	6		
\$35,000- 49,999	24	19	5		
\$50,000- 74,999	22	18	4		
\$75,000- 99,999	9	7	2		
\$100,000 and up	1	1	0		

(table cont'd)

Variable	Entire Sample (n=230)	Displaced (n=180)	Non-displaced (n=50)	F statistic	Significance level
<i>Mother Education</i>					
6 th grade or less	2	1	1	F(1,218)=.20	p=.66
junior HS	10	6	4		
partial HS	32	25	7		
HS graduate	62	50	12		
Partial college	70	57	13		
Graduate professional degree	11	9	2		

Demographic Variables

Demographic variables were computed to explore the characteristics of the participating 230 students. Table 2 provides a summary of these descriptives. African-Americans comprised 62% of the sample, while 28% were Caucasian, 5.7% were Asian, 2.2% were Hispanic, and .8% were “other.” Regarding gender, the sample was 45% male and 55% female, and regarding academic grade level, .4% were in the 1st grade, 3% were in the 4th, 10% in the 5th, 23% in the 6th, 36% in the 7th, and 25% in the 8th. The average child age was 12.5 years. Yearly income before Hurricane Katrina was reportedly between \$0 and \$4,999 for 15% of participants, between \$5,000 and \$9,999 for 10% of participants, between \$10,000 and \$14,999 for 10 % of participants, between \$15,000 and \$24,999 for 14% of participants, between \$25,000-\$34,999 for 15% of participants, between \$35,000 and \$49,999 for 10% of participants, between \$50,000 and 74,999 for 10% of participants, and above \$75,000 for 4% of participants. Reported maternal education levels were 1% for 6th grade or less, 5% for Junior High School Graduate, 15% for

partial High School, 28% for High School Graduate, 32% for partial college, 15% for college or university graduate, and 5% for graduate professional degree. In this sample, 78% were displaced from their homes due to Hurricane Katrina, while 22% were not displaced.

Preliminary Analyses

Preliminary Analyses were conducted to compare the demographics of the displaced and non-displaced samples (see Table 2). The groups were not significantly different in terms of race, $F(1,225) = .03, ns$; family income, $F(1,201) = .04 ns$; and mother education ($1,218) = .20 ns$. The groups were significantly different in regards to age, $F(1,229) = 6.12, p = .01$ and gender $F(1,229) = 6.09, p = .01$.

Measures

Demographic Questionnaire

A demographic questionnaire was designed in order to obtain information regarding child participant age, grade, gender, and family characteristics. Mother participants completed the questionnaire. Family income, parent education, ethnicity, child gender, and child age served as control variables at the second step of analyses.

UCLA PTSD Reaction Index

The UCLA PTSD Reaction Index is a revised version of the widely used and researched Child PTSD Reaction Index (CPTSD-RI; Nader et al., 1990). The 22-item instrument screens PTSD diagnostic criteria in children and adolescents according to the DSM-IV (American Psychiatric Association, 1994). The measure creates scores for the B cluster of symptoms (reexperiencing of the traumatic event), the C cluster (avoidance of stimuli and numbing of responses), and the D cluster (increased arousal), as well as 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 et al., 2001; Steinberg, et al., 2004). Child participants completed this measure, and the Index Summary Score was used as an overall index of child posttraumatic symptoms in the present study.

Hurricane-Related Traumatic Experiences (HURTE)

The HURTE was created as a measure of hurricane-related traumatic experiences. Two factor scales, Threat and Loss, are created from the summation of “yes” or “no” responses to trauma experience related questions. Little research exists concerning psychometric properties of the HURTE. Per suggestion of previous researchers, the current study utilized Loss and Threat scores as a combined variable to represent child exposure to traumatic experiences.

Screen for Adolescent Violence Exposure (SAVE)

The SAVE assesses violence exposure in three different settings (school, home, and neighborhood) and includes three violence exposure factors including Traumatic Violence (severe victimization experiences), Indirect Violence (witnessing or being informed of a less severe interpersonal violence) and Interpersonal Aggression (threatened harm directed at the participant). The SAVE contains 32 items administered in a 5-point Likert format. The SAVE has been found to successfully classify low- and high-violence groups and demonstrated good construct validity, internal consistency, test-retest reliability, and validity. Total setting scores range from 0 to 160, with higher scores reflecting greater violence exposure. Child participants completed this measure, and the total neighborhood setting score plus school setting score will be used as an overall index of community violence exposure in the present study.

Procedure

Following school board approval in Orleans, Jefferson, and East Baton Rouge Parish, schools were contacted and provided information regarding the current study. Students in the 4th

through 8th grades were recruited via various procedures based on school personnel preferences. Recruitment procedures included the use of flyers sent home to mothers as well as questionnaire packets sent directly home. The majority of mothers and students were recruited via questionnaire packets sent directly to the home through the child. Packets included information regarding the study, parent consent forms, contact information for the purpose of psychological referrals if appropriate, and the Demographic Questionnaire, as well as other measures included in a larger grant funded research project. Upon the return of a completed packet to the child's school, including parent consent for child participation, the child was given information regarding the study and was allowed to sign assent forms. Subsequently, the child completed the above listed child-report questionnaires under the supervision of trained members of the research team on the child's school campus. The child measures included the UCLA PTSD Reaction Index, the HURTE, the SAVE, and other questionnaires utilized for a larger grant funded research study. Children with reading difficulties were given the option of having measures read to them by a researcher. Mothers were then contacted via telephone by a trained researcher in order to confirm participation status. They were given appropriate referral information for mental health services if requested or if need was indicated per child response to the questionnaires.

Depending on preferences of school personnel, various incentives and forms of compensation were used. These included a \$5 cash prize or pizza parties for students who participated, and mother participants were either entered into a drawing for a cash prize or paid \$20 individually for participation. Mother and child responses were anonymous and packets were coded to match their data.

Data Analyses

In order to examine hypotheses 1, 2, and 3, separate hierarchical regression analyses were run to assess predictors of child PTSD symptomatology as measured by the Index Summary Score of the UCLA PTSD Reaction Index. The main effects of child exposure to events associated with Hurricane Katrina, as measured by the HURTE, were entered in step one. In step two, demographic variables (age, gender, ethnicity, family income, and parent education) were entered to control for their effects. In step three, community violence exposure, as measured by the SAVE, was entered.

Results

Missing Data and Invalid Data Analyses

As recommended by Schafer and Graham (2002), missing responses in the current study were addressed using the Bayesian multiple imputation procedure. Each missing value was replaced with a list of $m > 1$ simulated values. Per recommendations of Rubin (1987) and Schafer (1997) each of the m data sets were subsequently analyzed using a complete data method, and results were combined through simple arithmetic to give parameter estimates and standard errors which accounted for uncertainty due to missing data values (Schafer & Graham, 2002).

Preliminary Analyses of Questionnaire Scores

Preliminary Analyses were conducted to compare item endorsement among the displaced and non-displaced samples (see Table 3). The groups were not significantly different regarding the HURTE Threat Score, $F(1,227) = .43, ns$; the UCLA PTSD Reaction Index Summary Score $F(1,227) = .00, ns$; or the SAVE community violence score $F(1,196) = 2.82, ns$. The groups were significantly different in terms of the HURTE Loss Score $F(1,227) = 4.64, p = .03$.

Table 3.

Means and Standard Deviations for the HURTE, UCLA PTSD-RI, and SAVE

Variable	Entire Sample (n=230)	Displaced (n=180)	Non-displaced (n=50)	F statistic	Significance Level
<i>HURTE Loss score</i>				$F(1,227) = 4.64$	$p = .03$
M	3.08	3.55	1.4		
SD	2.05	1.90	1.7		
 <i>HURTE Threat Score</i>					
M	.71	.77	.50	$F(1,227) = .43$	$p = .51$
SD	.99	.98	1.0		

(table cont'd)

Variable	Entire Sample (n=230)	Displaced (n=180)	Non-displaced (n=50)	F statistic	Significance Level
<i>UCLA PTSD</i>					
<i>Reaction Index Summary Score</i>					
M	17.83	17.59	18.68	F(1,227)=.00	p =.97
SD	14.60	14.6	14.64		
<i>SAVE</i>					
<i>Community Violence Z-Score</i>					
M	.00	.01	-.02	F(1,196)=2.82	p =.10
SD	1.00	1.04	.79		

Description of Predictor Variable: HURTE Scores

Item endorsement on the HURTE questionnaire is provided in Table 4. Fewer respondents endorsed Threat Scale items as compared to Loss Scale items. The Threat Scale item regarding injury or death of pet received the highest endorsement. The greatest endorsement of Loss Scale items pertained to loss of contact with friends, having to move to a new school, and home badly damaged or destroyed by the hurricane.

Table 4.

Item Endorsement for the HURTE

Item	% Endorsing Item		
	Total	Displaced	Non-displaced
Threat Scale			
Did windows or doors break in the place you stayed during the hurricane?	18	19	14
Did you get hurt during the hurricane?	3	3	2
Did you see anyone else get hurt during the hurricane?	18	18	16
Did you have to go outside during the hurricane because the building you were staying in was badly damaged?	8	8	6

(table cont'd)

Item	% Endorsing Item		
	Total	Displaced	Non-displaced
Did a pet you liked get hurt or die during the hurricane?	19	24	2
Did you get hit by anything falling or flying during the hurricane?	5	4	10
Loss Scale			
Was your home damaged badly or destroyed by the hurricane?	45	52	18
Did you have to go to a new school because of the hurricane?	48	59	6
Did you move to a new place because of the hurricane?	33	38	12
Did one of your parents lose his or her job because of the hurricane?	30	34	14
Has it been hard to see your friends since the hurricane because they moved or you moved?	62	72	24
Did your family have trouble getting enough food or water after the hurricane?	25	22	34
Were your clothes or toys ruined by the hurricane?	41	49	14
Did your pet run away or have to be given away because of the hurricane?	8	9	4
Did you have to live away from your parents for a week or more because of the hurricane?	17	18	14

Description of Predictor Variable: SAVE Scores

Regarding questionnaire scores, the displaced sample reported a mean SAVE Community Violence score of 17.6 and the non-displaced sample reported a mean SAVE Community Violence score of 18.7. Total sample item endorsement is provided in Appendix G.

Correlation of Variables

Bivariate correlations between the predictor, demographic, and criterion variables were conducted for the total sample (see Table 5). The predictor variables threat, loss, and CVE were significantly and positively correlated with child PTSD. Regarding demographic variables race was negatively and significantly correlated with yearly income. Yearly income (control variable) was negatively and significantly correlated with both child PTSD and CVE.

Table 5.

Correlation Matrix of Predictor, Demographic and Criterion Variables for the Total Sample

Variable	1	2	3	4	5	6	7	8	9
1. Threat Score	-	.38**	.11	-.02	.08	-.07	-.14*	.29**	.30**
2. Loss Score		-	.06	.04	.05	-.13	-.20**	.34**	.25**
3. Age			-	-.05	-.07	-.13*	-.06	-.07	.16*
4. Gender				-	.01	-.21	-.14*	.06	.03
5. Race					-	-.03	-.27**	-.11	-.00
6. Mother Education Level						-	.44**	-.05	-.15*
7. Yearly Income Before Hurricane							-	-.16*	-.30**
8. Child PTSD								-	.41**
9. Community Violence Exposure									-

*p<.05. **p<.01.

Correlations in the non-displaced sample are displayed in Table 6. Regarding predictor variables, threat, loss and CVE were positively and significantly correlated with child PTSD.

Table 6.

Correlation Matrix of the Predictor, Demographic, and Criterion Variables for the Non-displaced Sample

Variable	1	2	3	4	5	6	7	8	9
1. Threat Score	-	.57**	.10	.16	.08	.03	-.26	.42**	.24
2. Loss Score		-	.34*	.10	.18	-.11	-.37*	.42**	.14
3. Age			-	.08	.14	-.12	-.06	-.01	.15
4. Gender				-	.08	-.58**	-.41**	.04	.01
5. Race					-	-.13	-.16	.23	.15
6. Mother Education Level						-	.53**	.07	-.13
7. Yearly Income Before Hurricane							-	-.18	-.28
8. Child PTSD								-	.34*
9. Community Violence Exposure									-

*p<.05. **p<.01.

Correlations for the displaced sample are displayed in Table 7. Regarding predictor variables, threat, loss, and CVE were positively and significantly correlated with child PTSD.

Regarding demographic variables, Race was significantly correlated with yearly income and child PTSD. Yearly income was negatively and significantly correlated with both child PTSD and CVE.

Regression Analyses

In order to examine the relationship between variables, hierarchical regression analyses were conducted to determine if hurricane exposure, demographics (race, gender, age, mother

education, and income before the hurricane) and community violence exposure serve as predictors of PTSD symptomatology. Hurricane exposure was entered in the first step. In the Table 7.

Correlation Matrix of the Predictor, Demographic, and Criterion Variables for the Displaced Sample

Variable	1	2	3	4	5	6	7	8	9
1. Threat Score	-	.32**	.14	-.10	.08	-.11	-.11	.26**	.32**
2. Loss Score		-	.10	-.07	.00	-.17*	-.20*	.39*	.30**
3. Age			-	-.05	-.09	-.14	-.05	-.09	.16*
4. Gender				-	-.01	-.10	-.09	.07	.04
5. Race					-	-.02	-.29**	-.16*	-.02
6. Mother Education Level						-	.42**	-.09	-.15
7. Yearly Income Before Hurricane							-	-.16*	-.31**
8. Child PTSD								-	.43**
9. Community Violence Exposure									-

*p<.05. **p<.01.

second step, demographic variables were entered. Community Violence exposure was entered in the third step. The analyses were performed for the three samples: displaced, non-displaced, and total.

Displaced Sample Regression Analyses

In step one of the regression analysis of the displaced sample (see Table 8), the HURTE Loss and Threat scores were significant predictors of child PTSD [$F(2, 133) = 15.73$].

Demographic variables were added in step two and were not significant. In step three CVE was added and was significant [$F(1, 127) = 13.22$]. These variables accounted for 32% of the

variance in child reported PTSD symptoms in the displaced sample. It should be noted that CVE entered alone as a predictor of PTSD, accounted for 18% of the variance, while demographic variables, entered alone as predictor of PTSD accounted for only 9% of the variance.

Table 8.

Hierarchical Regression Analysis Evaluating the Moderating Effects of Community Violence Exposure and PTSD in the Displaced Sample

Variable	Step One		Step Two		Step Three	
	<i>B</i>	β	<i>B</i>	β	<i>B</i>	β
Threat	3.20*	.21*	3.34**	.22**	2.08*	.14*
Loss	2.53***	.33***	2.36**	.31**	1.84**	.24**
Age			-1.46	-.11	-1.78*	-.13*
Gender			3.76	.13	3.20	.11
Race			-2.27*	-.14*	-2.00	-.12
Yearly Income Before Hurricane			-.72	-.11	-.28	-.04
Mother Education Level			-.47	-.04	-.48	-.04
Community Violence					4.43***	.31***

Note. $R^2 = .19***$ for Step 1; $\Delta R^2 = .06$ for Step 2; $\Delta R^2 = .08***$ for Step 3.
 *** $P < .001$. ** $P < .01$. * $p < .10$.

Non-displaced Sample Regression Analyses

In step one of the regression analysis for the non-displaced sample (see Table 9), the HURTE Loss and Threat scores were significant predictors of child PTSD [$F(2, 30) = 7.50$]. Demographic variables were added in step two and were not significant. In step three CVE was added and was significant [$F(1, 24) = 3.61$]. These variables accounted for 47% of the variance in child reported PTSD symptoms in the non-displaced sample. It should be noted that CVE entered alone as a predictor of PTSD, accounted for 11% of the variance, while demographic variables, entered alone as predictor of PTSD accounted for only 12% of the variance.

Table 9.

Hierarchical Regression Analysis Evaluating the Moderating Effects of Community Violence Exposure and PTSD in the Non-displaced Sample

Variable	Step One		Step Two		Step Three	
	<i>B</i>	β	<i>B</i>	β	<i>B</i>	β
Threat	.56	.04	.31	.02	-1.76	-.13
Loss	4.93*	.55*	4.38	.49	5.72*	.64*
Age			-.94	-.06	-2.15	-.14
Gender			2.76	.09	5.67	.18
Race			4.29	.17	3.14	.12
Yearly Income Before Hurricane			-.99	-.11	.14	.02
Mother Education Level			2.33	.19	3.19	.25
Community Violence					6.08*	.33*

Note. $R^2 = .33^{**}$ for Step 1; $\Delta R^2 = .05$ for Step 2; $\Delta R^2 = .08^*$ for Step 3.
 *** $P < .001$. ** $P < .01$. * $p < .10$.

Total Sample Regression Analyses

In step one of the regression analysis for the total sample (see Table 10), the HURTE Loss and Threat scores combined were significant predictors of child PTSD [$F(2, 166) = 18.96$]. Demographic variables were added in step two and were not significant. In step three, CVE was entered and was significant [$F(1, 160) = 16.62$]. These variables accounted for 30% of the variance in child reported PTSD symptoms. It should be noted that CVE entered alone as a predictor of PTSD, accounted for 17% of the variance, while demographic variables, entered alone as predictor of PTSD accounted for only 5% of the variance.

Examination of SAVE Validity and Reliability

Internal Consistency

Chronbach's alpha was calculated for the SAVE factors to examine internal consistency. Alpha's for the school and neighborhood settings were .89 and .92, respectively. Subscale alphas ranged from .60 to .89 (see Table 11).

Principal-Component Analysis (PCA)

A principal components analysis (PCA) with varimax rotation was run on the SAVE to examine factor structure. For both school and neighborhood settings, eight factors with eigenvalues greater than 1.0 emerged. This is discrepant with the findings of Hastings and Kelley (1997), which reported three factors within each setting: indirect violence, traumatic violence, and physical/verbal abuse.

In the neighborhood setting of the current PCA, seven items emerged in the first factor: seen someone carry a gun, seen the police arrest someone, seen a grownup hit a kid, heard about someone being shot, seen someone carry a knife, seen a kid hit an adult, and seen people scream at each other. Each of these items were previously cited by Hastings and Kelley (1997) to load

Table 10

Hierarchical Regression Analysis Evaluating Hurricane Exposure, Demographics, and Community Violence Exposure as a predictor of PTSD in the Total Sample

Variable	Step One		Step Two		Step Three	
	<i>B</i>	β	<i>B</i>	β	<i>B</i>	β
Threat	3.34**	.22**	3.28	.22	2.23*	.15*
Loss	2.11***	.30***	1.95***	.27***	1.63**	.23**
Age			-.77	-.06	-1.12	-.08
Gender			2.34	.08	2.29	.08
Race			-1.82	-.11	-1.59	-.09
Yearly Income Before Hurricane			-1.06*	-.15*	-.61	-.09
Mother Education Level			.11	.01	.27	.02
Community Violence					4.57***	.30***

Note. $R^2 = .19***$ for Step 1; $\Delta R^2 = .04$ for Step 2; $\Delta R^2 = .07***$ for Step 3.
 *** $P < .001$. ** $P < .01$. * $p < .10$.

Table 11.

Internal Consistency for SAVE Scales and Subscales

Subscale	TV	IV	PA	TSV
School Violence	.73	.85	.60	.89
Neighborhood Violence	.84	.89	.71	.92

SAVE = Screen for Adolescent Violence Exposure; TV = Traumatic Violence; IV = Indirect Violence; PA = Physical/Verbal Abuse; TSV = Total Subscale Violence.

onto one factor, indirect violence. However, Hastings and Kelley (1997) also stated that 7 other items were part of the indirect violence factor. In the current PCA those remaining 7 items split onto three other factors. Regarding other factors of the current PCA, one factor consisted of only one item, grownups hit me, while two other factors consisted of only 2 items.

Discussion

Hurricane Katrina was one of the most disastrous natural occurrences to ever hit the United States. Extensive media coverage has provided insights into the suffering and recovery of those affected by the storm. While the hurricane proved devastating, its aftermath is unfortunately not the only stressor experienced by those affected. In 2006, there were 2,255 violent crimes reported by law enforcement agencies in the city of New Orleans alone (U. S. Department of Justice, 2007). The current investigation examined levels of hurricane exposure and community violence exposure as predictors of PTSD symptom severity in youth exposed to Hurricane Katrina. Participants were recruited from schools in the New Orleans and Baton Rouge areas and completed questionnaires that were part of a larger study funded by the National Institute of Mental Health. The non-displaced, Baton Rouge sample served as a comparison group as they experienced lower levels of loss compared to the New Orleans sample. Given that these two groups experienced similar levels of threat, data was examined using the combined sample as well in order to further probe the predictive value of hurricane exposure and community violence exposure in predicting PTSD symptomatology.

This sample was represented by a significant number of lower income families as 35% reported yearly family income of less than \$15,000 per year. Regarding race the sample was largely African-American and most participants were displaced from their homes due to the Hurricane.

Displaced children reported more loss than non-displaced children. This is expected as those families who had the most damage to their home were likely to be displaced, and therefore may have lost contact with friends. Additionally, after moving from highly damaged neighborhoods, these children were likely forced to attend new schools. Non-displaced children

reported similar levels of PTSD when compared to displaced children. Though these children were not forced to move, their neighborhoods likely experienced damage and disruption as they were in close proximity to the direct hit of the storm. Further, many New Orleans residents were forced to take refuge in Baton Rouge, resulting in much crowding and commotion. Facing such damage and disruption each day, likely served as a persistent reminder of the disaster.

Factors Correlating with Child PTSD

Threat and loss were positively correlated with child PTSD symptoms. This is in agreement with Vernberg et al. (1996). As outlined in the DSM-IV (DSM-IV, American Psychiatric Association, 1994), PTSD symptoms occur after a threat of death or serious injury. Children exposed to Hurricane Katrina who report higher levels of threat and loss likely experience more feelings of fear and helplessness, leading to a higher rate of PTSD symptomatology.

Community violence exposure was related to higher levels of PTSD. This is in agreement with findings of both Self-Brown et al. (2006), and Overstreet et al. (1999). Children living in an environment of high violence levels may often feel a threat to their own safety and life and therefore experience higher levels of PTSD symptoms.

In the combined and displaced samples, income was negatively correlated with child PTSD symptoms. Perhaps children living in impoverished conditions are frequently involved in a high stress environment as the adults in their lives are struggling to provide for their families. Referring to LaGreca et al.'s (1996) conceptual model for children's post-disaster reactions, a social support network is crucial in post-disaster recovery. If adults such as parents and teachers are unable to provide this social support, these children may not recover as well from their experiences.

PTSD symptomatology was not related to gender. This is in disagreement with previous studies such as Lonigan et al. (1991) and Garrison et al. (1993), which found females to report higher symptoms of PTSD. Perhaps males and females do exhibit reactions to trauma in the same way, though further evidence would be needed to support this idea.

Community Violence Exposure as a Predictor

In line with the first hypothesis, threat and loss were predictive of child PTSD Symptoms. In line with the second hypothesis, child PTSD symptoms were more predictable when accounting for CVE. As threat, loss, and CVE increased, child PTSD symptoms increased. This was found among the combined, displaced, and non-displaced samples. Discrepant with the third hypothesis, demographic variables were not predictive of child PTSD after accounting for threat and loss. Though minority status has previously been cited as a correlate of higher rates of PTSD (LaGreca et al., 1996; Lonigan et al., 1991), this study suggests that other factors, such as community violence exposure, may be to blame.

CVE could affect child psychopathology through multiple routes. As children are themselves exposed to community violence, they may perceive more threat to their own lives, and therefore develop more severe psychopathology. Also, those who are available to provide children with social support may be adversely affected by community violence, and therefore may be unavailable to help children cope with the threats to their lives.

As a measure of CVE, the SAVE has demonstrated solid internal consistency. Its factor structure, however, is not as stable as once thought, therefore, caution should be used when interpreting results from the Traumatic Violence, Indirect Violence, and Physical and Verbal Abuse factors. Future studies should further examine the factors within this measure, to

determine whether they can be improved with item elimination or the addition of more accurate items.

Clinical Implications

Much research has shown the negative impact on children's mental health following disasters. None to this point have examined the moderating effects of community violence on children's reactions to natural disasters. LaGreca et al. (1996) noted that children's preexisting characteristics, such as race and SES may help predict PTSD symptoms after trauma exposure. It is possible that such correlations may be an effect of violence experienced more frequently by those of lower socioeconomic status. The current investigation shows that community violence has an adversely additive effect on those affected by the hurricane.

Given that higher levels community violence are related to higher levels of PTSD symptoms after hurricane exposure, treatment programs may be more effective if community violence issues are addressed. Children may benefit from learning effective coping skills in dealing with community violence, given that their social support networks may be disrupted (Osofsky et al., 1993). Stein et al. (2003) developed such a program to reduce symptoms of post-traumatic stress in children exposed to violence. In a randomized controlled study, this school-based program has proven successful in reducing post-traumatic stress symptoms in children. Sessions include education about reactions to stress or trauma, identifying thoughts and feelings, construction of fear hierarchies, generating coping strategies, and social problem solving. Programs such as this may be improved through their incorporation with disaster specific interventions such as those posed by La Greca, Sevin, and Sevin (2005) in *After The Storm- A Guide to Help Children Cope with the Psychological Effects of a Hurricane*.

Limitations

This study is limited in that all measures were child self-report. Perhaps parent and teacher reports would more accurately represent the children's hurricane exposure experiences, as well as violence exposure and child PTSD symptomatology. Also limiting this study is its correlational design. Though increased hurricane and violence exposure are correlated with higher levels of PTSD symptomatology, this does not mean that either directly cause PTSD symptoms. Other factors may be involved.

Caution should be used when generalizing the findings of this study. While a range of family incomes were examined, only 14% of participants were in the above \$50,000 per year range. It is possible that children with higher family incomes may respond differently in the face of disasters. Further, each natural disaster has unique characteristics, and the traumas experienced by Hurricane Katrina may have unique effects.

Future Research

Future research would benefit from incorporating parent and teacher reports of children's experiences and psychopathology. Also, given that reports have had discrepant results regarding reports of PTSD symptoms between genders (Lonigan et al., 1991; Garrison et al., 1993), this issue should be further investigated. Further, given that community violence has proven to have an additive effect on children's reactions to disasters, measures of community violence should be fine-tuned in order to more accurately measure children's experiences with community violence. Lastly, given the debilitating effects of community violence and natural disasters on children, programs should be developed and evaluated through treatment outcome studies in order to provide children and their families with effective ways to cope with such traumas.

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Appendix A

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.)

<input type="checkbox"/> \$0-4,999	<input type="checkbox"/> \$15,000-24,999	<input type="checkbox"/> \$50,000-74,999
<input type="checkbox"/> \$5,000-9,999	<input type="checkbox"/> \$25,000-34,999	<input type="checkbox"/> \$75,000-99,999
<input type="checkbox"/> \$10,000-14,999	<input type="checkbox"/> \$35,000-49,999	<input type="checkbox"/> \$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.)

<input type="checkbox"/> \$0-4,999	<input type="checkbox"/> \$15,000-24,999	<input type="checkbox"/> \$50,000-74,999
<input type="checkbox"/> \$5,000-9,999	<input type="checkbox"/> \$25,000-34,999	<input type="checkbox"/> \$75,000-99,999
<input type="checkbox"/> \$10,000-14,999	<input type="checkbox"/> \$35,000-49,999	<input type="checkbox"/> \$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.

About You

What was your occupation/job title? (If you were retired, please 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

About Your Spouse

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

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

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

If you are **currently 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, please write "retired" and their past occupation. If they do not work outside the home, write "unemployed." If their job is the same as it was before the hurricane, please write "same.")

What kind of industry or company do 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.

<u>Relationship to you</u>	<u>Age</u>	<u>Sex</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>
_____	_____	<u>Male/Female</u>

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 adults under 18 living in your home **BEFORE** the hurricane? _____

Appendix B

Informed Consent Form

1. **Study Title.** Predictors of Recovery in Children Evacuated from Hurricane Katrina
2. **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

Appendix C

Assent Form

1. **Study Title:** Predictors of Recovery in Children Evacuated from Hurricane Katrina
2. **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

Appendix D

UCLA PTSD REACTION INDEX

Here is a list of problems people sometimes have after very bad things happen. Please **THINK** about the bad thing that happened to you (Hurricane Katrina). Then **READ** each problem on the list carefully. **CIRCLE ONE** of the numbers (0,1,2,3,or 4) that tells how often the problem has happened to you **in the past month**.

PLEASE BE SURE TO ANSWER ALL QUESTIONS.

HOW MUCH OF THE TIME DURING THE PAST MONTH	NONE	LITTLE	SOME	MUCH	MOST
1. I watch out for danger or things that I am afraid of.	0	1	2	3	4
2. When something reminds me of what happened, I get very upset, afraid or sad.	0	1	2	3	4
3. I have upsetting thoughts, pictures, or sounds of what happened come into my mind when I do not want them to.	0	1	2	3	4
4. I feel grouchy, angry, or mad.	0	1	2	3	4
5. I have dreams about what happened or other bad dreams.	0	1	2	3	4
6. I feel like I am back at the time when the bad thing happened, living through it again.	0	1	2	3	4
7. I feel like staying by myself and not being with my friends.	0	1	2	3	4
8. I feel alone inside and not close to other people.	0	1	2	3	4
9. I try not to talk about, think about, or have feelings about what happened.	0	1	2	3	4
10. I have trouble feeling happiness or love.	0	1	2	3	4
11. I have trouble feeling sadness or anger.	0	1	2	3	4
12. I feel jumpy or startle easily, like when I hear a loud noise or when something surprises me.	0	1	2	3	4
13. I have trouble going to sleep or I wake up often during the night.	0	1	2	3	4
14. I think that some part of what happened is my fault.	0	1	2	3	4
15. I have trouble remembering important parts of what happened.	0	1	2	3	4
16. I have trouble concentrating or paying attention.	0	1	2	3	4
17. I try to stay away from people, places, or	0	1	2	3	4

things that make me remember what happened.					
18. When something reminds me of what happened, I have strong feelings in my body, like my heart beats fast, my head aches, or my stomach aches.	0	1	2	3	4
19. I think that I will not live a long life.	0	1	2	3	4
20. I have arguments or physical fights.	0	1	2	3	4
21. I feel pessimistic or negative about my future.	0	1	2	3	4
22. I am afraid that the bad thing will happen again.	0	1	2	3	4

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 F

SAVE

How often it happens

	Never	Hardly Ever	Sometimes	Almost Always	Always
1. I have seen someone carry a gun					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
2. Someone has pulled a gun on me					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
3. Grownups beat me up					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
4. Someone my age has threatened to beat me up					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
5. I have been shot					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
6. I have seen the police arrest someone					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
7. Someone my age hits me					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
8. I have seen someone get killed					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4

9.	I have seen a grownup hit a kid					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
10.	I have heard about someone getting shot					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
11.	Someone has pulled a knife on me					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
12.	Grownups threaten to beat me up					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
13.	I have had shots fired at me					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
14.	I have seen someone carry a knife					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
15.	I have seen someone get shot					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
16.	I have been attacked with a knife					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
17.	I have seen a kid hit a grownup					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4

18.	I have seen people scream at each other					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
19.	I have seen someone pull a gun on someone else					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
20.	I have seen someone get beaten up					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
21.	I have heard about someone getting killed					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
22.	I have heard about someone getting attacked with a knife					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
23.	I have heard about someone getting beaten up					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
24.	I have seen someone pull a knife on someone else					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
25.	I have been badly hurt					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4
26.	I have seen someone get attacked with a knife					
	-at my school	0	1	2	3	4
	-in my home	0	1	2	3	4
	-in my neighborhood	0	1	2	3	4

27. I hear gunshots					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
28. I have seen someone get badly hurt					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
29. I have ran for cover when people started shooting					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
30. Grownups scream at me					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
31. I have heard of someone carrying a gun					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4
32. Grownups hit me					
-at my school	0	1	2	3	4
-in my home	0	1	2	3	4
-in my neighborhood	0	1	2	3	4

Appendix G

Item Endorsement for the SAVE

Item	% Endorsing Item (n = 205)				
	Never	Hardly Ever	Sometimes	A lot	Almost Always
<u>Neighborhood Setting</u>					
I have seen someone carry a gun	60	11	16	8	6
Someone has pulled a gun on me	91	3	3	2	1
Grownups beat me up	96	2	1	-	1
Someone my age has threatened to beat me up	83	12	4	-	1
I have been shot	95	2	1	-	1
I have seen the police arrest someone	32	16	24	14	14
Someone my age hits me	86	7	3	2	2
I have seen someone get killed	88	5	3	2	2
I have seen a grownup hit a kid	54	13	17	8	9
I have heard about someone getting shot	53	11	16	7	13
Someone has pulled a knife on me	93	2	2	1	2
Grownups threaten to beat me up	94	2	2	-	2
I have had shots fired at me	93	3	2	2	1
I have seen someone carry a knife	63	10	11	7	8
I have seen someone get shot	85	6	5	2	2
I have been attacked with a knife	96	2	2	1	-
I have seen a kid hit a grownup	71	10	11	2	6
I have seen people scream at each other	37	13	17	13	20
I have seen someone pull a gun on someone else	88	4	4	2	2
I have seen someone get beaten up	74	6	8	5	7
I have heard about someone getting killed	76	6	8	3	7
I have heard about someone getting attacked with a knife	84	4	7	2	3

Item	% Endorsing Item (n = 205)				
	Never	Hardly Ever	Sometimes	A lot	Almost Always
I have heard about someone getting beaten up	74	8	8	4	6
I have seen someone pull a knife on someone else	91	2	4	2	1
I have been badly hurt	81	11	4	3	2
I have seen someone get attacked with a knife	92	3	3	1	2
I hear gunshots	80	8	7	3	3
I have seen someone get badly hurt	80	9	4	2	5
I have ran for cover when people started shooting	86	4	3	1	5
Grownups scream at me	55	20	15	5	5
I have heard of someone carrying a gun	80	8	8	2	2
Grownups hit me	88	5	2	3	2
<u>School Setting</u>					
I have seen someone carry a gun	85	8	2	2	2
Someone has pulled a gun on me	98	1	1	1	1
Grownups beat me up	96	2	1	1	1
Someone my age has threatened to beat me up	71	15	8	3	3
I have been shot	98	2	1	0	0
I have seen the police arrest someone	54	15	19	6	6
Someone my age hits me	78	8	7	4	2
I have seen someone get killed	95	2	2	1	1
I have seen a grownup hit a kid	70	7	11	5	6
I have heard about someone getting shot	65	8	13	6	8
Someone has pulled a knife on me	93	3	2	1	2
Grownups threaten to beat me up	95	2	2	1	-
I have had shots fired at me	96	2	2	1	-
I have seen someone carry a knife	78	8	7	3	4
I have seen someone get shot	93	3	3	1	1
I have been attacked with a knife	95	2	2	1	-

Item	% Endorsing Item (n = 205)				
	Never	Hardly Ever	Sometimes	A lot	Almost Always
I have seen a kid hit a grownup	78	8	9	3	2
I have seen people scream at each other	37	14	18	14	17
I have seen someone pull a gun on someone else	36	13	17	14	20
I have seen someone get beat up	80	7	8	2	3
I have heard about someone getting killed	96	2	1	1	2
I have heard about someone getting attacked with a knife	61	9	15	4	11
I have heard about someone getting beat up	78	6	8	2	6
I have seen someone pull a knife on someone else	90	3	3	1	3
I have been badly hurt	85	4	8	1	2
I have seen someone get attacked with a knife	83	7	4	4	2
I hear gunshots	90	3	3	3	2
I have seen someone get badly hurt	83	5	5	1	6
I have ran for cover when people started shooting	71	11	8	3	7
Grownups scream at me	75	7	5	3	10
I have heard of someone carrying a gun	79	7	7	2	5
Grownups hit me	90	4	4	1	2

Vita

Audrey Baumeister graduated *magna cum laude* with a Bachelor of Science degree from the University of Florida in May 2005. She began her graduate studies at Louisiana State University under Dr. Mary Lou Kelley in August 2005. Audrey will receive her Master of Arts in psychology in May 2008 and will continue to pursue a doctoral degree in child clinical psychology.