

Mother and Child Reports of Hurricane Related Stressors: Data from a Sample of Families Exposed to Hurricane Katrina

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Abstract

Background Families exposed to disasters such as Hurricane Katrina are at risk for numerous adverse outcomes. While previous literature suggests that the degree of disaster exposure corresponds with experiencing negative outcomes, it is unclear if parents and children report similar levels of disaster exposure.

Objective The purpose of this paper was to examine levels of disaster stressor agreement among mother–child dyads affected by Hurricane Katrina, and to examine whether discrepancies in disaster stressor reports are associated with higher levels of posttraumatic stress (PTS) symptoms.

Methods Participants in this study consisted of 353 dyads of mothers (age $M = 38.79$ years, $SD = 7.52$; 68 % African American) and children (52 % girls; age $M = 11.61$ years, $SD = 1.57$) exposed to Hurricane Katrina. Parents and children were assessed at two timepoints, 3–7 months and 14–17 months postdisaster. Parent and child responses to items regarding hurricane related stressor exposure and PTS symptoms were analyzed.

Results Agreement on hurricane related exposures was predominately slight to moderate, with kappas ranging from $\kappa = 0.19$ to $\kappa = 0.83$. Polynomial regression analyses revealed that when mothers reported low levels of Immediate Loss/Disruption stressors and children reported high levels of these stressors, children reported higher levels of Time 2 PTS symptoms, $b = -0.72$ (0.33), $p = .03$.

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Conclusions Overall, levels of mother–child response agreement were low. Discrepancies in mother and child reports predicted higher levels of child PTS symptoms. Clinicians may want to query both parents and children about their disaster experiences when working with families postdisaster.

Keywords Children · Disasters · Posttraumatic stress · Family · Kappa · Discrepancy

Introduction

Hurricane Katrina was one of the most catastrophic natural disasters in United States history. Hundreds of thousands were displaced by the storm, with costs estimated at over a hundred billion US dollars (Knabb et al. 2005). In addition to the immediate impact of the storm, the recovery period after Hurricane Katrina was prolonged. Families exposed to disasters are at risk for developing numerous mental health and physical health problems, as observed in the aftermath of Katrina. Families reported psychological distress such as symptoms of posttraumatic stress (PTS), depression, and anxiety; sleep disturbances (Brown et al. 2011; Cerda et al. 2013; Jaycox et al. 2010; Kelley et al. 2010; Kessler et al. 2008; Overstreet et al. 2010; Weems et al. 2010); and negative physical health outcomes (Rath et al. 2007; Sastry and Gregory 2013). Thus, identifying factors contributing to the development of postdisaster distress and maladaptive outcomes after disasters is crucial.

Dose–response models of disasters indicate that “doses” of exposure to disaster stressors predict the development of distress symptoms in both adults and children (Bonanno et al. 2010; La Greca et al. 1996; Lai et al. 2013; Lowe et al. 2013; Weems et al. 2007). However, in the context of families, it remains unclear whether parents and children who experience the same disaster report similar levels of stressors. It also is unclear whether discrepancies in exposure reports have implications for family functioning.

Our *first study aim* was to examine whether discrepancies exist in measures of disaster stressors, as reported by mothers and children exposed to Hurricane Katrina. The current study investigated how mothers and children experiencing the *same event in the same context* might agree or disagree in their reports of Katrina-related stressors. To our knowledge, correspondence between parent and child reports of disaster stressors has not been examined in the literature. Disaster stressors may be conceptualized as *subjective* stressors (e.g., perceived threat experiences such as thinking you might die during the disaster) and *objective* stressors (e.g., actual life threatening events such as a tree falling on your home, witnessing someone being hurt during the disaster). The implicit assumption in research has been that parent and child disaster stressor exposure is equivalent (Chemtob et al. 2010). For example, Proctor and colleagues used mother reports regarding disaster exposure to serve as a proxy for young children’s disaster exposure to an earthquake (Proctor et al. 2007). Polusny and colleagues (2011) studied adolescents and their parents after severe tornadoes in Minnesota. They queried adolescents and parents separately about subjective stressors, but parent-report served as a proxy for family levels of objective stressors. No direct comparisons were made between adolescent and parent reports of objective stressors.

In this study, we expected that parent and child reports would differ with regard to both subjective and objective stressors. We expected these discrepancies because discrepancies among reports from multiple informants have been observed throughout the extant child

mental health literature (De Los Reyes and Kazdin 2005; Laird and De Los Reyes 2013; Laird and Weems 2011). In addition, low levels of association between parent and child reports of *traumatic events* have been documented outside of the disaster literature. For example, discrepant reports between parents and children have been found after exposure to events such as accidents, attacks, and abuse (Stover et al. 2010). In addition, Tingskull et al. (in press) examined a cohort from birth until 12 years of age in Sweden. They found low levels of agreement between parent and child reports of traumatic events. Further, low levels of concordance have been found between parents and children for diverse outcomes such as mental health symptoms (Weems and Overstreet 2008) and quality of life (Cremeens et al. 2006).

Discrepancies in reports may exist for multiple reasons. Interpersonal characteristics may influence how informants perceive or recall events, memories, or behaviors (De Los Reyes and Kazdin 2005). Discrepancies may also arise from contextual variation in the behavior or event perception (De Los Reyes 2011). For example, when a behavior occurs at home, the behavior or perception of the behavior may vary greatly from a behavior observed in school or with peers.

Low agreement in parent and child reports does not necessarily suggest that children are unreliable or invalid in their reports of exposure postdisaster. For example, Weems et al. (2014) found that child reports of Katrina-related exposures are relatively stable and reliable over time, even after exposure to a consequent disaster. Therefore, discrepancy among informant reports may simply be an indication that perceptions of the salience of objective events may differ between parents and children (Kuo et al. 2000). Concurrent with the extant literature, these differing perceptions may serve to yield a more diverse and comprehensive perspective of the nature of the exposure (Pfefferbaum et al. 2013).

Our *second study aim* was to examine whether differences in parent and child reports of stressor experiences are associated with greater parent and child PTS symptoms. In general, discrepancies may be meaningful indicators of potential outcomes in child psychopathology, rather than merely “noise” in the data (Achenbach 2011; De Los Reyes 2011; Dirks 2011; Drabick et al. 2011; Hartley 2011; Reynolds et al. 2011). We expected that when discrepancies in parent and child reports exist, the discrepancies would be associated with higher levels of PTS symptoms. Discrepancies in parent/child reports on reports of community violence have been linked with higher levels of psychological distress (Ceballo et al. 2001).

Discrepancies in reports may indicate underlying differences between parents and children that may lead to higher levels of psychological distress. For example, parent recognition of problems is often the primary step needed in order for children to obtain help (Stover et al. 2010; Tingskull et al., in press). Parents who view stressors differently from their children may be less likely to identify resources to help children cope with distress symptoms. In addition, mismatch between parent and child reports may be an indication of lower levels of parent responsiveness to children’s needs. Lower levels of responsiveness are associated with poorer outcomes for children (Baumrind 1991).

Understanding differences between parent and child reports of exposure to stressors, and how differences may relate to PTS symptoms, has important implications for disaster research and policy. First, it will help us understand whom we should ask about exposure. Is it important to query both parents and children about their exposure? If parents and children have low levels of agreement in their reports of disaster stressor exposure, parents may need help recognizing stressors their child experiences. Further, if differences are associated with distress, this information will help guide practice and research. Data collection in the aftermath of disasters is burdensome, and if responses agree highly, ethics

would dictate that asking only one family member about stressors could reduce the burden of research. However, if differences play an important role in predicting mental health outcomes, then it is imperative to query multiple family members as standard practice in research and clinical assessments for families following disasters.

Method

Participants

Participants in this study were part of a larger, longitudinal study examining parents and children who resided in southern Louisiana when Hurricane Katrina made landfall (Kelley et al. 2010; Lai et al., in press; Self-Brown et al. 2013). Hurricane Katrina was a Category 5 hurricane that resulted in approximately 1,500 deaths in different states, mostly in Louisiana, leaving behind thousands of destroyed homes, businesses and other properties (Knabb et al. 2005). Total damage resulting from this disaster was approximately \$108 billion, including financial loss and other damages (Knabb et al. 2005).

For this study, data from Times 1 and 2 of the larger study were used. Times 1 and 2 were 3–7 months and 14–17 months post-Katrina, respectively. Of the 361 dyads who completed questionnaires at Time 1, a final sample of 353 dyads (98 %) was retained for analysis in this study. Specifically, given the small number of fathers who participated in the larger study, two dyads were removed because the packet was father completed, and 6 dyads (2 %) were removed due to survey response errors. Dyads in the final sample did not differ from the excluded dyads in terms of mother age, child age, race, or mother education level.

The majority of the 353 dyads included in this study were displaced as a result of the storm (74 %). The mothers in this study ranged in age from 23 to 67 years ($M = 38.79$, $SD = 7.52$), with an average education level of high school graduate. Most mothers were racial minorities (i.e., 68 % Black/African-American, 24 % White/Caucasian, 8 % Other). The average yearly income per household before Hurricane Katrina was \$15,000–\$24,999. Among the children in the dyads, approximately half of the participants were girls (52 %). Children ranged in age from 8 to 16 years ($M = 11.61$, $SD = 1.57$) and were in grades 3 through 8 at Time 1 (i.e., 3–7 months post-Katrina).

Given the study goals in Aim 1 to examine agreement in disaster stressor reports from parent–child dyads who experienced the *same event in the same context*, a subsample ($n = 249$) of only mother–child dyads who reported being together during Hurricane Katrina and who completed Time 1 measures of hurricane related stressors were analyzed for Aim 1. Specifically, 80 dyads (23 %) were removed because the mother and child were not together during the hurricane, 4 dyads (1 %) were removed because child gender was not reported, and 20 dyads (6 %) were removed due to incomplete data for primary variables of interest (i.e., measures of disaster related stressors). Dyads in the Aim 1 subsample ($n = 249$) did not differ from those in the larger study sample ($n = 353$) in terms of mother age, child age, race, or mother education level.

Given the longitudinal questions posed in Aim 2, only mothers ($n = 158$) and children ($n = 301$) that reported PTS symptoms at Time 2 were included in the regression analysis. These individuals also did not differ from the overall sample ($n = 353$) in terms of mother age, child age, race, or mother education level.

Procedure

Approval for this study was obtained through the IRB at Louisiana State University. Questionnaires were administered to assenting children in their schools under teacher supervision. Children's parents were invited to participate in the study through flyers given to their children. Parents completed the questionnaires at home. Sealed envelopes containing the completed parent questionnaire were returned to the school by the children. To incentivize questionnaire completion, monetary compensation was given in the form of cash drawings or a pizza party for children and a cash prize for parents. This was only true for Time 1. Time 2 questionnaires were mailed directly to the researchers via prepaid envelopes.

Measures

Hurricane Related Experiences

Mother and Child at Time 1 The Hurricane Related Traumatic Experiences-Revised (HURTE-R; La Greca et al. 1996) is a self-report questionnaire designed to assess life threatening events during a hurricane and loss/disruption following exposure to a hurricane. One item (coded as Yes = 1, No = 0) assessed Perceived Life Threat (i.e., "At any time during the hurricane, did you think you might die?"). Six items (coded as Yes = 1, No = 0) referred to Actual Life Threat (e.g., "Did you get hit by anything falling or flying during the hurricane?"). These items were summed to obtain a total Actual Life Threat score ranging from 0 to 6. Nine items were related to Immediate Loss/Disruption (coded as Yes = 1, No = 0) resulting from the disaster were asked of both mothers and children (e.g., "Was your home badly damaged or destroyed by the hurricane?"). These items were summed to create a total score for Immediate Loss/Disruption ranging from 0 to 9. Of note, the original HURTE-R contains 10 items for Immediate Loss/Disruption. Six items assessed Ongoing Loss/Disruption (e.g., changing homes, changing schools, coded as Yes = 1, No = 0), which were summed to create a score ranging from 0 to 6. The HURTE-R has been utilized with other disaster samples (La Greca et al. 2013). Internal consistency is not reported for the HURTE-R items, as these items are conceptualized as causal indicators rather than effect indicators (Bollen 1989). Thus, alpha was not appropriate as the items are not attributable to a common source (DeVellis 1991).

Posttraumatic Stress Symptoms

Mothers at Times 1 and 2 The Posttraumatic Diagnostic Scale (PDS; Foa 1995) is a self-report scale designed to assess PTS symptoms in adults, based on the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition-Text Revision (DSM-IV-TR; American Psychiatric Association 2000). Seventeen items from the PDS were applied in this study to assess PTS symptoms. Items were rated in terms of severity from 0 ("not at all or only one time") to 3 ("5 or more times a week/almost always"). The PTS symptom total score for the items ranged from 0 to 51. The PDS has been validated in different clinical research settings (Haslam and Mallon 2003) and has demonstrated high test-retest reliability, good sensitivity and specificity (Foa et al. 1997). In this study, internal consistency for the PDS was acceptable at both Time 1 ($\alpha = 0.88$) and Time 2 ($\alpha = 0.88$).

Children at Times 1 and 2 The University of California at Los Angeles Post-traumatic Stress Disorder Reaction Index-Revision 1 (UCLA-PTSD RI-R1; Steinberg et al. 2004) is a self-report questionnaire designed to assess PTS symptoms in children; it is based on the *DSM-IV-TR* (American Psychiatric Association 2000). The UCLA-PTSD RI-R1 is an 18-item questionnaire. Items are rated on a 5-point scale (0 = “none of the time” to 4 = “most of the time”). Total scores for 17 symptoms (possible range = 0 to 68) were used to indicate PTS symptom levels in this study. The UCLA-PTSD RI-R1 has been previously used with samples of children exposed to disasters (Lai et al. 2013). Internal consistency in the current sample was acceptable at both Time 1 ($\alpha = 0.91$) and Time 2, ($\alpha = 0.91$).

Results

Preliminary Analyses

Mothers Means and frequencies for hurricane related stressors and PTS symptoms in mothers were examined. Approximately 23 % of mothers reported Perceived Life Threat (i.e., thinking that they might die during Hurricane Katrina), and 32 % reported one or more events of Actual Life Threat ($M = 0.53$, $SD = 1.00$). The most commonly reported Actual Life Threat event was windows or doors breaking, which was reported by 18 % of mothers. Regarding Immediate Loss/Disruption, 85 % reported at least one event ($M = 3.94$, $SD = 2.73$), with difficulty seeing friends (63 %) reported as the most common stressor. For Ongoing Loss/Disruption, 86 % of mothers reported experiencing at least one event ($M = 2.38$, $SD = 1.56$); the most common ongoing stressor was still living in a house with unfixed damage from Hurricane Katrina (66 %). Finally, for psychological outcomes in mothers, mean levels of PTS symptoms were $M = 26.28$ ($SD = 18.19$) and $M = 28.80$ ($SD = 17.28$) at Time 1 and Time 2, respectively. At both timepoints, these average scores fell in the moderate-severe range on the PDS.

Children In terms of hurricane related stressors and PTS symptoms in children, 33 % of children reported experiencing Perceived Life Threat. Approximately 46 % of children reported experiencing one or more Actual Life Threat events ($M = 0.72$, $SD = 1.02$), with injury or death to pet (20 %) and witnessing someone get badly hurt (19 %) as the most commonly reported events. Regarding Immediate Loss/Disruption after the hurricane, 83 % of children reported one or more stressor ($M = 3.09$, $SD = 2.29$). Similar to mothers, the most frequently reported stressor was difficulty seeing friends after the storm (60 %). For Ongoing Loss/Disruption, most children (75 %) reported at least one ongoing stressor ($M = 1.71$, $SD = 1.40$), with still living in a house with unfixed damage as the most commonly reported response (43 %). Finally, with regards to psychological outcomes in children, mean levels of PTS symptoms were $M = 18.31$ ($SD = 14.64$) at Time 1 and $M = 14.37$ ($SD = 13.10$) at Time 2. These scores reflect mild levels of average PTS symptoms.

Aim 1: Agreement Between Mother and Child Stressor Reports

Agreement between mother and child reports on hurricane related stressors (HURTE-R) was examined through Cohen’s kappa analyses, utilizing SPSS (version 20). Ranges for kappa interpretation were based on established guidelines: poor ($\kappa \leq 0$); slight (κ ranging

from 0.01 to 0.20); fair (κ ranging from 0.21 to 0.40); moderate (κ ranging from 0.41 to 0.60); substantial (κ ranging from 0.61 to 0.80); and almost perfect (κ ranging from 0.81 to 1) (Landis and Koch 1977).

For Perceived Life Threat (see Table 1), kappa fell in the slight range, $\kappa = 0.19$, $p \leq 0.01$. For Actual Life Threat (see Table 1), kappas ranged from 0.19 to 0.47, falling in the slight to fair ranges. The highest kappa corresponded to the question pertaining to injury or death of a pet, $\kappa = 0.47$, $p \leq 0.001$, and the lowest kappa corresponded to the question concerning fallen or flying debris, $\kappa = 0.19$, $p \leq 0.001$. For Immediate Loss/Disruption (see Table 2), kappas ranged from 0.19 to 0.83, ranging from slight to almost perfect. The highest kappas were for questions about going to a new school ($\kappa = 0.83$, $p \leq 0.001$) and damage and destruction to the home ($\kappa = 0.60$, $p \leq 0.001$). The lowest kappas were for items relating to troubling getting food or water ($\kappa = 0.19$, $p \leq 0.001$) and living away from a parent for longer than one week ($\kappa = 0.27$, $p \leq 0.001$). Finally, for outcomes within Ongoing Loss/Disruption (see Table 3), kappas ranged from 0.25 to 0.72, falling in the fair to substantial ranges. The highest kappa was reported for the item asking about living in the same house that was lived in pre-Katrina ($\kappa = 0.72$, $p \leq 0.001$), while the lowest kappa was reported for living in a house with unfixed damage ($\kappa = 0.25$, $p \leq 0.001$).

Exploratory Analyses Levels of Agreement on Stressor Reports by Gender and Age

We conducted exploratory analyses to examine whether gender and age might be associated with higher levels of agreement on mother and child stressor reports. To examine this, we stratified kappa analyses by gender (i.e., boys and girls) and age (i.e., younger children defined as 12 years of age or less; older children defined as being more than 12 years of age).

For Perceived Life Threat (see Table 1), kappa was significant for girls ($\kappa = 0.21$, $p \leq 0.01$), but not for boys. With regards to responses to Actual Life Threat items (see Table 1), the largest difference in agreement for gender and age corresponded to the death or injury of a pet; for this item, there was higher mother–child agreement for girls ($\kappa = 0.54$, $p \leq 0.001$), compared to boys ($\kappa = 0.34$, $p \leq 0.001$), as well as for older children ($\kappa = 0.73$, $p \leq 0.001$) compared to younger children ($\kappa = 0.36$, $p \leq 0.001$). In terms of Immediate Loss/Disruption (see Table 2), the biggest difference in kappa for boys and girls corresponded to the item about a parent losing a job, with boys displaying higher levels of dyad agreement ($\kappa = 0.64$, $p \leq 0.001$) than girls ($\kappa = 0.51$, $p \leq 0.001$). When stratified by age, the biggest difference in immediate item agreement was for difficulty seeing friends after the storm, with younger children agreeing more with mothers ($\kappa = 0.63$, $p \leq 0.001$) compared to older children ($\kappa = 0.34$, $p \leq 0.001$). Finally, for Ongoing Loss/Disruption (see Table 3), item stratification revealed that the greatest difference in mother–child agreement corresponded to the item pertaining to unfixed damage to the house; girls had greater levels of agreement ($\kappa = 0.51$, $p \leq 0.001$) than boys ($\kappa = 0.25$, $p < 0.01$), and older children had greater levels of agreement ($\kappa = 0.61$, $p \leq 0.001$) than younger children ($\kappa = 0.30$, $p \leq 0.001$).

Aim 2: Differences in Stressor Reports as a Predictor of Time 2 Mother and Child PTS Symptoms

We expected that differences in mother and child reports of hurricane related traumatic experiences would be associated with higher levels of Time 2 PTS symptoms in mothers

Table 1 Stratified item analysis for perceived life threat and actual life threat

Item	Total			Stratified by gender			Stratified by age								
				Boys			Girls			≤12 years			≥12 years		
	M%	C%	κ	M%	C%	κ	M%	C%	κ	M%	C%	κ	M%	C%	κ
1. Perceived Life Threat	23	33	0.19**	25	28	0.17	21	36	0.21**	23	32	0.13	24	34	0.29**
2. Did windows or doors break?	15	17	0.34***	17	17	0.34***	13	17	0.34***	12	14	0.33***	19	21	0.34**
3. Did you get hurt?	4	3	0.23***	3	3	0.31***	4	3	0.17*	3	2	0.20**	5	4	0.26*
4. Did you see anyone else get badly hurt?	14	19	0.26***	15	19	0.32***	13	19	0.22**	12	21	0.23**	17	16	0.34**
5. Did you have to go outside due to damage?	8	9	0.22***	11	11	0.09	6	9	0.36***	6	11	0.30***	11	6	0.07
6. Did a pet get hurt or die?	8	20	0.47***	6	18	0.34***	9	22	0.54***	7	23	0.36***	10	15	0.73***
7. Did you get hit by flying or fallen debris?	2	6	0.19***	0	6	N/A	4	6	0.28***	2	6	0.14*	2	6	0.26**

M%, mother percentage yes; C%, child percentage yes; N/A, not applicable

* $p \leq 0.5$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 2 Stratified item analysis for immediate loss/disruption

Item	Total			Stratified by gender				Stratified by age							
	M%	C%	κ	Boys		Girls		≤12 years		≥12 years					
				M%	C%	κ	M%	C%	κ	M%	C%	κ			
1. Was your home badly damaged or destroyed?	50	45	0.60***	50	46	0.58***	49	45	0.62***	49	43	0.60***	51	50	0.60***
2. Did you have to go to a new school?	57	51	0.83***	58	53	0.85***	55	49	0.81***	63	54	0.80***	45	44	0.88***
3. Did you move to a new place?	49	36	0.53***	50	36	0.49***	49	37	0.57***	51	35	0.56***	46	39	0.47***
4. Did parent lose job?	34	30	0.57***	37	27	0.64***	31	32	0.51***	34	30	0.60***	35	30	0.51***
5. Has it been hard to see friends?	65	62	0.52***	64	58	0.50***	65	64	0.55***	64	64	0.63***	65	56	0.34***
6. Did your family have trouble getting food or water?	35	20	0.19***	38	14	0.19*	33	25	0.20*	30	18	0.31***	46	24	-0.01
7. Were clothes or toys ruined?	58	39	0.51***	57	38	0.52***	58	39	0.50***	55	39	0.54***	64	39	0.45***
8. Did you pet run away or have to be given away?	8	9	0.40***	7	8	0.35***	9	10	0.43***	5	8	0.47***	14	11	0.32***
9. Did you live away from parent for 1+ week?	13	11	0.27***	11	12	0.14	14	9	0.37***	11	9	0.22**	15	13	0.32**

M%, mother percentage yes; C%, child percentage yes

* $p \leq 0.5$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 3 Stratified item analysis for ongoing loss/disruption

Item	Total			Stratified by gender			Stratified by age								
	M%	C%	κ	Boys		Girls		≤12 years		12–17 years		>17 years			
				M%	C%	M%	C%	M%	C%	M%	C%	κ			
1. Has all damage to your house been fixed?	34	58	0.40***	25	59	0.25**	41	57	0.51***	32	60	0.30***	39	54	0.61***
2. Are you now living in house lived in before HK?	64	65	0.72***	62	66	0.68***	65	64	0.75***	61	61	0.69***	69	72	0.77***
3. Are you living in a house that still has damage?	26	12	0.25***	31	15	0.18*	23	10	0.32***	23	12	0.30***	33	12	0.18*
4. Do you have to travel a lot longer to get to school?	28	18	0.38***	30	19	0.31***	27	17	0.44***	33	21	0.42***	19	13	0.25*
5. Is one of your parents now out of a job?	25	18	0.41***	26	18	0.23*	24	19	0.56***	27	19	0.40***	22	16	0.43***
6. How many times have you moved since HK?	62	39	0.43***	67	41	0.40***	59	39	0.45***	63.6	42.0	0.44***	60	35	0.39***

M%, mother percentage yes; C%, child percentage yes

* $p \leq 0.5$; ** $p \leq 0.01$; *** $p \leq 0.001$

and children. Polynomial regression equations were used to evaluate interaction hypotheses (following recommendations in Edwards (1994) and Laird and De Los Reyes (2013)). Time 2 maternal PTS symptoms (Table 4) and child PTS symptoms (Table 5) were regressed on Time 1 stressor reports (i.e., Perceived Life Threat, Actual Life Threat, Immediate Loss/Disruption, Ongoing Loss/Disruption) utilizing SPSS (version 20). Each model included the following stressor terms: maternal report, child report, an interaction term created by multiplying child by maternal report, maternal report squared, and child report squared. All reports were mean-centered.

Note that regression models for Time 1 Perceived Life Threat were not reported because of problems with multicollinearity in these models. Tolerance was 0.0 in those models for maternal and child reports of Perceived Life Threat, likely due to the fact that Perceived Life Threat is a dichotomous variable.

In addition, four higher order terms (i.e., the interaction between maternal report by child report squared, maternal report squared by child report, maternal report cubed, and child report cubed) were tested to examine whether these terms significantly improved model fit, following guidelines from Edwards (1994) and Laird and De Los Reyes (2013). These higher order terms did not significantly improve model fit for any of the models, and thus are not reported here.

Predicting Maternal PTS Symptoms at Time 2

For analyses examining reports of Actual Life Threat, no predictors were significant. In analyses examining Immediate Loss/Disruption, significant predictors of maternal PTS symptoms at Time 2 included mother reported Immediate Loss/Disruption, $b = 3.72$ (0.98), $p < 0.001$, and child reported Immediate Loss/Disruption, $b = -3.30$ (1.17), $p < 0.01$. For analyses examining reports of Ongoing Loss/Disruption, maternal report significantly predicted maternal PTS symptoms at Time 2, $b = 2.76$ (1.29), $p < 0.05$.

Table 4 Maternal and child stressor reports at Time 1 as predictors of maternal posttraumatic stress (PTS) symptoms at Time 2 (polynomial regression)

Time 1 stressor reports Parameter	Actual life threat			Immediate loss/disruption			Ongoing loss/disruption		
	<i>b</i> (SE)	β	<i>p</i>	<i>b</i> (SE)	β	<i>p</i>	<i>b</i> (SE)	β	<i>p</i>
Maternal report	1.61 (3.10)	0.07	0.61	3.72 (0.98)	0.57	0.000***	2.76 (1.29)	0.25	0.03*
Child report	3.65 (2.37)	0.19	0.13	-3.30 (1.17)	-0.44	0.005**	0.44 (1.52)	0.04	0.77
Maternal \times child report	3.19 (2.88)	0.18	0.27	0.50 (0.70)	0.14	0.48	0.03 (1.17)	0.003	0.98
Maternal report squared	-0.76 (1.82)	-0.08	0.68	-0.37 (0.37)	-0.13	0.32	0.11 (0.70)	0.02	0.87
Child report squared	-1.62 (0.88)	-0.23	0.07	0.40 (0.51)	0.12	0.43	-0.10 (1.00)	-0.01	0.92
Model R ²	0.05			0.11			0.07		

Regression models for Time 1 Perceived Life Threat were not reported because of problems with multicollinearity in these models. Tolerance was 0.0 in those models for mother and child reports of Perceived Life Threat

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 5 Maternal and child stressor reports at Time 1 as predictors of child posttraumatic stress (PTS) symptoms at Time 2 (polynomial regression)

Time 1 stressor reports Parameter	Actual life threat			Immediate loss/disruption			Ongoing loss/disruption		
	<i>b</i> (<i>SE</i>)	β	<i>p</i>	<i>b</i> (<i>SE</i>)	β	<i>p</i>	<i>b</i> (<i>SE</i>)	β	<i>p</i>
Maternal report	-2.04 (1.47)	-0.15	0.17	-1.04 (0.51)	-0.22	0.04*	-0.22 (0.71)	-0.03	0.76
Child report	3.11 (1.19)	0.23	0.01*	1.61 (0.60)	0.29	0.007**	1.84 (0.81)	0.20	0.03*
Maternal \times child report	-0.69 (0.98)	-0.06	0.49	-0.72 (0.33)	-0.28	0.03*	-0.16 (0.68)	-0.02	0.82
Maternal report squared	0.42 (0.62)	0.08	0.50	0.21 (0.18)	0.10	0.25	-0.01 (0.40)	-0.002	0.98
Child report squared	0.49 (0.51)	0.08	0.33	0.61 (0.25)	0.24	0.02*	-0.03 (0.56)	-0.004	0.96
Model R^2	0.07			0.06			0.03		

Regression models for Time 1 perceived life threat were not reported because of problems with multicollinearity in these models. Tolerance was 0.0 in those models for mother and child reports of perceived life threat

* $p \leq 0.05$; ** $p \leq 0.01$

Predicting Child PTS Symptoms at Time 2

For analyses examining reports of Actual Life Threat, child reported Actual Life Threat significantly predicted child Time 2 PTS symptoms, $b = 3.11$ (1.19), $p \leq 0.01$. In analyses examining Immediate Loss/Disruption, mother reports, $b = -1.04$ (0.51), $p < 0.05$, child reports, $b = 1.61$ (0.60), $p < 0.01$, the interaction between mother and child reported Immediate Loss/Disruption, $b = -0.72$ (0.33), $p < 0.05$, and squared child reported Immediate Loss/Disruption, $b = 0.61$ (0.25), $p < 0.05$, were significant predictors of child PTS symptoms at Time 2. The significant interaction term between mother and child reported Immediate Loss/Disruption was evaluated by calculating simple slopes for high and low levels of the moderator at +1 standard deviation above the mean and -1 standard deviation below the mean, respectively in Fig. 1. We examined this interaction with the mother report as the moderator, for ease of interpretation. For analyses examining reports of Ongoing Loss/Disruption, child report significantly predicted child PTS symptoms at Time 2, $b = 1.84$ (0.81), $p < 0.05$.

Discussion

To our knowledge, this study is the first to systematically examine agreement and discrepancies in mother and child reports of hurricane related stressors. Findings revealed that agreement between mother and child reports of stressors was predominantly slight to moderate. Discrepancies in reports of Immediate Loss/Disruption Stressors predicted higher levels of PTS symptoms in children, but discrepancies in stressor reports were not related to higher levels of PTS symptoms in mothers. These key findings will be discussed below.

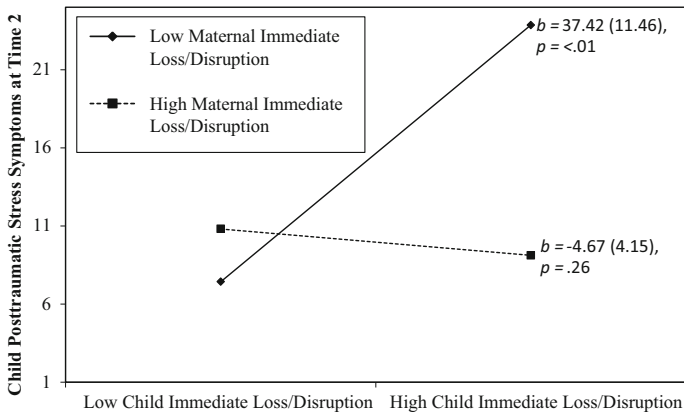


Fig. 1 Immediate loss/disruption stressor reports at Time 1 and relationship to child posttraumatic stress symptoms at Time 2

Mothers and children did not have substantial levels of agreement in their reports of hurricane related stressors. This finding is in stark contrast to how current postdisaster research is often conducted. Parent reports of stressors serve as a proxy for children’s experiences of stressors in much of the existing research (e.g., Chemtob et al. 2010; Polusny et al. 2011; Proctor et al. 2007). This is presumably based on the assumption that parent and child reports of hurricane related stressors have high levels of agreement. However, our findings suggest that this current practice should be changed, as parent and child reports had, at best, modest levels of agreement.

Interestingly, low levels of agreement were found despite the fact that we analyzed agreement only among dyads who were together when they were exposed to Hurricane Katrina. Our finding of discrepancies in reports is in keeping with the extant literature, which indicates that reports between different informants tend to not agree (De Los Reyes 2011; De Los Reyes and Kazdin 2005). In general, mothers endorsed the occurrence of a stressor more often than children (e.g., parent losing a job, difficulty obtaining food or water), with the exception that more children than parents thought their pet had been hurt or died. This indicates that parents and children may have different interpretations for events that might be considered “objective.” This potential explanation is in keeping with the larger literature on discrepancies, which suggests that differences in perceptions and recall for events may partially explain the existence of discrepancies in reports (De Los Reyes and Kazdin 2005). For example, in response to the question, “Has all damage to your house been fixed,” more children (58 %) responded affirmatively to this question than mothers (34 %). This may indicate that mothers are operating by different benchmarks than children, such as assessing internal mold damage and other concerns to which children may not be privy. It may also be that parents attempted to shield their children from stressors.

Our findings add to the growing body of literature outside the disaster field indicating that parent and child reports are often discrepant, even when objective events are considered (e.g., Ceballos et al. 2001; Tingskull et al., in press). Results may also suggest that different types of questions may be asked of mothers and children postdisaster to reduce burden. For example, some stressors may be in areas that children are not responsible for and thus have little knowledge of (e.g., fixing the home, getting food and water), and

parents may even try to protect their children from knowing about the full extent of these burdens. Thus, it is possible that parent responses may be more valid for those types of questions, although this would need further study.

When we conducted exploratory analyses examining levels of agreement in mother and child reports by age and gender, older child age emerged as a potential indicator that might be related to lower levels of agreement in reports. It should be noted that these analyses are descriptive only, as there was no formal method to directly compare kappa statistics. However, older child age has been associated with discrepancies in parent and child reports of quality of life (Cremeens et al. 2006). Older children may have reports that differ from their parents partly due to normative developmental milestone of independence.

In this study, discrepancies in mother and child reports predicted higher levels of child PTS symptoms. Specifically when mothers reported low levels of Immediate Loss/Disruption stressors, while children reported high levels of these stressors, children reported high levels of Time 2 PTS symptoms. However, when mothers reported high levels of these stressors while children reported low levels of these stressors, children reported lower levels of PTS symptoms. These results indicate that in situations where parents perceive a disaster as being associated with fewer stressors than their children, children may be more likely to report psychological distress symptoms. This finding may underline the importance of parent recognition of distress. Parent recognition of distress is often the primary criterion for children to receive therapy services. If parents fail to recognize a situation as being associated with stressors, they may not realize that their child needs help coping with stressors. As further evidence for this theory, discrepancies in reports were only associated with higher levels of children's PTS symptoms (i.e., discrepancies did not predict maternal PTS symptoms). This finding is also initial evidence that parents may assume that children experience an event in a way similar to their own experiences.

It is of note that child PTS symptoms were only predicted by discrepancies in reports of Immediate Loss/Disruption stressors. This may indicate that certain postdisaster periods, such as the immediate postdisaster recovery period, are particularly critical in terms of considering discrepancies between parents and children. However, this finding will need to be replicated. Another potential explanation for this finding may be related to the fact that the immediate recovery period for Hurricane Katrina was particularly stressful and prolonged, compared to other disasters.

Several limitations should be considered when evaluating this study. First, this study contained reports on hurricane related stressors at only one timepoint. Thus, we were not able to comment on the stability of dyad agreement or discrepancies over time. Further, only mothers were included in this study. Future studies should include fathers, as results may differ when fathers are included. In addition, this study relied on parent and child report exclusively, as is common of many postdisaster studies. However, future research examining parent and child report against objective measures such as insurance claims would provide useful validation information. Further, our sample was recruited exclusively from families exposed to Hurricane Katrina. Thus, our findings may not generalize to other disaster samples, especially when compared to disasters with a less prolonged recovery period.

Our findings have important implications for clinicians. Findings suggest that differences in *subjective* experiences of parents and children are important and should be acknowledged in assessing children's and adult's disaster responses. Clinicians may want to query both parents and children about their disaster experiences when working with families. Parent reports of disaster stressors may be very different from their children's reports, and discrepancies may be associated with PTS symptoms in children. In fact,

clinicians may be able use this examination of hurricane related stressors in both parents and children as an opportunity to discuss discrepancies in experiences.

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