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Posttraumatic Stress, Anxiety, and Depression Symptoms Among Children After Hurricane Katrina: A Latent Profile Analysis

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Abstract

This study utilized Latent Profile Analysis to identify typologies of distress (i.e., patterns of posttraumatic stress, anxiety, and depression symptoms) among children exposed to Hurricane Katrina. Outcomes and risk factors for these pattern groups were examined. Participants were children (*n* = 353; ages 8–15 years) affected by Hurricane Katrina. Children were assessed at 3 – 7 months (Time 1) and 14 – 17 months (Time 2) post-Katrina. Results identified three pattern groups (No Disturbance, PTS Only, and Mixed Internalizing) at Time 1. Children in the No Disturbance group reported the lowest levels of internal distress, while the Mixed Internalizing group reported the highest levels of internal distress at Time 2. The Mixed Internalizing and the PTS Only groups reported greater school problems than the No Disturbance group at Time 2. Perceived life threat and community violence exposure were risk factors associated with higher likelihood of falling in the PTS Only and Mixed Internalizing groups, compared to the No Disturbance group. Immediate loss and disruption was also a risk factor associated with a higher likelihood of falling in the PTS Only group, compared to the No Disturbance group. Finally, social support from parents or a classmate/friend was a significant protective factor associated with a lower likelihood of falling into a symptomatic pattern group.

Keywords

Posttraumatic Stress Symptoms; Anxiety; Depression; Children; Disasters; Latent Profile Analysis

Introduction

Children's reactions to traumatic events are an important public health concern as millions of children are exposed to disasters each year (Seballos, Tanner, Tarazona, & Gallegos, 2011). Elevated symptoms of posttraumatic stress (PTS), anxiety, and depression are well-documented among disaster-exposed children (Costa, Weems, & Pina, 2009; Kelley et al., 2010; Lai, Auslander, Fitzpatrick, & Podkowirow, in press; Lai, La Greca, & Llabre, in press; Scheeringa & Zeanah, 2008; Self-Brown, Lai, Thompson, McGill, & Kelley, 2013; Weems et al., 2007). These internal distress symptoms may persist over time (La Greca, Silverman, Lai, & Jaccard, 2010; Lai, La Greca, Auslander, & Short, 2013) and may interfere with children's functioning in school (Samuelson, Krueger, Burnett, & Wilson, 2009; Schoeman, Carey, & Seedat, 2009). However, it is unclear how these symptoms may co-occur, and it is also unclear what patterns of distress symptoms may be typical among children exposed to disasters.

Prior research examining children's reactions to disasters has generally focused on single diagnostic symptoms, such as PTS (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Furr, Comer, Edmunds, & Kendall, 2010; Galea, Nandi, & Vlahov, 2005), anxiety (Costa et al., 2009), or depression (Warheit, Zimmerman, Khoury, Vega, & Gil, 1996). Some research has examined co-occurring symptoms, but this research primarily has focused on *pairs* of diagnostic symptoms, such as PTS and depression (e.g., Aderka, Foa, Applebaum, Shafran, & Gilboa-Schechtman, 2011; Ekşi & Braun, 2009; Goenjian et al., 2001) or PTS and anxiety (Weems et al., 2007).

Only five studies have assessed the co-occurrence of multiple internalizing symptoms (i.e., PTS, anxiety, *and* depression) in children postdisaster (Brown & Goodman, 2005; Kar & Bastia, 2006; Liu et al., 2011; Meewisse, Olff, Kleber, Kitchiner, & Gersons, 2011; Yang et al., 2011). These studies utilized categorical approaches to identify the presence or absence of clinically significant levels of distress symptoms. Although important, this approach limits our understanding of the range of reactions children may exhibit postdisaster. For example, it is currently unknown to what extent children may exhibit moderate or low levels of internal distress symptoms postdisaster. Focusing on the presence or absence of pathology also precludes an investigation of whether differing ranges of symptoms may co-occur (e.g., low anxiety with high depression, moderate PTS with low depression). As a result, it is unknown what patterns of internal distress symptoms may be typical for children after disasters. Identifying these patterns is necessary in order to classify normative responses to disasters (Bonanno & Mancini, 2012). Information about normative responses is needed in order to create tailored interventions for children exposed to disasters.

Latent Profile Analysis (LPA) is a relatively modern approach that allows researchers to move beyond an examination of the presence or absence of pathology (i.e., a categorical approach). LPA examines continuously measured data; LPA is a person-centered approach that identifies latent subgroups by examining how individuals naturally group together (Lanza & Rhoades, 2013). A major strength of this approach is that it may be used to "identify shared symptom patterns" in a sample (Au, Dickstein, Comer, Salters-Pedneault, &

Litz, 2013, p. 2). LPA is an ideal approach for identifying information about naturally occurring patterns of internal distress symptoms among children exposed to disasters.

To date, there has been limited focus in the literature on varying internal distress symptom patterns among children exposed to disasters. There is initial evidence for the existence of a no disturbance pattern (i.e. low levels of PTS, anxiety, and depression symptoms), as many children report minimal distress symptoms following a disaster (La Greca, Lai, Llabre, et al., 2013; Self-Brown et al., 2013), and no disturbance patterns have been identified among adults after trauma exposure (Au et al., 2013). Evidence also exists for a pattern of significant internal distress symptoms among children. Trauma-exposed children may report multiple internal distress symptoms (Kar & Bastia, 2006; Liu et al., 2011; Meewisse et al., 2011). However, no clear evidence exists for other potential patterns of internal distress among children postdisaster.

A second important consideration in identifying patterns of distress is examining how distress patterns function over time. Initial distress patterns, occurring during the initial postdisaster recovery period, need to be identified in order to inform initial screening and assessment efforts postdisasters. Information related to distress symptom patterns beyond the initial recovery period is also needed. Studies of children extending beyond one year postdisaster are rare (La Greca et al., 2010). However, longitudinal studies that extend into this time period are needed in order to understand how initial patterns of internal distress may progress over time and to understand outcomes for children who present with different internal distress patterns.

Finally, it is important to identify risk and protective factors related to patterns of distress in order to elucidate factors related to individual differences (Bonanno & Mancini, 2012) in children's disaster responses. Previous conceptual models (i.e., Kelley et al., 2010; LaGreca, Silverman, Vernberg, & Prinstein, 1996; Lai et al., 2013; Vernberg, La Greca, Silverman, & Prinstein, 1996) have identified disaster exposure stressors (i.e., perceived and actual life threat, immediate loss and disruption) and other non-disaster stressors (i.e., community and family violence exposure) as risk factors that predict the development of internal distress postdisaster (La Greca, Lai, Joormann, Auslander, & Short, 2013). In contrast, social support is an important protective factor (La Greca et al., 2010).

The current study was conducted with children affected by Hurricane Katrina, who were assessed at 3 – 7 months and 14 – 17 months after Hurricane Katrina. Hurricane Katrina was the most costly disaster in U.S. history and claimed over 1,800 lives (Knabb, Rhome, & Brown, 2005). The storm caused significant and prolonged displacement of residents along the Gulf Coast, especially those from New Orleans. Our first study aim was to identify children's typologies of distress symptoms (i.e., PTS, anxiety, depression). Our second aim was to examine the functioning of our internal distress pattern groups over time. We expected that children who reported multiple internal distress symptoms initially, at 3 – 7 months postdisaster, would also report higher levels of internalizing symptoms at 14 – 17 months postdisaster, as the presence of comorbid symptoms may delay children's postdisaster recovery (Lai et al., 2013). We also expected that children in high symptom level groups would report more school-related problems, as psychological distress symptoms may interfere with children's learning, cognitive functioning, and attention (Husain, Allwood, & Bell, 2008; Samuelson et al., 2009; Schoeman et al., 2009). Our final aim was to identify risk and protective factors related to patterns of distress in order to elucidate factors related to individual differences (Bonanno & Mancini, 2012) in children's disaster responses. We expected that exposure stressors and non-disaster stressors would be related to a higher risk of falling into a symptomatic pattern group. Further, we expected that social support might play a protective role, such that higher social support would be associated with a lower likelihood of falling into a symptomatic pattern group.

Method

Participants

Participants in this study were part of a larger study examining children (n = 426) who resided in southern Louisiana when Hurricane Katrina made landfall (Kelley et al., 2010; Self-Brown et al., 2013). The majority of participants included in this study (78%) were displaced as a result of the storm. Half of the participants were female (52%), and most were ethnic minorities (i.e., 68% Black/African-American, 8% other ethnicities), while 25% of participants were White/Caucasian. Children ranged in age from 8 to 15 years (M = 11.71, SD = 1.52) and were in grades 4 through 8 at Time 1 (i.e., 3 – 7 months post-Katrina). The median income of families ranged from $15,000 to $24,999, and 51% of children resided in single-parent households.

Participants missing data on internal distress at Time 1 were excluded from analyses (n = 73). Thus, a subsample of 353 children was utilized in the current study. Children included in this study were slightly older (M = 11.71 years) than those excluded (M = 11.22 years), $t(423) = 2.485$, $p = .013$. The two groups did not differ in terms of gender or ethnic composition.

Procedure

Questionnaires were administered to children in their schools at two time points. Responses from Time 1 were collected 3 – 7 months post-Katrina. Responses from Time 2 were collected 14 – 17 months post-Katrina.

Measures

Posttraumatic Stress—The UCLA PTSD Reaction Index–Revision 1 (ULCA-RI-R; Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998) is an 18-item scale that was used to assess PTS symptoms at Time 1 and Time 2. Children rated the frequency of PTS symptoms on a five-point scale (0 = none of the time to 4 = most of the time), based on experiences with Hurricane Katrina. Items were summed to create a PTSD Symptom Severity score. Categories of PTS symptom severity (*Doubtful, Mild, Moderate, Severe,* or *Very Severe*) were calculated based on the PTSD Symptom Severity score (Steinberg, Brymer, Decker, & Pynoos, 2004). The PTSD Reaction Index has been widely used in trauma research (Steinberg et al., 2004), particularly with disaster-affected children (Kelley et al., 2010; Self-Brown et al., 2013; Weems et al., 2010). The measure demonstrates good psychometric properties (Steinberg et al., 2004). The internal consistency for this sample was excellent (α = .91).

Anxiety and Depression—The Behavioral Assessment System for Children, Second Edition (BASC-2) is used to assess behavior, psychopathology, and adjustment in children (Reynolds & Kamphaus, 2004). Children rated items on a two-point (i.e., true or false) and four-point (i.e., never, sometimes, often, almost always) scale. The Anxiety and Depression subscales were used as measures of internalizing symptoms at Time 1 and Time 2. T-scores falling between 60 and 69 are within the *At-Risk* range, and t-scores greater than 70 are considered *Clinically Significant* (Reynolds & Kamphaus, 2004). The internal consistency for the anxiety and depression scales for children (i.e., α =.86 and α = .84, respectively) and adolescents (i.e., α = .86 and α = .86 – .88, respectively) was good (Reynolds & Kamphaus, 2004).

School Problems—The School Problems subscale of the BASC-2 was used as a measure of academic problems at Time 2. The internal consistency for School Problems (i.e., α = .85 for children and α = .84 – .87 for adolescents) was good (Reynolds & Kamphaus, 2004).

Life Threat and Loss/Disruption—The Hurricane-Related Traumatic Experiences questionnaire (Vernberg et al., 1996) was used to assess children's hurricane exposure at Time 1. The measure consists of 15 items and yields two factors: Actual Life Threatening Experiences (5 items) and Immediate Loss/Disruption (9 items). An additional item assessing perceived life-threat was included. Children rated items as "yes" or "no", indicating whether they experienced each type of event during and after Hurricane Katrina. This measure has been used in previous studies of disaster-exposed children (La Greca et al., 2010; Lai et al., 2013).

Social Support—The Social Support Scale for Children was used to assess children's perceived social support at Time 1 from four sources: parents, teachers, close friends, and classmates (Harter, 1985). A factor analysis using the full sample revealed three factors, combining close friends and classmates into a single source of peer support. The measure contains 24 items, and children were instructed to select one of two statements as most accurate and then rate the statement as "really true" or "sort of true" of themselves. The internal consistency and construct validity for this scale are good (Harter, 1985; Varni & Katz, 1997). The internal consistency using the current sample was adequate (i.e., α = .74 for parent, α = .71 for peers, and α = .69 for teacher).

Family and Community Violence Exposure—The Screen for Adolescent Violence Exposure (SAVE) is a 32-item self-report scale that was used at Time 1 to measure violence exposure in children ages 11 – 16 years (Hastings & Kelley, 1997). Children responded to items using a five-point scale (0 = never to 4 = always). The measure yields three main factors: Family, School, and Neighborhood violence exposure. The School and Neighborhood subscales were combined as a measure of community violence exposure. The SAVE demonstrates good psychometric properties (Hastings & Kelley, 1997). The internal consistency using this sample was excellent, with community violence α = .96 and family violence α = .92.

The KID-SAVE, a 35-item self-report modified version of the SAVE, was used at Time 1 to assess younger children's (i.e., ages 8 – 11 years) violence exposure (Flowers, Hastings, & Kelley, 2000). The KID-SAVE contains questions related to violence exposure in three settings: Family, School, and Neighborhood. The School and Neighborhood subscales were combined as a measure of community violence exposure. Children responded to items on a three-point scale (i.e., "never," "sometimes," "a lot"). The questionnaire demonstrates high reliability and good discriminant validity (Flowers et al., 2000). The internal consistency for this sample was α = .91 for community violence and α = .52 for family violence.

Analytic Approach

To identify internal distress pattern groups among children exposed to a disaster (Aim 1), we conducted LPA models in *Mplus* (version 7). We focused on patterns of PTS, anxiety, and depression symptoms reported at Time 1. To determine the number of pattern groups in our data, we ran models containing one to four pattern groups. The final model was chosen based upon fit indices and substantive interest. Models were judged to exhibit better fit under the following conditions: lower Akaike Information Criterion (AIC), lower Bayesian Information Criterion (BIC), lower sample size adjusted BIC, a significant Lo-Mendell-Rubin likelihood ratio test (LMR-LRT), and a significant bootstrap likelihood ratio test (BLRT; Jung & Wickrama, 2008). We characterized children falling within these pattern groups by utilizing the AUXILIARY option with the e-setting to test the equality of means on child characteristics (i.e., age, gender, ethnicity). This option conducts posterior probability based multiple imputations to conduct pairwise mean comparisons (Muthen & Muthen, 1998 – 2007).

To validate our pattern groups, we examined outcomes (i.e., internal distress symptoms and school problems) reported at Time 2 for children in differing pattern groups (Aim 2). We again utilized the AUXILIARY option with the e-setting to test the equality of means on the four outcome variables across pattern groups.

Finally, we identified risk and protective factors related to Time 1 internal distress pattern groups (Aim 3). First, we utilized the pseudoclass draws method (see Asparouhov & Muthen, 2012 for a review) to narrow the pool of potential risk and protective factors. Narrowing the pool of risk and protective factors eases model convergence (Clark & Muthen, 2009). The pseudoclass draws method first classified individual children into internal distress pattern groups multiple times (i.e., in multiple draws). Next, pattern group information was jointly analyzed with risk and protective factors multiple times. The pseudoclass draws method then combined this information from the multiple draws. This information was utilized to narrow the pool of potential risk and protective factors by identifying potentially significant risk and protective factors for pattern groups. Significant risk and protective factors from these analyses were then included as covariates while forming subgroups (i.e., single-step regression).

Results

Means and standard deviations for this sample have been previously reported (Kelley et al., 2010; Self-Brown et al., 2013). To identify typologies of distress symptoms (Aim 1), LPA models for one to four pattern groups were run (Table 1). The three and four pattern group solutions were both considered as potential solutions, due to their fit indices (i.e., relatively lower AIC, lower BIC and adjusted BIC, and a significant BLRT). However, the three group solution was chosen because it contained patterns that were of substantive interest (see Table 2). In contrast, the four group solution contained two subgroups that were not clinically differentiated.

The pattern groups were named: a) No Disturbance (68% of the sample), b) PTS Only (20%), and c) Mixed Internalizing (12%). We characterized these pattern groups by examining average scores for each subgroup, and comparing these scores to established clinical markers for our measures of PTS, anxiety, and depression symptoms (i.e., markers for the UCLA-RI-R and the BASC-2). Children in the No Disturbance group reported mild levels of PTS symptoms and below average levels of anxiety and depression symptoms. Children in the PTS Only group reported PTS symptoms falling near a clinically significant cutoff of 38 on the UCLA-RI-R (Steinberg et al., 2004), and average levels of anxiety and depression symptoms. Children in the Mixed Internalizing group reported moderate levels of PTS symptoms and At-Risk levels of anxiety and depression symptoms falling near the Clinically Significant range. We further characterized these pattern groups by examining whether children in these groups differed on child characteristics (i.e., age, gender, minority status). The three pattern groups did not significantly differ on any child characteristics.

To examine the functioning of our pattern groups over time (Aim 2), we examined whether children in each pattern group reported different outcomes at Time 2 (14 – 17 months postdisaster). Means for each pattern group on internal distress outcomes and school problems are listed in Table 3. Children in the No Disturbance group reported significantly lower internal distress symptoms and school problems at Time 2 than any other group, as expected. Children in the Mixed Internalizing group reported significantly higher levels of anxiety and depression symptoms at Time 2, as compared to the PTS Only group. Surprisingly, the Mixed Internalizing and the PTS Only groups did not differ in their reports of PTS symptoms or school problems at Time 2.

Finally, we sought to identify risk and protective factors associated with the three pattern groups (Aim 3). To do so, we first utilized the pseudoclass draws method to narrow the pool of potential covariates. This process identified perceived life threat, immediate loss/disruption, community violence, and parent and peer social support as being significantly associated with pattern groups.

We included these factors in an LPA model as covariates associated with pattern group membership (i.e., single-step regression; see Table 4). First, we designated the No Disturbance group as a comparison group. Children who reported thinking that they might die during Hurricane Katrina (i.e., perceived life threat) were 3.45 (*CI* = 1.49, 8.03) times more likely to fall in the PTS Only group, and 3.21 (*CI* = 1.37, 7.49) times more likely to fall in the Mixed Internalizing group, as compared to the No Disturbance group. For every additional immediate loss/disruption event that children reported, they were 1.57 (*CI* = 1.21, 2.03) times more likely to fall in the PTS Only group, compared to the No Disturbance group. For every additional standard deviation that children fell above the mean on the measure of community violence, they were 2.98 (*CI* = 1.95, 4.56) times more likely to fall in the PTS Only group, and 2.02 (*CI* = 1.10, 3.71) times more likely to fall in the Mixed Internalizing group, compared to the No Disturbance group. Parent and peer social support were protective factors for children. For every additional unit of parent support reported by children, they were .65 times less likely to fall in the Mixed Internalizing group, *OR* = .35 (*CI* =.19, .67), compared to the No Disturbance group. For every additional unit of peer social support, children were .73 times less likely to fall in the PTS Only group, *OR* = .27 (*CI* =.12, .58), as compared to the No Disturbance group. No other risk or protective factors were significantly associated with falling in the Mixed Internalizing or PTS Only groups when compared to the No Disturbance group.

Next, we examined factors that might differentiate the likelihood of falling into the PTS Only group versus the Mixed Internalizing group. Thus, we designated the latter group as the reference group. For every additional unit of parent social support that children reported, they were .66 times less likely to fall in the Mixed Internalizing group than the PTS Only group, *OR* = .34 (*CI* =.13, .88). No risk or protective factors significantly differentiated likelihood of falling into these groups.

Discussion

The current study examined prototypical internal distress pattern groups among children exposed to Hurricane Katrina. We identified three patterns of internal distress symptoms among children, based on symptoms reported at Time 1: No Disturbance, PTS Only, and a Mixed Internalizing pattern. Children in the Mixed Internalizing group reported the worst outcomes at Time 2. Risk and protective factors for falling into symptomatic groups included: perceived life threat, immediate loss/disruption, community violence, and social support from a parent or peer.

The majority of the children in our study (68%) fell into a No Disturbance pattern group. These findings contribute to a growing body of literature that indicates that most children, similar to adults, report minimal symptoms following disasters (La Greca, Lai, Llabre, et al., 2013; Self-Brown et al., 2013). In addition, 20% of children fell in the PTS Only group. These findings are comparable to the larger disaster literature. Chronic symptom elevations in PTS among children rarely exceed 30% of those sampled (Bonanno et al., 2010). We also identified a small group of children (12%) who presented with Mixed Internalizing symptoms of high anxiety and depression and moderate PTS symptoms.

Identification of a Mixed Internalizing group suggests that researchers might need to shift how postdisaster outcomes are studied. To date, the predominant focus in disaster research has been on screening and identifying children's PTS symptoms. For example, numerous meta-analyses and reviews have summarized this research (Alisic, Jongmans, van Wesel, & Kleber, 2011; Furr et al., 2010; Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). However, screenings focused strictly on PTS symptoms would likely have overlooked children in this group, given that their Time 1 PTS symptoms fell in the moderate range. Importantly, this group reported the worst outcomes at Time 2. For example, their anxiety and depression symptoms at Time 2 *continued* to fall within the At-

Risk range. Further, the Mixed Internalizing group also reported PTS symptoms at Time 2 that were elevated and *comparable in elevation* to those reported by the PTS Only group. Thus, children in the Mixed Internalizing group reported PTS symptoms over a year after Hurricane Katrina that were as concerning as those reported by peers in the PTS Only group.

In this study, we also examined how pattern groups might be related to overall school functioning. The PTS Only and Mixed Internalizing groups reported significantly higher levels of school problems at Time 2 than the No Disturbance group. However, these two groups did not differ from each other in their levels of school problems, and these elevations in school problems did not fall within an At-Risk range. This study contributes to a growing body of literature examining the broader range of effects disaster exposure may have on children (Brown, Mellman, Alfano, & Weems, 2001; Lai et al., in press; Weems & Overstreet, 2008). Next steps for researchers could include examining more objective school outcomes, such as school grades and standardized test scores.

Several risk and protective factors were associated with these pattern groups. Stressors identified as risk factors associated with the likelihood of falling into a symptomatic group (i.e., PTS Only or Mixed Internalizing) included: perceived life threat, immediate loss and disruption, and community violence exposure. The importance of these factors has been documented in other disaster studies (Kilic, Kilic, & Aydin, 2011; Kronenberg et al., 2010; McDermott & Palmer, 2002; Salloum, Carter, Burch, Garfinkel, & Overstreet, 2011; Shahar, Cohen, Grogan, Barile, & Henrich, 2009; Thienkrua et al., 2006). For example, Kilic and colleagues (2011) reported that perceived life threat was significantly associated with depressive symptoms in youth exposed to an Earthquake in Turkey. Our results support previous research underlining the importance of screening for these stressors in order to identify children who may be at risk for developing internal distress reactions after disasters. Children who experience multiple stressors may be at an even higher risk for developing multiple internalizing symptoms postdisaster.

Finally, social support was an important protective factor. Interestingly, children with higher levels of parent social support were more likely to fall in the PTS Only group, compared to the Mixed Internalizing group. This finding adds to a growing body of literature identifying social support (LaGreca et al., 1996; Lee, Ha, Kim, & Kwon, 2004), and specifically parent support, as an important buffer against the development of internal distress symptoms after exposure to a potentially traumatic event (Bokszczanin, 2008; Thabet, Ibraheem, Shivram, Winter, & Vostanis, 2009), and these findings add to evidence identifying parent support as a risk factor for increased internal distress (Stice, Ragan, & Randall, 2004). Thus, support from parents may be an important buffer against developing *multiple* internalizing symptoms.

To our knowledge, this study is the first to utilize LPA to identify patterns of children’s internal distress symptoms after a natural disaster. However, there are some limitations to this study. First, although our use of LPA is a major strength of the current study, these findings will need to be replicated across other independent samples. Second, we utilized a convenience sample, indicating that our findings may not generalize to other types of disasters.

Future Directions

Overall, our results indicate the need for future research that extends beyond an examination of the presence or absence of pathology. If a categorical rather than dimensional approach had been utilized in the current study, the Mixed Internalizing group would not have been identified. Findings from the current study, if replicated, may serve as a guideline for future researchers and interventionists. For example, means for each pattern group may guide researchers and interventionists interested in triaging services for children postdisaster. Children may need services if they fall near or above the means identified in this study for the PTS Only and Mixed Internalizing groups. Importantly, these means were empirically defined by our data. Triaging services after disasters is an important concern, given that intervention resources are limited after disasters (Jaycox et al., 2010).

Our findings also have implications for clinicians. Clinicians should assess multiple symptoms of distress and potential stressors among children after disasters, as our research suggests that the presence of additional internal distress symptoms may influence recovery over time, and the presence of stressors may increase risk for developing a symptomatic pattern postdisaster. Further, current interventions primarily focus on children's PTS symptoms (La Greca & Silverman, 2011), but treatments may need to be tailored for children who report multiple internal distress symptoms after disasters.

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Table 1

Fit indices and group assignment accuracy for LPA models.

Number of Prototypical Patterns	AIC	BIC	Sample Size Adjusted BIC	Entropy	Posterior Probabilities	LMR-LRT	BLRT
1 Pattern	7386.31	7409.51	7390.47	1	1	N/A	N/A
2 Patterns	7057.16	7095.82	7064.10	.85	.94 – .97	<.001	<.001
3 Patterns	6999.48	7053.61	7009.20	.81	.81 – .95	.21	<.001
4 Patterns	6950.22	7019.81	6962.71	.76	.81 – .90	.31	<.001

Note. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test, and BLRT = Bootstrap Parametric Likelihood Ratio Test. Entropy, LMR-LRT, and BLRT values are not available (N/A) for single pattern models.

Table 2

Parameters for the final three prototypical patterns.

Symptoms	Pattern Groups *M* (*SD*)		
	No Disturbance *n* **= 240 (68%)**	**PTS Only** *n* **= 71 (20%)**	**Mixed Internalizing** *n* **= 42 (12%)**
PTS	10.46 (0.73)	35.25 (2.96)	28.77 (4.18)
Anxiety	43.71 (.61)	55.79 (1.56)	63.49 (1.88)
Depression	45.04 (.44)	53.07 (1.21)	68.14 (1.75)

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Table 3

Mean outcome scores at Time 2 for each pattern group.

	Pattern Group *M* (*SD*)		
Outcomes at Time 2	**No Disturbance**	**PTS Only**	**Mixed Internalizing**
PTS Symptoms	9.96 (.71)^{a}	22.34 (2.04)^{b}	21.22 (2.55)^{b}
Anxiety Symptoms	45.43 (.72)^{a}	53.84 (1.58)^{b}	59.31 (2.07)^{c}
Depression Symptoms	46.06 (.53)^{a}	53.82 (1.59)^{b}	60.10 (2.12)^{c}
School Problems	48.30 (.74)^{a}	54.08 (1.75)^{b}	55.48 (2.13)^{b}

Note. Superscripts within rows are different when means are significantly different ($p < .05$).

Table 4

Risk and protective factors associated with membership in pattern groups.

	Comparison Group	No Disturbance		PTS Only
		PTS Only Odds Ratio (95% *CI*)	Mixed Internalizing Odds Ratio (95% *CI*)	Mixed Internalizing Odds Ratio (95% *CI*)
Exposure Stressors	Perceived Life Threat	3.45 (1.49 – 8.03)**	3.21 (1.37 – 7.49)**	0.93 (.33 – 2.63)
	Immediate Loss/Disruption	1.57 (1.21 – 2.03)***	1.20 (.96 – 1.49)	0.76 (.57 – 1.02)
Non-Disaster Stressors	Community Violence	2.98 (1.95 – 4.56)***	2.02 (1.10 – 3.71)*	.68 (.36 – 1.28)
Social Support	Parent	1.04 (.49 – 2.22)	0.35 (0.19 – 0.67)***	.34 (.13 –.88)*
	Classmate/Friend	0.27 (.12 – .58)***	0.66 (0.23 – 1.90)	2.49 (.82 – 7.59)

Note.

* $p \leq .05$,

** $p \leq .01$,

*** $p \leq .001$.