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# Exploring posttraumatic growth in children impacted by Hurricane Katrina: Correlates of the phenomenon and developmental considerations

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## Abstract

This study explored posttraumatic growth (PTG), positive change resulting from struggling with trauma, among 7- to 10-year-olds impacted by Hurricane Katrina. Analyses focused on child self-system functioning and cognitive processes, and the caregiving context, in predicting PTG at two time points. Findings suggest that rumination, both negative, distressing thoughts and constructive, repetitive thinking, plays an important role in PTG. Hypotheses regarding future expectations and perceived competence were not fully supported, and, unexpectedly, coping competency beliefs, realistic control attributions, and perceived caregiver warmth did not contribute to PTG models. With one exception (positive reframing coping advice), caregiver–reported variables did not relate to PTG; no caregiver variable reached significance in final models. Relevant theory, developmental considerations, and future directions are discussed.

### Keywords

posttraumatic growth; Hurricane Katrina; children and disasters

## Exploring posttraumatic growth in children impacted by Hurricane Katrina: Correlates of the phenomenon and developmental considerations

The child disaster literature has largely focused on symptomatology and problem behaviors, primarily posttraumatic stress symptoms (PTSS) and posttraumatic stress disorder (PTSD), and factors that appear to influence children's adjustment (Silverman & La Greca, 2002). While that work has yielded necessary findings about the consequences of disaster and informed subsequent research, intervention, and policy, this evolving field needs to go beyond negative sequelae and elucidate factors that may mitigate the impact of disaster, as well as factors and conditions that contribute to resilience and processes such as *posttraumatic growth* (Alisic, van der Schoot, van Ginkel, & Kleber, 2008; Kilmer & Gil-Rivas, in press).

Posttraumatic growth, or PTG, refers to positive change experienced as a result of the struggle with trauma. Emphasizing the transformative elements of responding to adversity, PTG has been the focus of burgeoning interest in the research and clinical literatures (e.g., Calhoun & Tedeschi, 2006; Helgeson, Reynolds, & Tomich, 2006). However, despite this attention, and the significant research base regarding children and youth's response to stress or trauma (Compas et al., 2001; Grant et al., 2003; Osofsky, 2004a), relatively few studies

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have examined the construct among children. Notably, the report of the Hurricane Katrina Community Advisory Group (HKCAG; 2006) assessed PTG; however, they did so only among adults.

Nevertheless, early evidence supports the conclusion that growth occurs in some form among children and youth who have experienced natural disasters (Cryder, Kilmer, Tedeschi, & Calhoun, 2006; Kilmer et al., 2008), terrorism (e.g., Laufer & Solomon, 2006), traffic accidents (Salter & Stallard, 2004), cancer (e.g., Barakat, Alderfer, & Kazak, 2006), and a range of traumatic events (e.g., Alisic et al., 2008; Ickovics et al. 2006; Milam, Ritt-Olson, & Unger, 2004). However, the literature appears to include only four published papers (Alisic et al., 2008; Cryder et al., 2006; Phipps, Long, & Ogden, 2007; Salter & Stallard, 2004) investigating PTG or related constructs (stress-related growth, perceived benefits, benefit finding) within a child sample or subsample. Of those, only Cryder and colleagues reported correlates of PTG reflecting resources, competencies, or processes thought to relate to the growth process. This paper seeks to extend those findings and enhance understanding of PTG in children. It has the following objectives: a) provide relevant conceptual background, considering developmental issues, distinguishing the construct from resilience, and discussing selected variables thought to be relevant to the PTG process; and b) examine correlates of PTG. Specifically, informed by Kilmer's (2006) model of the growth process and ideas posited by Kilmer and Gil-Rivas (in press), the present work focuses on the role of child characteristics, including self-system variables (e.g., perceived competence, future expectations) and cognitive resources and processes (e.g., realistic control expectations, rumination), and indicators of the caregiving context (e.g., caregiver warmth, caregiver positive reframing coping advice) thought, on theoretical and/or empirical grounds, to be related to PTG.

## Posttraumatic growth and the growth process

Although many children adapt successfully in the face of adversity, research has demonstrated that children who have experienced trauma may exhibit difficulties in multiple developmental domains, i.e., emotional and behavioral symptoms, delays or regressions in developmental skills, and difficulties in cognitive and socio-emotional functioning (e.g., Cicchetti & Lynch, 1993). Disaster-specific work has reinforced such notions, suggesting that a sizable proportion of children evidence a range of short- and long-term mental health sequelae following disaster (e.g., La Greca, Silverman, Vernberg, & Roberts, 2002; Pfefferbaum et al., 1999), which vary based on a child's developmental level (see National Child Traumatic Stress Network [NCTSN], n.d.; Osofsky, Osofsky, & Harris, 2007). The most common long-term negative consequences reflect PTSD symptoms, anxiety and generalized distress, major depression, suicidality, and problem behaviors (e.g., Silverman & La Greca, 2002).

The child trauma literature has also described findings akin to PTG. For instance, work with pediatric cancer survivors suggested that youth experienced positive changes including heightened sensitivity to others, increased altruism, and modified values (Fritz, Williams, & Amylon, 1988). A recent study with youth aged 7–18 years who had experienced traffic accidents found that many reported a changed philosophy of life, improved relationships, and more positive self-perceptions after the accidents (Salter & Stallard, 2004). Others have documented instances of children reporting that they feel "stronger" after significant life events, such as the death of a parent (Krementz, 1983), and more systematic efforts, focusing on PTG, have found evidence supporting the phenomenon in children (Alisic et al., 2008; Cryder et al., 2006; Kilmer et al., 2008). In general, the literature suggests that the positive changes framed as PTG tend to cohere in several main domains: a greater sense of one's personal strength; a different perspective on one's relationships; a changed philosophy

of life, such as a greater appreciation for life and its new possibilities; and spiritual growth (Calhoun & Tedeschi, 2006; Kilmer, 2006).

Key elements of the hypothesized PTG process warrant mention (see Kilmer, 2006). In many cases, traumas such as disaster can impact meaningfully a youngster's assumptive world. They can shatter assumptions about one's self, others, one's world, and the expected course of one's life (Janoff-Bulman, 1992), stimulating attempts to cope and adapt. Growth is thought to evolve as a result of the struggle with trauma and its aftermath, not solely the experience of the trauma itself, developing as one grapples with his or her new reality, working to understand what has happened and its implications for life going forward (Calhoun & Tedeschi, 2006). In fact, theorists postulate that this continuing distress and the individual's efforts to reconcile his or her post-trauma reality facilitate a constructive cognitive processing of trauma, or productive rumination (Calhoun & Tedeschi, 2006). Through this process, one may try to make sense of the event(s) and integrate the trauma and its aftermath in a manner consistent with prior internal representations, or working models. Subsequently, this ruminative process yields schema change, a critical element that serves to consolidate changed perspectives on self, others, and one's new life and way of living (Calhoun & Tedeschi, 2006). Of relevance here, existing evidence suggests that, following trauma, the reactions and responses of children and youth at different ages and stages vary, in part because their cognitive and emotional capacities lead them to understand and internalize the experience differently (NCTSN, n.d.; Osofsky, 2004b). In light of these realities, and because PTG appears to involve a degree of cognitive sophistication that allows both losses and gains to be recognized, the degree to which the growth process in children accords with the process observed among adults is unclear (Cryder et al., 2006).

## Developmental considerations in the study of PTG

Questions have been raised about children's capacity to engage in the cognitive and affective processes necessary to yield transformational changes, including their "psychological mindedness" (intrapersonal awareness and insight) or self-understanding (Cryder et al., 2006; Kilmer, 2006). Variability in youngsters' cognitive capabilities may influence their encoding and appraisal of, and attributions about, trauma (Hasan & Power, 2004; Shahinfar & Fox, 1997); repertoire of coping strategies; ability to marshal resources and cope effectively; and capacity to attend to and report their internal experiences and emotional states (Alisic et al., 2008; Cryder et al., 2006; Kilmer, 2006; Osofsky, 2004b). Moreover, children's responses and reactions are closely tied to their cognitive, emotional and behavioral capacities at the time of the trauma and the time of the expression of their responses post-trauma (Shahinfar & Fox, 1997). Although this study does not address these issues directly, several developmental considerations warrant a brief discussion, particularly the degree to which child self-reported PTG reflects actual growth versus normative maturation; and cognitive maturity and the appraisal and understanding of the event, including issues of self-awareness and self-understanding.

Some researchers have underscored the need to differentiate child PTG from change resulting from normal maturational processes (Cohen, Hettler, & Pane, 1998). Two recent efforts shed light on this valid issue. Taku and colleagues (2008) found that, among Japanese youth (mean age = 13.52 years, *SD* = .97), those who reported experiencing at least one trauma or major stressful event within the past year scored significantly higher on a measure of PTG (and on eight of its 10 items) than peers who had not (who, in response to the PTG measure's items, reported about the degree to which they had changed in the last year). In their community sample (mean age = 10.24 years, *SD* = 1.21), Alisic and colleagues (2008) asked children to describe their "worst experience ever" and to consider that experience as they answered items about PTSS and PTG. An expert panel then determined whether the events reported were consistent with the *DSM-IV* PTSD A1 criterion

for objective trauma exposure (i.e., "the person experienced, witnessed, or was confronted with an event or events that involve actual or threatened death or serious injury; or threat to the physical integrity of himself or herself or others," American Psychiatric Association [APA], 1994, p. 427) and classified children on the basis of their experiences (i.e., exposed/not exposed to trauma). Consistent with Taku et al. (2008), children exposed to trauma reported more PTG than those without trauma experiences (Alisic et al., 2008). While prospective longitudinal methodologies are necessary to yield compelling evidence that the growth assessed is indeed PTG, these findings provide support for the PTG process as distinct from normal growth.

When considering cognitive maturity, some may question whether young children are sufficiently self-aware to reflect and consider the degree to which they have changed over time. Kilmer et al. (2008) reported responses to findings from open-ended items illustrating that, while few 7 to 10 year olds spontaneously made comments that clearly suggested growth (e.g., "I am more positive now"), they demonstrated a grasp of the temporal element of the questions about change (e.g., "After the hurricanes, my grandfather died and my mother got meaner"). This capacity to make the temporal comparison is consistent with prior findings (Harter, 2006).

Beyond the temporal element, with cognitive maturity comes the capacity for greater self-understanding and awareness and more developed schema for oneself and one's world, key factors in the processes presumed relevant to growth. Findings regarding the impact of age have been mixed: Milam et al. (2004) found a positive association between age and PTG among adolescents, positing that a particular level of cognitive maturity is necessary to find meaning or identify salient positive changes as a result of trauma; however, in much younger samples, Cryder et al. (2006) and Kilmer et al. (2008) did not detect a relationship between age and PTG.

Nevertheless, multiple salient capacities emerge in middle and late childhood that warrant mention, given their potential relevance to PTG. For example, during this time, children evidence increased competence in managing trauma-related thoughts and regulating their emotions (e.g., Salmon & Bryant, 2002). Thus, authors have noted the increase in emotion-focused coping and the manifestation of cognitively-oriented attempts at coping, including cognitive reframing, or reappraising a difficult situation (e.g., Aldwin, 2007; Compas et al., 2001; Salmon & Bryant, 2002). Moreover, although findings vary regarding the ages at which this capacity coalesces, between ages 6 and 9, control expectations become more realistic, and children are better able to identify the ways in which they can cope with those circumstances that can and cannot be controlled (e.g., Aldwin, 2007; Salmon & Bryant, 2002).

Furthermore, given that a) schema change and b) the capacity to acknowledge and integrate the positives in oneself and one's situation following trauma constitute two critical elements of the hypothesized PTG process, it is necessary to highlight that young children's internal representations of self and others are not yet set and may be qualitatively different than those of adults. According to Janoff-Bulman (1992), because a child's assumptive world is more pliable than an adult's, his or her basic assumptions and working models may be modified as new experiences become incorporated. Thus, exposure to trauma can severely disrupt one's assumptive world (e.g., of safety, predictability), because these cumulatively-constructed representations are less firmly entrenched (Janoff-Bulman, 1992; Lieberman & Van Horn, 2004). However, that also suggests that the child's schema may be open to adaptive inputs (Janoff-Bulman, 1992), including the re-working and revision of one's views of oneself and one's world.

For that to occur, the child must recognize and internalize some positive appraisals of the trauma and subsequent changes. A line of research regarding children's ability to acknowledge the simultaneous existence of positive and negative emotions or attributes in relation to a target event (Harter, 1986; Harter & Buddin, 1987) may shed light on their capacities to accommodate a positive aspect or change in the face of trauma. Specifically, while 5–7 year olds are generally unable to integrate emotions of opposing valence (both positive and negative), a developmental progression is evident such that children develop the capacity to understand and express emotions of different valence to a target between nine and thirteen years of age ($M$ = 11.34; $SD$ = 2.12), with some children evidencing this ability as young as 7.6 years (Harter, 1986; Harter & Buddin, 1987). These findings may suggest a lower age limit for PTG (Kilmer, 2006).

## The PTG and resilience constructs: Parallel but distinct

PTG clearly shares significant conceptual variance with the construct of resilience; however, they are distinct. While resilience refers to "a dynamic developmental process reflecting evidence of positive adaptation despite significant life adversity" (Cicchetti, 2003, p. xx; see Masten, 2001), PTG refers to a process by which one is *transformed* as a result of his or her struggle in trauma's aftermath (Cryder et al., 2006). Thus, PTG involves positive changes extending beyond sound adjustment despite adversity; it "involves movement beyond pre-trauma adaptation, a qualitative change in functioning across domains" (Cryder et al., 2006, pp. 65–66).

That PTG does not equate to positive adjustment further distinguishes PTG and resilience. That is, those reporting PTG may also report less emotional well-being or positive adjustment than those evidencing resilient adaptation (Cryder et al., 2006). Although a recent prospective longitudinal study with adolescents demonstrated that those who reported higher PTG exhibited less emotional distress up to 12 and 18 months post-event (Ickovics et al., 2006), and others have reported a link between PTG and health-related behaviors (Milam et al., 2004), the extant literature largely suggests that, while many survivors recognize positive change as a result of their struggle, they often report distress and symptomatology in the aftermath of trauma (Calhoun & Tedeschi, 2006). Thus, growth and distress may co-exist (Kilmer & Gil-Rivas, 2008). In that vein, Linley and Joseph (2004) suggested framing growth and distress as independent dimensions, not two ends of a single continuum. Accordingly, Salter and Stallard (2004) reported that, while 42% of their sample reported PTG, 37% of these same children met criteria for a PTSD diagnosis. Similarly, Alisic et al. (2008) and Kilmer et al. (2008) found a significant positive correlation ($r$s = .41 and .44, respectively) between PTG and PTSS. Such findings are not inconsistent with PTG models - distress is viewed as a key catalytic element of the process and may serve to maintain growth (Tedeschi, Calhoun, & Cann, 2007).

Notwithstanding the differences between the constructs, the resilience research base can point to factors, processes, and conditions that may not only influence children's adjustment in response to trauma, including disaster, but may also hold promise in the study of PTG. For instance, most disaster studies have focused on relatively circumscribed individual characteristics (e.g., demographics) and elements of functioning, such as coping approaches (e.g., La Greca, Silverman, Vernberg, & Prinstein, 1996) or pre-disaster functioning (e.g., anxiety symptoms) (e.g., Weems et al., 2007). Although these studies have yielded important findings, work in resilience suggests a far wider range of child variables that warrants investigation, particularly child attributes, resources, and competencies such as positive dispositional qualities; good intellectual functioning; self-efficacy; perceived competence; control attributions; and positive future expectations or optimism (e.g., Luthar, 2003; Masten & Coatsworth, 1998). Results from this work may inform PTG research.

## Constructs of relevance to the present study

Drawing from prior PTG research and theory (e.g., Cryder et al., 2006; Kilmer, 2006), as well as work in stress and coping and risk and resilience (e.g., Luthar, 2003; Masten & Coatsworth, 1998), the following constructs are of prime relevance to the present study.

**Self-system factors: Perceptions regarding competence and the future—**One's perceptions of competence; one's expectations for his or her future; and one's positive appraisals and expectations regarding one's ability to meet daily task demands, cope, and adjust in the face of stress or trauma are hypothesized to play a core role in the PTG process (Kilmer, 2006). Cryder et al. (2006) found a direct relationship between competency beliefs and PTG and, in the resilience literature, positive self-views and self-system functioning are among the most consistently-reported factors that seemingly serve a protective function, facilitating positive adaptation and reducing risk of maladjustment in the face of adversity (e.g., Luthar, Cicchetti, & Becker, 2000; Masten, 2001). For instance, perceived competence scores were among the most powerful discriminators of those demonstrating resilient versus maladjusted outcomes in two independent cohorts of children exposed to multiple risks (Cowen et al., 1992; Hoyt-Meyers et al., 1995). Additionally, in their influential work, Werner and Smith emphasized that those exhibiting resilient adaptation "worked well, played well, loved well, and *expected* well" (1982, p. 153, italics added). Positive beliefs about one's competencies or future may influence how a youngster perceives an event, his or her responses to adversity, and the effort he or she sustains in wrestling with the event and its aftermath (e.g., Wyman, Cowen, Work, & Kerley, 1993). In turn, factors reflecting sound self-system functioning (e.g., future expectations, perceived competence) are hypothesized to relate directly to PTG, because they not only may affect one's perceptions of these events and ability to deal with them, but also one's approach to and persistence in coping and the likelihood of perceiving positive change (Kilmer, 2006).

**Cognitive resources: Realistic control expectations—**Current PTG models highlight cognitive processes, including not only appraisals of the traumatic event, but control attributions and rumination (Calhoun & Tedeschi, 2006; Kilmer, 2006). The accuracy of children's control expectations can influence how they respond and react following adversity (see Wannon, 1990). Wyman (2003) argued that, under adversity, realistic control – that is, accurate, age appropriate perceptions about events, outcomes, and problems that are controllable and uncontrollable – may be more meaningful and adaptive for children than an undifferentiated internal locus of control, a hypothesis with some support (Cowen et al., 1992; Hoyt-Meyers et al., 1995). For example, children's realistic control expectations and attributions about their circumstances would seem salient in the post-disaster context, as they may influence their responses to adversity, coping approaches, affect regulation, and behavioral organization and goals (Kilmer, 2006; see Hasan & Power, 2004; Pynoos, Steinberg, & Wraith, 1995). In turn, Kilmer (2006) hypothesized that realistic control relates bidirectionally with other cognitive elements of the growth process, such as productive rumination, and with aspects of the self-system, including coping competency beliefs and hope for the future.

**Productive rumination—**The function of rumination, or repetitive thought, is thought to be of particular import in the PTG process. Ruminative thinking can have negative consequences (intrusive rumination has been linked with depressive symptoms and anxiety) or can serve a more constructive function, for example, helping one to recover and perhaps even grow post-trauma (see Watkins, 2008). According to PTG models, disruptions to one's assumptive world and distress associated with trauma (including intrusive thinking) may result in productive, or deliberate, ruminative processes that are thought to help one better understand, engage, and perhaps find meaning in the event, allowing for the inclusion of

positive appraisals. These positive appraisals facilitate schema change as one notes and integrates the changes in oneself and one's environment (Kilmer, 2006; Tedeschi et al., 2007). Kilmer (2006) hypothesized a link between deliberate ruminative thinking and self-system variables and, consistent with this notion, Cryder et al. (2006) reported a significant relationship between rumination and children's competency beliefs, with the latter the prime proximal predictor of PTG. While the nature of the rumination-PTG relationship is not clear, early indications suggest the amount of rumination alone is not a significant predictor of PTG (Cryder et al., 2006). It is possible the content of the repeated thoughts and the manner in which the individual engages them more actively contribute to, and perhaps catalyze, the growth process (Kilmer, 2006; Tedeschi et al., 2007).

**The caregiving context—**Caregivers and, more broadly, the caregiving context are widely recognized to play a central role in helping children adapt in the face of adversity (Luthar, 2003; Masten & Coatsworth, 1998) and, more specifically, disasters (Gil-Rivas, Holman, & Silver, 2004). Among many potentially salient elements of this context, caregiver functioning post-disaster (including distress and symptoms) may relate to their responsiveness and availability (affecting caregiver behaviors and support) as well as children's appraisals, interpretations, reactions, and behavior (Masten, Best, & Garmezy, 1990; Salmon & Bryant, 2002).

Caregivers can also help youngsters appraise and understand events and their emotions, provide support, share perspective, and guide or model coping (Gil-Rivas, Silver, Holman, McIntosh, & Poulin, 2007; Kliewer, Sandler, & Wolchik, 1994; Pynoos et al., 1995). In turn, coping advice involving positive reframing, i.e., encouraging children to consider the positive, would seem germane to child PTG. In the same vein, caregiver PTG may evidence a meaningful link to child PTG, in part because their experiences may inform the manner by which they help the child craft narratives about, or increase understanding of, the changes that have occurred, and offer perspectives that can foster adaptive schema change (Calhoun & Tedeschi, 2006; Janoff-Bulman, 1992; Kilmer, 2006).

Researchers have emphasized that warm, nurturant caregiving can mitigate the impact of risk (Luthar et al., 2000; Masten & Coatsworth, 1998), and competent, developmentally appropriate parenting in the disaster's aftermath will facilitate attunement and responsiveness to children's needs (Kilmer, 2006). In addition, supportive and nurturant caregiver-child relationships are thought to positively influence children's self-views and self-system functioning (Yates, Egeland, & Sroufe, 2003). In the PTG literature, this possibility was borne out by the significant link identified between perceived support and children's coping competency beliefs (Cryder et al., 2006). Thus, within the PTG process, warm, responsive caregiving may contribute to PTG largely through its association with the self-system.

## The context of the present study: Children and families impacted by Hurricane Katrina

The adversities experienced and the consequences evidenced by the children and families impacted by Katrina have been well-documented (Gil-Rivas, Kilmer, Hypes, & Roof, in press; HKCAG, 2006; Osofsky, Osofsky, Kronenberg, & Cross, in press; Weems et al., 2007). In describing the experiences of the sample studied in the present investigation, Gil-Rivas et al. (in press) noted that 86.8% endorsed experiencing at least one hurricane-related traumatic event, and 63.2% of children reported that Hurricane Katrina was one of the "most scary" events they had experienced. Overall, children reported experiencing considerable adversity and, in the face of such circumstances, one year post-hurricane Katrina, 21% of the children obtained PTSS scores suggesting the presence of a probable PTSD diagnosis, and

nearly all reported experiencing at least one PTSS much or most of the time during the previous month (Gil-Rivas et al., in press).

Kilmer and colleagues (2008) examined PTG among those same children, validating the PTG measure and reporting that, at baseline (approximately 12 months post-disaster), roughly 50% of the sample obtained total scores suggesting an average response of "some" perceived change, or growth, across the scale's items; 7.5% had scores suggesting average responses of "a little" change or less. Total PTG scores did not differ for boys and girls, and age did not correlate with PTG. Analyses examined the linkages between PTG and multiple trauma-related variables. Consistent with expectations, children's baseline PTG scores were not significantly associated with objective hurricane exposure, but children's self-reported subjective response to the event and self-reported PTSS correlated significantly with PTG. Regression analysis demonstrated that subjective response related to PTG over and above objective hurricane exposure, though, in the final model, only PTSS significantly explained variance in PTG scores. Similar findings held at follow-up, roughly 22 months post-hurricane. For instance, 53% of the sample obtained PTG scores suggesting "some" perceived change; 13.2% had scores suggesting "a little" or less. Consistent with baseline results, there were no gender differences in PTG scores, and age did not relate to PTG. Although baseline PTSS correlated with PTG at follow-up, baseline PTG was the only significant predictor of PTG. Overall, these findings lay groundwork for the present study.

## The present study

This study sought to extend previous PTG work (i.e., Cryder et al., 2006; Kilmer et al., 2008), enhance understanding of PTG, and expand its nomological network by exploring relationships beyond those between PTG and trauma-related variables (e.g., subjective response, PTSS). Specifically, it examined associations between PTG, children's self-system and cognitive resources and processes, and the caregiving context in a sample of young children (aged 7–10 years) impacted by Hurricane Katrina. This age group was targeted because it would permit examination of relevant developmental considerations and change over time, particularly among key constructs hypothesized to be associated with PTG. Informed by prior research and theory (Cryder et al., 2006; Kilmer, 2006; Kilmer & Gil-Rivas, in press), the age of the children (and their still-evolving self-systems), the presumed importance of the caregiving context, and the assumed role of ruminative thinking in catalyzing the PTG process, we expected that:

- **a.** At baseline, self-system variables (perceived competence, future expectations, and coping competency beliefs) would relate positively to PTG;
- **b.** At baseline, perceived caregiver warmth would relate to both self-system variables and PTG; caregiver distress would be negatively associated with PTG; and caregiver PTG and positive reframing coping advice would be positively associated with child PTG;
- **c.** At baseline, cognitive variables, particularly deliberate rumination, would evidence a positive association with PTG, over and above caregiver and self-system variables;
- **d.** Baseline levels of child self-system functioning, rumination (intrusive and deliberate), and caregiver's positive reframing coping advice would predict PTG at follow-up, over and above PTG at baseline.

# METHOD

## Participant Recruitment and Study Design

Face-to-face interviews were conducted with children and their primary caregiver in the Baton Rouge and New Orleans, LA metropolitan areas and along the Mississippi Gulf Coast. Baseline interviews were conducted roughly one year post-Hurricane Katrina (*M* = 12.62 months, *SD* = 4.08); follow-up interviews were conducted approximately two years post-hurricane (*M* = 22.36 months, *SD* = 3.25). Participants were recruited via flyers distributed at elementary schools, FEMA-operated trailer parks, service provider agencies, and community-based organizations, and via participant referral. Trained research assistants conducted the interviews at participants' homes or at locations convenient to caregivers. Participants were compensated with gift cards for their participation and that of their child. The study was approved by the University of North Carolina at Charlotte and the Louisiana State University Institutional Review Boards.

## Participants

At baseline (T1), participants included 66 caregiver-child dyads, of these, 51 completed the follow-up (T2) interview (77% retention). At T1, children, on average, were 8.5 years of age (*SD* = 1.1), and 56.1% were female. A majority of children were African-American (77.3%), 15.2% were White, and 7.5% reflected other backgrounds. Caregivers were predominantly female (87.9%) and, on average, they were 38.1 years old (*SD* = 9.6); 80.9% of them were the biological parent. Over half of (63.6%) caregivers had a GED/high school diploma or less. Just over one-third (34.9%) of the caregivers were married or living as married, 31.8% were divorced or separated, and 33.3% were single. Roughly two-thirds (68.2%) of caregivers were unemployed, and 56.1% reported an annual household income of less than $9,999; an additional 16.7% had an income of less than $20,000. Nearly all children (97.0%) were directly exposed to the hurricane (i.e., they were in a building that was damaged, were injured, or were in a community that was flooded; a family member was injured or killed; or they otherwise experienced a loss) and, as a result, 95.7% of the families had to evacuate their communities and 90.0% became homeless. In the year following the hurricane, families moved an average of 3.1 times (*SD* = 2.1; range 0–11). At T1, 36.4% of participants were living in FEMA trailers, 16.7% in their own house or apartment, 37.9% in a rented apartment or house, 6.1% lived with relatives, and 2.9% reported other living arrangements.

## Measures

Children completed the following measures at T1, unless otherwise noted:

**Hurricane-related exposure—**Children completed an 8-item checklist that parallels in content the Hurricane Related Exposure scale (La Greca et al., 1996) (e.g., "You were injured or hurt"). A total score of events reported was computed.

**Child post-traumatic stress symptoms (PTSS)—**The UCLA-PTSD RI-1 (Steinberg et al., 2004) assessed PTSS at T1 and T2. The scale reflects *DSM-IV* (APA, 1994) PTSD-related symptoms: re-experiencing (i.e., intrusive memories, nightmares; 5 items), arousal (i.e., irritability, sleep difficulties; 5 items), and avoidance (i.e., avoiding people, activities, feelings; 7 items). The scale also includes 2 items assessing other symptoms of clinical significance (i.e., fears of recurrence and trauma-related guilt). Children reported how much of the time they had experienced these symptoms in relation to Hurricane Katrina during the past month on a scale ranging from 0 (none) to 4 (most of the time). The UCLA-PTSD-RI-1 has demonstrated good internal consistency and test-retest reliability. A PTSS total score was computed, using the method specified by Steinberg et al. (2004); α in this sample = .88.

**Posttraumatic growth—**The Posttraumatic Growth Inventory for Children-Revised (PTGI-C-R; Kilmer et al., 2008) was administered at T1 and T2. Each youth responded to open-ended items assessing changes perceived in their lives and themselves since Katrina. Children also responded to 10 items assessing changes in five PTG domains: *New Possibilities* ("I have new ideas about how I want things to be when I grow up"); *Relating to Others* ("I feel closer to other people (friends and family) than I used to"); *Personal Strength* ("I learned that I can deal with more things than I thought); *Appreciation of Life* ("I know what is important to me better than I used to"); *Spiritual Change* ("My faith (belief) in God is stronger than it was before") (Kilmer et al., 2008). Children responded on a 4-point scale (0 = no change, 1 = a little change, 2 = some change, 3 = a lot of change). Consistent with prior work, a total score was computed by summing the items; the scale demonstrated adequate internal reliability at T1 (α = .77) and T2 (α = .81).

**Coping competency beliefs—**This adaptation of the 5-item Children's Competency Beliefs Scale (CCBS; Weyer & Sandler, 1998) used in a study of children displaced by Hurricane Floyd (Cryder et al., 2006) assessed children's perceptions of their ability to handle problems related to the hurricane (e.g., "Overall, I think that the things I did after the hurricanes worked to make things go better for me"), as well as other areas of their life (e.g., "I feel good about the way I have tried to handle my problems"), using a 0 (not at all true for me) to 3 (very true for me) scale. Mean scores were created; higher scores indicate greater coping competence (α = .63).

**Perceived competence—**Adapted from Harter's (1982) Self Perception Profile for Children, this 28-item version employs simplified item wording and a single-step forced-choice format (instead of the original's two-stage forced-choice response) to assess self-views of *Social Competence/Acceptance, Scholastic Competence, Behavioral Conduct, Athletic Competence, Physical Appearance,* and *Global Self-Worth* (Hoyt-Meyers et al., 1995). For each item, youth indicated which of two statements better described them (e.g., "I don't have as many friends as I'd like" vs. "I have lots of friends"). Items indicating greater perceived competency were coded as "1" and those reflecting lower competence as "0"; responses were summed (α = .83).

**Future expectations—**This 7-item adaptation of Wyman et al.'s (1993) scale assesses youngster's views about their futures (e.g., the degree to which they expect to have a happy life, have friends and people who care about them) on a 3-point scale. The scale was modified to add structure and simplify responses for young children (Kilmer, 1996). Items were summed to create a total score; higher scores suggest more positive future expectations (α = .73).

**Realistic control expectations—**This adaptation of Wannon's (1990) measure assessed control expectations for controllable (e.g., "can children keep from failing a test if they study?") and uncontrollable (e.g., "can children keep adults from having any worries?") events, using a 3-point scale. This modification retained 11 of 12 items from the scale used by Hoyt-Meyers et al. (1995), dropping one of the two items excluded by Kilmer (1996) to reduce redundancy. Controllable and uncontrollable subscale αs = .70 and .52, respectively; given the low alpha, the latter was not included in analyses. Higher mean scores indicate more accurate expectations.

**Rumination scale for children (RS-*C*)—**Used by Cryder et al. (2006), this 5-item adaptation of the adult Rumination Scale (Calhoun, Cann, Tedeschi, & McMillan, 2000) measures intrusive (2 items; e.g., "I think about it when I don't mean to") and deliberate rumination, (3 items; e.g., "Sometimes I think about it to try to figure out why things like

that happen"). Children responded using a scale from 1 (not at all true for me) to 4 (very true for me); a mean score for each subscale was created to facilitate interpretation. The correlation between the items reflecting intrusive thoughts was .33; the deliberate rumination subscale α =.65.

**Caregiver warmth and acceptance—**Children completed a 10-item version of a scale used previously to assess perceptions of caregiver warmth and acceptance (e.g., "My caregiver really understands me;" "My caregiver enjoys spending time with me") (Greenberger & Chen, 1996). Respondents used a 1 (not all true) to 4 (very true) scale, and a mean score was created (α = .68).

Caregivers completed the following measures at T1:

**Demographic characteristics—**Caregivers provided information regarding their age, gender, ethnic background, marital status, employment, annual income, and housing status. In addition, caregivers provided information regarding their child's age, grade, and ethnicity.

**Psychological distress—**The Hopkins Symptom Checklist-25 (HSCL-25; Derogatis, Lipman, Rickels, Uhlenluth, & Covi, 1974) assessed symptoms of depression, anxiety, and somatization. Caregivers indicated how frequently they had experienced symptoms over the past week using a scale from 0 (not at all) to 3 (extremely). A mean score was computed (α = .96).

**Posttraumatic growth—**Caregivers completed the 21-item Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) at T1. Caregivers indicated to what extent they had experienced changes in their lives and themselves as a result of Katrina and its aftermath on a scale ranging from 0 (no change) to 5 (a great deal of change); a total summary score was computed. The scale demonstrated excellent internal reliability (α = . 94).

**Positive reframing coping advice—**At T1 caregivers answered two items assessing how frequently they had encouraged their child to use positive reframing to cope post-disaster (e.g., "encouraged [my child] to see the positive in what happened") (Gil-Rivas et al., 2007). They responded on a 0 (not at all) to 4 (most of the time) scale; a mean score was created; item-*r* = .34.

## Plan of Analysis

Correlations examined associations between key variables. Hierarchical multiple regressions explored correlates of children's PTG scores at T1 by entering caregiver variables in step 1; child self-system variables and realistic control expectations in step 2; and intrusive and deliberate rumination in Step 3. At T2, structurally similar regression analyses tested correlates of PTG after controlling for T1 PTG. In an effort to identify the most parsimonious model, variables not associated with PTG at $p < .10$ (on the basis of bivariate correlations) were excluded from the final analyses. As distress has been hypothesized to serve a catalytic role in the PTG process, and PTSS have been shown to be significantly associated with PTG (e.g., Alisic et al., 2008; Kilmer et al., 2008; Salter & Stallard, 2004), similar analyses included concurrent child-reported PTSS to determine the extent to which these symptoms influenced the pattern of relationships identified. Finally, as children's perceived coping competency, control expectations, and rumination may vary by age, the following interaction terms were tested: age × coping competency beliefs; age × control expectations; age × intrusive rumination; and age × deliberate rumination.

Attrition analyses were conducted to determine whether children who did not participate at T2 ($n$ = 15) were significantly different from those who completed the follow-up ($n$ = 51). No significant differences were identified in demographics and the study's core variables.

## RESULTS

Table 1 presents descriptive statistics for key study variables. Overall, children reported moderate levels of PTG and mild to moderate levels of PTSS at T1 and T2. Children reported positive future expectations and moderate levels of perceived competence, realistic control expectations, perceived coping competence, and intrusive and deliberate event-related rumination. Overall, children perceived their primary caregiver as warm and accepting. Caregivers reported mild levels of distress, moderate levels of PTG, and having provided their child with positive reframing coping advice a good portion of the time.

### Associations among key variables

Caregiver and child demographic variables were not significantly associated with children's self-reported PTG at T1 and T2. Table 2 presents correlations among variables of interest. Contrary to expectations, self-system variables, namely perceived competence, future expectations, and coping competency beliefs, did not evidence a significant positive association with PTG at T1. In fact, perceived competence was significantly negatively related to PTG. At T2, among self-system variables, only children's future expectations showed a trend toward a positive association with PTG. Children's realistic control expectations were not significantly associated with T1 or T2 PTG scores. As expected, both intrusive and deliberate rumination were positively associated with children's PTG at T1 and T2. Caregiver warmth was positively associated with children's coping competency beliefs and future expectations, but not with perceived competence or PTG. The provision of coping advice involving positive reframing was the only caregiver variable significantly associated with T1 PTG. Contrary to expectations, no caregiver variable was significantly associated with T2 PTG.

### Correlates of PTG

The hierarchical regression analyses revealed that, contrary to expectations, coping advice involving positive reframing was not significantly associated with PTG at T1, after including intrusive and deliberate rumination (see Table 3). Although perceived competence was negatively associated with PTG, it did not reach significance in the final model. Finally, as expected, deliberate rumination was related to higher PTG scores. Analyses not shown found that the inclusion of T1 PTSS did not change the pattern of associations.

At T2, after adjusting for T1 PTG and caregiver distress, although they approached significance ($p$ = .066), children's future expectations were not significantly associated with T2 child PTG scores in the final model (Table 4). Moreover, intrusive rumination, rather than deliberate rumination, was associated with higher PTG scores. The inclusion of T2 PTSS minimally altered the results obtained, such that future expectations reached significance in the final step. However, because of the overlap (both conceptual and statistical) between PTSS and intrusive rumination, and in the interest of building the most parsimonious model, T2 PTSS was not included in the final model presented here. Neither age nor the age-related interactions contributed meaningfully to the regressions at either time point.

## DISCUSSION

This study sought to extend the research base on PTG in children, examining the role of child self-system and cognitive variables, as well as the caregiving context, in the youngest sample in the PTG literature. These children and their families, impacted by Katrina and its aftermath, were exposed to extreme levels of adversity, and the children evidenced negative consequences one year post-disaster (Gil-Rivas et al., in press). In addition to ongoing distress, a sizable proportion reported PTG (Kilmer et al., 2008). Overall, although conclusions about causality are not possible, results suggest that rumination, both negative, distressing thoughts and deliberate, repetitive thinking, may play a key role in PTG.

Age did not relate to PTG nor to the child variables assessed, a result that likely reflects the sample's restricted age range. Given that prior age-related findings have varied (e.g., Cryder et al., 2006; Milam et al., 2004), future studies could examine the degree to which variables hypothesized to be relevant to the PTG process have a differential impact across developmental stages (Kilmer, 2006).

Hypotheses involving self-system functioning, operationalized by perceptions of one's competence, coping competency beliefs, and future expectations, received minimal support. For instance, consistent with hypotheses, positive future expectations were identified as a potentially "active" variable. Specifically, although not meaningfully related to T1 PTG, after adjusting for T1 PTG and caregiver distress, future expectations at T1 approached significance in contributing to the prediction of T2 PTG in the final regression. Although the T2 finding is suggestive, these results involving future expectations are largely not consistent with adult PTG findings regarding the influence of optimism (Linley & Joseph, 2004) or child resilience research (Werner & Smith, 1982; Wyman et al., 1993). Overall, while associations involving this variable demonstrated expected relationships with other self-system variables at T1, such that optimistic views about one's future correlated with perceived competence and coping competency beliefs, it is not possible to ascertain (a) whether these expectations anteceded or were elicited by the other self-system competencies assessed, or (b) of more salience here, their specific role in the PTG process. Wyman et al. (1993) found that positive future expectations reported by 9 to 11 year olds seemingly promoted ongoing positive adaptation, both directly and by moderating the adverse effects of subsequent stress exposure. However, following a trauma of Katrina's magnitude, as well as the persistent secondary adversities experienced by families, it may have been difficult for the children to maintain hope and optimism about their future. Nevertheless, it is possible that such future views may facilitate not only positive adaptation but also growth. That is, hope for the future may provide a lens through which children can try to view, cope with, and make sense of their circumstance, perhaps increasing the likelihood that they will try to identify the positive in their situation. Future research can address their potential role in the PTG process.

The hypothesis that the study's other self-system variables would relate positively to PTG was not supported. Specifically, in contrast to expectations and results linking competency beliefs and PTG reported by Cryder and colleagues (2006), a study that also included older children, coping competency beliefs did not relate to PTG at T1 or T2. Perhaps more notably, perceived competence related negatively to PTG at T1 (both at the bivariate level and in the regression, though not in the final model) and did not contribute to predictions of PTG at T2. Variables reflecting perceived competence have discriminated sensitively between those evidencing resilient adaptation and those experiencing adjustment problems (Hoyt-Meyers et al., 1995). The present findings may thus point to another point of divergence in the resilience and PTG processes. That is, the same self-views of competence that seemingly help forestall dysfunction in the face of adversity may very well reduce the

likelihood of growth post-trauma. Put another way, perceptions of one's competence may foster positive adjustment, but not PTG. If one holds positive views of his or her competence, it is possible that he or she may appraise the event and its impact for him- or herself and his or her world differently; as such, these children may not perceive their assumptive worlds as "shattered" to the same degree. In turn, it may be that those children who reported more positive self-views regarding their competence may experience less distress and reduced levels of intrusive ideation and, consequently, given the presumptive link between distress and PTG, not go through a growth-like process. This notion is supported by the significant negative correlations between perceived competence and both intrusive rumination and T1 PTSS in this sample. On the other hand, if one is experiencing high levels of PTSS, as well as intrusive rumination, perhaps one path to adaptation is via deliberate, constructive rumination and PTG. The PTG evidence base has not yet established if those reporting PTG also evidence proportionally fewer PTSS over time (e.g., Salter & Stallard, 2004); however, this will be a consideration for future longitudinal examinations. Alternatively, it may be that the self-system, more globally, and competency beliefs, in particular, become more salient as children progress along their developmental trajectories and their self-views crystallize, while other factors, such as the role of the caregiver, carry special weight for younger children.

Indeed, future research will need to elucidate the role of caregivers in fostering PTG in children, because the present findings are mixed. Although caregiver warmth correlated positively with two of the study's three self-system variables (coping competency and future expectations), it did not relate to PTG. Though unexpected here, this finding is consistent with the results of Cryder et al. (2006). In considering these findings, it may be that, analogous to the results involving perceived competence, caregiver warmth and responsiveness may serve a protective function under adverse conditions, (Luthar et al., 2000; Masten & Coatsworth, 1998), but may reduce the likelihood of PTG. Warm, supportive caregiving may affect youngsters' appraisal of the trauma and reduce the degree to which they feel shaken in its aftermath, thereby limiting the experience of ongoing distress thought so critical to the PTG process.

That caregiver distress did not relate significantly to the core child variables was also unexpected (though the correlation with T2 PTG approached significance). This factor is presumed to relate to availability and the capacity to provide support and nurturance, even coping advice. The present data do not convey the degree to which children were aware of caregiver distress; it may be that this factor holds salience when children perceive and understand caregivers' reactions and difficulties. This notion may also explain the lack of association between caregiver and child PTG. That is, if children are unaware of positive changes experienced by caregivers, they may not be influenced by them. It may be that such positive changes – or the orientation to seek the positive in a difficult situation – manifest in the coping guidance offered by caregivers. Notably, among the caregiver variables, only positive reframing coping advice was associated with PTG at T1, though it did not reach significance in the final model; it also did not relate to T2 PTG. The process of encouraging one's child(ren) to identify the positive in their new circumstance would appear to be of direct conceptual relevance to PTG, and the present data – including positive associations with deliberate rumination and caregiver PTG – are suggestive. The role of this variable warrants attention in future research.

Realistic control, thought to be a key cognitive resource for children, also did not function as expected. In fact, this slightly modified version of a scale used by Hoyt-Meyers et al. (1995) did not hold up psychometrically in the present sample, leading to the exclusion of the subscale for uncontrollable events. While its modification may have contributed to the scale's reduced psychometric properties, this outcome was unexpected, particularly since, as

Wyman (2003) noted, the Hoyt-Meyers study demonstrated that many children in their young cohort (aged 7–9 years) had the cognitive capacity to report differentiations regarding the controllability of the events assessed. That this measure performed so poorly raises the possibility that, given the youngsters' experiences and belief systems, and/or the values and practices of their culture(s), the items on these scales took on a different meaning in this post-disaster context. Beyond that, the controllable subscale correlated negatively with intrusive rumination and T1 PTSS, indicating that more accurate views about controllable events tended to be associated with lower levels of intrusive thinking and PTSS. Nevertheless, realistic control did not contribute reliably to prediction models. Future research will have to examine the role of this construct in PTG.

The most noteworthy findings center on rumination. Consistent with predictions, T1 deliberate rumination related positively to PTG, after accounting for caregiving and self-system variables. In fact, this variable was the lone significant predictor of PTG in the final T1 model. In addition, T1 levels of intrusive rumination, but not deliberate rumination, significantly predicted PTG at T2, providing partial support for the hypothesized role of rumination. Although T1 levels of deliberate rumination correlated with PTG at T2 ($r = .35$), this variable did not add meaningfully to the regression model. Overall, in line with PTG theory, variables reflecting ruminative processing exhibited strong relationships to growth. The present findings highlight the two complementary cognitive processes hypothesized to be at play: 1) negative, distressing ideation associated with one's ongoing struggle with adversity and his or her new reality seemingly catalyzes the process leading to growth; and 2) deliberate rumination serves a constructive function, as one works to reprocess the trauma and its aftermath, in an effort to understand and reconcile the experience with prior models of self, others, and the world. The present design cannot test these notions directly, but its results are suggestive.

That ruminative thinking was directly associated with PTG is consistent with findings reported in adult research (Linley & Joseph, 2004), but does not accord with the findings of Cryder et al. (2006) – these researchers did not examine intrusive and deliberate rumination separately and did not detect an association between rumination and PTG; rather, rumination related significantly to competency beliefs, which were associated with PTG. This study's hypotheses regarding the weight of rumination were informed by assumptions about the importance of cognitive reprocessing of the trauma to PTG, as well as the still-emerging representational worlds and self-systems of young children. It may be that the roles of self-system and rumination variables vary by age. This possibility, and the nature of the rumination-PTG relationship, will need to be clarified in subsequent work. Given developmental considerations in the study of rumination (see Sprung, 2008), future studies should examine these processes in relation to PTG, in particular the constructive, cognitive reprocessing of one's circumstances, in larger, more diverse samples.

## Study Limitations, Contributions, and Future Directions

Several study limitations bear mention. The study's relatively small sample affected power, prohibited the use of other statistical techniques, and limited foci to the variables selected. In addition, the sample's voluntary nature limits generalizability because nonrandom factors may have influenced families' decisions to participate. Moreover, sample characteristics (i.e., evacuees, residents of FEMA-provided housing) also limit generalizability. Other aspects of the sample's composition and cultural context may also have impacted results. For instance, the sample largely includes African American children from impoverished backgrounds, many of whom may have had significant prior trauma exposure (e.g., Osofsky et al., 2007), factors that may have influenced their post-Katrina response (e.g., appraisals and attributions), capacity (or willingness) to access services and supports, and adaptation. In addition, many evacuee children (likely including study respondents) had been attending

underperforming schools and/or had been assessed as performing below national grade-level norms (Osofsky et al., 2007; Snider, Hoffman, Littrell, Fry, & Thornburgh, in press); these factors are relevant in light of the cognitive components of the hypothesized PTG process and may influence generalizability. These results highlight future directions for child PTG research, including work investigating the function of context (Kilmer et al., 2008). Finally, that T1 was one year post-disaster restricts the degree to which one can draw clear temporal inferences regarding the roles of the factors associated with PTG. That is, it is unclear if they were resources or approaches present pre-trauma versus "products" that increased, emerged, or evolved in the trauma's aftermath. Prospective-longitudinal designs are necessary to enhance understanding of the PTG process.

Nevertheless, the child PTG literature is nascent in its development, and the present findings contribute to the knowledge base in an area in which, to date, there has been a paucity of empirical work. Notwithstanding the limitations described, this work provides an examination of child and caregiving context variables among young children who had been exposed to severe trauma and highlights key correlates of PTG. In the early years of a developing area, it is critical to identify factors associated with the construct or process of interest. Such generative work can then be built upon with the use of methodologies that allow for exploration of the pathways seemingly involved in the growth process. The present findings demonstrate the merit of studying variables reflecting child resources and processes (e.g., rumination) and the caregiving environment in the context of PTG work and serve to identify factors that might profitably be incorporated into designs in which causal inferences are possible.

In addition, because the domains in which children evidence growth may vary with age, future efforts could compare the nature of PTG across different stages, i.e., the degree to which there is a developmental progression in the manner in which PTG manifests. It may be that young children can more easily experience and express growth around their perceptions of their strength, their relationships, and their spirituality (particularly if caregivers have invoked faith-based explanations and/or encouraged faith-based coping), rather than describing a changed philosophy of life or a sense of new possibilities. Some of these presumed differences stem from the cognitive demands and self-awareness necessary to experience PTG, as well as the fact that children's sense of self is evolving and self-schema are less crystallized, thereby likely limiting the degree to which young children will describe growth in these areas. Future research could also explore the degree to which the PTG process (or one's growth trajectory) may differ following acute versus chronic traumas, or traumas with significant post-event adversities. Efforts investigating such questions could yield findings of relevance to those working in trauma, developmental psychology, and developmental psychopathology.

In addition to its heuristic benefit, research enhancing understanding of the PTG construct and the growth process among young people can yield valuable information for those working with youth who have experienced trauma (Kilmer, 2006). For example, although the present findings must be considered preliminary, they suggest the potential benefit of working to restructure youngsters' cognitive appraisals of trauma and foster productive rumination. Work in this area can also increase the likelihood that clinicians and other professionals will attend to and assess relevant competencies and resources, and take steps to facilitate resources and processes that may foster PTG (Kilmer & Gil-Rivas, 2008; Tedeschi & Kilmer, 2005).

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## References

Aldwin, CM. Stress, coping, and development: An integrative perspective. 2nd ed.. New York: The Guilford Press; 2007.

Alisic E, van der Schoot TAW, van Ginkel JR, Kleber RJ. Looking beyond posttraumatic stress disorder in children: Posttraumatic stress reactions, posttraumatic growth, and quality of life in a general population sample. Journal of Clinical Psychiatry 2008;29:1455–1461. [PubMed: 19193345]

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th edition. Washington, D.C.: American Psychiatric Press; 1994.

Barakat LP, Alderfer MA, Kazak AE. Posttraumatic growth in adolescent survivors of cancer and their mothers and fathers. Journal of Pediatric Psychology 2006;31:413–419. [PubMed: 16093518]

Calhoun LG, Cann A, Tedeschi RG, McMillan J. A correlational test of the relationship between posttraumatic growth, religion, and cognitive processing. Journal of Traumatic Stress 2000;13:521–527. [PubMed: 10948491]

Calhoun, LG.; Tedeschi, RG. The foundations of posttraumatic growth: An expanded framework. In: Calhoun, LG.; Tedeschi, RG., editors. Handbook of posttraumatic growth: Research and practice. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers; 2006. p. 1-23.

Cicchetti, D. Foreword. In: Luthar, S., editor. Resilience and vulnerability: Adaptation in the context of childhood adversities. New York: Cambridge University Press; 2003. p. xix-xxvii.

Cicchetti D, Lynch M. Toward an ecological/transactional model of community violence and child maltreatment: Consequences for children's development. Psychiatry 1993;56:96–118. [PubMed: 8488217]

Cohen, LH.; Hettler, TR.; Pane, N. Assessment of posttraumatic growth. In: Tedeschi, RG.; Park, CL.; Calhoun, LG., editors. Posttraumatic growth: Positive change in the aftermath of crisis. Mahwah, NJ: Lawrence Erlbaum Associates; 1998. p. 23-42.

Compas BE, Connor-Smith J, Saltzman H, Harding Thomsen A, Wadsworth ME. Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. Psychological Bulletin 2001;127:87–127. [PubMed: 11271757]

Cowen EL, Work WC, Wyman PA, Parker GR, Wannon M, Gribble PA. Test comparisons among stress-affected, stress-resilient and nonclassified fourth through sixth grade urban children. Journal of Community Psychology 1992;20:200–214.

Cryder CH, Kilmer RP, Tedeschi RG, Calhoun LG. An exploratory study of posttraumatic growth in children following a natural disaster. American Journal of Orthopsychiatry 2006;76:65–69. [PubMed: 16569128]

Derogatis LR, Lipman RS, Rickels K, Uhlenluth EH, Covi L. The Hopkins Symptom Checklist: A self-report symptom inventory. Behavioral Science 1974;19:1–15. [PubMed: 4808738]

Fritz GK, Williams JR, Amylon JR. After treatment ends: Psychosocial sequelae in pediatric cancer survivors. American Journal of Orthopsychiatry 1988;58:552–561. [PubMed: 3228162]

Gil-Rivas V, Holman EA, Silver RC. Adolescent vulnerability following the September 11th terrorist attacks: A study of parents and their children. Applied Developmental Science 2004;8:130–142.

Gil-Rivas, V.; Kilmer, RP.; Hypes, AW.; Roof, KA. The caregiver-child relationship and children's adjustment post-Hurricane Katrina. In: Kilmer, RP.; Gil-Rivas, V.; Tedeschi, RG.; Calhoun, LG., editors. Helping families and communities recover from disaster: Lessons learned from Hurricane Katrina and its aftermath. Washington, D.C.: American Psychological Association; (in press).

Gil-Rivas V, Silver RC, Holman EA, McIntosh D, Poulin M. Parental response and adolescent adjustment to the September 11, 2001 terrorist attacks. Journal of Traumatic Stress 2007;20:1063–1068. [PubMed: 18157889]

Grant KE, Compas BE, Stuhlmacher AF, Thurm AE, McMahon SD, Halpert JA. Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. Psychological Bulletin 2003;129:447–466. [PubMed: 12784938]

Greenberger E, Chen C. Perceived family relationships and depressed mood in early and late adolescence: A comparison of European and Asian Americans. Developmental Psychology 1996;32:707–716.

Harter S. The Perceived Competence Scale for Children. Child Development 1982;53:87–97.

Harter S. Cognitive-developmental processes in the integration of concepts about emotions and the self. Social Cognition 1986;4:119–151.

Harter, S. Self-processes and developmental psychopathology. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology, Vol. 1: Theory and method. 2nd ed.. Hoboken, N.J.: John Wiley & Sons, Inc.; 2006. p. 370-418.

Harter S, Buddin B. Children's understanding of the simultaneity of two emotions: A five stage developmental acquisition sequence. Developmental Psychology 1987;23:388–399.

Hasan N, Power TG. Children's appraisal of major life events. American Journal of Orthopsychiatry 2004;74:26–32. [PubMed: 14769106]

Helgeson VS, Reynolds KA, Tomich PL. A meta-analytic review of benefit finding and growth. Journal of Consulting and Clinical Psychology 2006;74:797–816. [PubMed: 17032085]

Hoyt-Meyers LA, Cowen EL, Work WC, Wyman PA, Magnus KB, Fagen DB, Lotyczewski BS. Test correlates of resilient outcomes among highly stressed 2nd and 3rd grade urban children. Journal of Community Psychology 1995;23:326–338.

Hurricane Katrina Community Advisory Group. Overview of baseline survey results. 2006. Retrieved 11/22/07 from http://hurricanekatrina.med.harvard.edu/pdf/baseline_report%208-25-06.pdf

Ickovics JR, Meade CS, Kershaw TS, Milan S, Lewis JB, Ethier KA. Urban teens: Trauma, posttraumatic growth, and emotional distress among female adolescents. Journal of Consulting and Clinical Psychology 2006;74:841–850. [PubMed: 17032088]

Janoff-Bulman, R. Shattered assumptions. New York: The Free Press; 1992.

Kilmer, RP. Pre-post evaluation of a school mental health program: A pilot study using child measures. Rochester, NY: Poster session presented at the annual convention of the New York Association of School Psychologists; 1996 Oct.

Kilmer, RP. Resilience and posttraumatic growth in children. In: Calhoun, LG.; Tedeschi, RG., editors. Handbook of posttraumatic growth: Research and practice. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers; 2006. p. 264-288.

Kilmer RP, Gil-Rivas V. Posttraumatic growth in youth following disasters. The Prevention Researcher 2008;15:18–20.

Kilmer, RP.; Gil-Rivas, V. Introduction: Attending to ecology. In: Kilmer, RP.; Gil-Rivas, V.; Tedeschi, RG.; Calhoun, LG., editors. Helping families and communities recover from disaster: Lessons learned from Hurricane Katrina and its aftermath. Washington, D.C.: American Psychological Association; (in press).

Kilmer RP, Gil-Rivas V, Tedeschi RG, Cann A, Calhoun LG, Buchanan T, Taku K. Use of the revised Posttraumatic Growth Inventory for Children (PTGI-C-R) to assess positive changes post-Hurricane Katrina. 2008 Manuscript under revision.

Kliewer, W.; Sandler, I.; Wolchik, S. Family socialization of threat appraisal and coping: Coaching, modeling, and family context. In: Nestmann, F.; Hurrelmann, K., editors. Social networks and social support in childhood and adolescence. New York, NY: Waler de Gruyter; 1994. p. 271-291.

Krementz, J. How it feels when a parent dies. New York: Knopf; 1983.

La Greca AM, Silverman WK, Vernberg EM, Prinstein MJ. Symptoms of posttraumatic stress in children following Hurricane Andrew: A prospective study. Journal of Consulting and Clinical Psychology 1996;64:712–723. [PubMed: 8803361]

La Greca, AM.; Silverman, WK.; Vernberg, EM.; Roberts, MC., editors. Helping children cope with disasters. Washington, DC: American Psychological Association; 2002.

Laufer A, Solomon Z. Posttraumatic symptoms and posttraumatic growth among Israeli youth exposed to terror incidents. Journal of Social and Clinical Psychology 2006;25:429–447.

Lieberman, AF.; Van Horn, P. Assessment and treatment of young children exposed to traumatic events. In: Osofsky, JD., editor. Young children and trauma: Intervention and treatment. New York: Guilford Press; 2004. p. 111-138.

Linley PA, Joseph S. Positive change following trauma and adversity: A review. Journal of Traumatic Stress 2004;17:11–21. [PubMed: 15027788]

Luthar, SS., editor. Resilience and vulnerability: Adaptation in the context of childhood adversities. New York: Cambridge University Press; 2003.

Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. Child Development 2000;71:543–562. [PubMed: 10953923]

Masten AS. Ordinary magic: Resilience processes in development. American Psychologist 2001;56:227–238. [PubMed: 11315249]

Masten AS, Best KM, Garmezy N. Resilience and development: Contributions from the study of children who overcome adversity. Development and Psychopathology 1990;2:425–444.

Masten AS, Coatsworth JD. The development of competence in favorable and unfavorable environments. American Psychologist 1998;53:205–220. [PubMed: 9491748]

Milam JE, Ritt-Olson A, Unger J. Posttraumatic growth among adolescents. Journal of Adolescent Research 2004;19:192–204.

National Child Traumatic Stress Network. Age-related reactions to a traumatic event. (no date) Retrieved from http://www.nctsn.org/nctsn_assets/pdfs/age_related_reactions.pdf.

Osofsky, JD., editor. Young children and trauma: Intervention and treatment. New York: Guilford Press; 2004a.

Osofsky, JD. Different ways of understanding young children and trauma. In: Osofsky, JD., editor. Young children and trauma: Intervention and treatment. New York: Guilford Press; 2004b. p. 3-9.

Osofsky JD, Osofsky HJ, Harris WW. Katrina's children: Social policy considerations for children in disasters. Society for Research in Child Development Social Policy Report 2007;21:1–18.

Osofsky, J.; Osofsky, HJ.; Kronenberg, M.; Cross, T. The aftermath of Hurricane Katrina: Mental health considerations and lessons learned. In: Kilmer, RP.; Gil-Rivas, V.; Tedeschi, RG.; Calhoun, LG., editors. Helping families and communities recover from disaster: Lessons learned from Hurricane Katrina and its aftermath. Washington, D.C.: American Psychological Association; (in press).

Pfefferbaum B, Nixon SJ, Tucker PM, Tivis RD, Moore VL, Gurwitch RH, et al. Posttraumatic stress responses in bereaved children after the Oklahoma City bombing. Journal of the American Academy of Child and Adolescent Psychiatry 1999;38:1372–1379. [PubMed: 10560223]

Phipps S, Long A, Ogden J. Benefit finding scale for children: Preliminary findings from a childhood cancer population. Journal of Pediatric Psychology 2007;32:1264–1271. [PubMed: 17210581]

Pynoos, RS.; Steinberg, AM.; Wraith, R. A developmental model of childhood traumatic stress. In: Cohen, DJ.; Cicchetti, D., editors. Developmental psychopathology Volume 2: Risk, disorder, and adaptation. Oxford, England: John Wiley & Sons; 1995. p. 72-95.

Salmon K, Bryant RA. Posttraumatic stress disorder in children: The influence of developmental factors. Clinical Psychology Review 2002;22:163–188. [PubMed: 11806018]

Salter E, Stallard P. Posttraumatic growth in child survivors of a road traffic accident. Journal of Traumatic Stress 2004;17:335–340. [PubMed: 15462541]

Shahinfar, A.; Fox, NA. The effects of trauma on children: Conceptual and methodological issues. In: Cicchetti, D.; Toth, SL., editors. Rochester symposium on developmental psychopathology (Vol. 8): Developmental perspectives on trauma: Theory, research, and intervention. Rochester, NY: University of Rochester Press; 1997. p. 115-139.

Silverman, WK.; La Greca, AM. Children experiencing disasters: Definitions, reactions, and predictors of outcomes. In: La Greca, AM.; Silverman, WK.; Vernberg, EM.; Roberts, MC., editors. Helping children cope with disasters. Washington, D.C.: American Psychological Association; 2002. p. 11-33.

Snider, L.; Hoffman, Y.; Littrell, M.; Fry, W.; Thornburgh, M. Supporting children post-Katrina: Reflections on psychosocial interventions and guiding principles. In: Kilmer, RP.; Gil-Rivas, V.; Tedeschi, RG.; Calhoun, LG., editors. Helping families and communities recover from disaster:

Lessons learned from Hurricane Katrina and its aftermath. Washington, D.C.: American Psychological Association; (in press).

Sprung M. Unwanted intrusive thoughts and cognitive functioning in kindergarten and young elementary school-age children following Hurricane Katrina. Journal of Clinical Child and Adolescent Psychology 2008;37:575–587. [PubMed: 18645748]

Steinberg AM, Brymer MJ, Decker KB, Pynoos RS. The University of California at Los Angeles Post-Traumatic Stress Disorder Reaction Index. Current Psychiatry Reports 2004;6:96–100. [PubMed: 15038911]

Taku, K.; Calhoun, LG.; Kilmer, RP.; Tedeschi, RG. *Posttraumatic growth* and non-traumatic growth in Japanese youth. Paper session presented at the 54th annual meeting of the Southeastern Psychological Association; 2008 March; Charlotte, NC.

Tedeschi RG, Calhoun LG. The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. Journal of Traumatic Stress 1996;9:455–471. [PubMed: 8827649]

Tedeschi RG, Calhoun LG, Cann A. Evaluating resource gain: Understanding and *misunderstanding* posttraumatic growth. Applied Psychology: An International Review 2007;56:396–406.

Tedeschi RG, Kilmer RP. Assessing strengths, resilience, and growth to guide clinical interventions. Professional Psychology: Research and Practice 2005;36:230–237.

Wannon, M. Unpublished doctoral dissertation . Rochester, NY: University of Rochester; 1990. Children's control beliefs about controllable and uncontrollable events: Their relationship to stress resilience and psychosocial adjustment.

Watkins ER. Constructive and unconstructive repetitive thought. Psychological Bulletin 2008;134:163–206. [PubMed: 18298268]

Weems CF, Pina AA, Costa NM, Watts SE, Taylor LK, Cannon MF. Predisaster trait anxiety and negative affect predict posttraumatic stress in youths after Hurricane Katrina. Journal of Consulting and Clinical Psychology 2007;75:154–159. [PubMed: 17295574]

Werner, EE.; Smith, RS. Vulnerable but invincible: A study of resilient children. New York: McGraw-Hill; 1982.

Weyer M, Sandler IN. Stress and coping as predictors of children’s divorce-related ruminations. Journal of Clinical Child Psychology 1998;27:78–86. [PubMed: 9561940]

Wyman, PA. Emerging perspectives on context specificity of children’s adaptation and resilience: Evidence from a decade of research with urban children in adversity. In: Luthar, SS., editor. Resilience and vulnerability: Adaptation in the context of childhood adversities. New York: Cambridge University Press; 2003. p. 293-317.

Wyman PA, Cowen EL, Work WC, Kerley JH. The role of children’s future expectations in self-system functioning and adjustment to life stress: A prospective study of urban at-risk children. Development and Psychopathology 1993;5:649–661.

Yates, TM.; Egeland, B.; Sroufe, LA. Rethinking resilience: A developmental process perspective. In: Luthar, SS., editor. Resilience and vulnerability: Adaptation in the context of childhood adversities. New York: Cambridge University Press; 2003. p. 243-266.

**Table 1**

Descriptive statistics for key variables of interest

| | M (SD) | Scale range |
|---|---|---|
| Posttraumatic growth | | 0–30 |
| Baseline (T1) | 20.00 (6.54) | |
| Follow-up (T2) | 19.22 (7.09) | |
| Hurricane-related exposure | 5.33 (2.63) | 0–8 |
| Posttraumatic stress symptoms | | 0–68 |
| Baseline (T1) | 28.23 (15.76) | |
| Follow-up (T2) | 23.98 (12.70) | |
| Perceived competence | 16.80 (5.52) | 0–28 |
| Future expectations | 17.56 (3.04) | 0–21 |
| Coping competency beliefs | 1.98 (0.68) | 0–3 |
| Realistic control expectations | 2.28 (0.57) | 1–3 |
| Rumination | | 1–4 |
| Intrusive | 2.37 (1.00) | |
| Deliberate | 2.84 (0.88) | |
| Perceived caregiver warmth and acceptance | 3.29 (0.47) | 1–4 |
| Caregiver psychological distress | 1.08 (0.79) | 0–3 |
| Caregiver posttraumatic growth | 71.36 (26.41) | 0–105 |
| Positive reframing coping advice | 3.41 (0.71) | 0–4 |

Note. [a] Sample size = 66.

**Table 2**

Correlations among variables of interest

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Child PTG T1 | -- | | | | | | | | | | | | | | | |
| 2. Child PTG T2 | .44** | -- | | | | | | | | | | | | | | |
| 3. Child age | −.10 | .07 | -- | | | | | | | | | | | | | |
| 4. Hurricane Exposure | .10 | .20† | .03 | -- | | | | | | | | | | | | |
| 5. PTSS T1 | .45*** | .32* | −.01 | .51*** | -- | | | | | | | | | | | |
| 6. PTSS T2 | .27* | .32* | −.18† | .30* | .48*** | -- | | | | | | | | | | |
| 7. Perceived competence | −.24* | −.03 | −.17† | −.32** | −.39** | −.10 | -- | | | | | | | | | |
| 8. Coping competency beliefs | −.02 | .08 | .04 | −.03 | .11 | −.20† | .21* | -- | | | | | | | | |
| 9. Future expectations | .15 | .22† | −.04 | −.15 | −.21* | −.12 | .41*** | .33** | -- | | | | | | | |
| 10. Realistic control expectations | −.16 | −.18 | .01 | −.05 | −.25* | −.18 | .04 | .10 | .07 | -- | | | | | | |
| 11. Rumination-intrusive | .51*** | .46*** | −.01 | .32** | .70*** | .35** | −.35** | −.08 | −.02 | −.28* | -- | | | | | |
| 12. Rumination-deliberate | .54*** | .35** | −.01 | .33** | .59*** | .39** | −.12 | .07 | .20† | −.23* | .64*** | -- | | | | |
| 13. Perceived caregiver warmth | .14 | .13 | .26* | −.16 | −.09 | −.22† | .14 | .30* | .32** | −.02 | .04 | .25* | -- | | | |
| 14. Caregiver PTG T1 | .16 | .04 | .05 | .25* | .36** | .38** | −.29** | −.15 | −.14 | −.13 | .25* | .13 | −.17† | -- | | |
| 15. Coping advice-positive reframing | .30** | .16 | −.07 | .05 | .18† | .15 | .08 | −.14 | −.01 | −.22* | .17† | .35** | .02 | .45*** | -- | |
| 16. Caregiver distress T1 | .03 | .19† | .05 | .25* | .26* | .25* | −.17† | −.02 | −.07 | −.19† | .10 | .04 | −.10 | .26* | −.01 | -- |

Note. T1 $n$ = 66; T2 $n$ = 51.

† $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

**Table 3**

Summary of Hierarchical Regression Analysis for Child and Caregiving Variables Predicting Posttraumatic Growth at Baseline

| | Step1 | | Step2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | B | β | B | β | B | β |
| Coping advice-positive reframing | 2.73 | .30* | 2.91 | .32** | 1.43 | .16 |
| Perceived competence | -- | -- | −.31 | −.27* | −.16 | −.13 |
| Rumination - intrusive | -- | -- | -- | -- | 1.53 | .23 |
| Rumination - deliberate | -- | -- | -- | -- | 2.39 | .32* |

*Note*. Step 1 Adjusted $R^2$ = .07, $p$ = .015; Step 2 Adjusted $R^2$ = .13, $p$ = .004; Step 3 Adjusted $R^2$ = .33, $p$ = .001.

† $p < .10$.

* $p < .05$.

** $p < .01$.

**Table 4**

Summary of Hierarchical Regression Analysis for Baseline Child and Caregiving Variables Predicting Posttraumatic Growth at Follow-up

| | Step1 | | Step2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | B | β | B | β | B | β |
| Posttraumatic growth T1 | .46 | .42** | .43 | .40** | .24 | .22 |
| Caregiver distress T1 | 1.54 | .16 | 1.78 | .18 | 1.54 | .16 |
| Future expectations | -- | -- | .47 | .19 | .58 | .24† |
| Rumination - intrusive | -- | -- | -- | -- | 2.48 | .35* |
| Rumination - deliberate | -- | -- | -- | -- | −.09 | −.01 |

*Note*. Step 1 Adjusted $R^2$ = .18, $p$ = .003; Step 2 Adjusted $R^2$ = .20, $p$ = .003; Step 3 Adjusted $R^2$ = .26, $p$ = .002.

† $p < .10$.

* $p < .05$.

** $p < .01$.