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Predicting posttraumatic growth: coping, social support, and posttraumatic stress in children and adolescents after Hurricane Katrina

Mark Allen Schexnaildre

Louisiana State University and Agricultural and Mechanical College

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PREDICTING POSTTRAUMATIC GROWTH: COPING, SOCIAL SUPPORT, AND
POSTTRAUMATIC STRESS IN CHILDREN AND ADOLESCENTS AFTER HURRICANE
KATRINA

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
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in

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By
Mark A. Schexnaildre
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ABSTRACT

There is a growing area of research that explores the possibility that negative life events could ultimately result in positive outcomes. However, there exists some debate on whether or not children are capable of experiencing such outcomes. The proposed study examined posttraumatic growth (PTG), positive psychological change in the wake of a traumatic event, in a sample of child and adolescent victims of Hurricane Katrina. Specifically, the roles of coping and social support were studied as predictors of PTG. Additionally, the relationship between PTG and posttraumatic stress disorder, which has been shown to be a complex one, was explored. This study used an existing data set of 94 children and adolescents who lived in Southern Louisiana when Hurricane Katrina made landfall.

INTRODUCTION

Hurricane Katrina resulted in a reported 1,836 deaths and over \$80 billion in damages (Beven II et al., 2008). The resulting psychological distress has been thoroughly researched (see Galea et al., 2007). However, the majority of studies focus on negative psychological effects of the storm such as posttraumatic stress disorder (PTSD; Sprang & LaJoie, 2009), depression (McLeish & Del Ben, 2008), substance abuse (Rowe & Liddle, 2008), and aggression (Marsee, 2008). The positive effects of trauma, albeit few, have yet to be adequately explored.

Children and adolescents displaced by Hurricane Katrina suffered a great deal of psychological and emotional distress (Kessler et al., 2008; Weems et al., 2007; Spell et al., 2008). Many youths were forced into temporary housing situations with different housemates than previously. They were required to attend new schools far from their homes and friends. Their regular routines were disrupted, and the loss of possessions was great. Research indicated that PTSD symptom severity was measured at high levels in children affected by the hurricane (Hensley & Varela, 2008; Cohen et al., 2009).

Although there is considerable research evaluating how Katrina marred the lives of children and their families, there is an emerging area of research that explores positive outcomes, specifically, posttraumatic growth (PTG). Researchers are interested in the possibility that traumatic life events that often result in negative outcomes may also bring about positive change (Helgeson, Reynolds, & Tomich, 2006). Tedeschi and Calhoun (2004) define PTG as “positive psychological change experienced as a result of the struggle with highly challenging life circumstances” (p. 1). The proposed study measured predictors of PTG in children and adolescents as well as explored the relationship between PTG and PTSD.

Posttraumatic Growth

Tedeschi and Calhoun provide a model of experiencing PTG that details the progression from trauma to growth. According to this model, negative life events can, and often do, result in positive outcomes (Tedeschi & Calhoun, 2004). The model begins with an individual experiencing a traumatic event. If the event is sufficiently distressing, it is said to destroy the individual's fundamental schemas—beliefs and goals—resulting in extreme emotional distress. In an attempt to alleviate the distress, the individual automatically and without intent, ruminates on the trauma. Because these cognitive processes are often unwanted and intrusive, support from others is sought out, and coping strategies such as self-disclosure emerge. This social support aids greatly in the management of emotional distress and reformation of schemas. Once some of the emotional distress is reduced, the automatic rumination transforms into a more purposeful reflection about how the event has changed the individual. Finally, when the intentional thinking is constructive—finding meaning, finding benefits, reappraisal—personal growth occurs (Tedeschi & Calhoun, 1995).

Tedeschi and Calhoun propose three broad areas of change related to PTG: perceived changed in self, a changed sense of relationships with others, and a changed philosophy of life (Tedeschi & Calhoun, 1996). Perceived change in self refers to how individuals see themselves and their self-efficacy beliefs. Trauma victims have reported feeling more self-confident and stronger as a result of negative life events (Collins, Taylor, & Skokan, 1990). Change in relationships with others involves feeling closer to and more appreciative of loved ones. Malinak, Hoyt, and Patterson (1979) found that bereaved adults felt an increased appreciation for their families after suffering the death of a parent. Change in philosophy of life can be seen as

taking a new, positive perspective of life. Individuals who experience this kind of change claim to find more fulfillment and pleasure in everyday life (Joseph, Williams, & Yule, 1993).

As a measure of PTG, Tedeschi and Calhoun developed the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The PTGI contains 21 items and uses a 6-point Likert scale. Individuals rate the degree to which change was experienced from 0, "I did not experience this change as a result of my crisis" to 5, "I experienced this change to a very great degree as a result of my crisis" (p. 459). Through factor analysis, five contributing constructs emerged: New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation for Life. Preliminary reliability analysis showed the measure to have strong internal consistency ($\alpha = .90$). Since its development, the PTGI has been widely used in research studies for measuring adult PTG (see Snape, 1997; Cordova, Cunningham, Carlson, & Andrykowsky, 2001; Sears, Stanton, & Danoff-Burg, 2003), but a single measure of child and adolescent PTG has yet to be identified as a clear standard (Kilmer et al., 2009).

Posttraumatic Growth in Children and Adolescents

Although most of the PTG research has been conducted with adults, recently the concept has been explored with children and adolescents. For example, variables related to youth PTG have been evaluated in adolescents with cancer (Barakat, Alderfer, & Kazak, 2006), those who experienced the death of a loved one (Ickovics, Meade, Kershaw, Milan, Lewis, & Ethier, 2006), children who were victims of traffic accidents (Salter & Stallard, 2004), college students exposed to community violence (Park, 2006), and adolescents exposed to terrorist attacks (Milam, Ritt-Olson, Tan, Unger, & Nezami, 2005). There is some debate, however, on whether or not PTG is an appropriate construct to study in children and adolescents (Joseph, Knibbs, & Hobbs, 2007). Cohen, Hettler, and Pane (1998) argue that children are less resilient than adults

and thus, less likely to experience PTG after suffering a traumatic event. Further, children's cognitive capabilities are much less developed than those of adults (Milam et al., 2005). Much of this debate revolves around a process which is fundamental to PTG: schema change. Fiske (2004) defines a schema as "a cognitive structure containing the attributes of a concept or type of stimulus and the relationships among the attributes" (p. 143). However, in the study of PTG, schemas are more often conceptualized as "working and workable structures that we use to organize our experiences and anticipate outcomes" (Janoff-Bulman, 2006, p. 83). For example, if a Gulf South resident has lived through many hurricane seasons but has never been harmed by a hurricane, he/she will expect to remain safe in the face of future natural disasters. Adult PTG is thought to be the rebuilding of once well established schemas which were broken down by a traumatic event. In contrast, because children have limited life experiences, their schemas are still in the process of being built and, as such, are not yet fully developed (Janoff-Bulman, 2006). One could argue then, that young people may be *more likely* to integrate new information, be it positive or negative, into their still forming schemas. In any case, studying PTG in children is a worthwhile undertaking and may shed light on the underlying processes of PTG (Milam, Ritt-Olson, & Unger, 2004).

Several measures of PTG for young people have been developed, most of which are adaptations of the PTGI (Tedeschi & Calhoun, 1996). In a study by Milam and colleagues (2004), nearly 30% of the 435 adolescent participants reported at least moderate positive outcomes as a result of various negative life events, and there were no significant differences in PTG scores across different events, $F(5, 426) = 0.80$, ns. The researchers found that age was a significant predictor of PTG, $\beta = .21$, $t = 4.26$, $p < .001$. This relationship is contrary to previous research (Abraido-Lanzo, Guier, & Colon, 1998; Polatinsky & Esprey, 2000) and was attributed

to a certain level of cognitive maturity necessary to find benefits in the wake of a negative event (Milam et al., 2004). To assess for PTG, the researchers developed a 16-item self-report measure that was adapted from the PTGI (Tedeschi & Calhoun, 1996) to be more suitable for children and adolescent readers. The scale was modified to include opportunities for respondents to endorse *negative change* as a result of the trauma. A 5-point Likert scale was used ranging from (1) highly negative change to (5) highly positive change where 3 would be scored for no change (Milam et al., 2004).

Cryder, Kilmer, Tedeschi, and Calhoun (2006) also used a modified version of the PTGI (Tedeschi & Calhoun, 1996) dubbed Posttraumatic Growth Inventory for Children (PTGI-C) in their study of 46 children and adolescents displaced by flooding caused by Hurricane Floyd. The PTGI-C used a 4-point scale to assess the degree of change caused by the storm and measured all five of the original domains contained in the PTGI. Their results showed that PTGI-C scores were variable (mean = 65.11, SD = 11.87). PTG was significantly related to competency beliefs ($r = .382$, $p < .01$) but not to rumination or social support (Cryder et al., 2006).

In a 2006 book chapter, Kilmer discussed an unpublished dissertation by Yaskowich (2002) that details the development of yet another adaptation of the PTGI (Tedeschi and Calhoun, 1996). Each of the 21 items was reworded to be appropriate for children as young as 8-years-old. Coined the Posttraumatic Growth Inventory-Revised for Children and Adolescents, the measure was piloted with young cancer survivors. The total score alpha was measured at .94. The five factors of the PTGI were retained and their alphas ranged from .68 to .86. Results of this study were not discussed by Kilmer (2006).

Ickovics and colleagues (2006) studied the aftereffects of various traumatic events and PTG's effect on emotional distress in a longitudinal study of 328 mostly minority (78%)

adolescent females. Initially, the participants were interviewed about the chronology of their traumatic experiences. Prior to conducting their 12-month follow-up assessment interview, the researchers ran pilot tests with the PTGI (Tedeschi and Calhoun, 1996) and modified the measure to be more interview-friendly. Several of the items were reworded, and the scale was changed to a mere 3-point scale (0 = no change, 1 = a little change, 2 = a lot of change). Finally, after psychometric analysis, the two items from the Spiritual Change factor were omitted. Results showed that PTG measured at 12-month follow-up was related to lower levels of emotion distress measured at 18-month follow-up (Ickovics et al., 2006).

Barakat et al. (2006) interviewed young cancer survivors regarding PTG. The authors were primarily interested in the association between perceived treatment intensity, life threat, and PTG. Using the Perceptions of Changes in Self scale from the Impact of Traumatic Stressors Interview Schedule (Kazak, Stuber, Barakat, & Meeske, 1996), the authors assessed change as a result of their struggle with cancer. Thirty-two percent of the adolescent participants reported experiencing four or more positive changes, while 84.7% endorsed at least one positive change. PTG was positively associated with age (.28, $p < .005$), perceived life threat (.32, $p < .005$), and perceived treatment intensity (.20, $p < .01$). Unexpectedly, the researchers found a significant positive correlation between posttraumatic stress symptoms and PTG (.35, $p < .005$).

Salter et al. (2004) collected qualitative data by interviewing youths who were involved in traffic accidents. The interviewers administered diagnostic tools for PTSD, anxiety, and depression soon after each participant's accident. During the interviews researchers made notes of the various experiences and feelings, including ones of positive outcomes and growth, reported by the participants. No formal measure of PTG was used. The main interest of the study was to explore how youths experience PTG in each of the three broad areas of growth proposed

by Tedeschi and Calhoun (1996): changes in perception of self, changes in interpersonal relationships, and changes in philosophy of life. Of these, participants most strongly endorsed having a change in philosophy of life. Many participants expressed a new appreciation for life and a desire to seize new opportunities.

Posttraumatic Growth and Resilience

Although similar, PTG and resiliency differ from one another in some subtle but important ways (Calhoun & Tedeschi, 2006). Clay, Knibbs, and Joseph (2009) define resilience as “the ability to continue to function normally in spite of adversity” (p. 413). Scales, Benson, Leffert, and Blyth (2000) conceptualize resilience as overcoming negative events and quickly returning to pre-trauma levels of functioning. In contrast, PTG involves positive, long term change as a result of a negative event (Calhoun & Tedeschi, 1999). It is achieving higher levels of functioning than before and engaging in healthier behaviors. Therefore, higher levels of resilience should result in PTG (Calhoun & Tedeschi, 2006). However, Clay et al. (2009) suggest the resilience could lead to less PTG. They infer that traumatization or a certain level of vulnerability is necessary to experience growth. Resilient people may overcome adversity without ever experiencing intense distress and therefore would be less likely to experience personal growth. Levine, Laufer, Stein, Hamama-Raz, & Solomon (2009) found an inverse relationship between resilience and PTG suggesting that resilient individuals emerge from trauma relatively unchanged. Consequently, they are less likely to engage in positive “meaning-making” (p. 285) of the negative event necessary to experience PTG. Nevertheless, PTG and resilience, although differing, do share some variance and are valuable constructs in posttraumatic studies (Luthar, Cicchetti, & Becker, 2000).

Coping and Posttraumatic Growth

The coping strategies used to deal with stress greatly influence personal adjustment (Lazarus & Folkman, 1984). Tedeschi and Calhoun (1995) found that, in adults, coping that occurs immediately after a negative life event is often emotion-focused in an attempt to make the present distress more tolerable. They also suggest that denial or avoidant coping allows the individual to face the negative event at their own pace and prevents the victim from becoming overwhelmed with distress. However, it is thought that active problem solving as a coping response to negative life events is more highly related to positive long term outcomes (Butler et al., 2005).

There is a great deal of research examining coping in youth (see Compas & Epping, 1993; Blount, Davis, Powers, & Roberts, 1991; Langrock, Compas, Keller, Merchant, & Copeland, 2002); however, studies exploring the association between youth coping strategies and positive outcomes are limited. In a longitudinal study by Wolchik, Coxe, Tein, Sandler, and Ayers (2008), active and avoidant coping as well as PTG were measured in a sample of fifty adolescents and young adults who had suffered the death of a parent. For their purposes, active coping was defined as problem solving and positive cognitive restructuring, while avoidant coping referred to avoiding the problem and engaging in wishful thinking. Active coping was significantly related to the New Possibilities (.47, $p < .01$) and Personal Strength (.42, $p < .01$) domains of the PTGI (Tedeschi & Calhoun, 1996) but not to the three remaining factors (i.e., Relating to Others, Spiritual Change, Appreciation for Life). Interestingly avoidant coping was also associated with New Possibilities (.35, $p < .05$) and Personal Strength (.34, $p < .34$). After controlling for other coping variables, active coping was still significantly related to New

Possibilities. The authors propose that using active problem solving increases the ease with which individuals engage in new opportunities (Wolchik et al., 2008).

Several studies have investigated coping strategies in college students and other young people. In their development of the Stress-Related Growth Scale (SRGS), Park, Cohen, and Murch (1996) found that of college students who reported experiencing several different traumatic events, greater positive growth was seen in those who used positive reinterpretation and acceptance coping. Positive reinterpretation represents an active attempt to grow as a result of the trauma according to the authors. Active coping in college students who experience various negative events was also found to be significantly related to all five factors of the PTGI (Tedeschi & Calhoun, 1996; Wild & Paivio, 2003). The significant association between acceptance coping and growth was also found in a sample of adult victims of the September 11, 2001, attacks on the World Trade Center (Butler et al., 2005). Appropriately, the use of defensive coping methods such as acting out and becoming angry were related to negative outcomes in a sample of young adults (Sever, Guttmann, & Lazar, 2007).

Social Support and Posttraumatic Growth

Social support is an important aspect of understanding positive change in response to a life crisis (Schaefer and Moos, 1998). It is suggested that social support encourages positive coping behaviors and contributes to positive outcomes in the aftermath of a negative life event. In a meta-analysis by Prati and Piertrantoni (2009), social support was found to be a moderate predictor of adult PTG. The authors attributed the modest significance to the possibility that social support promoted effective coping strategies, which in turn promotes positive outcomes. Individuals who seek out support from others are more likely to engage in active coping strategies (Schaefer & Moos, 1998). Tedeschi and Calhoun (2004) take a different approach by

claiming that social support is a direct predictor of positive change after a crisis. By self-disclosing and seeking help from others, individuals discover positive aspects of the trauma of which they may not have been aware. Also noted is the importance of support imparted between individuals with shared experiences. Individuals are more trusting of and receptive to others who experienced the same trauma and are thus more likely to self-disclose (Tedeschi & Calhoun, 2004).

As previously mentioned, Wolchik and colleagues (2008) examined PTG in a sample of 50 bereaved adolescents. In this study, the researchers also measured social support from four different sources: parents, adults other than parents, peers, and siblings. Parental support was significantly correlated with the Relating to Others (.45, $p < .01$), New Possibilities (.41, $p < .01$), and Personal Strength (.37, $p < .05$) factors of the PTGI (Tedeschi & Calhoun, 1996). Support from adults was associated with Relating to Others (.31, $p < .05$) and New Possibilities (.26, $p < .10$). Interestingly, peer and sibling support was not significantly correlated with PTG. The authors hypothesized that because the participants had suffered the death of a parent, they may have only sought out support from the surviving parent and other adult relatives (Wolchik et al., 2008).

In another study of social support and PTG, children and adolescents identified up to ten sources of support and evaluated each of them by their ability to listen and provide comfort (Cryder et al., 2006). Contrary to what the researchers hypothesized, the relationship between social support and PTG was not significant.

Posttraumatic Stress Disorder and Posttraumatic Growth

Although often thought to be the antithesis of PTG, posttraumatic stress disorder (PTSD) has been found to have mixed associations with PTG (Zoellner & Maecker, 2006). In a review of

PTG and related constructs in adults, several positive, negative and non-significant relationships were found in the literature.

In their study of young cancer survivors, researchers predicted that PTG and PTSD would be negatively associated (Barakat et al., 2006). The two constructs were, in fact, significantly positively correlated. After controlling for all other variables (i.e., age at diagnosis, life threat, and treatment intensity), PTSD remained significantly predictive of PTG in regression analysis. In another study with young car accident victims, 42% of participants reported experiencing some degree of personal growth. Of those children, 37% met criteria for PTSD as measured by the Clinician Administered PTSD Scale for Children (CAPS-C; Nader, Kriegler, Blake, & Pynoos, 1994). However, of the children who did not meet criteria for PTSD, 38%, a comparable percentage, still reported some aspects of PTG (Salter et al., 2004).

According to Zoellner and Maecker (2006), a consistent systematic relationship between posttraumatic growth and posttraumatic stress disorder has yet to be found. The authors suggest that factors such as trauma severity and time since trauma may influence the lack of a relationship between PTG and PTSD. Method of assessment could also play a role in the direction of the correlations. Zoellner and Maecker (2006) reported that studies that used the PTGI (Tedeschi & Calhoun, 1996) or the SRGS (Park et al., 1996) found either no relationship or a positive relationship between PTG and PTSD. Studies that used interview formats or self-constructed scales to assess for PTG showed negative correlations between positive growth and PTSD symptoms.

In an attempt to further explore the relationship between PTG and PTSD, Levine, Laufer, Hamama-Raz, Stein, and Solomon (2008) evaluated the relationship between PTSD *severity* and PTG in a sample of 4,054 Israeli youths. The results showed that PTG increased as PTSD

severity increased. Interestingly, the curvilinear model also was significant and took the shape of an inverted-U. The authors explain the latter model by inferring that individuals with mild or severe PTSD show lower levels of growth. A moderate level of PTSD appears optimal for experiencing positive growth (Levine et al., 2008).

Summary and Purpose

Posttraumatic growth is a quickly developing area of research in the literature, yet few studies measure positive outcomes in non-adult victims of natural disasters. Although PTG is a somewhat controversial construct in children (Joseph et al., 2007), research has shown that children and adolescents are capable of experiencing positive outcomes in the face of negative life events. Factors that lead to posttraumatic growth have not yet been sufficiently researched. Coping strategies and social support are important predictors of post-trauma outcomes in children and adolescents. Furthermore, the relationship between posttraumatic stress and posttraumatic growth has proven to be a complex one (Zoellner & Maecker, 2006). Further research is needed to explore how these two constructs are consistently associated. The proposed study will hopefully advance the research by measuring how posttraumatic growth is related to age, coping strategies, social support, and posttraumatic stress in children and adolescents. Based on previous research, the following are hypothesized:

- (1) Age will be significantly positively related to PTG in a Pearson product-moment correlation.
- (2) Active coping, social support, and PTSD will be uniquely predictive of PTG in a multiple regression model.

(3) In support of the findings by Levine et al. (2008), PTSD symptom severity will be predictive of PTG in a curvilinear model. The regression curve will take the form of an inverted-U and show moderate PTSD severity to be optimal for experiencing PTG.

METHOD

Participants

Participants were 94 children and adolescents who lived in and around the city of New Orleans when Hurricane Katrina made landfall. The existing data set used in this study was collected approximately 3 ½ years post-Katrina. The participants were part of a longitudinal study in which data collection began in October of 2005. The sample was 52% female with an average age of 14.3 years old. The majority of the sample was African American (60%) and the remaining being Caucasian (34%), and other races (6%).

Measures

Demographic Questionnaire. Each participant completed a demographic questionnaire regarding their gender, age, and ethnicity (See Appendix A).

Posttraumatic Growth Inventory for Children (PTGI-C; Cryder, Kilmer, Tedeschi, & Calhoun, 2006). The PTGI-C is a 21-item adaptation of the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). Items were reworded to be more suitable for children. The five factors of the PTGI were: New Possibilities, Relating to Others, Personal Strength, Appreciation for Life, and Spiritual Change. Items were rated on a 4-point Likert scales ranging from 0 (“Not at All True”) to 4 (“Very True”). Participants reported on whether items were true since Hurricane Katrina (See Appendix B). This study used the total score. The alpha for the PTGI-C in this sample was .95.

UCLA PTSD Reaction Index (Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998). This 22-item measure (See Appendix C) is used as to screen for PTSD in children according to criteria in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994). Items are rated on how much of the time

during the past month certain situations happened on a scale from 0 (“None”) to 4 (“Most”). The measure has been shown to have strong psychometric properties (Pynoos, Goenjian, & Steinberg, 1998). The measure’s total severity index was used in this study. The alpha for the UCLA PTSD Reaction Index for this sample was .92.

Youth Coping Responses Inventory (YCRI; Hernandez, Vigna, & Kelley, 2010). This 44-item measure was originally developed as part of the aforementioned NIMH grant studying the aftereffects of Hurricane Katrina (See Appendix D). It contains three domains: Diversion (“I returned to doing things with friends”), Ameliorative Coping (“I focused on how to solve the problem”), and Destructive Coping (“I took it out on others”). Participants rated how often they used each coping strategy on a scale from 1 (“Never”) to 4 (“Almost Always”). This study used the Ameliorative Coping factor of the measure. The alpha for the YCRI in this sample was .92. The alpha for the Ameliorative Coping factor was .86.

Social Support Questionnaire for Children (SSQC; Gordon, Thompson, Kelley, Schexnaildre, & Burns, unpublished measure). This 50-item scale (See Appendix E) measures social support from five different sources: Parent, Relative, Adult (non-relative), Peer, and Sibling. Items are rating on a 4-point scale from 0 (“Never or rarely true”) to 3 (“Always true”). Examples of items are “A peer comforts me when I am upset” and “A relative is there when I need them”. The alpha for the SSQC for this sample was .97.

Procedure

Approval from the institutional review board was received. Consent was obtained from parents as well as assent from the young participants. Once approval from respective school boards and schools was received, data collection began. Participants were visited at their schools, and they completed the questionnaires under the supervision of the researchers. Youth were

provided small gifts such as pencils, candy, or sports teams stickers for their participation and the families were compensated monetarily as part of the larger longitudinal study.

RESULTS

Assumptions of Normality

SPSS 15.0 was used to test assumptions of normality. No univariate outliers were found as no values deviated from the mean by three and one-half standard deviations. Also, Mahalanobis distances were used to search of multivariate outliers (Field, 2005); none were found. Tests for multicollinearity were conducted. No significant overlap was found among the outcome or predictor variables.

Missing Data

Missing data was measured at 9% for this study. EQS 6.1 software was used to conduct the expectation maximization (EM) technique. EM is a two-step procedure that imputes missing values by using the covariance matrix to create a series of regression equations. These regression equations are used to estimate the missing values. Once all missing values have been imputed, new regression equations are generated, and the process continues until the difference in consecutive covariance matrices meets a convergence criterion. In an effort to restore uncertainty to the data, EM adds residual variance to imputed values whereas standard regression imputation does not (Enders, 2003).

Descriptive Statistics and Zero-order Correlations

The means, standard deviations, and ranges for each predictor and outcome variable are listed in Table 1. Bivariate correlations among all variables are also presented.

Participant age was not significantly correlated to PTG ($r=.04$, ns). PTG related significantly to social support ($r=.62$, $p<.01$) and active coping ($r=.36$, $p<.01$). PTSD symptom severity failed to correlate significantly with PTG ($r=-.03$, ns). Interestingly, active coping was significantly related to PTSD symptom severity ($r=.28$, $p<.05$).

Table 1. Means, Standard Deviations, Ranges, and Intercorrelations among Predictor and Outcome Variables

Variable	Mean	SD	Range	1	2	3	4
1. Age	14.31	1.36	12 – 18				
2. PTG	60.46	15.42	23 – 84	.043			
3. PTSD Symptom Severity	12.04	11.05	0 – 45	-.032	-.031		
4. Social Support	112.40	30.86	35 – 150	.014	.619*	-.165	
5. Active Coping	23.56	7.58	11 – 44	.011	.360*	.280*	.178

*p < .01

Multiple Regression Analysis

To examine hypothesis 2, a multiple regression model was calculated. As recommended by Baron & Kenny (1986), all variables were centered around their means to control for multicollinearity. Social support, active coping, and PTSD symptom severity were entered as predictors simultaneously using the enter method. PTG was entered as the outcome variable.

The overall regression model was significant [$F(3,93)=24.3$, $R^2=.45$]. Social support was a significant predictor ($\beta=.57$, $sr^2=.35$, $p<.01$). Active coping was also found to significantly predict PTG ($\beta=.26$, $sr^2=.10$, $p<.01$). PTSD symptom severity was not a significant predictor in the model ($\beta=-.01$, ns).

Curvilinear Regression Analysis

To examine hypothesis 3, a curvilinear regression was calculated using a quadratic model. PTSD was entered as the predictor variable, while PTG was entered as the outcome variable. The model was not significant [$F(2,91)=.045$, $R^2=.001$, ns].

DISCUSSION

This study examined predictors of PTG in children and adolescents who experienced Hurricane Katrina. The study was designed to evaluate Tedeschi and Calhoun's (1996) model of PTG in a sample of hurricane exposed youth in hopes of better understanding the underlying mechanisms of PTG. In addition, the study examined the relationship between PTSD and PTG. It was thought that those who experienced distress related to their trauma would in turn experience growth. Also, it was hypothesized that those who experienced a moderate amount of trauma related distress would experience the highest level of growth. These predictions were partially supported.

The study found that children and adolescents are capable of undergoing positive change as a result of experiencing a trauma. This was evidenced by ratings on the PTGI-C ($M=60.46$, $SD=15.42$). This finding is supportive of previous studies that found non-adults reporting growth after experiencing a variety of traumatic events (Janoff-Bulman, 2006; Milam et al., 2004; Levine et al., 2008; Butler et al., 2005).

Hypothesis 1 predicted that participant age would be significantly positively correlated with PTG. The hypothesis was not supported as age and PTG rating were not significantly related. This finding is contrary to the significant positive relationship (.20, $p<.001$) found by Milam et al. (2004). This result is surprising as the participants in the mentioned study had age ranges similar to the current study ($M=15.8$, $SD=1.52$). The limited age range in the current study (12-18) may have influenced the lack of significant findings. As it was proposed that a certain level of maturity is needed to engage in the necessary reflection to achieve PTG, it may be that most participants had already attained that level of maturity. Further research is needed, especially with non-adolescent children, that examines the relationship between age and PTG.

Hypothesis 2 predicted that social support, active coping, and PTSD symptom severity would predict PTG in the sample. Overall, this hypothesis was supported as the model was significant and accounted for 45% of the variance. However, PTSD symptom severity was not found to be a significant predictor.

Social support was a significant predictor of PTG and uniquely accounted for 35% of the variance. This finding is in support of previous research of adolescent trauma victims (Prati & Piertrantoni, 2009; Wolchik et al., 2008). It also contributes to the overall model of PTG (Tedeschi & Calhoun, 1996), which indicates that social support is vital in the development of positive outcomes. Through self-disclosure, as well as hearing accounts from other with whom an experience is shared, individuals build narratives and engage in schema change.

Positive, active coping was also a significant predictor of PTG and uniquely accounted for 10% of the variance of the model. This finding contributes to the limited amount of studies examining coping styles and positive outcomes post-trauma (e.g., Wolchik, et al., 2008; Park et al., 1996; Wild & Paivio, 2003). Supported is the notion that active coping strategies (e.g., problem solving, reflection, writing about the trauma, meaning-making) lead to better long term adjustment (Butler et al., 2005). Tedeschi and Calhoun (1995) suggest that in the early days post-trauma, avoidant coping styles can be protective in that they allow the individual to confront their experience at their own pace, as not to be overwhelmed. Ultimately, however, it is active coping that fosters positive outcomes.

PTSD symptom severity was not a significant predictor in the model. This finding opposes the hypothesis but is not inconsistent with the literature (see Maecker, 1998; Znoj, 1999; Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003). There are several factors that may have influenced this lack of significant relationship. Time since the trauma has been suggested to

affect the association (Zoellner & Maecker, 2006; Milam et al., 2004). Although PTG may be experienced relatively soon after a traumatic experience, the more accepted progression from trauma to growth takes considerable time. PTG may be experienced by those who continue to experience PTSD symptoms and by those whose distress has subsided. Data were collected 3 ½ years post-Hurricane Katrina. Longitudinal studies are needed to better track the endorsement and progression of PTSD and PTG. Another factor that may have contributed to the finding is method of measurement. Studies using factor analyzed measures of PTG commonly find no relationship between PTG and PTSD symptoms, while interview formats and self-constructed scales often produce negative relationships (Aldwin, 1994; Frazier, Colon, & Glaser, 2001; Zoellner & Maecker, 2006). This could suggest a “one or the other” bias in the nature of the qualitative studies. Participants may have suggested experiencing either distress *or* growth but not both simultaneously. Further study is needed to determine the most reliable and comprehensive method of assessing PTG.

Hypothesis 3 predicted that a curvilinear relationship would be found when PTSD symptom severity was regressed against PTG. This hypothesis was not supported as the model was not significant. This finding is in contrast to previous studies (Butler et al., 2005; Levine et al, 2008). It may be that length of time since the trauma and method of measurement contributed to the non-significant finding. Also, higher levels of PTG may be experienced by those with several different levels of PTSD symptom severity. Further studies testing non-linear associations between PTG and PTSD are needed. It is well documented in the literature the relationship between PTG and PTSD is complex. However, the finding of significant curvilinear relationships is encouraging and suggests that researchers may be on the correct path to uncovering the nature of the relationship.

Limitations

This study contains several limitations that must be noted. First, the study used self-report measures with no observational or interview data. The young participants were visited at their respective schools and completed a large packet of measures, including the ones used in this study. They were supervised; however, their honesty in rating can only be assumed and not guaranteed.

The measures used in this study were measured to have adequate internal reliability. However, some of them have not been adequately validated in the literature. The PTGI-C (Cryder et al., 2006) was developed in conjunction with Tedeschi and Calhoun, developers of the PTGI and the original model of PTG. Unfortunately, the PTGI-C is currently not the “gold standard” of measuring PTG in children and adolescents, as other measures are often used. The YCRI (Hernandez et al., 2010) is a promising measure of children’s coping but has yet to be studied adequately. Finally, the SSQC (Gordon et al., 2010) is an unpublished measure of social support in children. The measure has undergone preliminary analysis including exploratory factor analysis, and is currently in development.

The relatively small sample size and unprecedented circumstances of Hurricane Katrina limit the generalizability of this study. Also, this study borrowed several elements of the PTG model and theory from adult studies. Therefore, yet to be discovered moderators could have influenced the tested relations. The study of PTG in youth is relatively new and requires further exploration.

Clinical Implications

A great deal of research is dedicated to the investigation of negative outcomes post-trauma. Children and adolescent’s achievement of higher levels of functioning in the wake of a

disaster like Hurricane Katrina is encouraging to a clinical setting. The current study demonstrates that active coping styles and social support nurture positive schema change. The assessment of these two factors is paramount. Children and adolescents should be educated about various coping strategies and the benefits of active coping. They should also be encouraged to seek out assistance from others around them. Self-disclosure, reflection, and listening to the experiences of others should be recommended as well in order to foster positive outcomes.

The currently study exhibited that youngsters are capable of experiencing positive outcomes regardless of age, and seemingly maturity level. Also, PTG may be endorsed in the presence or absence of PTSD symptoms. Young trauma victims who are currently experiencing distress could, simultaneously, identify positive changes in their lives. Additionally, those who have merely suffered minor life stressors could also become changed for the better as a result.

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APPENDIX A: DEMOGRAPHIC QUESTIONNAIRE

DATA COLLECTION CHECKLIST

Wave 5

Subject Number _____

Subject Name _____

DOB _____ **Age** _____ **Sex** _____ **Race** _____

Wave 5 School _____

Grade _____

Mother's Name _____

Mother's Address _____

Mother's Phone Number _____

Where do you think you will be attending school next year?

School Name: _____

APPENDIX B: POSTTRAUMATIC GROWTH INVENTORY FOR CHILDREN

The following are things that some people experience after a disaster or crisis. Please indicate how true each statement is for you since **Hurricane Katrina**.

1=Not at all true 2=A little true 3=Mostly true 4=Very true

	Questions	Not at all true	A little true	Mostly true	Very true
1.	I have learned what is important to me.	1	2	3	4
2.	I am now more likely to try to change things in my life that need changing.	1	2	3	4
3.	I have learned that life is important.	1	2	3	4
4.	I learned that I can count on myself.	1	2	3	4
5.	I understand spiritual things (like religious ideas) more now.	1	2	3	4
6.	I learned that some people will be there for me and help me if something bad happens.	1	2	3	4
7.	I feel closer to other people (friends or family) than I did before.	1	2	3	4
8.	I learned that I can handle my problems.	1	2	3	4
9.	I feel like it is okay to let people know how I feel inside.	1	2	3	4
10.	I feel like I can deal with things the way they turn out.	1	2	3	4
11.	I feel like each day is important.	1	2	3	4
12.	I can better understand other people's feelings.	1	2	3	4
13.	I am able to do a better job on my work in school and at home.	1	2	3	4
14.	I have the chance to do some things I wouldn't have been able to do before.	1	2	3	4
15.	I try harder to get along with my family and friends.	1	2	3	4
16.	My religious beliefs are stronger now.	1	2	3	4
17.	I have learned that I can deal with more than I ever thought I could.	1	2	3	4
18.	I learned how nice some people can be.	1	2	3	4
19.	I have new things that I like to do (like hobbies, toys, etc.)	1	2	3	4

20.	I learned that sometimes I need other people to help me out.	1	2	3	4
21.	I have some new ideas about how I want things to be when I grow up.	1	2	3	4

APPENDIX C: UCLA PTSD REACTION INDEX

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

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

often during the night.					
14. I think that some part of what happened is my fault.	0	1	2	3	4
15. I have trouble remembering important parts of what happened.	0	1	2	3	4
16. I have trouble concentrating or paying attention.	0	1	2	3	4
17. I try to stay away from people, places, or things that make me remember what happened.	0	1	2	3	4
18. When something reminds me of what happened, I have strong feelings in my body, like my heart beats fast, my head aches, or my stomach aches.	0	1	2	3	4
19. I think that I will not live a long life.	0	1	2	3	4
20. I have arguments or physical fights.	0	1	2	3	4
21. I feel pessimistic or negative about my future.	0	1	2	3	4
22. I am afraid that the bad thing will happen again.	0	1	2	3	4

APPENDIX D: YOUTH COPING RESPONSES INVENTORY

Directions: People do different things when they are very upset or bothered by a problem or situation. Indicate how often you do each of the following things when you experience a serious problem or situation. Circle 1 for Never, 2 for Sometimes, 3 for Often, and 4 for Almost Always.

TO HELP MYSELF DEAL WITH THE PROBLEM, I ...

HOW OFTEN DID YOU DO THIS?

	Never 1	Sometimes 2	Often 3	Almost Always 4
1. Return to doing things with friends.				
2. Try to relax or calm down.	1	2	3	4
3. Spend time with my family.	1	2	3	4
4. Try to see the good side of things.	1	2	3	4
5. Yell, scream, or get angry.	1	2	3	4
6. Stay by myself.	1	2	3	4
7. Return to doing things with my family.	1	2	3	4
8. Do something quiet like watch TV, play on the computer, or read a book.	1	2	3	4
9. Pray.	1	2	3	4
10. Blame someone for causing the problem.	1	2	3	4
11. Keep quiet about the problem.	1	2	3	4
12. Play a game to forget my problems.	1	2	3	4
13. Imagine I am in the situation again.	1	2	3	4
14. Talk with a friend about the problem.	1	2	3	4
15. Know the problem is in God's hands.	1	2	3	4
16. Focus on the cause of the problem.	1	2	3	4
17. Take it out on others.	1	2	3	4
18. Return to helping around the house.	1	2	3	4
19. Play sports to forget my problems.	1	2	3	4
20. Ask adults for advice.	1	2	3	4
21. Cry to let my feelings out.	1	2	3	4
22. Write about the situation for myself only (like in a diary).	1	2	3	4
23. Destroy things.	1	2	3	4
24. Eat more than usual.	1	2	3	4
25. Look for people who can help me.	1	2	3	4
26. Wish that I could change the way that I feel.	1	2	3	4

HOW OFTEN DID YOU DO THIS?

	Never	Sometimes	Often	Almost Always
27. Focus on how to solve the problem.	1	2	3	4
28. Tell myself things to make me feel better.	1	2	3	4
29. Return to after-school activities like sports, dance, or clubs.	1	2	3	4
30. Receive comfort from friends.	1	2	3	4
31. Come up with several different solutions to the problem.	1	2	3	4
32. Refuse to obey adults.	1	2	3	4
33. Receive comfort from family.	1	2	3	4
34. Expect the worst possible outcome.	1	2	3	4
35. Return to my regular daytime activities like church or school.	1	2	3	4
36. Do a physical activity like riding my bike or walking.	1	2	3	4
37. Receive comfort from my place of worship.	1	2	3	4
38. Try to understand the situation.	1	2	3	4
39. Return to completing homework.	1	2	3	4
40. Tell myself that it is not really happening to me.	1	2	3	4
41. Take it out on myself.	1	2	3	4
42. Make jokes about it.	1	2	3	4
43. Try to think of positive things.	1	2	3	4
44. Focus on what is good in my life.	1	2	3	4

APPENDIX E: SOCIAL SUPPORT QUESTIONNAIRE FOR CHILDREN

PARENT: An adult who lives with you and takes care of you most of the time (ex. mom, dad, grandparent, step-parent).

RELATIVE: An **ADULT** who is related to you by blood or marriage, someone other than a parent.

ADULT: Refers to a teacher, coach, religious leader, club leader, neighbor, close family friend or other person **over the age of 18 who you do not live with, and you are not related to.**

PEER: Anyone around your age who you associate with such as a friend, classmate, or teammate.

SIBLING: A full (biological), half, or step-brother or sister.

SOCIAL SUPPORT: Emotional comfort given to us by another person that lets us know we are cared for and valued.

Directions: Please read each item and rate how often each statement is true.

		Never or Rarely True	Sometimes True	Often or Very True	Always True
1.	I enjoy spending time with a sibling.	0	1	2	3
2.	I have a sibling who treats me fairly.	0	1	2	3
3.	A relative helps me feel good about myself.	0	1	2	3
4.	A relative helps me when I am sick or injured.	0	1	2	3
5.	A peer comforts me when I am upset.	0	1	2	3
6.	A peer cares about me and makes me feel wanted.	0	1	2	3
7.	A sibling helps me when I need it.	0	1	2	3
8.	A peer gives me affection (hugs, pats me on the back).	0	1	2	3
9.	A parent shows me affection.	0	1	2	3
10.	A relative is there when I need them.	0	1	2	3
11.	A peer gives me good advice.	0	1	2	3
12.	I have a relative who shows me how to do things.	0	1	2	3
13.	I have an adult in my life who really cares about me.	0	1	2	3
14.	A sibling will let me borrow money if needed.	0	1	2	3
15.	A peer accepts me for who I am.	0	1	2	3
16.	A parent makes sure I have what I need.	0	1	2	3
17.	A peer supports my decisions.	0	1	2	3
18.	A relative helps me when I need it.	0	1	2	3
19.	I have a peer I can count on.	0	1	2	3
20.	A peer encourages me.	0	1	2	3
21.	A sibling comforts me when I am upset.	0	1	2	3
22.	A parent helps me feel good about myself.	0	1	2	3
23.	I have a parent who encourages me.	0	1	2	3
24.	I have a parent who treats me fairly.	0	1	2	3
25.	A parent helps me when I need it.	0	1	2	3
26.	A relative explains things I don't understand.	0	1	2	3
27.	I have a sibling who supports my decisions.	0	1	2	3
28.	An adult comforts me when I am upset.	0	1	2	3
29.	An adult spends time with me when I need it.	0	1	2	3
30.	A relative comforts me when I am upset.	0	1	2	3

31.	A parent shows me how to do things.	0	1	2	3
32.	I have an adult in my life who I can really count on.	0	1	2	3
33.	I have a parent that I can count on.	0	1	2	3
34.	A sibling gives me affection.	0	1	2	3
35.	A parent cares about my feelings.	0	1	2	3
36.	A relative listens when I want to talk.	0	1	2	3
37.	A parent listens when I want to talk.	0	1	2	3
38.	I have a peer who treats me fairly.	0	1	2	3
39.	An adult shows me how to do things.	0	1	2	3
40.	I have a sibling who cares about me.	0	1	2	3
41.	A relative helps take care of things I can't do alone.	0	1	2	3
42.	I have a peer who I can talk to.	0	1	2	3
43.	An adult helps me when I need it.	0	1	2	3
44.	An adult helps me feel good about myself.	0	1	2	3
45.	I have a sibling I can trust to keep a secret.	0	1	2	3
46.	An adult gives me good advice.	0	1	2	3
47.	A sibling accepts me for who I am.	0	1	2	3
48.	An adult shows me affection.	0	1	2	3
49.	A relative helps me cope with my problems.	0	1	2	3
50.	An adult cares about my feelings.	0	1	2	3

VITA

Mark Schexnайдре graduated with a Bachelor of Science degree in psychology from Louisiana State University in 2007. He began his graduate studies at Louisiana State University under Dr. Mary Lou Kelley in August of 2008. He is currently a third-year student working towards his Doctor of Philosophy degree in psychology and will be receiving his Master of Arts degree in May 2011. He is currently interested in working with children, and his main research interests lie in the areas of children's responses to trauma with respect to the family unit.