Journal of Social and Clinical Psychology, Vol. 24, No. 4, 2005, pp. 538-560

PREDICTORS OF PERCEIVED GROWTH FOLLOWING DIRECT EXPOSURE TO COMMUNITY VIOLENCE

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This study examines longitudinal predictors of perceived growth in a sample of 258 physically injured survivors of community violence. Structural equation modeling was used to evaluate the relative importance of objective trauma severity, trauma–related distress, and both dispositional and situation–specific optimism in predicting the degree of positive growth reported three months following assault. Analyses indicated that perceived growth at follow–up was positively linked to situation–specific optimism, dispositional optimism, and initial symptoms of trauma–related distress, even after adjusting for objective trauma severity at baseline as well as optimism and trauma–related distress at follow–up. These findings offer evidence that initial trauma–related distress, as well as initial optimistic expectancies, may play a direct role in perceived growth following adversity.

More than a century after Nietzsche's provocative assertion, "that which does not kill me makes me stronger" (Nietzsche, 1889/1997), a growing body of research suggests that people do, in fact, draw strength from ad-

This research was supported by grants from the National Institute of Mental Health (RO1MH56122) and the William T. Grant Foundation. Preparation of this manuscript also was supported by funding from the National Institute of Mental Health to the first author (MH019958). The views expressed are ours and do not necessarily reflect those of the NIMH, the William T. Grant Foundation, or RAND. We express gratitude to the following individuals for their contributions to this study: Deirdre Anglin, Howard Belzberg, Carole Berkson, David Foy, Lisa Jaycox, Angela Miu, Suzanne Perry, Terry Schell, Erika Taylor, and David Watson. We gratefully acknowledge the generosity of the assault survivors who participated in this study as well as the efforts of the interview team.

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versity (e.g., Calhoun & Tedeschi, 1990; Collins, Taylor, & Skokan, 1990; Davis, Nolen–Hoeksema, & Larson, 1998; McMillen, Fisher, & Smith, 1997; Park, Cohen, & Murch, 1996; Tedeschi & Calhoun, 1996). Although a variety of terms have been used by researchers to describe this phenomenon—including posttraumatic growth (Tedeschi & Calhoun, 1995, 1996), perceiving benefits (Affleck & Tennen, 1996; Davis et al., 1998; McMillen et al., 1997; McMillen, Zuravin, & Rideout, 1995), finding meaning (Park & Folkman, 1997), and positive change following negative events (Frazier, Conlon, & Glaser, 2001; Updegraff, Taylor, Kemeny, & Wyatt, 2002)—each refers to the observation that people often report beneficial changes in their lives in the aftermath of traumatic events. For example, Davis et al. (1998) reported that nearly three–quarters of study participants who recently had suffered the loss of a family member found that something positive had occurred as a result of their bereavement. Similarly, a majority of participants in McMillen et al.'s (1997) study of disaster victims reported that they had found benefits in the aftermath of being exposed to a mass killing, a plane crash, or a tornado.

The relatively recent shift in research emphasis from a virtually exclusive focus on the negative aftermath of trauma to an examination of the possible benefits of surviving trauma holds much promise as a more encompassing framework for understanding adjustment to adversity. Despite this potential, a number of remaining issues require resolution. First, most research has been directed at documenting the prevalence of perceived growth following trauma exposure, as well as determining whether growth is associated with psychological adaptation (e.g., Frazier et al., 2001; McMillen et al., 1997). On the whole, this body of research has found perceptions of growth to be associated with both current (e.g., McMillen et al., 1997; Thompson, 1985; Updegraff et al., 2002) and subsequent well–being (e.g., Curbow, Somerfield, Baker, Wingard, & Legro, 1993; Davis et al., 1998), although some studies have found no relationship (e.g., Lehman et al., 1993; Tennen, Affleck, Urrows, Higgins, & Mendola, 1992; see Park, 1998, for review). Although the emphasis on documenting the prevalence and implications of perceiving growth is understandable given the nascent status of the field, this focus leaves largely unexamined key questions concerning initial circumstances that serve as catalysts of subsequent growth. In particular, research is needed to determine the degree to which posttraumatic growth is predicted by the objective circumstances or the subjective impact of a traumatic event.

Tedeschi and Calhoun (1995; Tedeschi, 1999) have posited that the potential for growth is greatest following exposure to extraordinary traumatic life experiences. For example, Calhoun (1996), as cited by Tedeschi

(1999), refers to "seismic events" of sufficient magnitude to precipitate transformation. Elsewhere, Tedeschi and Calhoun (1995; Tedeschi, 1999) have proposed that growth stems from struggling to resolve difficult psychological consequences of traumatic events and that people who have experienced the most psychological distress are those most prone to subsequent transformational experiences. These are not incompatible positions, yet they differ substantially in their emphasis and implications. The former underscores the life-changing impact of having survived an objectively traumatic life experience of substantial magnitude, thus emphasizing the character of the exogenous event. By contrast, the latter centers on the psychological consequences of the event, irrespective of its objective severity. Within the latter framework, mere exposure to an extraordinary life experience, irrespective of its magnitude, does not necessarily present transformational opportunities—one must have also suffered psychologically.

Although a number of studies have examined the relationship between the severity of a traumatic event and people's perceptions of posttraumatic growth, to our knowledge, no study has compared objective severity with initial subjective distress in predicting subsequent perceptions of posttraumatic growth. However, consistent with Tedeschi and Calhoun's (1995; Tedeschi, 1999) propositions, existing studies do seem to suggest that more extreme stressors may create a greater potential for growth. For example, in a cross–sectional study of breast cancer survivors, women who had perceived their condition to be more of a life threat reported greater posttraumatic growth (Cordova, Cunningham, Carlson, & Andrykowski, 2001). Similarly, war veterans who reported being exposed to heavier combat situations in past military service (i.e., had killed or witnessed others being killed) were more likely to report that they were better able to cope with adversity and had greater self–discipline than those who reported lighter combat experience (Elder & Clipp, 1989). In a study of bone marrow transplant survivors, riskier prognosis at the time of the transplant (based on objective medical records) was positively related to subsequent perceptions of positive life change (Fromm, Andrykowski, & Hunt, 1996). Thus, in past studies, the assessment of event severity has varied from the subjective (e.g., Cordova et al., 2001) to the objective (e.g., Fromm et al., 1996), but has left unanswered the question of which aspect of a traumatic event may be most predictive of subsequent posttraumatic growth. Thus, the current study assessed both objective event severity initial subjective distress and compared their roles in predicting subsequent perceptions of growth.

Another important gap in existing research is that relatively little is known about individual differences that might play a role in determin-

ing who is more likely to perceive growth following trauma exposure. Dispositional optimism—the conviction that the future holds desirable outcomes (Scheier & Carver, 1985; Scheier, Carver, & Bridges, 1994)—has frequently been proposed as a personality characteristic that may predispose some people to perceive growth and find benefits following exposure to trauma (e.g., Affleck & Tennen, 1996; Tedeschi & Calhoun, 1996). Of the studies that have examined this link, some have reported a positive relationship between optimism and perceived growth (Affleck, Tennen, & Rowe, 1991; Curbow et al., 1993; Davis et al., 1998; Tedeschi & Calhoun, 1996; Tennen et al., 1992) while others have found no unique relationship between optimism and growth (Park et al., 1996, Study 3; Park & Fenster, 2004; Tennen & Affleck, 1998; Updegraff et al., 2002). However, of the studies that have addressed this issue, many have relied on cross–sectional designs (e.g., Curbow et al., 1993; Tennen et al., 1992; Updegraff et al., 2002). In addition, much of this research assesses growth and optimism long after the occurrence of the traumatic event, thus further compromising the ability to identify early predictors (e.g., Curbow et al., 1993; Park et al., 1996; Tennen et al., 1992). Thus, a more definitive examination of this issue requires a longitudinal design with assessments conducted in temporal proximity to the traumatic event.

To our knowledge, only one study has longitudinally evaluated the relationship between dispositional optimism and perceived growth over time, using measures collected in temporal proximity to the event. Specifically, Davis et al. (1998) found that pre–bereavement optimism predicted subsequent benefit finding after the expected death of a hospice–residing loved one, even after adjusting for other relevant covariates, including pre–bereavement psychological distress. The results of Davis et al. (1998) suggest that dispositional optimism may contribute to perceived growth following *anticipated* trauma. This research does not, however, address the issue of whether optimism also predicts posttraumatic growth following *sudden unexpected* traumatic life events. Perceived predictability has long occupied a central role in models of stress and coping (e.g., Lazarus & Folkman, 1984). Thus, there is reason to believe that perceived growth following expected and unexpected events may differ. Moreover, insofar as participants in Davis et al.'s (1998) study had not yet experienced bereavement when psychological distress was initially measured, it is not possible to determine whether optimism would have predicted perceived growth after adjusting for initial posttraumatic subjective distress. Additional research is needed to determine whether optimism predicts perceived growth independently of trauma–related distress and to address the role of dispositional

optimism in predicting perceived growth following unanticipated trauma exposure.

A final issue concerns the degree to which general life expectancies—of the sort embodied by dispositional optimism—or specific optimistic expectancies might relate to the perception of growth in the aftermath of trauma. In this vein, Carver and Scheier have contended that generalized optimistic expectancies should be the best predictors of broad outcomes, such as physical and mental health. Yet, they also acknowledge that more specific outcomes might best be explained by context–specific expectancies (Carver & Scheier, 2001; Scheier & Carver, 1985). Insofar as perceived posttraumatic growth is a specific outcome tied to a particular negative event, one would expect that context–specific optimism (e.g., the extent to which a person believes that something good can ultimately result from an experience with trauma) might emerge as an important, independent predictor of perceived posttraumatic growth. As yet, no empirical research has addressed this issue.

The broad goal of the present study was to examine the relationships among trauma severity, symptoms of trauma–related distress, generalized and context–specific optimistic expectancies, and perceived growth in survivors of community violence. Community violence is an important arena in which to examine posttraumatic growth (Tedeschi, 1999). In principle, violence exposure would seem to provide a potentially transformational experience (e.g., Janoff–Bulman, 1995; Tedeschi, 1999). Moreover, direct exposure to interpersonal violence puts individuals at a substantial risk for the development of posttraumatic distress (e.g., Brewin, Andrews, Rose, & Kirk, 1999; Riggs, Rothbaum, & Foa, 1995; Wirtz & Harrell, 1987). Yet, whereas perceived growth has been examined in a wide variety of stressful contexts, relatively few studies have examined growth in the context of violence, and no study has examined psychological distress as a predictor of growth in persons *directly* exposed to community violence.[1]

Using covariance structure modeling of data collected at two time points (i.e., shortly after the assault and three months following the initial interview), three specific questions were examined: (a) Is perceived growth primarily associated with the objective severity of trauma exposure or the degree of initial trauma–related distress, or are both factors predictive of perceived growth?; (b) Does initial dispositional optimism

1. Frazier et al. (2001) did examine perceived growth in sexual assault survivors. Yet, the focus of their study was on predicting distress from perceived growth, whereas our research is aimed at determining factors that predict perceived growth.

predict subsequent perceived growth independently of initial levels of trauma–related distress and other relevant covariates?; and (c) Is initial context–specific optimism, as distinct from dispositional optimism, uniquely predictive of subsequent perceived growth? In conducting these analyses that predict perceived growth from trauma, we simultaneously adjusted for the covariation of baseline predictors and the associations with constructs measured contemporaneously with perceived growth at follow–up.

METHOD

PARTICIPANTS

Data were collected as part of a larger study of the mental health consequences of exposure to community violence (Jaycox, Marshall, & Orlando, 2003; Marshall & Orlando, 2002; Marshall, Orlando, Jaycox, Foy, & Belzberg, 2002). Although domestic violence is an important topic in its own right, the context in which domestic violence occurs is often quite different from that associated with community violence. In particular, domestic violence is often associated with chronic traumatization, repeat victimization, and the constant psychological fear of living with one's assailant (e.g., Kaysen, Resick, & Wise, 2003). Moreover, comparatively few studies have examined the psychological aftermath of community violence resulting in serious physical injury. Between October 1998 and June 2000, research staff attempted to screen for eligibility all consecutively hospitalized persons between ages 18 and 35 who were hospitalized at a large Los Angeles Level I trauma center for treatment of blunt or penetrating injury trauma. For purposes of the current study, a community violence–related injury was defined as an injury that was inflicted by a person other than a family member or a former intimate sexual partner. Given our focus on community violence, persons whose injuries stemmed from motor vehicle crashes, accidents, or other incidents also were excluded. Participants were required to communicate fluently in either English or Spanish.

Of 653 persons screened, 423 were eligible for the study, 413 (98%) of these completed the baseline interview, and 258 (62% of baseline sample) completed both the baseline and 3–month follow–up. Attrition at the 3–month assessment did not vary as a function of basic demographic characteristics (i.e., gender, ethnicity, education, income) or analytic variables used in this study (all ps > .14).

The vast majority of the participants were male (94.0%). Participants averaged 24.3 years of age (SD = 5.60). The majority of the participants (79.1%) were of Latino ethnicity, with a smaller proportion identifying

as African–American (12.3%), Caucasian (3.3%), Asian or Pacific Islander (1.4%), Native American (0.5%), or other/biracial (3.3%). Most participants (57.1%) had not completed high school or its equivalent, 39.5% had finished high school, and 3.4% had attended/finished some college. With respect to pre–tax monthly income, 30.8% reported receiving $500 or less, 29.8% received between $501 and $1,000, 17.8% received between $1,001 and $1,500, and the remaining participants reported receiving more than $1,500. Fifty–nine percent of the sample was single, 33% was married or cohabiting, and 8.0% was separated or divorced. Fifty–nine percent had sustained injured from gunshots, while the remaining 41% of the participants had received injuries from other penetrating or blunt objects.[2]

PROCEDURES

All participants completed a face–to–face fully structured questionnaire administered by trained research assistants. In other words, interviewers read aloud questions to participants and recorded participants' answers. Interviewers were not called upon to make subjective judgments or ratings. Questionnaires were administered within several days of hospital admission (M = 7.3 days; Median = 4; Mode = 1; SD = 8.8). Participants also completed face–to–face interviews again at three months. A majority of the baseline interviews took place at the hospital (65.3%), with a smaller portion taking place at the participant's residence (24.9%) or at other community settings, such as restaurants or public parks (9.7%). All follow–up, a vast majority of interviews took place at the participant's residence, with a small number taking place in community settings. Each interview took approximately 45 to 60 min to complete. The interview covered a range of topics in addition to those relevant for the current purposes.

QUESTIONNAIRES

Questionnaires were administered in either English or Spanish, as needed. Trained research assistants determined the choice of English or Spanish administration in consultation with each participant. The decision was based on the language in which a given respondent was most

2. Given the unique sample, we assessed the degree to which contextual factors such as prior exposure to violence, gang involvement, or whether the attacker was known to the participant might have been associated with reports of perceived growth. None of these factors was associated with perceived growth.

fluent. Seventy–six percent (n = 195) of the sample completed an English–language version of the instrument, whereas the remainder were administered a Spanish version (n = 63). The Spanish version of the instrument was developed using the translation procedures described by Brislin (1970). A bilingual translator first translated each scale from English to Spanish, whereupon a second bilingual translator translated the scale back into English. Additional bilingual translators not involved in either of the initial translations helped to reconcile discrepancies. For the present purposes, analyses were based on pooled data from English– and Spanish–speaking respondents.[3]

MEASURES

Data on injury mechanism, injury site, and injury severity were extracted from computerized medical records. All other data were obtained by means of face–to–face structured questionnaires. All psychological measures were assessed at baseline as well as at three month follow–up, with the exception of perceived posttraumatic growth, which was assessed at three–month follow–up only. For all measures, descriptive statistics and reliability estimates are presented in Table 1. Correlations among the measures are presented in Table 2. With the exception of situational optimism, all constructs were measured as latent variables. Thus, correlations reflect disattenuation for measurement error.

Objective trauma severity. Objective trauma severity was measured in two ways: by the number of days the participant was hospitalized and by the (ISS; Baker, O'Neill, Haddon, & Long, 1974). The ISS is an anatomical scoring system that provides an overall score for patients with multiple injuries. Each injury is assigned a score ranging from between 1 ("minor") and 5 ("critical") and is allocated to one of six body regions (head, face, chest, abdomen, extremities, and external). Scores for the three most severely injured body regions are squared and summed to produce the ISS score. Thus, the ISS incorporates information concerning both the site and the extent of injuries into a single score ranging from 1 to 75, with higher scores reflecting lower probability of survival. Interrater reliability is generally quite high (i.e., .90; Neale, Rokkas, & McClure, 2003). For this study, ratings were made by staff trauma nurses and were abstracted from computerized medical records. The mean ISS score for this sample was 9.31 (SD = 8.67). A score of 9 is considered to be of mod-

3. In our sample, sensitivity analyses confined to English–speaking participants yielded a virtually identical pattern of findings.

TABLE 1. Descriptive Statistics for Baseline and Follow–Up Measures

	Baseline			Follow–up		
Measure	***M***	***SD***	α	***M***	***SD***	α
Injury Severity (ISS)	9.31	8.67	—	—	—	—
Days of Hospitalization	7.26	8.58	—			
Posttraumatic Stress Symptoms	37.95	13.55	.88	34.62	14.73	.93
Situational Optimism	3.15	1.50	—	3.01	1.44	—
Dispositional Optimism	20.94	3.73	.64	21.29	3.62	.65
Perceived Growth	—	—	—	33.70	8.85	.86

Note. Descriptive statistics were calculated by summing items that measure each construct. For analytic purposes, constructs were operationalized in a different manner. See text for details.

erate severity (Collopy et al., 1992). The average length of hospitalization was 7.26 days ($SD = 8.58$) and was positively correlated with ISS ($r = .53$, $p < .01$). In the covariance structural models, trauma severity was analyzed as a latent construct, with ISS and length of hospitalization as measured indicators.

Posttraumatic stress disorder symptom severity. To measure trauma–related distress, the civilian version of the Posttraumatic Stress Disorder Checklist (PCL–C; Weathers, Litz, Herman, Huska, & Keane, 1993) was used. The widely–used PCL–C contains 17 items that correspond to the three DSM–IV symptom clusters: re–experiencing (five items), avoidance/numbing (seven items), and hyperarousal (five items). This instrument has proven suitable for use in various traumatized samples and has been shown to possess solid psychometric properties across diverse groups (e.g., Andrykowski, Cordova, Studts, & Miller, 1998; Asmundson et al., 2000). At both baseline and follow–up, participants were asked to indicate the extent to which they had been bothered by each of the symptoms in the past seven days (or since the attack took place), using a 5–point scale ranging from 1 ("not at all") to 5 ("extremely"). Responses at each wave of data collection were answered with respect to the specific assault in question (e.g., "How much have you been bothered by repeated, disturbing dreams of the attack"). Although the PCL–C is a screening tool and cannot be substituted for a clinical interview in deriving a definitive diagnosis of PTSD, for descriptive purposes only, we characterized the extent of PTSD symptom severity using the PCL screening tool. At baseline, 26% of respondents met symptom—but not duration—criteria for probable PTSD as calculated using the method described by Weathers et al. (1993). At three–month follow–up, 27% met criteria for probable PTSD. Symptom severity was

TABLE 2. Correlations Among Latent Variables in the Measurement Model

Measure	2.	3.	4.	5.	6.	7.	8.
1. T1 Trauma Severity	.06	–.03	.25**	.20**	–.03	.05	.16*
2. T1 Situational Optimism	—	.11	.11	.38**	.16*	.11	.34**
3. T1 Dispositional Optimism		—	–.15	–.02	.70**	–.13	.21*
4. T1 PTSD Symptoms			—	.05	–.19*	.66**	.28**
5. T2 Situational Optimism				—	.15*	.01	.40**
6. T2 Dispositional Optimism					—	–.24**	.25**
7. T2 PTSD Symptoms						—	.25**
8. T2 Perceived Growth							—

Note. Correlations among latent variables were based on a measurement model in which all latent variables correlated freely with one another. All constructs were measured as latent variables[comma here] with the exception of situational optimism. Thus[comma here] correlations are disattenuated for measurement error. Fit statistics of this measurement model indicated a good fit ($\chi^2(204) = 265.98$[comma here] *NNFI* = .96[comma here] *CFI* = .97[comma here] *RMSEA* = .04). T1 = Time 1 (Baseline); T2 = Time 2 (three–month follow–up). *$p < .05$ **$p < .01$

also significant when expressed with respect to summed scores. That is, the average participant experienced each PTSD symptom at least "a little bit."

Prior confirmatory factor analysis of this sample suggests that the 17 items can be depicted as representing a higher–order dimension that reflects overall distress that subsumed four—rather than three—first order constructs. Specifically, as found by others (e.g., Asmundson et al., 2000; King, Leskin, King, & Weathers, 1998), avoidance and numbing emerged as empirically differentiable factors. In the covariance structural models, four separate measured indicators of trauma–related symptom severity were created by averaging across items measuring each of the four first–order constructs.

Dispositional optimism. Generalized optimistic expectancies were assessed using the Revised Life Orientation Test (LOT–R; Scheier et al., 1994). The LOT–R is composed of six statements (e.g., "In uncertain times, I usually expect the best"). Participants respond to each item, using a 5–point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Previous research using a Spanish translation of the LOT–R reported similar reliability and correlations with other measures as compared with the original English version of the LOT–R (Perczek, Carver, Price, & Pozo–Kaderman, 2000). To reduce the number of parameters to be estimated in the covariance structural models, the six items that as-

sess dispositional optimism were aggregated to create three two–item parcels, which were used as measured indicators.

Context–Specific Optimism. A single item was used to assess the extent to which participants expected positive outcomes as a result of their exposure to community violence. Participants were posed a single question: "When you think about the attack and why it happened, how much do you think that anything good or positive can ever come from what happened?" Answers were provided on a 5–point scale ranging from 1 ("not at all") to 5 ("extremely"). In the covariance structural models, this item was used as a single–item index of situation–specific optimism.

Perceived Posttraumatic Growth. At the three–month follow–up interview, perceived growth resulting from the attack was assessed using items drawn from the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The PTGI is a 21–item scale that assesses perceived growth in five domains: *new possibilities*, *relating to others*, *personal strength*, *appreciation of life*, and *spiritual change*. Although the five domains have been shown to be separable using factor analysis (Tedeschi & Calhoun, 1996), the PTGI is typically scored as a unidimensional measure of posttraumatic growth. To minimize respondent burden, previous factor analyses (Tedeschi & Calhoun, 1996) informed our selection of 11 PTGI items for administration to our sample (three items from *relating to others* and two from each remaining domain). Item wording was modified slightly to facilitate administration to this sample. For example, the original statement, "New opportunities are available which wouldn't have been otherwise," was changed to the question, "Since the attack, how much did you change in seeing new opportunities that wouldn't have been available otherwise?" Participants answered each item using a 5–point scale ranging from 1 ("not at all") to 5 ("extremely"). In the covariance structural models, items representing each of the five domains of growth were averaged together to create five measured indicators, and growth was modeled as a single latent construct.

DATA ANALYTIC OVERVIEW

Covariance structural modeling that used the EQS structural equation modeling (SEM) program (Bentler, 1995) was the primary method of examining relationships among the measures. Maximum likelihood estimation was used with raw data as input. In SEM, hypotheses are translated into a series of regression equations that are solved simultaneously in order to generate an estimated covariance matrix. The estimated covariance matrix is then compared with the sample covariance matrix to assess the adequacy of the underlying hypothesized model in

accounting for the covariation among the measures in the sample. As noted earlier, one advantage of covariance structural modeling is that the relationships among latent variables are disattenuated for measurement error.

To assess the adequacy of model fit, we followed the recommended strategy of relying upon multiple fit indices (Marsh, Balla, & McDonald, 1988). These indices included the chi–square (χ^2) to degrees of freedom ratio, the non–normed fit index (NNFI; Bentler & Bonnet, 1980), the comparative fit index (CFI; Bentler, 1990), and the root mean squared error of approximation (RMSEA; Browne & Cudeck, 1993). Because the χ^2 value can be significant in large models even if the discrepancies between the actual and estimated covariance matrices are trivial, a conservative rule for assessing goodness–of–fit is that the χ^2 value should be no greater than twice the associated degrees of freedom (Bollen & Long, 1993). By convention, incremental fit indices (i.e., NNFI, CFI) above .90 signify good model fit. RMSEA values lower than .08 signify acceptable model fit, and values lower than .05 signify good model fit (Browne & Cudeck, 1993).

RESULTS

MEAN REPORTS OF POSTTRAUMATIC GROWTH

Across the 11 items that assessed posttraumatic growth, the mean response on the 5–point scale was 3.06 (SD = .80), corresponding to "a moderate amount." The extent of reported growth varied somewhat across domains, with the greatest amount of growth reported in the areas of *appreciation of life* (M = 3.75, SD = 1.04) and *personal strength* (M = 3.25, SD = 1.03), and somewhat less growth reported in the areas of *spiritual change* (M = 2.98, SD = 1.36), *relating to others* (M = 2.82, SD = .96), and *new possibilities* (M = 2.63, SD = 1.05).

To examine whether the forms of perceived growth may have differed according to ethnicity (Latino versus other) or language of administration, multivariate ANOVA's were conducted with the five domains of growth as the dependent measures. Neither ethnicity (p = .18) nor language (p = .11) had significant effects on the degree of posttraumatic growth reported across domains.

COVARIANCE STRUCTURAL MODELING

Our modeling strategy involved two general steps. First, we developed a baseline measurement model in which constructs measured at both time points were included (i.e., general optimism, situation–specific op-

timism, trauma–related distress), in addition to trauma severity. This model allowed all within–wave constructs to freely correlate and included only structural paths that predicted follow–up measures from their baseline counterparts (e.g., baseline distress predicting follow–up distress). As part of the process of developing a measurement model, we imposed cross–wave equality constraints on the unstandardized factor loadings for corresponding indicators of dispositional optimism and trauma-related distress. This modification proved tenable, $\chi^2_{change}(5) = 7.18$, ns. An additional modification involved the inclusion of four correlations among error terms of identical items assessed at different waves (i.e., autocorrelations). Addition of these parameters significantly improved model fit, $\chi^2_{change}(4) = 55.38$, $p < .01$; *NNFI* = .97, *CFI* = .97, *RMSEA* = .03. Further, in a separate specification, we also tested the hypothesized measurement model of the perceived posttraumatic growth construct. The initial growth measurement model provided a good fit according to some indices (*NNFI* = .91, *CFI* = .95), but not others ($\chi^2(5) = 22.25$, *RMSEA* = .12). Therefore, in order to account for some multidimensionality among the growth indicators, two correlations were added between two pairs of indicators (appreciation of life – new possibilities; personal strength – spiritual change), which significantly improved the fit of the growth measurement model, $\chi^2_{change}(2) = 17.64$, $p < .001$; *NNFI* = .99, *CFI* = 1.00, *RMSEA* = .05. Standardized factor loadings for each of the latent constructs are presented in Table 3.

In a second modeling step, we examined structural relations among constructs of interest. We were specifically interested in examining the degree to which three–month perceived growth could be predicted by each of the other measures in the model. Thus, three–month growth was added to the model, as well as paths predicting perceived growth from all other baseline and follow–up latent measures. The strategy of allowing perceived growth at three months to be predicted by other constructs also measured at 3–month follow–up was intended solely as a stringent test of the unique relationship between baseline measures and subsequent growth by taking into account any contemporaneous associations among constructs measured at 3–month follow–up. If a relationship between any baseline measure and subsequent perceived growth remained significant even after controlling for contemporaneously measured constructs then we could be reasonably certain that relationship could not be attributed merely to the stability of constructs (e.g., dispositional optimism) over the 3–month span.

This preliminary prediction model fit the data well, $\chi^2(213) = 283.78$, *NNFI* = .96; *CFI* = .96, *RMSEA* = .04. Yet, there were a number of non–significant structural paths that could be removed to improve the parsi-

TABLE 3. Standardized Factor Loadings for Latent Variables in the Measurement Model

		Factor Loading	
Latent Variable	**Indicator**	**At Baseline**	**At Follow–up**
Trauma Severity	Injury Severity Score	.95	–
	Length of Hospital Stay	.56	–
Optimism	LOT–R – Parcel 1*	.77	.77
	LOT–R – Parcel 2**	.58	.59
	LOT–R – Parcel 3***	.54	.54
PTSD	PCL–C – Reexperiencing	.76	.87
	PCL–C – Avoidance	.62	.73
	PCL–C – Numbness	.68	.82
	PCL–C – Arousal	.76	.81
Perceived Growth	PTGI – New possibilities	—	.75
	PTGI – Relating to Others	—	.64
	PTGI – Personal Strength	—	.66
	PTGI – Appreciation of Life	—	.66
	PTGI – Spiritual Change	—	.56

Note. All parameter estimates are significant at $p < .001$. Analogous factor loadings are constrained to be equal, in the unstandardized model, across the two time points. Thus, differences from baseline to follow–up in the reported standardized loadings are due to differences in the variances of the indicator variables at each time point, rather than differences in the factor loadings. *Contains LOT–R items "I usually expect the best to happen" and "I hardly ever expect things to go my way" (reverse–scored). **Contains LOT–R items "If something can go wrong for me, it will" (reverse–scored) and "I almost never count on good things happening to me" (reverse–scored). ***Contains LOT–R items "I am always optimistic (hopeful) about my future" and "Overall, I expect more good things to happen than bad."

mony of the model. These paths included parameters such as within–wave correlations between constructs and regression paths predicting the 3–month perceived growth. Multivariate Wald tests were used as the basis for successively removing nonsignificant ($p > .05$) structural paths, up to the point at which all remaining structural parameters differed significantly from zero. In all, three correlations among baseline constructs, three correlations among follow–up constructs, and three regression paths predicting 3–month perceived growth were removed from the model. Removal of these non–significant parameters did not adversely affect the fit of the model, χ^2_{change} (9) = 15.16, $p = .09$. Further, the resultant model (see Figure 1) provided a good representation of the covariation among the observed measures according to all fit indices, $\chi^2(222) = 298.94$, *NNFI* = .96, *CFI* = .96, RMSEA = .04.

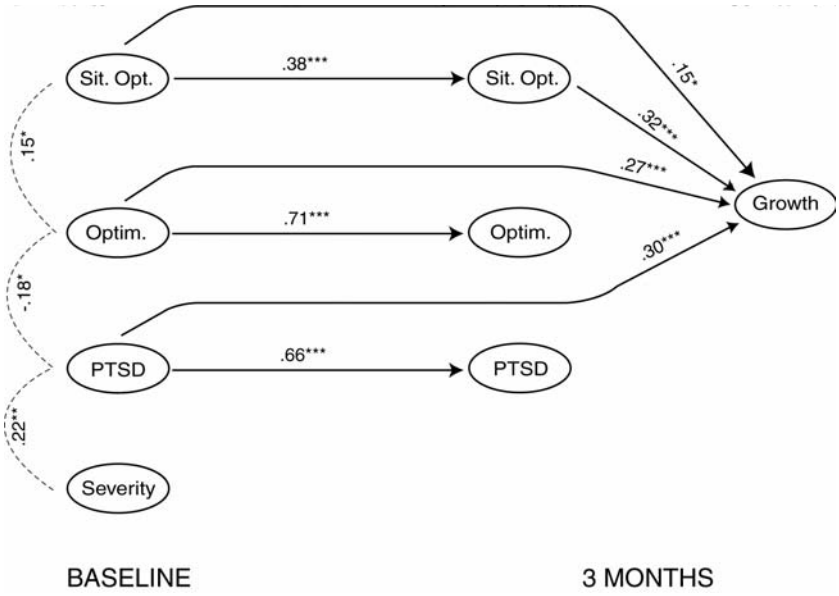

FIGURE 1. Model representing significant predictors of perceived posttraumatic growth at 3 months, with standardized path coefficients. Solid lines represent significant regression paths; dashed lines represent significant within-wave correlations among latent mea-

As shown in Figure 1, perceived growth was significantly and independently predicted by the baseline measures of trauma–related distress ($\beta = .30$, $p < .001$), dispositional optimism ($\beta = .27$, $p < .001$), and situation–specific optimism ($\beta = .15$, $p < .05$). All constructs were positively associated with perceived growth, such that reported posttraumatic growth increased as a function of initial dispositional optimism, situation–specific optimism, and trauma–related distress. In particular, trauma–related distress at baseline was positively associated with perceived growth at follow–up, consistent with Tedeschi and Calhoun's (1995; Tedeschi, 1999) speculation that persons who experience the most trauma–related distress are those most likely to report perceived posttraumatic growth. By contrast, objective trauma severity as measured by injury severity scores and length of hospitalization was not significantly associated with subsequent perceived growth. Notably, baseline constructs were significantly and uniquely predictive of subsequent perceived growth after adjusting for follow–up dispositional optimism, situation–specific expectancies, and trauma–related distress. In fact, after controlling for baseline measures of trauma–related distress and dispositional optimism, these constructs at follow–up were not signifi-

cantly associated with perceived posttraumatic growth. The latter finding suggests that it is initial levels of these constructs, rather than changes over time, which predict subsequent perceived growth.

DISCUSSION

This study employed covariance structural modeling of longitudinal data to address key questions concerning factors associated with perceiving growth in the aftermath of trauma exposure. Three key issues were examined. First, we examined whether perceived growth is best viewed as varying in response to the degree of objective event severity or initial subjective distress. Second, we evaluated whether dispositional optimism independently predicted perceived growth after adjusting for other relevant factors, including baseline trauma–related distress and objective injury severity. Finally, we examined the hypothesis that context–specific optimism—as distinct from dispositional optimism—would contribute uniquely to subsequent perceptions of growth.

With respect to the first issue, the results clearly demonstrate that perceived posttraumatic growth varies as a function of initial subjective trauma–related distress. Consistent with Tedeschi (1999; Tedeschi & Calhoun, 1995), the more serious the initial psychological distress, the greater the perceived growth. By contrast, objective injury severity had no relationship to perceived growth. In other words, posttraumatic growth is associated with the degree of psychological disruption—as measured by posttraumatic distress—rather than with objective injury severity. Further, perceived growth at follow–up was significantly predicted by baseline trauma–related distress, but not by trauma–related distress at follow–up. Individuals who are most symptomatic shortly after trauma exposure are among those most likely to report personal growth at 3–month follow–up. This finding is important to emphasize inasmuch as past research on interpersonal violence has tended to focus solely on the negative influence of initial symptoms of posttraumatic distress on subsequent psychological adjustment (e.g., Brewin et al., 1999; Shalev, Peri, Canetti, & Schreiber, 1996). Therefore, initial posttrauma distress may have two quite different long–term effects. On the one hand, it may place a person at greater risk for subsequent distress. However, initial distress also may create the potential for subsequent development of posttraumatic growth.

On a related issue, symptomatic distress at follow–up was not significantly associated with perceived growth after adjusting for initial trauma–related distress, which suggests that posttraumatic growth is not merely the converse of posttraumatic distress. This finding, taken to-

gether with inconsistencies in previous studies that have examined concurrent associations between distress and growth (see Park, 1998, for review), suggests that the relationship between posttraumatic growth and concurrent distress may vary over the course of adjustment, or that posttraumatic growth may show stronger concurrent relationships with particular measures of adjustment and well–being. With regard to the first possibility, Park (2004) has posited that soon after the occurrence of a traumatic event, people with more distress may be likely to report a greater degree of growth as a result of the greater total impact of the event on their lives. However, as time passes, the relationship between growth and concurrent distress may begin to attenuate and even reverse, as perceptions of growth may begin to mitigate the otherwise deleterious effects of trauma on psychological well–being. In our study, we assessed growth at only the follow–up interview, so we were unable to observe the degree to which the concurrent relationship between growth and distress might vary over time. However, future research could benefit by examining whether the relationship between growth and adjustment itself may be a function of the time frame in the coping process. With regard to the second possibility, our study used PTSD symptomatology as the measure of distress, but other studies have used measures ranging from depression and anxiety (e.g., Frazier et al., 2001; Mohr et al., 1999; Updegraff et al., 2002) to more positive measures of well–being, such as positive affect, self–esteem, and life satisfaction (e.g., Curbow et al., 1993; Fromm et al., 1996; McMillen et al., 1995; Park et al., 1996; Tomich & Helgeson, 2002). Some evidence suggests that growth may be more strongly related to positive than to negative mental health outcomes (Curbow et al., 1993; Park et al., 1996; Fromm et al., 1996; Park & Fenster, 2004; Tomich & Helgeson, 2002) or that it may be more strongly tied to depressive than to anxious or PTSD–related symptomatology (Frazier et al., 2001; Updegraff et al., 2002; but see Mohr et al., 1999, for an exception). Thus, it is possible a stronger association with perceived growth may have emerged with the use of other adjustment measures at follow–up. Lastly, because the focus of our study was on identifying the predictors—rather than the potential consequences—of posttraumatic growth, we did not examine the degree to which perceiving growth might have been predictive of longer–term adjustment. However, other studies (e.g., Davis et al., 1998; McMillen et al., 1997) have found the derivation of growth to be linked to better *subsequent* adjustment. Thus, although our results strongly suggest that the people who are most likely to perceive posttraumatic growth following community violence are those who experience the greatest amount of initial distress, they also point to the need for further research in

understanding the potential role that perceptions of growth and benefit may play in the adjustment process.

With respect to the second broad issue of this study, these data implicate dispositional optimism as playing a unique role in the process of perceiving growth following trauma exposure. In particular, initial optimism significantly predicted subsequent growth, even after adjusting for optimism that was measured contemporaneously with perceived growth. Thus, our results are consistent with Davis et al.'s (1998) finding of an association between early optimism and later benefit finding. They also point to a more specific, independent role of early optimism in predicting subsequent reports of perceived growth. With regard to the third issue, these findings are consistent with the proposition that context–specific optimism—as distinct from dispositional optimism—contributes uniquely to subsequent perceptions of personal growth. In other words, perceived growth varies as a function of the degree to which individuals initially expect that something positive will occur as the result of exposure to adversity. The latter finding is consistent with the recent suggestion that greater attention be directed at matching expectations to the specific outcome of interest (Carver & Scheier, 2001). Whereas the current findings suggest that the impact of context–specific optimism is relatively modest, its emergence has significant practical as well as theoretical ramifications. At least in principle, context–specific expectancies might be readily modifiable, thus serving as a leverage point for clinical interventions with traumatized persons. By contrast, dispositional optimism—although also associated with perceived growth—may be less amenable to intervention efforts.

In interpreting study findings, it is essential to highlight some issues that require additional research. First, this investigation focused on a sample of relatively young, urban, male, and Latino survivors of community violence. Moreover, this sample was of modest socioeconomic status, with comparatively low levels of education. A number of past studies have shown that perceptions of growth may be less common for males than for females (Park et al., 1996; Ryff & Keyes, 1995; Tedeschi & Calhoun, 1996), for people with lower education and socioeconomic status (Cordova et al., 2001; Davis et al., 1998; Updegraff et al., 2002), and for people responding to events that represent malicious acts of others as compared with impersonal events such as natural disasters (McMillen et al., 1997). Despite these qualifications, the present sample did report moderate levels of growth, particularly in the domains of appreciation for life, personal strength, and spiritual change. Although some researchers have speculated that the particular form of growth perceptions can be shaped by one's ethnic and cultural context (cf. Abraído–Lanza, Guier, & Colón, 1998), in our study we did not find any

evidence that Latinos or Spanish–speakers differed from non–Latinos or English–speakers in terms of the degree or types of growth reported (for similar findings, see also Frazier et al., 2001; Siegel & Schrimshaw, 2000; and Updegraff et al., 2002). Nonetheless, additional research is needed to determine whether our pattern of findings might be attributable to cultural differences in the meaning of optimism in our largely Latino sample.[4] Although our sample limits the generalizability of our findings, this focus on a largely Latino sample also can be viewed as a strength inasmuch as most research on deriving growth from adversity has tended to focus on non–minority samples. In acknowledging these limitations in generalizing the prevalence of growth reported by our participants to other traumatized samples, we should emphasize that we are not aware of any existing research that suggests our findings regarding the relationships among event severity, subjective impact, optimism, and growth should differ for other samples. In any event, future research is needed to determine the generalizability of our findings to women, as well as to persons with a broader range of ethnicities, cultural factors, ages, and types of trauma exposure.[5]

Moreover, this study focused on a specific type of posttraumatic distress—symptoms of PTSD. Although the PTSD symptom severity of this sample was notable, additional research might examine other types of distress (e.g., symptoms of depression). In addition, although our study was longitudinal in nature, our research design precluded gathering true pretrauma exposure measures of dispositional optimism. However, we note that injury severity was not significantly correlated with dispositional optimism, which suggests that trauma exposure did not substantially influence responses to this dispositional measure. Nonetheless, to the degree that our post–exposure dispositional measures might have been influenced by trauma exposure, future research employing true pretrauma measures is needed.

An additional shortcoming of this study is the reliance on a single–item measure of context–specific optimism. One might wonder, in particular, whether this measure is merely a proxy index for perceived growth from trauma. That is, because there was variation in the elapsed time to initial interview, our measure of context–specific optimism actually might reflect growth processes already underway by the initial assessment. As a preliminary examination of this possibility, we examined the relationship between context–specific optimism and elapsed time

4. We thank an anonymous reviewer for raising this issue.
5. See footnote 2.

from hospitalization to initial interview. If elapsed time to interview already had influenced growth processes, then one might expect to find a significant correlation between elapsed time and context–specific optimism. This was not the case, however, $r = .08$, $p = .17$. A final limitation of our study is our reliance on a modest degree of post–hoc model fitting to achieve good fitting models. In this instance, post–hoc modifications generally were limited to including conceptually and empirically expected parameters (e.g., autocorrelations among error terms for measured indicators across multiple measurements). Nonetheless, to the degree that our findings might have capitalized on chance (Quintana & Maxwell, 1999), additional research is indicated.

In sum, our findings indicate that perceived growth in the aftermath of trauma is related to both optimistic expectations and experienced distress in the days immediately following trauma exposure. First, initial subjective posttraumatic distress—rather than objective event severity—appears to play an important role in determining the degree to which people subsequently view a traumatic event as having a positive effect on themselves and their lives. To put it simply, individuals who suffer the most initially may be those who have the most ultimately to gain from adversity (Tedeschi & Calhoun, 1995). Second, both dispositional optimism and context–specific optimism measured shortly after a traumatic event emerge as independent predictors of subsequent growth. Given that recent interventions have successfully reduced distress in traumatized women by increasing both optimistic expectancies and perceived benefits (Antoni et al., 2001), context–specific expectancies may be especially important to study as determinants of posttraumatic growth because they may be more amenable than dispositional expectancies to change via therapeutic interventions.

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