

# **Optimism, Social Support, and Coping Strategies As Factors Contributing to Posttraumatic Growth: A Meta-Analysis**

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*This meta-analytic review examines the role of optimism, social support, and coping strategies in contributing to posttraumatic growth. Results from 103 studies showed that all three systems of variables yielded significant effect sizes. Religious coping and positive reappraisal coping produced the largest effect sizes. Social support, seeking social support coping, spirituality, and optimism were moderately related to posttraumatic growth. Acceptance coping yielded the smallest effect sizes. Moderator analyses showed that effect sizes did not differ according to time elapsed since trauma, gender, and type of posttraumatic growth measure (post-traumatic growth vs. benefit finding). Age and gender were significant moderators of religious coping, whereas study design (longitudinal vs. cross-sectional) significantly moderated the effect of positive reappraisal coping. Implications for research and interventions on posttraumatic growth are also discussed.*

The idea that trauma or life crises may lead to positive changes has been suggested in ancient literature, philosophy, and religion. In social science, this phenomenon has been systematically investigated only in the past 15 to 20 years (Calhoun & Tedeschi, 2006). Many instruments have been validated for the assessment of several domains of growth, such as increased spirituality, self-understanding, belongingness, personal strength, appreciation

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of one's life, and quality of relationships (Calhoun & Tedeschi, 2006; Joseph & Linley, 2006; Zoellner & Maercker, 2006). The last decade has been a very prolific period for the theoretical and empirical research in this field, as recent narrative reviews attest (see reviews by Joseph & Linley, 2006; Linley & Joseph, 2004; Stanton, Bower, & Low, 2006; Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2006). Helgeson, Reynolds, and Tomich (2006) conducted the first meta-analysis in this area, investigating the relation between benefit finding and health outcomes. In the literature, a recurrent question concerns the factors that contribute to posttraumatic growth. Narrative reviews have produced inconsistent findings (Linley & Joseph, 2004; Stanton et al., 2006; Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2006). Given that results on the relationships among optimism, social support, and adaptive coping strategies and posttraumatic growth have been inconsistent, the aim of this meta-analysis is to explore these relationships.

Scheier and Carver (1985) have defined optimists as people who "generally believe that good rather than bad things will happen to them" (p. 219). Dispositional optimism, or the generalized expectancy for positive outcomes, is a particularly interesting resource variable in the present context for three reasons. First, optimistic persons might be more inclined than pessimists to derive a sense of benefit from adversity (Tennen & Affleck, 1998). Second, it is known that optimism is not related to rigid patterns of coping strategies, irrespective of stressor type. In fact, optimism is related to flexible use of adaptive coping strategies with regard to the controllability of stressors (Solberg Nes & Segerstrom, 2006). Third, optimism is considered a predictor of perceived capability to manage the demands of a potentially traumatic event (Benight & Bandura, 2004).

Social support is considered a key environmental resource in Schaefer and Moos's (1998) conceptual model for understanding positive outcomes of life crises and transitions. In addition, Tedeschi and Calhoun's (2004) revised model of posttraumatic growth includes social support as a predictor of positive change in the aftermath of traumatic events. According to Schaefer and Moos (1998), social support may be a precursor of personal growth by influencing coping behavior and fostering successful adaptation to life crises. It should be noted that seeking social support may be distinct from receiving or perceiving social support. It may be that seeking social support improves social resources by providing sympathy or reduces the individual's feelings of isolation and loneliness. Although there is some suggestion that social support and seeking social support coping may promote posttraumatic growth (Schaefer & Moos, 1998; Tedeschi & Calhoun, 2004), these findings are mixed (Linley & Joseph, 2004).

In addition to seeking social support, in this meta-analysis we focused on three coping strategies that are thought to be adaptive according to Zoellner and Maercker's (2006) review and Pargament, Koenig, and Perez's (2000) definition of methods of religious coping. Among coping factors,

Zoellner and Maercker's (2006) review emphasized the potentially functional effects of acceptance coping and reappraisal coping. Zoellner and Maercker (2006) suggested that the ability to accept situations that cannot be altered is crucial for adaptation to uncontrollable or unchangeable events. Reappraising the crisis in a more positive light is one path to the emergence of posttraumatic growth (Schaefer & Moos, 1998; Zoellner & Maercker, 2006).

Finally, given that many people cope with potentially traumatic events by means of religion or spirituality (Pargament et al., 2000), it is interesting to test its effect on posttraumatic growth. Many studies show a relationship between health and global religious indices, such as prayer, church attendance, and self-rated religiousness and spirituality (for reviews, see Koenig, McCullough, & Larson, 2001; Pargament, 1997). Pargament (1997) maintained that the effect of religiousness on health may be explained by the use of specific religious beliefs and practices. Thus, religious coping methods may represent one promising candidate that mediates the relationship between religiosity and health. In this meta-analysis, we analyze the effect of both religiousness and religious coping on posttraumatic growth. If religious coping is a mediator, its effect size should be higher than the effect size of religiousness because it is more proximal to the outcome. In Ano and Vasconcelles's (2005) meta-analysis on the relationship of situation-specific religious coping methods with psychological adjustment to stress, the effect of religiousness was not considered. In this meta-analysis, positive religious coping was significantly related ( $r = .33$ ) to positive adjustment to stress, although this outcome was not specific to posttraumatic growth.

It should be noted that optimism, positive reappraisal, spirituality, and acceptance coping were found to be related to posttraumatic growth in Helgeson et al.'s (2006) meta-analysis. However the analysis was based on a small sample of studies (optimism  $k = 11$ , positive reappraisal  $k = 7$ , acceptance coping  $k = 7$ , spirituality  $k = 8$ ). According to Field (2003a), there are problems in the accuracy of effect sizes when there are fewer than 20 studies in the meta-analysis.

We speculated that these sets of variables might promote posttraumatic growth by encouraging favorable appraisals of threat, by influencing health behavior, by reinforcing adaptive personal resources (e.g., hardiness, mastery, self-efficacy), and by fostering the process of making sense of the event. Moreover, the positive effect of optimism and social support on posttraumatic growth could be explained by recourse to adaptive coping strategies (Schaefer & Moos, 1998; Tennen & Affleck, 1999; Zoellner & Maercker, 2006). It is hypothesized that adaptive coping is based on perceived self-efficacy beliefs that could lead to positive adaptation as a self-fulfilling prophecy. According to the social cognitive theory of posttraumatic recovery, a strong sense of coping efficacy strengthens resiliency to adversity (Benight & Bandura, 2004).

It should be noted, however, that the variables we took into account are not the only potential predictors of posttraumatic growth. For example, demographic variables (age, sex, and socioeconomic status), stressor characteristics (stressor type, objective severity, perceived threat or stress, and time since event), self-esteem, positive affect, negative affect, intrusive-avoidant thoughts, global distress, and life satisfaction may be all related to positive changes. Given that they were taken into account in Helgeson et al.'s (2006) meta-analysis using an adequate sample of studies ( $k > 20$ ), they will not be considered here.

We examined five moderators of relations with posttraumatic growth. The studies taken into account were highly dissimilar in terms of research methods, instruments, time since the event, and participants' age and gender, all of which are potential moderators. With the exception of research methods, we did not have any predictions here; therefore, these analyses are exploratory. The use of the phrase "factors contributing to growth," rather than correlates, refers to the theoretical model proposed by Schaefer and Moos (1998). It is important to know whether longitudinal versus cross-sectional studies might produce different relations among psychosocial variables and growth. If these factors are correlates rather than determinants, we expect relations to posttraumatic growth to be stronger in cross-sectional studies than in longitudinal ones. Therefore, in moderator analyses, we examined the potential differences between longitudinal and cross-sectional studies.

## METHOD

### Literature Search

Pertinent studies were initially identified through four major database searches—MEDLINE, PsycINFO, PILOTS, and ERIC—for research published between 1990 and 2006. Keywords entered were posttraumatic growth, posttraumatic growth, benefit finding, perceived benefit, perception of benefits, stress-related growth, positive by-products, positive life change, adversarial growth, and thriving. Moreover, the reference lists of five recent narrative review articles on posttraumatic growth and benefit finding (Joseph & Linley, 2006; Linley & Joseph, 2004; Stanton et al., 2006; Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2006) were searched to discover additional articles.

Lipsey and Wilson (2001) argued that unpublished material can be as rigorous as the published literature and that the decision to exclude unpublished studies may introduce an upward bias of effect sizes. To avoid publication bias, three strategies were used. First, we performed a Web search with the previously cited keywords using Google Scholar (<http://scholar.google.com/>). Second, we contacted the authors of PhD dissertations on these

issues. Third, we contacted the leading authors in this field asking for unpublished studies.

### Inclusion Criteria

Studies were included if they (a) measured positive change as a result of exposure to a stressful event, (b) provided an estimate of the relationship of posttraumatic growth to one of several variables (optimism, social support, active coping, seeking social support coping, religious coping, acceptance coping, and positive reappraisal), and (c) provided the necessary statistical information to compute effect sizes.

In cases of different studies reporting analyses from the same sample, we chose the study reporting estimates from longitudinal data that considered the longest period or the largest sample. We excluded the other studies unless they provided estimates for different constructs.

We identified 211 studies, and 157 of them met the criteria for inclusion. Among these studies, 103 measured one of the previously mentioned factors and were included in the analysis. These selected studies are marked in the reference list with asterisks. A table containing the list of the studies and their characteristics is available at [http://emergenze.psice.unibo.it/table\\_studies.pdf](http://emergenze.psice.unibo.it/table_studies.pdf).

### Variables Coded From Each Study

The following general characteristics were coded from each study: (a) year of publication, (b) source of publication (journal article, poster, speech/meeting paper, book chapter, doctoral dissertation), (c) research design (longitudinal or cross-sectional), (d) number of participants, (e) participants' gender and mean age, (f) type of critical event experienced, (g) length of time elapsed between event and growth assessment, and (h) type of growth assessment. Sears, Stanton, and Danoff-Burg (2003) stated that benefit finding and posttraumatic growth represent related but distinct constructs. This was considered in moderator analyses, where instruments were divided into the Benefit Finding Scale (Antoni et al., 2001; Mohr et al., 1999; Tomich & Helgeson, 2004) and Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996) together with the Stress-Related Growth Scale (Armeli, Cimbolic Gunthert, & Cohen, 2001; Park, Cohen & Murch, 1996).

When results from two or more religious coping subscales were available, as in the case of RCOPE (Pargament et al., 2000), a positive religious coping subscale was chosen because, according to Pargament et al. (2000), it is important to distinguish between potentially functional and dysfunctional forms of religious coping. The differential contribution to effect sizes of general religious coping and positive religious coping was taken into account in moderator analyses.

Optimism measures were derived from the Life Orientation Test (LOT; Scheier & Carver, 1985) or the Life Orientation Test–Revised (LOT-R, Scheier, Carver, & Bridge, 1994). Zoellner and Maercker (2006, p. 645) observed:

When the old version of the LOT was employed, optimism was related to PTG. Using the revised version, however, optimism was not related to PTG (Tennen & Affleck, 1998). The reported correlations between dispositional optimism measured by the LOT and posttraumatic growth may have simply been due to overlapping measures, since two of the original items of the optimism scale measured the ability to extract positive value from negative circumstances.

We took into account this possibility in the moderator analyses.

Spirituality measures included intrinsic religiousness, religious affiliation and participation, identification with a religion, spiritual/religious orientation, and religious belief. Social support measures were derived from constructs such as received support, perceived support, and satisfaction with social support. We excluded seeking social support coping measures because, in the papers reviewed, they were derived from subscales of coping inventories. Also excluded were social network measures because, according to Sarason et al. (1983, p. 137), “the variables—perceived number of supports and satisfaction with supports—were demonstrated to be two rather separate aspects of the general concept. The studies reported here show that both these factors need to be considered separately in future research.” Social support may be understood in different ways (e.g., instrumental, emotional), and it is necessary to distinguish these specifically. However, almost all of the studies included in this meta-analysis employed scales that do not distinguish between different forms of social support. Usually, the researchers computed a total score for these categories, and thus it is impossible for us to obtain a separated effect size for each. Most of the scales used in the included studies employed perceived social support measures. Given that perceived social support measures evaluate recipients’ perceptions concerning the general availability of support or global satisfaction with support provided (Sarason, Sarason, & Pierce, 1990), we distinguished the effect of perceived social support according to this differentiation.

### Computation and Analysis of Effect Sizes

The procedure we employed in this meta-analysis can be summarized as follows. First, primary effect sizes were calculated using either Excel macros or formulas provided by Lipsey and Wilson (2001). Pearson’s  $r$  was the effect size metric used, and therefore all of the statistics were converted to the correlation coefficient  $r$ . We combined results from multiple measures of the same constructs using DeCoster’s (2004) guidelines in order to obtain a single

effect size for each construct in each study. For multiple regression analyses, we contacted the authors to obtain original correlation coefficients. In the case of nonresponse, beta coefficients were converted into Pearson's  $r$  using the formula provided by Peterson and Brown (2005).

Second, we analyzed the distribution of effect sizes with stem-and-leaf plots. Third, we analyzed outliers, examining studies yielding extreme values (more than 3 standard deviations from all the effect sizes). These studies were examined after the fact to establish if they differed methodologically from the other studies. If there were no differences, we employed the Windsorizing procedure; in other words, we recoded the extreme value to the value at 3 standard deviations from the mean as recommended by Lipsey and Wilson (2001).

Fourth, we calculated basic central tendency statistics. We conducted homogeneity analyses of primary effect sizes using the chi-square of heterogeneity test ( $df = k - 1$ ) and the  $I^2$  statistic. These tests specify the amount of heterogeneity (Higgins & Thompson, 2002). Percentages of around 25% ( $I^2 = 25$ ), 50% ( $I^2 = 50$ ), and 75% ( $I^2 = 75$ ) represent low, medium, and high heterogeneity, respectively. We calculated mean effect sizes and confidence intervals using a conditional random-effects approach (Hedges & Vevea, 1998). A Monte Carlo simulation showed that this approach is more effective with unreliable between-study variance estimates if the number and size of the studies are small (Van den Noortgate & Onghena, 2003). In this procedure, the use of the fixed- or random-effects approach is conditional on the homogeneity analysis. When there were no significant differences between effect sizes, we conducted a fixed-effects analysis. If homogeneity was rejected, we used random-effects analysis procedures. We decided to employ Hedges and Vevea's (1998) method because, according to Field (2003b), this procedure controls the Type I error rate better than the Hunter-Schmidt method (2000) when the number of studies is not large ( $k = 20-40$ ).

Effect sizes were converted into a standard normal metric (using Fisher's  $r$ -to- $Z$  transformation), and then we calculated a weighted average of these transformed scores using the inverse variances of each study (for fixed effects) or a variance component that incorporated between-study variance in addition to the within-study variance used in the fixed-effect model (for random effects) (Field, 2001). After being weighted and aggregated, Fisher's  $r$ -to- $Z$  converted scores were transformed back to  $r$  values. We used Cohen's guidelines (as cited in Lipsey & Wilson, 2001) for interpreting the magnitude of effect size correlations (small effect size,  $r \leq .10$ ; medium effect size,  $r = .25$ ; large effect size,  $r \geq .40$ ).

Fifth, we analyzed the file-drawer problem using Orwin's (1983) fail-safe  $N$  for Cohen's small effect size (0.1). Finally, we conducted moderator analyses. In the case of significantly heterogeneous effect size distributions, we examined the significant effects of moderators through single-factor

ANOVAs and multivariate linear regression analyses (assuming mixed effects models [random effects] as described by Overton, 1998). These analyses were performed to investigate the moderator variables that might account for excess variability among effect sizes. We estimated the model using full-information maximum likelihood methods, as implemented in macros developed for this purpose by Lipsey and Wilson (2001).

## RESULTS

The distribution of effect sizes for the predictor variables is shown in Table 1. Analysis of outliers revealed one study with an extreme value, the effect size of social support reported in the study of Borja, Callahan, and Long (2006). We decided to employ the Windsorizing procedure.

Results of the basic central tendency statistics and publication bias analyses are presented in Table 2. The variance in all of the effect sizes, with the exception of seeking social support coping, was heterogeneously distributed and could not be accounted for by sampling error alone, as evidenced by highly significant  $Q$  values. In addition, according to the  $I^2$  statistic, most of the variables showed high heterogeneity. Therefore, all of the effect sizes, with the exception of seeking social support coping, were calculated via the random-effects model.

All effect sizes were highly significant. Religious coping and positive reappraisal coping were strongly correlated with growth. Social support, seeking social support coping, spirituality, and optimism were moderately related to positive changes. Acceptance coping yielded the smallest significant effect size.

The file-drawer problem analysis showed that the fail-safe  $N$  for acceptance coping was small. The other factors seemed to be robust to the file-drawer problem.

Table 3 provides results from the moderator analyses of age, gender (percentage of women), research design (cross-sectional vs. longitudinal), measurement type (posttraumatic growth vs. benefit finding measures), and time elapsed since the event.

Moderator analyses for positive reappraisal coping ( $R^2 = .37$ ;  $Q_{\text{MODEL}} = 13.63$ ,  $df = 5$ ,  $p = .03$ ;  $Q_{\text{RESIDUAL}} = 21.84$ ,  $df = 17$ ,  $p = .19$ ) and religious coping ( $R^2 = .60$ ;  $Q_{\text{MODEL}} = 42.57$ ,  $df = 6$ ,  $p = .001$ ;  $Q_{\text{RESIDUAL}} = 27.90$ ,  $df = 19$ ,  $p = .08$ ) explained the variance in the primary effect sizes and indicated that the remaining variability across effect sizes was rather homogeneous. Moderator analyses for social support ( $R^2 = .11$ ;  $Q_{\text{MODEL}} = 3.75$ ,  $df = 5$ ,  $p = .59$ ;  $Q_{\text{RESIDUAL}} = 30.55$ ,  $df = 27$ ,  $p = .29$ ), optimism ( $R^2 = .22$ ;  $Q_{\text{MODEL}} = 6.45$ ,  $df = 6$ ,  $p = .37$ ;  $Q_{\text{RESIDUAL}} = 23.21$ ,  $df = 15$ ,  $p = .08$ ), spirituality ( $R^2 = .13$ ;  $Q_{\text{MODEL}} = 2.95$ ,  $df = 5$ ,  $p = .71$ ;  $Q_{\text{RESIDUAL}} = 20.50$ ,  $df = 14$ ,  $p = .12$ ), and acceptance coping ( $R^2 = .12$ ;  $Q_{\text{MODEL}} = 2.49$ ,  $df = 5$ ,  $p = .78$ ;



**TABLE 1** Stem and Leaf Displays of Effect Sizes for Predictor Variables

Social support			Optimism			Seeking support coping			Religious coping			Positive reappraisal coping			Acceptance coping			Spirituality		
<i>f</i>	Stem	Leaf	<i>f</i>	Stem	Leaf	<i>f</i>	Stem	Leaf	<i>f</i>	Stem	Leaf	<i>f</i>	Stem	Leaf	<i>f</i>	Stem	Leaf	<i>f</i>	Stem	Leaf
5	0	04589	2	-1	58	2	1	01	1	Extremes (≥.00)	4	1	2689	1	-1	3	Extremes (≥-.20)	1	Extremes (≥-.20)	
13	1	0034445556679	1	-0	1	4	1	9999	2	1	67	5	2	3	-0	118	01123445567789	1	-0	4
15	2	00122345677799	2	0	39	8	2	00112344	7	2	3345899	5	2	2	0	45	00001333356668	2	0	04
7	3	1333468	7	1	2355669	4	2	5889	9	3	001223579	7	3	6	1	034778	2345677	4	1	0034
2	4	02	5	2	12356	4	3	0068	7	4	1344479	8	4	7	2	0114788	5	11	2	00334677889
3	5	224	9	3	155677899	2	4	11	1	5	6	2	5	4	3	1236		2	3	06
1	Extremes (≥.70)		1	4	7	1	Extremes (≥.49)		4	6	0233							0	4	
																		1	5	0
																		1	Extremes (≥.57)	

*Note.* Stem width: .10; each leaf: 1 case.

**TABLE 2** Basic Central Tendency Statistics and File-Drawer Problem Analysis

Factor	<i>k</i>	<i>N</i>	Effect size	95% CI	<i>Q</i>	<i>I</i> <sup>2</sup> (%)	Fail-safe, <i>N</i>
Social support	46	5,876	.26***	.22 to .30	120.29***	63	72
Optimism	27	4,794	.23***	.18 to .29	95.57***	73	36
Spirituality	24	7,774	.23***	.17 to .30	164.29***	86	32
Support coping	26	5,231	.25***	.22 to .28	27.16	26	39
Religious coping	31	6,188	.38***	.33 to .43	111.36***	73	87
Reappraisal coping	26	5,340	.36***	.30 to .41	110.27***	77	67
Acceptance coping	23	5,119	.17***	.11 to .23	82.51***	73	17

*Note.* *k* refers to the number of studies available for computation of a specific effect size; *N* is the sample size on which the effect size was based. For effect sizes, *r* is significantly different from zero (\*\**p* < .001); effect sizes are weighted average size correlations. For the *Q* statistic, significant values indicate that there is more variability in effect sizes than one would expect by chance (\*\**p* < .001). For the *I*<sup>2</sup> statistic, percentages of around 25% (*I*<sup>2</sup> = 25), 50% (*I*<sup>2</sup> = 50), and 75% (*I*<sup>2</sup> = 75) mean low, Medium, and high heterogeneity, respectively.

$Q_{\text{RESIDUAL}} = 18.74$ ,  $df = 15$ ,  $p = .23$ ) did not explain significant amounts of variability or show significant moderator effects.

Age and gender were significant predictors of the effect sizes for religious coping such that the relation of religious coping to posttraumatic growth was stronger for older people than for younger people and stronger for women than for men.

Effect sizes derived from longitudinal studies were significantly lower than those derived from cross-sectional studies for positive reappraisal coping. Analog ANOVA moderator analyses showed that the effect sizes for positive reappraisal coping were .40 ( $p > .001$ ) in cross-sectional studies and .22 ( $p > .001$ ) in longitudinal studies. Time since trauma and type of posttraumatic growth were not significant predictors of effect sizes for any of the variables.

Analog ANOVA moderator analyses of social support showed that the effect size for general availability of support ( $r = .20$ ,  $p > .001$ ) was not significantly different from the effect size for global satisfaction with support provided ( $r = .27$ ,  $p > .001$ ) ( $Q_{\text{BETWEEN}} = 1.36$ ,  $df = 1$ ,  $p = .25$ ).

Finally, the use of the LOT (Scheier & Carver, 1985) or the LOT-R (Scheier et al., 1994) did not predict the effect size for optimism, whereas the religious coping measure emerged as a significant predictor of the effect size for religious coping. Analog ANOVA moderator analyses showed that the effect size for general religious coping was .33 ( $p = .001$ ), whereas the effect size for positive religious coping was .45 ( $p = .001$ ).

## DISCUSSION

The results of this meta-analytic review clearly support the hypothesis that optimism, social support, spirituality, acceptance coping, reappraisal coping,

**TABLE 3** Moderator Analyses (Weighted Regressions) of the Relation of Psychosocial Predictors to Growth

	<i>B</i>	<i>SE B</i>	−95% CI	+95% CI	<i>z</i>	<i>p</i>	$\beta$
<i>Social support</i>							
Age	.00	.00	.00	.00	−1.03	.30	−.22
Gender <sup>a</sup>	.00	.00	.00	.00	−.11	.91	−.02
Design <sup>b</sup>	−.06	.05	−.16	.05	−1.09	.28	−.20
Growth measure <sup>c</sup>	.03	.06	−.10	.15	.41	.68	.07
Time since event	.00	.00	.00	.00	.16	.87	.03
<i>Optimism</i>							
Age	.00	.00	−.01	.00	−.88	.38	−.18
Gender <sup>a</sup>	.00	.00	.00	.00	−.64	.52	−.13
Design <sup>b</sup>	−.09	.06	−.21	.03	−1.42	.15	−.28
Growth measure <sup>c</sup>	−.09	.07	−.24	.05	−1.30	.20	−.30
Time since event	.00	.00	.00	.00	.01	.99	.00
Optimism measure <sup>d</sup>	.03	.07	−.11	.17	.43	.67	.10
<i>Spirituality</i>							
Age	.00	.00	.00	.01	1.57	.12	.39
Gender <sup>a</sup>	.00	.00	.00	.01	.05	.96	.02
Design <sup>b</sup>	−.02	.10	−.23	.18	−.24	.81	−.06
Growth measure <sup>c</sup>	.00	.00	−.01	.01	−.20	.84	−.06
Time since event	.00	.00	.00	.00	−1.23	.22	−.30
<i>Religious coping</i>							
Age	.00	.00	.00	.01	3.35	.00	.49
Gender <sup>a</sup>	.00	.00	.00	.00	2.33	.02	.32
Design <sup>b</sup>	−.06	.04	−.13	.01	−1.57	.12	−.23
Growth measure <sup>c</sup>	−.06	.05	−.16	.05	−1.07	.28	−.15
Time since event	.00	.00	.00	.00	1.08	.28	.15
Religious coping measure <sup>e</sup>	.12	.04	.05	.20	3.23	.00	.46
<i>Positive reappraisal coping</i>							
Age	.00	.00	.00	.00	.16	.87	.03
Gender <sup>a</sup>	.00	.00	.00	.00	.65	.52	.12
Design <sup>b</sup>	−.17	.05	−.27	−.07	−3.37	.00	−.61
Growth measure <sup>c</sup>	.00	.05	−.10	.10	.00	1.00	.00
Time since event	.00	.00	.00	.00	.46	.65	.09
<i>Acceptance coping</i>							
Age	.00	.00	−.01	.00	−1.14	.25	−.29
Gender <sup>a</sup>	.00	.00	.00	.00	−.39	.70	−.09
Design <sup>b</sup>	−.01	.07	−.16	.13	−.18	.86	−.04
Growth measure <sup>c</sup>	.05	.07	−.08	.18	.76	.45	.18
Time since event	.00	.00	.00	.00	−.06	.95	−.01

<sup>a</sup>Percentage of women in the study (0–100%).<sup>b</sup>Design is dummy coded: cross-sectional = 0 and longitudinal = 1.<sup>c</sup>Growth measure is dummy coded: Benefit Finding Scale = 0, Posttraumatic Growth Inventory and Stress-Related Growth Scale = 1.<sup>d</sup>Optimism measure is dummy coded: Life Orientation Test = 0, Life Orientation Test–Revised = 1.<sup>e</sup>Religious coping measure is dummy coded: general religious coping = 0, positive religious coping = 1.

religious coping, and seeking support coping are associated with posttraumatic growth. Coping responses, especially positive reappraisal and religious coping, are more related to posttraumatic growth than optimism and social support. It is likely that the beneficial effect of personal and social resources

is partially mediated by coping responses. Indeed, findings from the Berlin Longitudinal Study on Quality of Life after Tumor Surgery showed that personal resources influenced benefit finding both directly and indirectly, with mediation of coping strategies (Luszczynska, Mohamed, & Schwarzer, 2005). On the other hand, these coping strategies promote posttraumatic growth as they arise from active efforts to deal with the problem or the consequent emotions.

The effect size for social support was medium. According to Schaefer and Moos (1998), social support fosters a more favorable appraisal of the event and more effective coping strategies. Moreover, "supportive others can aid in posttraumatic growth by providing a way to craft narratives about the changes that have occurred, and by offering perspectives that can be integrated into schema change" (Tedeschi & Calhoun, 2004, p. 8). It is likely that the beneficial effect of social support is different when controlling for the impact of different types of social support in different phases after the trauma. For example, findings from the Berlin Longitudinal Study on Quality of Life after Tumor Surgery showed that emotional support was crucial in an early crisis phase but not in later stages (Schwarzer, Luszczynska, Boehmer, Taubert, & Knoll, 2006). Future studies should consider this possibility.

Optimism was moderately related to posttraumatic growth. This result supports the argument that optimism and posttraumatic growth are overlapping concepts (Zoellner & Maercker, 2006). However, the relationship of optimism to posttraumatic growth was modest, and although some previous studies have found this relationship, others have not (Bellizzi & Blank, 2004; Bower, Kemeney, Taylor, & Fahey, 1998; Hettler, 1996; King et al., 2000; Park et al., 1996; Park & Fenster, 2004; Sears et al., 2003; Tennen & Affleck, 1998; Tomich & Helgeson, 2006). This implies that, according to Tedeschi and Calhoun (2004), posttraumatic growth and optimism may well be distinct concepts. It is more likely that optimism promotes growth through its effects on threat appraisal and adaptive coping strategies (positive reappraisal, active coping, and seeking support coping) (Schaefer & Moos, 1998; Tennen & Affleck, 1999; Zoellner & Maercker, 2006). Furthermore, Tedeschi and Calhoun (2004) stated that optimists' ability to concentrate on the most important things and to disengage from unachievable goals or from world-views that are inconsistent with the reality of the trauma is crucial for cognitive processing related to growth. The effect size for optimism was a bit smaller than the effect size found in Helgeson et al.'s (2006) meta-analysis. Finally, the moderator analyses showed no significant differences in the effect sizes between the LOT (Scheier & Carver, 1985) and the LOT-R (Scheier et al., 1994). Therefore, it seems that the use of the original or the revised version of the LOT does not affect the relation of optimism to growth.

Seeking social support coping was moderately related to posttraumatic growth. It is speculated that this coping strategy might increase the quantity and quality of social support. Furthermore, as Tedeschi and Calhoun (2004,

p. 7) stated: "The degree to which individuals engage in self-disclosure about their emotions and about their perspective on their crisis, and how others respond to that self-disclosure, may also play a role in growth." A longitudinal study found that one of the best predictors of posttraumatic growth was emotional expression (Manne et al., 2004). According to the authors, there are several reasons for this result: desensitization to negative feelings, enhanced closeness in relationships, and consideration and recognition of personal strength.

Spirituality moderately predicted positive changes in the aftermath of crisis. Religiosity and growth may be partially overlapping concepts because, in assessments of positive changes, there is often an item or a subscale that includes spiritual growth. However, spiritual growth is different from spirituality, and its presence in the form of one or a few scale items does not explain the whole relation. It seems more likely that spirituality might promote posttraumatic growth because it provides a sense of community or community support and beliefs that foster the meaning-making process. Cadell, Regehr, and Hemsworth (2003) stated that spirituality and/or religiosity play an important role in meaning making and transformational coping. Furthermore, according to Pargament, Koenig, Tarakeshwar, and Hahn (2004), the factors that explain the beneficial effect of spirituality include health variables (e.g., health practices, immunological response), psychological variables (e.g., meaning, coherence, self-esteem), and social variables (e.g., social support, sense of community).

Religious coping was a strong predictor of posttraumatic growth. This result is in line with the results of Ano and Vasconcelles's (2005) meta-analysis on positive adjustment. Religious coping partially shares the same explanations of spirituality. However, religious coping had a stronger relation to posttraumatic growth, and this might be due to the specific use of religion resources as a way to deal with the event: "Measures of religious coping should specify how the individual is making use of religion to understand and deal with stressors. Thinking functionally should lead to stronger predictions of outcomes" (Pargament et al., 2000, p. 521). Moreover, Pargament et al. (2000) stated that religious coping serves a variety of purposes in day-to-day living and in crises: giving meaning to a negative event, acting as a framework to achieve a sense of control over a difficult situation, providing comfort during times of trouble, providing intimacy with the members of the religious community, and assisting people in making major life transformations. The result of this meta-analysis support Pargament's (1997) idea of religious coping methods as specific religious mechanisms that explain the relationship between individuals' global religiousness and positive health outcomes. Finally, our moderator analysis results support the refinement of the religious coping measure of Pargament et al. (2000). Indeed, general religious coping was related to growth but to a lesser extent than positive religious coping. Thus, religious coping strategies are not equally adaptive, and efforts at distinguishing them are justified.

Positive reappraisal coping was strongly related to growth, and the magnitude of this effect size was significantly greater for cross-sectional studies than for longitudinal studies. This result may be due to an overlap between the two constructs. However, the existence of studies reporting a small or nonsignificant relation between this coping strategy and growth (Butler et al., 2005; Hoffman & Whitmire, 2002; Manne et al., 2004; Prati & Pietrantonio, 2006) and evidence of distinct predictors and outcomes of these constructs (Sears et al., 2003) cast some doubt on the validity of this explanation. It seems more plausible that a person's efforts to positively interpret the threat could work as a self-fulfilling prophecy and thus lead to positive changes. This result supports theoretical assumptions (Schaefer & Moos, 1998) and preliminary evidence (Linley & Joseph, 2004; Zoellner & Maercker, 2006) regarding the beneficial effects of positive reappraisal coping. The effect size for positive reappraisal coping was a bit lower than the effect size found in Helgeson et al.'s (2006) meta-analysis.

Acceptance coping was a small but significant predictor of posttraumatic growth. This result supports Zoellner and Maercker's (2006) assumption about the importance of the ability to accept traumatic situations (usually uncontrollable or unchangeable life events) in the process of posttraumatic growth. However, this finding should be interpreted with caution because of the possibility of publication bias (small fail-safe *N*). As with positive reappraisal coping and optimism, the effect size for acceptance coping was a bit smaller than the effect size found in Helgeson et al.'s (2006) meta-analysis. The inclusion of unpublished studies may have lessened the upward bias of the effect size (Lipsey & Wilson, 2001).

### Moderator Analyses

We examined two demographic characteristics of the participants in moderator analyses: gender and age. The only significant finding was that religious coping was more beneficial for older people and for women.

There were no significant differences between estimates from longitudinal and cross-sectional studies with the exception of positive reappraisal coping. Therefore, relations of factors to posttraumatic growth were not significantly stronger in cross-sectional studies than in longitudinal studies. Given that longitudinal research is helpful in distinguishing process from outcome, these results underline the possibility that coping strategies and personal and environmental resources could act as predictors. This is a very important finding, since it would seem to answer some of the core challenges to posttraumatic growth research in terms of cross-sectional versus longitudinal methodologies.

Moderator analyses showed that none of the effect sizes differed between posttraumatic growth and benefit finding. In other words, posttraumatic growth (Posttraumatic Growth Inventory and Stress-Related Growth

Scale) and benefit finding (Benefit Finding Scale) measures had similar correlations with the predictors, and this result does not support the possibility that benefit finding and posttraumatic growth represent related but distinct constructs (Sears et al., 2003).

Time since trauma was not a significant moderator of any of the variables. It is actually somewhat surprising that resources and coping strategies did not contribute differentially according to time elapsed since the negative event. It is possible that the relation of these factors to posttraumatic growth is not linear but curvilinear. Given that posttraumatic growth is thought to take time to occur, it is likely that it positively correlates with time elapsed since the negative event. According to Joseph and Linley (2005), posttraumatic growth is a process that unfolds gradually over a period of time following accommodation to new trauma-related factors, because traumatic events generally require massive schematic changes. However, it is possible that when more time since the trauma has passed (e.g., after decades), positive changes decrease. It is not clear from previous research whether time since trauma is related to growth (Stanton et al., 2006). Future studies should explore this possibility.

Even after taking into consideration moderator variables, there appears to be additional variance in the effect sizes, except for positive reappraisal coping and religious coping, that needs to be explained. According to Helgeson et al. (2006, p. 812), one possible explanation has to do with the construct of posttraumatic growth. They stated that “growth outcomes may reflect a variety of processes, some of which have to do with actual changes in one’s life, some of which have to do with coping, and others of which have to do with cognitive manipulations on the order of self-enhancement biases meant to alleviate distress.” In line with this, Zoellner and Maercker (2006) outlined the Janus-Face model of posttraumatic growth in which illusory components coexist with constructive components.

Finally, a limitation of the moderator analyses is that event characteristics were not considered. Helgeson et al. (2006) grouped stressful events into two categories—health-related stressors and personal traumas—and showed that this categorization did little to enhance understanding of the conditions under which posttraumatic growth is related to health outcomes. According to these authors, future studies should explore the differential contributions of a more varied set of stressful events.

### Study Limitations

Whereas this meta-analytic review has many advantages in representations of weighted “average” effects across different studies, there are many limitations and problems inherent to this technique (Lipsey & Wilson, 2001). The most important limitation involves the methodological adequacy of the research base. The growth literature is lacking in prospective research

designs for ethical and feasibility reasons. Even if effect sizes do not differ between cross-sectional and longitudinal studies, the use of the term predictor should be taken with caution. It is always possible that individuals who find benefit tend to become more optimistic, tend to increase their social support, and tend to rely on active coping strategies. Prospective studies are needed to clearly demonstrate causal relations as well as determine the timing of these factors regarding the specific nature of an event.

Another limitation concerns the importance of distinguishing specifically the different ways in which social support may be understood. The differential effects on posttraumatic growth of the various functions of social support (e.g., belonging, self-esteem, tangible support) should be a focus of future research.

## Conclusions

Despite the limitations just described, this meta-analysis represents an attempt to bring some order to the disparate findings regarding factors contributing to posttraumatic growth. The data presented here suggest, from a theoretical point of view, that interventions aimed at increasing optimism, social support, and specific coping strategies may promote positive changes in the aftermath of trauma.

The research on posttraumatic growth and resilience does not necessarily entail denial of the psychopathological effects of trauma but helps to reveal paths leading to “light at the end of the tunnel” after trauma (Almedom, 2005). According to Helgeson et al. (2006), even if growth does not reflect the absence of mental health symptoms, this outcome may be of interest in its own right. Calhoun and Tedeschi (2006) underlined that posttraumatic growth may be useful from a eudaemonic rather than a hedonic mental health perspective. Indeed, posttraumatic growth is significantly related to positive well-being measures (Helgeson et al., 2006), and this relationship suggests that perceptions of positive changes may be an indicator of positive mental health in trauma survivors. Thus, posttraumatic growth may be an important outcome for interventions with individuals exposed to trauma. This meta-analysis suggests potential predictors that may be targeted in such interventions.

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