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Review

A meta-analytic clarification of the relationship between posttraumatic growth and symptoms of posttraumatic distress disorder

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ABSTRACT

Traumatic experiences can have a powerful impact on individuals and communities but the relationship between perceptions of beneficial and pathological outcomes are not known. Therefore, this meta-analysis examined both the strength and the linearity of the relationship between symptoms of posttraumatic stress disorder (PTSD) and perceptions of posttraumatic growth (PTG) as well as identifying the potential moderating roles of trauma type and age. Literature searches of all languages were conducted using the ProQuest, Wiley Interscience, ScienceDirect, Informaworld and Web of Science databases. Linear and quadratic (curvilinear) *r*s as well as *β*s were analysed. Forty-two studies (N = 11,469) that examined both PTG and symptoms of PTSD were included in meta-analytic calculations. The combined studies yielded a significant linear relationship between PTG and PTSD symptoms (r = 0.315, CI = 0.299, 0.331), but also a significantly stronger (as tested by Fisher's transformation) curvilinear relationship (r = 0.372, CI = 0.353, 0.391). The strength and linearity of these relationships differed according to trauma type and age. The results remind those working with traumatised people that positive and negative post-trauma outcomes can co-occur. A focus only on PTSD symptoms may limit or slow recovery and mask the potential for growth.

Contents

1. Introduction

Positive post-trauma changes have been increasingly researched since the mid 1990s and there is now a substantial body of literature that attests to the prevalence of such changes (e.g., Calhoun, Cann, & Tedeschi, 2010; Kleim and Ehlers, 2009; Shakespeare-Finch & Barrington, 2012; Solomon & Dekel, 2007; Tedeschi & Calhoun, 1996). Most commonly, such changes are referred to as posttraumatic growth or PTG (Linley, Andrews, & Joseph, 2007); a term coined by Tedeschi and Calhoun (1995). Of course there is also a large body of literature that examines negative post-trauma changes and interventions that are developed to alleviate associated symptoms (e.g., Bryant, Harvey, Guthrie, & Moulds, 2000; O'Donnell, Elliot, Lau, & Creamer, 2007; Vranceanu, Hobfoll, & Johnson, 2007). Over the past 16 years of published research examining positive post-trauma changes, the relationship between growth and distress has also been discussed. Yet to date, there has been no consensus about the nature of this relationship

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and therefore, it is that relationship that is the central focus of this paper.

The inconsistent findings in the literature around this topic do not appear to be attributable to the type of trauma experienced or the cultural context. For example, studying a group of bereaved Japanese students, Taku, Calhoun, Cann, and Tedeschi (2008), found evidence of a significant positive relationship between posttraumatic growth inventory (PTGI; Tedeschi & Calhoun, 1996) scores and posttraumatic stress symptoms. Similar results have been obtained in US samples (e.g., Kilmer et al., 2009) and in Israeli adolescents (Laufer & Solomon, 2006). Other researchers have found no relationship between PTG and maladaptive outcomes for example, examining cancer survivors in the US (Cordova, Cunningham, Carlson, & Andrykowski, 2001) or in SARS survivors in China (Ho, Kwong-Lo, Mak, & Wong, 2005). Others have found a negative relationship in populations as culturally diverse as the US and Turkey (e.g., Frazier, Conlon, & Glaser, 2001; Kilic & Ulsoy, 2003). Although most papers do not report testing for a non-linear relationship, some authors suggest that the relationship between growth and symptoms of PTSD is better explained as curvilinear (e.g., Butler et al., 2005; Lechner, Carver, Antoni, Weaver, & Phillips, 2006).

There are a number of ways in which the nature of the relationship between variables can be tested. Powell, Rosner, Butollo, Tedeschi, and Calhoun (2003) suggest there is a curvilinear relationship between growth and PTSD symptoms but like many others, only appear to test for this via visual inspection of scatterplots. The question arises as to the most reliable way to test for a curvilinear relationship. The most ideal way is with hierarchical regression where the test is for the additional variance explained by the curve over and above the linear assessment (Field, 2009, p. 791). Reporting on quadratic tests is another approach but its short coming is that it does not provide a test that explains if the curvilinear relationship is significantly more reliable than the linear estimate. Perhaps the weakest way is to use Analysis of Variance (ANOVA), for example, by grouping people scoring low, medium and high symptom severity and comparing groups on growth level. A curvilinear relationship would be implied if medium grouping scores were highest on growth scores.

Of the five studies (of 42; see Section 2) identified as having tested for a curvilinear relationship, Kleim and Ehlers (2009) used hierarchical regression to test quadratic effect over and above linear. Three dimensions of PTG were significantly curvilinear but the 'spiritual change' and 'relating to others' dimensions were marginal ($p = 0.057$). Levine, Laufer, Hamama-Raz, Stein, and Solomon (2008) tested both linear and curvilinear relationships but seemingly separately. That is to say, Levine et al. reported R^2 but not R^2_{change} for the quadratic curve, and were therefore unable to state if the quadratic curve was a significantly better fit of the data than the linear relationship detected. Solomon and Dekel (2007) found significant linear and quadratic effects of PTSD severity and growth but examined a range of other variables in the hierarchical regression to test quadratic effect over and above linear effects. Results predicted PTGI scores from PTSD but step two only added the PTSD quadratic estimation. Colville and Cream (2009) stated their quadratic solution better fit the data. However, in this study the authors failed to test to see if the difference between linear and curvilinear coefficients was significant. Similarly, Dekel and Nuttman-Shwartz (2009) tested linear and quadratic fits separately via curve estimation, therefore there was no test of a significant increment between the linear and quadratic estimates.

Another study looking at the relationship between distress symptoms and PTG was interested in predicting PTSD from PTG (Shiri, Wexler, Alkalay, Meiner, & Kreitler, 2008). The quadratic test was entered in the one step with the linear estimate, so there was no test of incremental significance. Both quadratic and linear coefficients were significant but Shiri and colleagues suggested a plateau effect rather than true inverted U shape. Using the ANOVA approach, Zoellner, Rabe, Karl, and Maercker (2008) divided their sample into full PTSD, "sub-syndromal" PTSD and no PTSD subgroups and compared these groups on PTGI scores. The differences between the three groups on the PTGI total score and subscales was not strongly suggestive of an inverted-U curvilinear relationship though a plateau was evident for the PTGI total score with an increase for the full PTSD group only. Using the preferred method of hierarchical regression entering the quadratic estimation at the second step, McCaslin et al. (2009) found evidence for an inverted U-shaped curvilinear relationship between PTGI scores and PTSD symptoms as measured by the Posttraumatic Stress Checklist with the linear R^2 accounting for 7.8% of the variance and the quadratic term accounting for an additional and statistically significant 10% of the variance.

An earlier meta-analysis of posttraumatic growth was conducted by Helgeson, Reynolds, and Tomich (2006), but did not address the question of a relationship between PTG and symptoms of PTSD. Further, the authors stated they did not include non-published studies. This potentially introduces an over-estimating bias of the effect sizes derived due to the generally accepted publication bias towards significant results.

An additional limitation of previous investigations is that the vast majority of published studies only report the magnitude and significance of tests of a linear relationship. This focus on linearity was also reflected in the meta-analysis by Helgeson et al. (2006) of the relationship between PTG and various physical and psychological health measures. Therefore the meta-analyses reported in this article redresses this gap in knowledge by aggregating both linear and curvilinear assessments and testing for significance between assessments, thereby shedding light on the relationship between PTG and PTSD symptoms.

2. Method

Literature searches were conducted using the ProQuest (incorporating Dissertations and Theses), Wiley Interscience, ScienceDirect, Informaworld and Web of Science databases. Separate searches using the terms "posttraumatic growth inventory", "PTGI", "Tedeschi", and "Calhoun" were conducted and cross-referenced. Searches were limited to research published from 1996 (the year that Tedeschi and Calhoun published their introductory paper on the posttraumatic growth inventory) to 2011. No language limitations were placed on database searches.

In addition to database searches, search efforts were supplemented by the perusal of reference lists of all articles obtained. All relevant studies included in Helgeson et al.'s (2006) meta-analyses, as well as reviews by Linley and Joseph (2004), Stanton, Bower, and Low (2006), and Zoellner and Maercker (2006) were perused for relevance. Further, a number of data sets from unpublished doctoral theses which included assessment of the variables of interest were included to more completely represent data from all reliable sources. Articles and theses were cross-referenced to ensure that data reported in multiple locations were not included more than once in the meta-analysis. In order to be included, studies had to use Tedeschi and Calhoun's (1996) posttraumatic growth inventory as a measure of posttraumatic growth and use a measure of posttraumatic stress disorder (PTSD) symptoms.

2.1. Analysis approach

For the purposes of the analyses conducted, posttraumatic growth was classified as the criterion variable and PTSD symptoms were classified as the predictor variable. The moderating role

Table 1
Results of meta-analysis of linear and quadratic relationship between posttraumatic growth and posttraumatic stress disorder symptoms by trauma type and age group.

Trauma type	Linear assessments					Curvilinear assessments						
	k	*N*	Linear *r* [95% CI]	*Q*	*FSN*	*k*	*N*	Quad. *r* [95% CI]	*Q*	*FSN*	*β*1	*β*2
Overall results												
All	42	11,469	0.315 [0.299, 0.331]	264.727***	792	28	7263	0.372*** [0.353, 0.391]	88.010***	531	0.396	−0.575
Minus two large studies	40	5161	0.201 [0.175, 0.227]	102.333***	266	27	3209	0.290*** [0.258, 0.321]	37.504*	216	0.362	−0.314
Trauma type												
Illness (self)	8	947	0.161 [0.099, 0.222]	9.990	13	4	582	0.260* [0.183, 0.334]	1.026	10	0.579	−0.362
Carer of ill loved one	5	371	0.195 [0.096, 0.291]	1.787	5	4	300	0.270 [0.162, 0.371]	4.220	6	−0.053	−0.419
Helping professions	7	1467	0.204 [0.155, 0.252]	13.413*	22	5	850	0.182 [0.117, 0.246]	13.595**	9	0.330	−0.289
Conflict (civilian)	6	6685	0.391 [0.371, 0.411]	80.814***	112	4	4334	0.427* [0.403, 0.451]	21.818***	68	0.404	−0.727
Conflict (military)	2	196	0.251 [0.155, 0.337]	6.405**	2	2	196	0.288 [0.155, 0.411]	4.028*	2	0	−0.128
Natural disaster	1	68	0.448 [0.235, 0.620]	NA	1	1	68	0.457 [0.246, 0.627]	NA	1	0.816	−0.379
Sexual abuse	2	141	0.048 [−0.118, 0.211]	0.975	1	1	40	0.184 [−0.135, 0.468]	NA	1	−0.026	−0.135
Mixture	8	1346	0.242 [0.192, 0.291]	19.679**	31	6	800	0.327* [0.264, 0.387]	0.883	25	0.682	−0.422
Age group												
Children	2	2322	0.401 [0.367, 0.434]	0.213	21	1	68	0.457 [0.246, 0.627]	NA	1	0.816	−0.379
Adults (17 and over)	40	9147	0.293 [0.275, 0.311]	231.000***	615	27	7195	0.371*** [0.351, 0.391]	87.318***	479	0.400	−0.581

Note: *k* = number of studies, *Q* = *Q* homogeneity test, *FSN* = Fail Safe *N*. Statistical significance denoted in the quadratic correlation column denotes quadratic correlations that are significantly higher than the linear correlations.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.00$.

of trauma type was explored via sub-group meta-analyses. For studies involving repeated measurements (irrespective of whether an intervention was used) only data from the first measurement time point was included to eliminate potential practice effects or confounding effects arising from the nature of the interventions implemented. Finally, where participants were asked to rate themselves both retrospectively and currently, only the current measure was used.

Meta-analytic aggregation of linear and quadratic (curvilinear) correlation co-efficients was conducted in order to determine the overall magnitude of linear and curvilinear assessments of the relationship between posttraumatic growth and PTSD symptoms. In

Table 2
Linear and curvilinear (quadratic) assessments of the relationship between PTG and PTSD symptoms by trauma type and age group.

Trauma type	Studies where both quadratic and linear correlations were conducted				All studies (including some with no quadratic correlations)		
	k	*N*	Quad. *r*	Linear *r*	*k*	*N*	Linear *r*
Overall results							
All	28	7263	0.372	0.337*	42	11,469	0.315***
Minus two large studies	27	3209	0.290	0.241*	40	5161	0.201***
Trauma type							
Illness (self)	4	582	0.260	0.219	8	947	0.161*
Carer of ill loved one	4	300	0.270	0.183	5	371	0.195
Helping professions	5	850	0.182	0.224	7	1467	0.204
Conflict (civilian)	4	4334	0.427	0.400	6	6685	0.391*
Conflict (military)	2	196	0.288	0.251	2	196	0.251
Natural Disaster	1	68	0.457	0.448	1	68	0.448
Sexual Abuse	1	40	0.184	0.181	2	141	0.048
Mixture	6	800	0.327	0.281	8	1346	0.242*
Age group							
Children	1	68	0.457	0.448	2	2322	0.401
Adults (17 and over)	27	7195	0.371	0.336**	40	9147	0.293***

Note: *k* = number of studies. Significant differences between quadratic and linear correlations.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

addition, standardised regression weights were also aggregated in an attempt to obtain an overall visual picture of the nature of this relationship.

Authors of the majority of articles included in the meta-analysis were contacted (with the exception of those reporting all results required for the meta-analysis) and asked to provide additional analyses to those that were originally reported. This was undertaken because generally only linear assessments were reported in published works and it was of interest to the current authors to examine curvilinear assessments. Researchers were asked to either supply results of curvilinear analysis or a copy of their data file (with only relevant variables included and which was deleted upon completion of the analysis) so that this analysis could be conducted to supplement the published curvilinear analyses. As a result of these approaches, curvilinear analysis was provided or able to be conducted for a further 23 studies. It should be noted that at the time of submission, 12 of the studies which included measurement of the two variables of interest were not included in the meta-analysis as insufficient information was reported in the original article and no further information had been able to be obtained from the authors at the time of manuscript submission.

Weighted average correlation co-efficients were calculated using Microsoft Excel and following the method outlined by Hunter and Schmidt (2004). Fisher's transformations were used to test the significance of the difference between weighted average linear correlation co-efficients and weighted average quadratic (curvilinear) correlation co-efficients. Weighted average beta weights were calculated using Microsoft Excel and following the method outlined by Becker and Wu (2007) and Greenland and Longnecker (1987), based on Hedges and Olkin's (1985) meta-analytic text. Both correlation co-efficients and beta weights were weighted by sample size in weighted average calculations. Confidence intervals and significance of estimates were calculated using estimated sampling error variance. Fixed effects models were used and heterogeneity of study effects (where present) was examined via sub-group meta-analyses to seek possible sources for heterogeneity rather than using a random effects model. *Q* homogeneity tests were conducted to determine heterogeneity of effect size estimates as per Hunter and Schmidt (2004). Fail Safe *N* was calculated for each correlation co-efficient aggregations using the method outlined by Carson, Schriesheim, and Kinicki (1990). This statistic provides an indication of the stability of the result in light of the notion that it is possible that not all studies of interest were identified and included in the analyses. The Fail Safe *N* is an estimate of the number of contradictory or null results that would be needed to reverse the statistical significance of the meta-analytic effect size or correlation co-efficient obtained.

3. Results

A total of 42 studies are included in the meta-analyses reported. Details of these studies along with their results can be found in Appendix A. Table 1 reports the overall and trauma sub-type meta-analytic linear and quadratic correlation coefficients as well as beta weights. By far the most common trauma type categories were civilian experiences in conflict zones ($N = 6685$), professional exposure to trauma by those in helping professions ($N = 1467$) and mixed trauma samples ($N = 1346$). As can be seen in Table 1, the overall aggregated linear correlation coefficient obtained was of a moderate magnitude, $r_{\text{linear meta}} = 0.315$ with the quadratic assessment of the potential curvilinear relationship slightly higher than this at $r_{\text{quadratic meta}} = 0.372$. This represents a significantly higher correlation coefficient for the quadratic than the linear relationship as tested via Fisher's transformation analysis. Examination of the aggregated standardised regression coefficients suggests that the curvilinear relationship takes the form of an inverted-U shape such that increases in PTSD symptoms are initially associated with an increase in PTG but that this relationship becomes negative when a critical point is reached in the severity of symptoms experienced. Two studies with comparatively large sample sizes (Laufer & Solomon, 2006; Levine et al., 2008; Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009) were removed from the analyses to investigate whether their relatively large correlation coefficients were having undue influence on the magnitude of the aggregated analyses.

As can be seen in Table 1, with these two studies removed the magnitude of the overall linear effect dropped to $r_{\text{linear meta}} = 0.201$, while the quadratic correlation dropped to $r_{\text{quadratic meta}} = 0.290$. The quadratic correlation remained significantly higher than the linear assessment despite the drops in magnitude for both. Table 2 presents the linear versus quadratic comparisons for all linear assessments as well as a more limited analysis which tests only the difference between linear and quadratic assessments for data sets for which both linear and quadratic analyses could be obtained.

The *Q* homogeneity tests associated with both of these correlation coefficients suggest significant heterogeneity among the sample of studies combined in these calculations. To investigate this heterogeneity further the studies were grouped according to both trauma type and age of participants. These subgroup analyses revealed differing magnitudes of the relationship between PTG and PTSD symptoms with stronger relationships noted for civilians in conflict zones, and survivors of natural disasters. Much weaker or null relationships were noted among populations affected by, or caring for, someone affected by ill-health and sexual abuse. In the majority of cases the quadratic correlation coefficient obtained was larger than the linear correlation though this difference was only statistically significant for populations comprising those with ill-health, civilians in conflict zones and mixed trauma groups. This seems to be largely an artefact of power associated with differential sample sizes. The stratification of studies by age of participants provided results suggesting a stronger relationship between PTG and PTSD symptoms among children than adults.

4. Discussion

Due to the contradictory evidence regarding the relationship between reported symptoms of PTSD and perceptions of PTG, this study investigated the nature of the relationship between PTGI scores and symptoms of PTSD. The null hypothesis that there would be no relationship between PTSD symptoms and PTG was rejected. Despite many significant linear co-efficients identified, the quadratic curve estimations added significant variance over and above that attributed to a linear relationship. Results also indicated that the nature of the event and a person's age have an impact on the relationship between factors investigated. For example, data demonstrated a lack of relationship between PTG and PTSD symptoms detected in studies when the traumatic experience was sexual assault as opposed to the stronger relationships between these outcome measures in survivors of a natural disaster and in civilians in conflict zones. There were also weak or non-existent relationships between PTSD symptoms and growth when the trauma was the serious ill-health of self or others and those who assist survivors of trauma such as health professionals.

With respect to age, the results suggest a stronger relationship between PTG and PTSD symptoms for children than adults. Closer inspection of this finding reveals that the meta-analytic results for the subset of studies with child samples is based on only two studies, with one study contributing a much larger sample ($n > 2000$) than the other. Further, the larger study comprised a group of adolescents in Israel experiencing a trauma type associated with one of the stronger results of the adult samples (i.e., experiencing conflict as a civilian). Measurement also differed between these studies with children in the Kilmer et al. (2009) research completing a revised version of the PTGI specifically designed for children, while the other study (Laufer & Solomon, 2006) used the adult version of the PTGI. It is unclear therefore whether the strength of the relationship among child samples derived from these two studies is confounded either with the version of the PTG measure used and/or the nature of the trauma experienced, or that the smaller sample comprised children and the larger study examined PTG and PTSD in adolescents. Further examination of a larger number of studies with child samples experiencing a range of different traumas would help elucidate this further.

While meta-analyses have their strengths if designed and executed in a robust manner such as this one, there are also caveats in drawing conclusions in studies that are essentially statistical in nature. For example, there is a fundamental question of this data when it is translated into potential practice implications. While the relationships were statistically significant, none were particularly strong, which indicates that many other factors can play a role in the differential level of growth and ongoing distress experienced by a trauma survivor. Just because the relationship between PTG and PTSD is significant statistically, does not mean the relationship found is significant practically or psychologically.

It is seductive to think that the results of this meta-analysis confirm there is an optimal level of PTSD symptoms related to growth but this conclusion is not warranted. For example, in a study of adult survivors of childhood sexual assault (Shakespeare-Finch & de Dassel, 2009) alongside reports of moderate levels of PTG, 95% of survivors recorded clinical levels of PTSD. Far from being impaired by these symptoms, participants in the study were well-functioning women. As an adult survivor of sexual abuse, heightened levels of arousal for example, were usual when compared to normative data generated from the general population.

What is clear is that there is an overall relationship between reports of PTSD symptoms and reports of PTG. Results support previous assertions in the literature of a linear relationship (e.g., Calhoun et al., 2010; Kleim and Ehlers, 2009; Solomon & Dekel, 2007) and of a curvilinear relationship between factors (e.g., Butler et al., 2005; Lechner et al., 2006). While one statistical solution better explains the relationship as curvilinear, the coefficients are very similar when converted to effect sizes. One thing seems clear, with the exception of specific traumatic experiences such as surviving sexual assault, there is a relationship between the variables measured. Research has moved past the idea that PTSD symptoms and perceptions of positive post-trauma changes are at opposite ends of a continuum and practitioners are advised to be mindful of the coexistence of positive and negative perceptions and manifestations of negotiating trauma. Actively seeking to identify the presence of growth, even amongst ongoing distress, provides an avenue for those who work with the traumatised to reflect their client's personal capacity to manage even the most severe of challenges, to redefine their personal strengths, philosophies, and relationships in moving forward.

The use of Fail Safe *N* provides confidence in the robustness of the findings with many studies with opposing results needed to reliably overturn the findings from this meta-analysis. However, it is certainly possible, and indeed likely, that the impact of post-trauma time lapse is one of notable import, but one that could not be validly assessed for the meta-analyses reported here. While the majority of studies reported the range of post-trauma time lapse in their study, the width of these margins was such that the use of an average time lapse as a moderating variable in the analyses would not have given a true reflection of the nature of its impact. Secondly it must also be borne in mind that a number of results included in the meta-analyses formed part of an intervention study. While only baseline measures were included it is certainly possible that participant expectations about the potential therapeutic benefit of the intervention to come could have influenced their scores at baseline compared to non-intervention studies.

Future trauma research would be enhanced by uniformly testing for a curvilinear relationship between variables rather than simply checking for a linear relationship. It is perhaps naive to assume the simplest solution is the most accurate. The nature of the relationship is not straight forward and it is important to remember this when conducting research regarding psychological trauma and its potential sequalae as well as the implications for a therapeutic context. The generalisability of individual study research results may not reliably capture the complexities of post-trauma trajectories but robustly designed and executed meta-analyses such as this one, may also fall prey to similar limitations. The ultimate question for a trauma researcher is what can be learned that will assist in the lives of trauma survivors.

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Appendix A.

Studies included in meta-analytic calculations.

Study	Trauma type	*N*	Linear *r*	Quad. *r*	$\beta 1$	$\beta 2$
Barton (2005)	Aid workers	434	0.14			
Burke, Shakespeare-Finch, and Paton (2006)	Mixture, police recruits	94	0.37	0.42	0.80	−0.53
Cann et al. (2011) Sample 1	Mixture	198	0.36	0.38	0.78	−0.45
Cann et al. (2011) Sample 2	Mixture	202	0.23	0.36	0.92	−0.73
Chopko (2007)	Police officers	183	0.27			
Colville and Cream (2009)	Parents of children in ICU	50	0.22	0.48		
Cordova et al. (2001)	Breast cancer	70	−0.01			
Dekel and Nuttman-Shwartz (2009)	Israeli survivors of missile attacks	122	0.44	0.49	0.35	−0.26
Forstmeier, Kuwert, Spitzer, Freyberger, and Maercker (2009)	WWII German child soldiers	103	0.09	0.11	0.20	−0.13
Grubagh (2003) [a]	Female assault victims	101	−0.01			
Harlan (2002)	Parents of children with autism	21	0.11	0.36	−1.81	1.95
Harris et al. (2008)	Mixture	327	0.06			
Kilmer et al. (2009)	Hurricane (1 year post)	68	0.45			
Laufer and Solomon (2006)	Israeli adolescents	2254	0.40			
Levine et al. (2008) and Levine et al. (2009)	Israeli Adolescents	4054	0.41	0.44	0.42	−0.76
Lev-Wiesel and Amir (2003)	Holocaust	97	−0.24			

Appendix A (*Continued*)

Study	Trauma type	*N*	Linear *r*	Quad. *r*	*β*1	*β*2
Lounsberry, MacRae, Angen, Hoeber, and Carlson (2010)	Stem cell transplant recipients	16	0.05	0.41	−1.28	1.38
Lurie-Beck, Liossis, and Gow (2008)	Holocaust	22	0.29	0.30	0.31	−0.01
McCaslin et al. (2009)	Sri Lankan students. Mixed traumas	93	0.28	0.42		
Morrill et al. (2008)	Breast cancer	165	0.16	0.16		
Morris and Shakespeare-Finch (2011)	Cancer	335	0.26	0.29	0.64	−0.41
Morris, Shakespeare-Finch, Rieck, and Newberry (2005)	Mixture	219	0.37			
Nightingale (2009)	AIDS patients	118	0.20			
Powell et al. (2003) and Rosner and Powell (2006)	Bosnian survivors of Yugoslav conflicts	136	0.03	0.11	0.29	−0.29
Roger (2007)	Mixture	94	0.25	0.21		
Shakespeare-Finch (2003)	Paramedics	526	0.16	0.20	0.50	−0.36
Shakespeare-Finch (2003)	Paramedics	40	0.50	0.51	0.81	−0.33
Shakespeare-Finch and Armstrong (2010)	Mixture	92	0.26	0.30	−0.49	0.76
Shakespeare-Finch and de Dassel (2009)	Childhood sexual abuse	40	0.18	0.18	−0.03	0.21
Snape (1997)	Admitted to hospital after traffic or other accident (2 months post only)	53	0.48			
Solomon and Dekel (2007)	Israeli veterans of Yom Kippur War	93	0.43	0.49		
Taku et al. (2008)	Bereavement	71	0.24			
Thornton and Perez (2006)	Prostate cancer	66	0.22	0.33	0.70	−0.54
Thornton and Perez (2006)	Spouse with prostate cancer	53	0.32	0.32	0.42	−0.10
Triplett (2009)	Mixture	147	0.30	0.35	0.83	−0.56
Warbel (2008)	Breast cancer and sexual assault groups combined	105	0.03			
Widows, Jacobsen, Booth-Jones, and Fields (2005)	Cancer, bone marrow transplant recipients	72	−0.01			
Zoellner et al. (2008)	Motor vehicle accident survivors	102	0.10			

[a] Averaged correlations between PTGI and two separate PTSD measures.

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