



Gratitude, depression and PTSD: Assessment of structural relationships



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ABSTRACT

Gratitude, the tendency to appreciate positive occurrences in one's life that can be partially attributed to another person, has been shown to be a robust predictor of greater well-being. Researchers have also found gratitude to be inversely related to several emotional disorders, including major depressive disorder (MDD) and posttraumatic stress disorder (PTSD). Both of these emotional disorders are highly comorbid and share dysphoric symptoms (e.g., restricted affect, detachment, anhedonia) that could account for deficits in the experience and expression of gratitude. We used confirmatory factor analysis to test the relationships between gratitude and the symptom factors of PTSD (using the DSM-5 model) and MDD in a sample of trauma-exposed college students ($N=202$). Results indicated that gratitude is more strongly related to PTSD's negative alterations in mood and cognition (NAMC) factor than to other PTSD factors. Implications of these findings for the study of gratitude and trauma are discussed, including whether gratitude and gratitude-based interventions might prove particularly suited to targeting depressive symptoms.

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1. Introduction

Gratitude can be broadly defined as the mindful appreciation of benefits received that can be attributed to the kindness of other people (e.g., McCullough et al., 2001). Several studies have found that grateful individuals experience greater psychological well-being in their life (e.g., Emmons and McCullough, 2003; Lambert et al., 2010); this includes a reduction in suicidal ideations over time and an increased sense of meaning in life (e.g., Kleiman et al., 2013), and less aggressiveness and more prosocial behavior (DeWall et al., 2012). There is also a small body of work suggestive that being grateful promotes physical health, in terms of fewer reports of physical health problems, better sleep quality, and more time spent exercising (Emmons and McCullough, 2003; Wood et al., 2009; Hill et al., 2013).

In response to basic research on the psychological, social, and physical health benefits of gratitude, we explored the links between gratitude and specific mental disorders at the latent level. In hopes of understanding mental health symptoms that are particularly relevant to gratitude, we examined relationships with latent factors representing major depressive disorder (MDD) and posttraumatic stress disorder (PTSD) symptoms.

1.1. Gratitude and DSM disorders

Gratitude has demonstrated inverse relationships with several mental disorders. In particular, individuals higher in dispositional gratitude display significantly fewer depressive symptoms over time (Wood et al., 2008; Lambert et al., 2012) and dispositional gratitude is also negatively associated with PTSD (Kashdan et al., 2006; Israel-Cohen et al., 2014). Possible mediating influences in the relationship between gratitude and depression include life satisfaction, positive affect and positive beliefs (Lambert et al., 2012), as well as the enhanced retrieval of positive memories (Watkins et al., 2014). The relationship between gratitude and PTSD may be mediated by negative affect and life satisfaction (Israel-Cohen et al., 2014). In addition, gratitude-based interventions, pioneered by Emmons and McCullough (2003), have shown preliminary effectiveness in reducing depressive symptoms (Seligman et al., 2005; Lambert et al., 2012), worry (Geraghty et al., 2010b) and body dissatisfaction (Geraghty et al., 2010a). These data suggest that gratitude may serve as a protective factor against certain types of psychopathology, through cognitive mediators such as life satisfaction and positive beliefs, as well as through affective mediators such as positive emotional experiences.

However, it is unclear whether the preponderance of evidence linking gratitude to lower depressive symptoms is due to a specific relationship between gratitude and depression, or merely a consequence of depressive symptoms often serving as the lone outcome to evaluate interventions designed to enhance well-being (Sin and Lyubomirsky, 2009).

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1.2. PTSD and depression

PTSD is a prevalent disorder among populations exposed to trauma. PTSD is complex and has high rates of comorbidity with depression, anxiety disorders and substance use (Lockwood and Forbes, 2014). In particular, PTSD has high comorbidity with MDD. PTSD symptoms are conceptualized in the Diagnostic and Statistical Manual of Mental Disorders (5th ed; *DSM-5*; American Psychiatric Association, 2013) as four distinct factors, including re-experiencing the trauma, effortfully avoiding trauma reminders, negative alterations in mood and cognition (NAMC), and alterations in arousal and reactivity (AAR). The NAMC cluster, which is of particular interest to this study, is composed of symptoms such as blaming oneself or others for the trauma, negative emotions related to the trauma, emotional detachment and loss of interest in pleasurable activities. Models of *DSM-5* PTSD symptom structure with more than four factors exist (e.g., Armour et al., 2015), but given that the *DSM-5* model is still relatively new, we chose to limit the focus of the present study to just four-factor models.

Previous research has identified a subset of PTSD symptoms which resemble symptoms of depression as potentially responsible for the comorbidity between PTSD and MDD. The *DSM-5* defines this symptom cluster as NAMC, and a model known as the dysphoria model of PTSD (Simms et al., 2002) groups these with several symptoms from the AAR cluster of PTSD symptoms to form a dysphoria factor. The dysphoria model of PTSD has received some support over other models, such as the numbing model, using *DSM-IV* criteria (Yufik and Simms, 2010), and a few studies have extended this finding to the *DSM-5* version of PTSD (Contractor et al., 2014; Elhai et al., 2015), although the *DSM-5* model has been better supported in at least one study (Biehn et al., 2013). These studies have found that both the NAMC factor and dysphoria factor of PTSD, depending on the model used, are more highly related to latent dimensions of depression (somatic and non-somatic, using the Patient Health Questionnaire-9, PHQ-9) than other factors (e.g., avoidance, re-experiencing and AAR). For the moment, however, the commonality between MDD and PTSD through the depression-like symptoms of the NAMC factor provides a possible theoretical basis for commonality in the relationship between gratitude and these two disorders.

1.3. The present study

The present study investigated the relationship of gratitude to the symptom dimensions of PTSD. First, we hypothesized that the dysphoria model (Simms et al., 2002) would fit the data better than the *DSM-5* model (American Psychiatric Association, 2013). Second, we hypothesized that gratitude would be more highly (inversely) related to PTSD's dysphoria or NAMC symptom cluster (depending on which model displays better fit) than to the re-experiencing, avoidance and AAR symptom clusters, in the same manner that depressive symptoms are more highly related to the NAMC/dysphoria factor.

2. Method

2.1. Procedure and participants

We enrolled students who endorsed the presence of a traumatic event, as defined by the Structured Clinical Interview for *DSM-IV* Disorders' PTSD trauma screen (Elhai et al., 2008). Using this pre-screening question, 389 undergraduate students in psychology courses who screened positive for trauma exposure enrolled in the IRB-approved study and completed an online questionnaire. Participants received class credit for their participation.

187 participants who did not qualify as trauma-exposed based on further screening were excluded from the analyses. This resulted in a final sample of 202 participants (75.2% women). Participants had a mean age of 20.4 ($SD_{age}=5.6$) and completed an average of 12.93 years of schooling ($SD_{school}=1.52$). Racial background was mostly Caucasian (82.7%), and remaining participants self-identified as African-American (14.4%), Asian-American (2.5%), American Indian/Alaskan Native (3%), Native Hawaiian (2%), or of another race (5.4%). Ethnically, participants were primarily not Latino (87.6%).

2.2. Measures

Stressful Life Events Screening Questionnaire (SLESQ): The SLESQ (Goodman et al., 1998) is a self-report measure which screens for exposure to a traumatic event. We inquired about the most distressing nominated trauma and symptom severity from this trauma in the past month. The SLESQ was originally developed for use with the *DSM-IV* with good psychometric properties (Goodman et al., 1998), and has been adapted for use with the *DSM-5* by Elhai et al. (2012b). The most prevalent trauma endorsed as most distressing in the past month was the death of a family member/close friend ($n=88$, 43.6%), followed by life-threatening accidents ($n=18$, 8.9%) and childhood sexual abuse ($n=18$, 8.9%).

PTSD Checklist for *DSM-5* (PCL-5): The PCL is a self-report measure assessing severity of PTSD symptoms in the past month. The PCL-5 (Weathers et al., 2013) is an adaptation of the original version (Weathers et al., 1993) with 20 items that map onto each of the *DSM-5* symptoms of PTSD. The PCL is widely used and the original version has strong diagnostic validity (McDonald and Calhoun, 2010). Items on the PCL-5 are scored on a Likert scale with options ranging from 0 ("Not at all") to 4 ("Extremely"). Internal consistency of the measure in the present study was $\alpha=0.96$, with a mean of 22.23 and a standard deviation of 18.19.

Patient Health Questionnaire-9 (PHQ-9): The PHQ-9 (Kroenke et al., 2001) assesses severity of depressive symptoms using nine items that map onto the nine *DSM-5* criteria for a major depressive episode. Items are scored based on frequency in the past month using a 4-point Likert scale ranging from 0 ("Not at all") to 3 ("Nearly every day"). The psychometric properties of the PHQ-9 are well-validated (Kroenke et al., 2010). The PHQ-9 has a two-factor structure with somatic (Items 3, 4, 5, 7, 8) and nonsomatic (Items 1, 2, 6, 9) symptom clusters (Elhai et al., 2012a; Tsai et al., 2014). Internal consistency of the measure in the present study was $\alpha=0.88$, with a mean of 7.93 and a standard deviation of 5.92.

Gratitude Questionnaire-6 (GQ-6): The GQ-6 is a six-item self-report measure assessing the frequency and intensity of grateful experiences (McCullough et al., 2002). Items consist of statements such as "I have so much in life to be thankful for" (Item 1) or "I am grateful to a wide variety of people" (Item 4), and are scored on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). GQ-6 items load onto a single factor which is distinct from constructs such as happiness, well-being, optimism and vitality (McCullough et al., 2002). Internal consistency for this measure was $\alpha=0.82$ in the present study, with a mean of 5.69 and a standard deviation of 1.05. Both metrics are reported as participants' averages of the 6 items on the 1–7 Likert scale, and approximate the characteristics of previous samples, e.g. mean=5.92, standard deviation=0.88 (Study 1; McCullough et al., 2002).

2.3. Data analysis

Prior to primary analysis, we compared the fit of the *DSM-5* model and the dysphoria model of PTSD. We treated PCL-5 and PHQ-9 data as ordinal data due to 5 or fewer Likert response options for these measures, using weighted least squares estimation

with a mean- and variance-adjusted chi-square (WLSMV), a polychoric covariance matrix and probit coefficients for factor loadings. We used maximum likelihood with robust standard errors (MLR) for the comparison between competing PTSD models to generate Bayesian Information Criteria (BIC) values for the categorical data, as BIC values allow for empirical comparison of non-nested models (Bollen et al., 2014).

3. Results

Contrary to our first hypothesis, the *DSM-5* model (χ^2 (164, 202)=403.359; $p < 0.001$; CFI=0.974; TLI=0.969; RMSEA=0.085; BIC=8902.079) fit the data significantly better than the dysphoria model (χ^2 (164)=398.201; $p < 0.001$; CFI=0.974; TLI=0.970; RMSEA=0.084; BIC=8912.282). A BIC difference of at least 10 points roughly equates to $p < 0.05$, with the lower BIC indicating better fit (Kass and Raftery, 1995). Given its better fit, we used the *DSM-5* model for remaining analyses.

To test our primary hypothesis, we constructed a CFA model including four factors representing PTSD symptom dimensions (re-experiencing, avoidance, NAMC, and AAR), two factors representing MDD symptom dimensions (somatic and nonsomatic), and one factor representing gratitude. Factor variances were set to 1, residual covariances were fixed to zero, and factor covariances were estimated. Model fit statistics were adequate or above adequate (χ^2 (506)=881.897; $p < 0.001$; CFI=0.963; TLI=0.959; RMSEA=0.059), indicating a well-fitting model (Hu and Bentler, 1999).

Factor intercorrelations, reported in Table 1, showed that gratitude had moderate inverse associations with depression and PTSD factors, and depression factors were strongly related to PTSD factors. However, the correlations between PTSD and depression factors were not explicitly compared via Wald χ^2 tests as they have been in prior studies (e.g., Elhai et al., 2015), to avoid Type I error inflation.

We then tested our hypothesis that gratitude would be more highly related to the negative alterations to mood and cognition (NAMC) factor of PTSD than to PTSD's other factors using Wald χ^2 tests of parameter constraints. A Bonferroni correction was applied to account for increased Type 1 error; alpha level was thus set at 0.016 (or, 0.05 divided by 3 Wald tests). Results indicate that the gratitude factor was more correlated with PTSD's NAMC factor ($r = -0.45$) than with reexperiencing ($r = -0.28$; Wald $\chi^2 = 9.104$, $p = 0.003$), avoidance ($r = -0.32$; Wald $\chi^2 = 6.403$, $p = 0.011$) and AAR ($r = -0.33$; Wald $\chi^2 = 10.248$, $p = 0.001$). Results are illustrated in Table 2.

4. Discussion

The results of this study suggest that gratitude has a stronger

Table 2
Wald tests of parameter constraints.

Correlation a	r	Correlation b	r	Wald χ^2 (p value)
Gratitude-NAMC	-0.45	Gratitude-reexperiencing	-0.28	9.104 ($p = 0.003$)*
Gratitude-NAMC	-0.45	Gratitude-avoidance	-0.32	6.403 ($p = 0.011$)*
Gratitude-NAMC	-0.45	Gratitude-AAR	-0.33	10.248 ($p = 0.001$)*

NAMC=negative alterations in mood and cognition, AAR=alterations in arousal and reactivity.

* Statistically significant ($p < 0.05$).

inverse relationship with depressive or negative affective symptoms, as represented by the NAMC factor of PTSD, than with other symptom clusters of PTSD. This study provides an overall model for how gratitude relates to PTSD symptoms, suggesting that future research could benefit from examining gratitude's relationship with PTSD's NAMC factor in particular. This study is the first to examine gratitude in relation to latent dimensions of depression and PTSD. The results raise the question of whether gratitude interventions may prove particularly suited to targeting depressive symptoms (Wood et al., 2010).

This study was unable to explore the mechanism(s) accounting for the stronger inverse relationship between gratitude and negative affective and cognitive symptoms compared with other symptom domains of PTSD. Continued investigation of proposed mediators (e.g., Wood et al., 2010; Kaczmarek et al., 2013, 2014) may further elucidate this relationship. In this study, the correlation between gratitude and depression's nonsomatic factor appears to be higher than the correlation between gratitude and depression's somatic factor. This finding is intuitive, as gratitude is theorized to contain cognitive and affective, but not somatic components (McCullough et al., 2001); future studies should investigate the theoretical and practical significance of this finding.

While this study does explore a novel aspect of the relationship between gratitude and PTSD, it has several limitations. The use of a college sample inhibits generalizability to different populations. In addition, the exclusive use of self-report measures introduces method bias, and our measures do not account for possible confounds in the relationships between gratitude, MDD and PTSD. Finally, this study investigated the constructs cross-sectionally, taking a snapshot of the overall structural relationships between gratitude and PTSD factors. Future research should endeavor to generalize this finding to clinical populations using structured diagnostic interviews, or exploring how gratitude influences dysphoric and depressive symptoms on a day-to-day basis (see Study 2, DeWall et al., 2012). Finally, research on gratitude interventions should endeavor to integrate these interventions as adjuncts to existing empirically supported treatments for depression, such as cognitive-behavior therapy and behavioral activation, while exploring their application to treating PTSD. Our work suggests that

Table 1
Correlations between Gratitude, MDD, and PTSD factors.

Construct Factor	PTSD				Depression		Gratitude
	Reexperiencing	Avoidance	NAMC	AAR	Somatic	Nonsomatic	
Reexperiencing	1	-	-	-	-	-	-
Avoidance	0.85	1	-	-	-	-	-
NAMC	0.84	0.79	1	-	-	-	-
AAR	0.83	0.76	0.90	1	-	-	-
Somatic	0.59	0.57	0.64	0.81	1	-	-
Nonsomatic	0.69	0.64	0.84	0.77	0.79	1	-
Gratitude	-0.28	-0.32	-0.45	-0.33	-0.30	-0.41	1

NAMC=Negative Alterations in Mood and Cognition; AAR=Alterations in Arousal and Reactivity.

the association between gratitude and mental health problems is not unitary, and there is much to be gained by a fine-grained analysis of the dimensions under study.

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