Mindfulness (2017) 8:1078–1087
DOI 10.1007/s12671-017-0683-4

ORIGINAL PAPER

Self-compassion and Posttraumatic Growth: Cognitive Processes as Mediators

Celia Ching Yee Wong[1] · **Nelson C. Y. Yeung**[2]

Published online: 8 February 2017

Abstract Developing research shows self-compassion (i.e., a self-caring and compassionate attitude in the face of suffering) is adaptive when coping with crises, but the association between self-compassion and posttraumatic growth (i.e., positive changes after experiencing negative life events) has not yet been examined. This study aimed to examine the association between self-compassion (positive and negative components) and posttraumatic growth, as well as the mediating roles of cognitive processes in this association. Specifically, we hypothesized that higher positive self-compassion and lower negative self-compassion were associated with higher posttraumatic growth. Those associations were also hypothesized to be mediated through more adaptive cognitive processes (i.e., acceptance, positive reframing, presence of and search for meaning). A sample of 601 ethnically diverse college students (consisting of 30.4% Latinos, 17.0% Caucasians, 15.0% Asians/Pacific Islanders, 8.6% African-Americans, and 29% other/multi-ethnics) who had been exposed to at least one prior negative life event were invited to complete a cross-sectional survey. Correlational results showed negative self-compassion was not significantly associated with posttraumatic growth, search of meaning was not significantly associated with positive self-compassion, negative self-compassion and search of meaning were thus dropped from the proposed model. Consequentially, the mediation model was revised and examined with structural equation modeling (SEM), and it was found to fit well to the data. SEM results showed significant indirect effects of the positive self-compassion component on posttraumatic growth through positive reframing (B = 0.34, β = 0.19, $p < 0.001$, 95% CI 0.10 to 0.28) and presence of meaning (B = 0.15, β = 0.08, $p < 0.001$, 95% CI 0.03 to 0.14). Our findings suggested that positive self-compassion may be associated with more adaptive cognitive processes, which in turn is associated with higher levels of posttraumatic growth. Theoretical and practical implications of the proposed mediation model will be discussed.

Keywords Self-compassion · Posttraumatic growth · Acceptance · Positive reframing · Meaning-making

Introduction

Exposure to traumatic experiences may result in poor psychological health (Hasanovic et al. 2009; Winthrop 2010) and even posttraumatic stress (Kessler et al. 1995). However, many people could also report unexpected positive outcomes and growth in the aftermath of traumatic events (Linley and Joseph 2004; Wortman 2004). Posttraumatic growth is not only surviving the traumas but also experiencing a personal development that has surpassed the level of functioning before the negative life events occurred (Tedeschi and Calhoun 2004). Common posttraumatic growth experiences include gaining wisdom from negative experience, strengthening relationships with significant others, being able to accept uncertainties in life, and being more open to life experiences (Calhoun and Tedeschi 1999). Previous studies have found that the experience of growth is frequently observed among people exposed to differing negative life events (e.g.,

✉ Celia Ching Yee Wong
celia.cyw@gmail.com

[1] Department of Psychology, University of Houston, Fred J. Heyne Building Rm 126, 3695 Cullen Boulevard, Houston, TX 77204-5022, USA

[2] The Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, China

life-threatening disease, bereavement, experiencing abuse, man-made and natural disasters) (Hefferon et al. 2009; Norris et al. 2009).

Theorists have proposed potential mechanisms about how posttraumatic growth could be facilitated through cognitive processes. Calhoun and Tedeschi (2004) proposed that negative life events may challenge a person's cognitive schemas and assumptions about the world (e.g., predictability and controllability about life events). To challenge these schemas and assumptions, the stressors brought from the negative life events should be perceived as sufficiently threatening to one's life (Creamer et al. 1992; Greenberg 1995). To facilitate posttraumatic growth, cognitive processing is critical as it helps people concentrate on existential matters and reduce illusionary worldviews that could not accommodate with their circumstances after the occurrence of negative events (Creamer et al. 1992; Greenberg 1995). Through these cognitive processes, people can rebuild their worldview and reconstruct their life structure, which guide them to move forward and gain new insights from the negative experiences (Tedeschi and Calhoun 2004). Consistent with these theoretical postulations, studies have also demonstrated the role of cognitive processing in facilitating posttraumatic growth. For instance, more frequent use of acceptance (Butler et al. 2005; Park et al. 1996; Tang et al. 2015), positive reinterpretation, and deliberate meaning-making (Cadell et al. 2014; Larner and Blow 2011; Park 1998; Schmidt et al. 2012) are found to be associated with higher levels of posttraumatic growth.

Self-compassion is a self-caring and compassionate attitude in the face of suffering (Neff 2003a, 2003b). According to Neff (2003a), there are three components in self-compassion: self-kindness (versus self-judgment), common humanity (versus isolation), and mindfulness (versus over-identification). *Self-kindness* refers to the tendency to be understanding and caring about ourselves rather than judgmental. Personal inadequacies and difficulties are being treated in a gentle, understanding manner. *Common humanity* involves the recognition that failure, mistakes, and difficulties are normal in people's life. *Mindfulness* refers to the awareness of present moment experiences in a balanced manner; negative thoughts and feelings are neither over-identified nor downplayed. Indeed, self-compassion has been extensively studied as a psychological resource when dealing with stressors (Neff and McGehee 2010; Vettese et al. 2011). Recent meta-analyses showed that self-compassion is significantly associated with better cognitive and psychological well-being (Zessin et al. 2015) and less psychopathology (MacBeth and Gumley 2012). Experimental data has also showed that self-compassion could buffer individuals against negative emotions in the face of stressful events, and motivate individuals to improve personal weaknesses (Breines and Chen 2012; Leary et al. 2007).

Previous studies suggest that self-compassion may not be a unidimensional construct. Instead, it could be constituted of positive self-compassion and negative self-compassion. A weak negative association ($r = -.11$, $p < .001$) was found between the positive self-compassion component (indicated by self-kindness, common humanity, and mindfulness) and the negative self-compassion component (indicated by self-judgment, isolation, and over-identification), suggesting positive self-compassion and negative self-compassion are not mutually exclusive (e.g., Costa et al. 2015; López et al. 2015). This is also in line with the concept that self-compassion and self-criticism can coexist, as suggested by the dual processes of the soothing system (self-compassion) and the threat system (self-criticism) in the neurobiological perspective (Falconer et al. 2015; Gilbert 2009; Longe et al. 2010). Furthermore, preliminary data have suggested that positive self-compassion and negative self-compassion play distinctive roles in well-being and psychopathologies; positive self-compassion tends to have stronger association with positive mental health outcomes while negative self-compassion tends to have stronger association with psychopathologies and negative mental health outcomes (Costa et al. 2015; Gilbert et al. 2011; López et al. 2015; Muris and Petrocchi 2016).

Self-compassion may facilitate posttraumatic growth. People with higher levels of self-compassion tend to construe negative events in a less dreadful way (Allen and Leary 2010), and they are better able to regulate their emotions when facing negative events (Heffernan et al. 2010; Neff 2003a). Despite a dearth of studies examining self-compassion and trauma survivorship, existing studies seem to suggest self-compassion is a protective factor for trauma adaptation. Empirical studies showed self-compassion was associated with less posttraumatic stress symptoms among veterans (Dahm et al. 2015) and other trauma-exposed samples (e.g., individuals who experienced physical abuse, sexual assault, and natural disasters) (Dahm et al. 2015; Seligowski et al. 2015; Thompson and Waltz 2008; Zeller et al. 2015). Therefore, it is likely that self-compassion would also be associated with higher levels of posttraumatic growth. Even though posttraumatic growth and posttraumatic stress may coexist (Tedeschi and Calhoun 2004; Wright 1989), they have unique contributions to psychological health outcomes (Wang et al. 2015). Therefore, it is not appropriate to assume the effect of self-compassion on posttraumatic stress is generalized to posttraumatic growth without empirical testing. So far, the association between self-compassion and posttraumatic growth has not been examined in any empirical studies.

The relationship between self-compassion and posttraumatic growth may be mediated by cognitive processing of traumas and crises. Self-compassion is not contingent on self-evaluation or social comparison (Neff and Vonk 2009) but founded on the idea that everyone deserves compassion and understanding. Due to its unconditional nature,

self-compassion provides emotional safety for individuals to see the self and reality clearly (Allen and Leary 2010; Neff et al. 2007), which in turn facilitates their cognitive processing of negative experiences. Indeed, the link between self-compassion and adaptive cognitive processing has been demonstrated in empirical studies. For instance, self-compassion has been found to be associated with more acceptance, more positive cognitive reframing, and more meaning in life (Phillips and Ferguson 2012). Self-compassion was also associated with higher levels of integrative self-knowledge (i.e., an adaptive capacity to integrate past and present self-experience to obtain desired outcomes in the future) (Ghorbani et al. 2012), and less self-disengagement and experiential avoidance (Sirois et al. 2015; Thompson and Waltz 2008). A recent empirical study also showed that self-compassionate individuals tend to have more positive thoughts related to one's experience, which in turn associated with better emotional outcomes (Allen and Leary 2014). These findings supported the idea that self-compassion could promote posttraumatic growth of trauma/crisis survivors through cognitive processing.

Extending from previous research, the present study aimed to (1) examine the associations between self-compassion (positive and negative) and posttraumatic growth in a sample of trauma-exposed college students and (2) investigate the potential mechanisms underlying the associations, including acceptance, positive reframing, and search for and presence of meaning. We hypothesized that there would be a positive association between positive self-compassion and posttraumatic growth and a negative association between negative self-compassion and posttraumatic growth, and these associations would be mediated by acceptance, positive reframing, and search for and presence of meaning.

Method

Participants

A total of 651 college students participated in the study. To serve the purpose of this study (i.e., to examine the factors that are associated with posttraumatic growth), only participants who report having experienced at least a crisis or a negative life event (e.g., losing a loved one, experiencing abuse, experiencing natural disaster, having an accident, having cancer/other diseases) were included in the data analysis, resulting in a final sample of 601 college students (117 men and 478 women, 6 missing information). The sample was ethnically diverse (consisting of 30.4% Latinos, 17.0% Caucasians, 15.0% Asians/Pacific Islanders, 8.6% African-Americans, 29% other/multi-ethnics), with a mean age of 22.56 (SD = 5.68). In this sample, 64.4% reported the most recent negative life event (e.g., such as diseases, abuse, natural disaster, economic difficulty, losing a loved one, accident, disability, etc.) occurred within 6 months, 12.4% had such an event between 6 and 12 months, 11.3% had such an event between 1 and 2 years, 7.4% had such an event between 2 and 5 years, and 4.5% had such an event beyond 5 years.

Procedure

Participants were recruited from undergraduate psychology classes from a southern university in the USA. Interested students signed up for the study through an online subject pool system. Upon informed consent, participants were asked to complete an online survey. After completion of the survey, participants were compensated with course credits. Institutional Review Board approval was sought before the study was launched.

Measures

Self-compassion The 26-item Self-Compassion Scale (Neff, 2003) was used to assess how individuals typically act toward themselves in difficult times. Participants rated on a 5-point scale ranging from (1) *almost never* to (5) *almost always* indicating how often they behaved as the descriptions in the items. Sample items are "I try to be loving towards myself when I'm feeling emotional pain (self-kindness)," "when things are going badly for me, I see the difficulties as part of life that everyone goes through (common humanity)," "when something upsets me I try to keep my emotions in balance (mindfulness)," "I'm disapproving and judgmental about my own flaws and inadequacies (self-judgment)," "when I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world (isolation)," and "when I'm feeling down I tend to obsess and fixate on everything that's wrong (over-identification)." The self-compassion scale has been validated in community and clinical samples, demonstrating adequate reliability and validity (Castilho et al. 2015; Costa et al. 2015). Following the recommendation by López et al. (2015) and Costa et al. (2015), the scores of positive self-compassion (i.e., self-kindness, common humanity, and mindfulness) and negative self-compassion (i.e., self-judgment, isolation, and over-identification) were computed separately. The two-factor model of the self-compassion scale has been tested in a trauma-exposed student sample (CFI = 0.95, TLI = 0.87, RMSEA = 0.15 [90% CI 0.12 to 0.18]; Seligowski et al. 2015). In the current sample, the two-factor model has been replicated, CFI = 0.87, TLI = 0.85, RMSEA = 0.07 [90% CI 0.07 to 0.08], with a satisfactory RMSEA value that indicates adequate model fit (Browne and Cudeck 1993). The Cronbach's alphas of the six individual subscales ranged from 0.77 to 0.82. The overall internal consistencies of positive and negative self-compassion components were 0.90 and 0.92, respectively.

Posttraumatic growth The 21-item Posttraumatic Growth Inventory (Tedeschi and Calhoun 1996) was used to measure people's positive changes after experiencing negative life events. It consists of 5 subscales (i.e., new possibilities, relating to others, personal strength, spiritual change, and appreciation of life). Participants rated on a 6-point scale from (0) *I did not experience this change as a result of my crisis* to (5) *I experienced this change to a very great degree as a result of my crisis*. Sample items are "A sense of closeness with others (relating to others)," "I established a new path for my life (new possibilities)," "Knowing I can handle difficulties (personal strength)," "A better understanding of spiritual matters (spiritual change)," and "An appreciation for the value of my own life (appreciation of life)." This measure has been shown to be reliable and valid in college student samples (e.g., Kashdan and Kane 2011; Yeung et al. 2015). In the present study, the overall internal consistency was 0.96.

Cognitive reappraisal The 2-item acceptance subscale and the 2-item positive reframing subscale from the Brief COPE (Carver 1997) were used to measure participants' cognitive appraisal when dealing with stressful events. Participants rated on a 4-point scale from (1) *I have not been doing this at all* to (4) *I have been doing this a lot*, to indicate their frequency of using these cognitive appraisal strategies to deal with their reported negative events. Sample items are "I've been accepting the reality of the fact that it has happened (acceptance)" and "I've been trying to see it in a different light, to make it seem more positive (positive reframing)." This scale has been shown to be valid and reliable in student and community samples (e.g., Gerber et al. 2011; Schroevers and Teo 2008). The Cronbach's alphas for acceptance and positive reframing were 0.69 and 0.81, respectively.

Meaning-making The 10-item Meaning in Life Questionnaire (Steger et al. 2006) was used to measure people's tendency to make meaning from life experiences. This measure had two dimensions of meaning in life, namely presence of meaning and search for meaning. Participants rated on a 7-point scale from (1) *absolutely true* to (7) *absolutely untrue*, to indicate how much they feel the lives have meaning as well as how much they strive to find meaning and understanding in their lives. Sample items are "I understand my life's meaning (presence of meaning)" and "I am looking for something that makes my life feel meaningful (search of meaning)." This scale has been shown valid and reliable in student and clinical samples (e.g., Schulenberg et al. 2011; Steger et al. 2006; Steger and Kashdan 2007). The Cronbach's alphas for presence of and search for meaning were 0.91 and 0.87, respectively.

Prior traumatic events Participants' prior traumatic events were measured by a checklist of events from the PTGI. The checklist included different types of traumatic events such as cancer, other diseases, divorce, losing a job, abuse, natural disaster, changing jobs, economic difficulty, losing a loved one, accident, disability, increased family responsibilities, and other traumatic events. Participants were asked to report when they had experienced those events (less than 6 months, 6 months to a year, 1 to 2 years, 2 to 5 years, and more than 5 years).

Data Analyses

Descriptive statistics and correlation analyses were conducted among the variables included in the proposed mediation model (see Fig. 1). Following the suggestion by Kline (2005), a confirmatory factor analysis was conducted to assess the goodness of fit of the measurement model. Then, the proposed mediation model was tested with structural equation modeling to examine whether acceptance, positive reframing, and presence and search of meaning may mediate the relationships between self-compassion (positive self-compassion and negative self-compassion) and posttraumatic growth. Depending

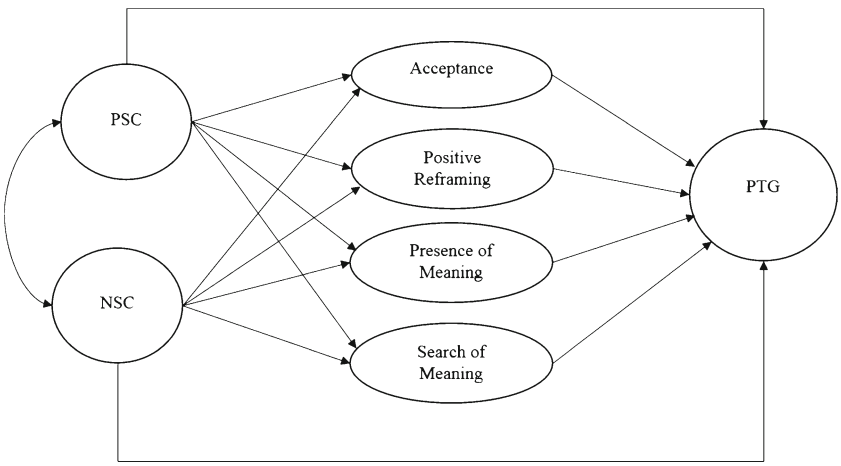

Fig. 1 Proposed model of self-compassion and posttraumatic growth. For clarity, covariance among mediators are omitted from the diagram

on the length of the measurements, constructs were indicated by items (i.e., acceptance, positive reframing, presence and search of meaning) or subscales (i.e., self-compassion, posttraumatic growth). Similar methods were also used in other empirical studies (e.g., Le et al. 2010; Taku et al. 2008). It has been acknowledged that two-indicator construct may be problematic (e.g., Harman 1967). Following the recommendation by Little et al. (1999), the item loadings of the 2-item acceptance scale were constrained to be equal, and the item loadings of the 2-item positive reframing scale were also constrained to be equal. To evaluate the overall model fit, indices including chi-square (χ^2) statistics, comparative fit index (CFI), Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA; Kline 2005) were used. For CFI and TLI, values greater than .95 indicate acceptable model fit (Bentler 1990; Muthén and Muthén 1998–2015). For RMSEA, a value between .05 and .08 reflects reasonable model fit (Browne and Cudeck 1993). Due to the fact that chi-square was sensitive to sample size (Bergh 2015) and the sample size in this present study was relatively large ($N = 601$), we did not use the statistical significance of the chi-square value as the primary index to evaluate the goodness of fit of the overall model. The bootstrapping method was also employed to estimate the indirect effect (Preacher and Hayes 2008); absence of zero in the 95% confidence interval suggests significant indirect effect. All analyses were performed using Mplus for Windows Version 7.3 (Muthén and Muthén 1998–2015).

Results

The means, standard deviations, and correlations for all variables are shown in Table 1. Most variables correlated with each other in a way that supported the hypothesized associations. Positive self-compassion was significantly associated with higher levels of posttraumatic growth, acceptance, positive reframing, and presence of meaning. Negative self-compassion was significantly associated with lower levels of positive reframing and presence of meaning, and higher levels of search for meaning. Inconsistent with hypotheses, positive self-compassion was not associated with search for meaning ($r = -0.07$; $p = 0.11$); negative self-compassion was not significantly associated with posttraumatic growth ($r = -0.07$; $p = 0.10$) and acceptance ($r = 0.03$; $p = 0.54$). We also examined the associations between demographic variables (i.e., gender, age, time since the most recent traumatic event) and posttraumatic growth. None of the demographic variables were found significantly associated with posttraumatic growth. Unexpectedly, time since the most recent traumatic event was also not significantly associated with posttraumatic growth ($r = -0.05$; $p = 0.25$) and thus not included in the model as a controlled variable. Based on these findings, the proposed mediation model was modified. In particular, negative self-compassion and search for meaning were dropped from the proposed model because it was not associated with posttraumatic growth (see Fig. 2).

Measurement Model

Direct maximum likelihood estimation procedures were used to accommodate missing data in all analyses. Results of the confirmatory factor analysis of the modified model (the one without negative self-compassion) showed an adequate overall model fit, χ^2 (111) = 208.33, $p < 0.001$, CFI = 0.98, TLI = 0.98, RMSEA = 0.04. Standardized factor loadings ranged from 0.61 to 0.90, and they were all significant at the

Table 1 Descriptive statistics and correlation matrix of the main study among variables of interest ($n = 601$)

	M	SD	2	3	4	5	6	7	8
1. PSC	3.21	0.70	−.53**	.26**	.38**	.43**	−.07	.26**	.00
2. NSC	3.26	0.83	–	.03	−.10*	−.35**	.25**	−.07	−.06
3. Acceptance	3.11	0.77		–	.52**	.25**	.14**	.39**	−.10*
4. Positive reframing	2.76	0.92			–	.32**	.15**	.50**	−.07
5. Presence of meaning	5.11	1.37				–	−.11**	.34**	.00
6. Search of meaning	5.09	1.34					–	.17**	−.11**
7. Posttraumatic growth	4.05	1.23						–	−.05
8. Time since the most recent traumatic event[a]	1.75	1.18							–

PSC positive self-compassion components, *NSC* negative self-compassion components

*$p < .05$; **$p < .01$

[a] (1) Less than 6 months, (2) 6 months to a year, (3) 1 to 2 years, (4) 2 to 5 years, and (5) more than 5 years

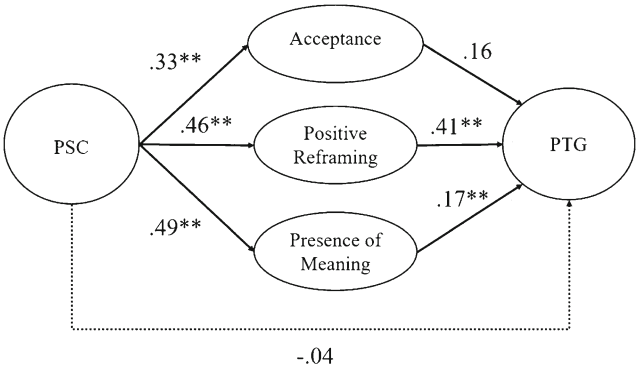

Fig. 2 Revised model of self-compassion and posttraumatic growth. Standardized path coefficients are shown. For clarity, measurement errors, parceled indicators, and covariance among mediators are omitted from the diagram. Parameter estimates from latent factors to their corresponding parceled indicators are shown in Table 2. *Two asterisks* $p < .01$

$p < .001$ level. Unstandardized and standardized loadings for the model are shown in Table 2.

Structural Model

Positive self-compassion was significantly associated with all cognitive processes, including higher levels of acceptance ($\beta = .33$, $p < .01$), positive reframing ($\beta = 0.46$, $p < 0.01$), and presence of meaning ($\beta = 0.49$, $p < 0.01$). Posttraumatic growth was significantly associated with higher levels of positive reframing ($\beta = 0.41$, $p < 0.01$) and presence of meaning ($\beta = 0.17$, $p < 0.01$), but it was not significantly associated with acceptance ($\beta = 0.16$, $p = 0.08$) (Table 3).

Table 2 Unstandardized and standardized loadings for the measurement model

Parameter estimate	Unstandardized	Standardized
PSC ➔ self-kindness	1.00	0.84**
PSC ➔ common humanity	0.94** (0.05)	0.73**
PSC ➔ mindfulness	0.99** (0.05)	0.84**
Acceptance ➔ A1	0.64** (0.03)	0.72**
Acceptance ➔ A2	0.64** (0.03)	0.72**
Positive reframing ➔ PR1	0.81** (0.03)	0.81**
Positive reframing ➔ PR2	0.81** (0.03)	0.79**
Presence of meaning ➔ PM1	1.00	0.82**
Presence of meaning ➔ PM2	1.07** (0.04)	0.89**
Presence of meaning ➔ PM3	0.99** (0.04)	0.87**
Presence of meaning ➔ PM4	1.07** (0.04)	0.86**
Presence of meaning ➔ PM5	0.91** (0.05)	0.66**
PTG ➔ relating to others	1.00	0.87**
PTG ➔ new possibilities	1.02** (0.04)	0.87**
PTG ➔ personal strengths	1.01** (0.04)	0.89**
PTG ➔ spiritual change	0.90** (0.06)	0.61**
PTG ➔ appreciation of life	0.94** (0.04)	0.80**

Standard errors are in parentheses

PSC positive self-compassion, *PTG* posttraumatic growth

**$p < .01$

The final model explained 36.0% of the variance in posttraumatic growth. The direct effect of positive self-compassion on posttraumatic growth was not significant when accounting for the variance explained by the cognitive processes (mediator variables), $B = -0.08$, $\beta = -0.04$, $p = 0.40$, 95% CI −0.14 to 0.05. However, the overall indirect effect of positive self-compassion via these cognitive processes was significant ($B = 0.59$, $\beta = 0.33$, $p < 0.001$, 95% CI 0.25 to 0.40). In particular, two specific indirect effects of positive self-compassion on posttraumatic growth via positive reframing and presence of meaning were significant (positive reframing: $B = 0.34$, $\beta = 0.19$, $p < 0.001$, 95% CI 0.10 to 0.28; presence of meaning: $B = 0.15$, $\beta = 0.08$, $p < 0.01$, 95% CI 0.03 to 0.14), but the indirect effect of positive self-compassion on posttraumatic growth via acceptance ($B = 0.10$, $\beta = 0.05$, $p = 0.10$, 95% CI −.01 to 0.12) was not significant. To compare the relative strength of indirect effects of positive self-compassion on posttraumatic growth among mediators, contrast tests were conducted. Results showed the indirect effect of positive self-compassion through positive reframing was stronger than the indirect effects through acceptance, χ^2 (1) = 4.79, $p < 0.05$, and through presence of meaning, χ^2 (1) = 4.69, $p < 0.05$. The indirect effect of positive self-compassion through presence of meaning was not significantly stronger than the indirect effect through acceptance, χ^2 (1) = 0.59, $p = 0.44$.

The independent indirect effect of each mediator was also examined without controlling for other mediators; slightly different results were obtained. The indirect effects of positive self-compassion through acceptance, positive reframing, and presence of meaning were all significant (acceptance: $B = 0.26$, $\beta = 0.15$, $p < 0.001$, 95% CI 0.08 to 0.21; positive reframing: $B = 0.47$, $\beta = 0.26$, $p < 0.001$, 95% CI 0.19 to 0.33; presence of meaning: $B = 0.25$, $\beta = 0.14$, $p < 0.001$, 95% CI 0.08 to 0.20).

Discussion

This study contributes to the literature by examining the association between self-compassion and posttraumatic growth and exploring the mediating role of cognitive processes in such an association. Our findings suggest self-compassion is adaptive in the experience of crises. Consistent with previous finding on the association between self-compassion and reduced posttraumatic stress symptoms (Dahm et al. 2015; Seligowski et al. 2015; Thompson and Waltz 2008; Zeller et al. 2015), we found that positive self-compassion was significantly associated with higher levels of posttraumatic growth, and the association was mediated by positive

Table 3 Unstandardized and standardized parameter estimates for the final structural model

Parameter estimate	Unstandardized	Standardized	95% CI
Direct effect			
PSC ➜ acceptance	0.53** (0.10)	0.33**	
PSC ➜ positive reframing	0.79** (0.11)	0.46**	
PSC ➜ presence of meaning	0.96** (0.08)	0.49**	
PSC ➜ PTG	−0.08 (0.09)	−0.04	
Acceptance ➜ PTG	0.18 (0.10)	0.16	
Positive reframing ➜ PTG	0.43** (0.10)	0.41**	
Presence of meaning ➜ PTG	0.15** (0.05)	0.17**	
Indirect effect			
PSC ➜ acceptance ➜ PTG	0.10 (0.06)	0.05	−.01, .12
PSC ➜positive reframing ➜ PTG	0.34** (0.09)	0.19**	.10, .28
PSC ➜presence of meaning ➜ PTG	0.15** (0.05)	0.08**	.03, .14
Covariance between mediators			
Acceptance—positive reframing	0.65** (0.06)	0.65**	
Acceptance—presence of meaning	0.20** (0.07)	0.17**	
Positive reframing—presence of meaning	0.23** (0.07)	0.21**	

Standard errors are in parentheses

PSC positive self-compassion, *NSC* negative self-compassion, *PTG* posttraumatic growth

**$p < .01$

reframing and presence of meaning, as well as acceptance when the mediators were examined independently.

Studies suggest self-compassion helps individuals to cope with negative life events through openly observing their thoughts and feelings associated with those negative experiences (Neff and McGehee 2010; Vettese et al. 2011). Not to deny or over-respond, people with high self-compassion take a balanced approach to review their experience, and acknowledge their suffering/gains in the negative experiences (mindfulness). Furthermore, self-compassionate individuals are more likely to acknowledge suffering is a part of the commonly shared human experience (common humanity), making them more willing to disclose their negative experiences to supportive others and gain insights from cognitive processing. These processes are important for facilitating posttraumatic growth (Tedeschi and Calhoun 2004). With unconditional understanding and care (self-kindness), self-compassionate individuals are also more likely to accept that their current goals may not accommodate the reality of crises. Such process may, in turn, helps people develop new life goals and assimilate them with reality (Tedeschi and Calhoun 2004).

While positive self-compassion was found to be significantly associated with posttraumatic growth, negative self-compassion was not. This may suggest that positive self-compassion and negative self-compassion may have different functions or mechanisms in affecting people's posttraumatic growth. This finding is also in line with the dual processes of self-compassion (representing positive self-compassion) and self-criticism (representing negative self-compassion) in crisis survivorship (Falconer et al. 2015; Gilbert 2009; Longe et al. 2010). According to Waite et al. (2015), self-compassion and self-criticism have distinct roles in recovery, and the two processes can coexist. On one hand, positive self-compassion may foster hope and self-efficacy, which help empower individuals and promote their recovery and growth. On the other hand, self-criticism may increase distress and ruminations, which prevent people from recovering from the negative experience. Indeed, a recent study showed that negative self-compassion was more strongly associated with posttraumatic stress symptoms than positive self-compassion (Seligowski et al. 2015), supporting the argument that negative self-compassion may be more influential than positive self-compassion to stress responses after traumatic events, while positive self-compassion may be more influential on positive outcomes such as posttraumatic growth.

Our findings contributed to the literature by showing that cognitive processes may explain the underlying relationship between self-compassion and posttraumatic growth. Self-compassionate individuals may be more likely to experience posttraumatic growth because they have a greater ability to accept the occurrence of crises, reinterpret their negative events in positive light, and experience meaning in life. Indeed, the association between self-compassion and adaptive cognitive processes has been well-established in the literature (Ghorbani et al. 2012; Martin et al. 2011; Phillips and Ferguson 2012; Sirois et al. 2015; Thompson and Waltz 2008).

Inconsistent with the hypothesis, positive self-compassion was not associated with search of meaning. This result may attribute to the varying association between self-compassion and search for meaning over time. Soon after the occurrence of crises, intense psychological distress may impede people's meaning-searching process. In such moments, self-compassion may play an important role in the meaning-making process by soothing negative emotions and providing emotional safety for individuals to examine the self and reality of crises. However, the negative emotions associated with crises may fade across time. As a result, the role of self-compassion in facilitating meaning-searching may become minimal (Santiago et al. 2013). In the present study, time elapsed since the most recent traumatic event widely varied across the participants. Around 64% of participants reported that the most recent event occurred within the last 6 months, whereas 23% had the most recent event beyond 1 year (see "Method"). This may be one of the factors that contribute to the null association between positive self-compassion and search for meaning. Future studies should re-examine the association between self-compassion and search for meaning with a longitudinal research design to verify this speculation.

Limitation and Future Directions

The present study was subject to several limitations. First, while the sample was ethnically diverse, it was a non-clinical (and relatively young) college student sample, which may limit the generalizability of findings. Future research is needed to replicate the proposed mediation model in more diverse samples (e.g., community adults, clinical samples). Second, the cross-sectional design of the present study prevented us from making causal inferences. As noted earlier, the associations among constructs (e.g., self-compassion and search for meaning) may change over time. Similarly, the importance of different cognitive processes in facilitating posttraumatic growth may also vary across time. Therefore, future studies should re-examine the proposed model with a longitudinal design to gain a more comprehensive understanding of the association between self-compassion and posttraumatic growth and its underlying cognitive processes. Third, the mediating role of cognitive processes may vary across the traumatic events that participants had experienced. The generalizability of our findings to a specific type of traumatic event may be compromised. Future studies should consider measuring people's cognitive processes specific to different types of traumatic events they had experienced.

Despite these limitations, the findings of the present study are stimulating. It contributes to the existing body of literature by empirically supporting the roles of self-compassion and some cognitive processes in facilitating posttraumatic growth. Theoretically, findings may help understand the underlying mechanisms between self-compassion and posttraumatic growth. Previous research showed self-compassionate individuals tend to have better emotional regulation capacities and more perceived social support (Brodar et al. 2015; Heffernan et al. 2010; Neff 2003a), which may provide important resources in the process of posttraumatic growth (Tedeschi and Calhoun 2004). In addition to cognitive processes, future studies may extend the present study by examining the potential emotional and social processes that may be involved in the association between self-compassion and posttraumatic growth. Practically, findings may help develop effective brief interventions such as self-compassion writing (Baum and Rude 2013; Johnson and O'Brien 2013; Wong and Mak 2016) to enhance posttraumatic growth among trauma-exposed individuals.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

References

Allen, A. B., & Leary, M. R. (2010). Self-compassion, stress, and coping. *Social and Personality Psychology Compass, 4*(2), 107–118.

Allen, A. B., & Leary, M. R. (2014). Self-compassionate responses to aging. *The Gerontologist, 54*(2), 190–200.

Baum, E. S., & Rude, S. S. (2013). Acceptance-enhanced expressive writing prevents symptoms in participants with low initial depression. *Cognitive Therapy and Research, 37*(1), 35–42.

Bentler, P. M. (1990). Fit indexes, Lagrange multipliers, constraint changes and incomplete data in structural models. *Multivariate Behavioral Research, 25*(2), 163–172.

Bergh, D. (2015). Chi-squared test of fit and sample size: a comparison between a random sample approach and a chi-square value adjustment method. *Journal of Applied Measurement, 16*(2), 204–217.

Breines, J. G., & Chen, S. (2012). Self-compassion increases self-improvement motivation. *Personality and Social Psychology Bulletin, 38*(9), 1133–1143.

Brodar, K. E., Barnard Crosskey, L., & Thompson Jr., R. J. (2015). Relationship of self-compassion with perfectionistic self-presentation, perceived forgiveness, and perceived social support in an undergraduate Christian community. *Journal of Psychology & Theology, 43*(4), 231–242.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage Publications.

Butler, L. D., Blasey, C. M., Garlan, R. W., McCaslin, S. E., Azarow, J., Chen, X., & Spiegel, D. (2005). Posttraumatic growth following the terrorist attacks of September 11, 2001: cognitive, coping, and trauma symptom predictors in an internet convenience sample. *Traumatology, 11*(4), 247–267.

Cadell, S., Hemsworth, D., Smit Quosai, T., Steele, R., Davies, E., Liben, S., et al. (2014). Posttraumatic growth in parents caring for a child with a life-limiting illness: a structural equation model. *Amerian Journal of Orthopsychiatry, 84*(2), 123–133.

Calhoun, L. G., & Tedeschi, R. G. (1999). *Facilitating posttraumatic growth: a clinician's guide*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc..

Carver, C. S. (1997). You want to measure coping but your protocol's too long: consider the brief COPE. *International Journal of Behavioral Medicine, 4*(1), 92–100.

Castilho, P., Pinto-Gouveia, J., & Duarte, J. (2015). Evaluating the multifactor structure of the long and short versions of the self-compassion scale in a clinical sample. *Journal of Clinical Psychology, 71*(9), 856–870.

Costa, J., Marôco, J., Pinto-Gouveia, J., Ferreira, C., & Castilho, P. (2015). Validation of the psychometric properties of the self-compassion scale. Testing the factorial validity and factorial invariance of the measure among borderline personality disorder, anxiety disorder, eating disorder and general populations. *Clinical Psychology & Psychotherapy.* doi:10.1002/cpp.1974.

Creamer, M., Burgess, P., & Pattison, P. (1992). Reaction to trauma: a cognitive processing model. *Journal of Abnormal Psychology, 101*(3), 452–459.

Dahm, K. A., Meyer, E. C., Neff, K. D., Kimbrel, N. A., Gulliver, S. B., & Morissette, S. B. (2015). Mindfulness, self-compassion, posttraumatic stress disorder symptoms, and functional disability in US Iraq and Afghanistan war veterans. *Journal of Traumatic Stress, 28*(5), 460–464.

Falconer, C. J., King, J. A., & Brewin, C. R. (2015). Demonstrating mood repair with a situation-based measure of self-compassion and self-criticism. *Psychology and Psychotherapy: Theory, Research and Practice, 88*(4), 351–365.

Gerber, M. M., Boals, A., & Schuettler, D. (2011). The unique contributions of positive and negative religious coping to posttraumatic growth and PTSD. *Psychology of Religion and Spirituality, 3*(4), 298–307.

Ghorbani, N., Watson, P. J., Chen, Z., & Norballa, F. (2012). Self-compassion in Iranian muslims: relationships with integrative self-knowledge, mental health, and religious orientation. *International Journal of the Psychology of Religion, 22*(2), 106–118.

Gilbert, P. (2009). *The compassionate mind*. London: Constable & Robinson.

Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2011). Fears of compassion: development of three self-report measures. *Psychology and Psychotherapy: Theory, Research and Practice, 84*(3), 239–255.

Greenberg, M. A. (1995). Cognitive processing of traumas: the role of intrusive thoughts and reappraisals. *Journal of Applied Social Psychology, 25*(14), 1262–1296.

Harman, H. H. (1967). *Modern factor analysis*. Chicago: University of Chicago Press.

Hasanovic, M., Haracic, E., Ahmetsphic, S., Kurtovic, S., & Haracic, H. (2009). The psychological disturbances of war-traumatized adolescents in rural and urban areas of Bosnia and Herzegoina and correlation with poverty and hoplessness. *International Journal of child and adolescent health, 2*(1), 81–97.

Heffernan, M., Quinn Griffin, M. T., McNulty, S. R., & Fitzpatrick, J. J. (2010). Self-compassion and emotional intelligence in nurses. *International Journal of Nursing Practice, 16*(4), 366–373.

Hefferon, K., Grealy, M., & Mutrie, N. (2009). Post-traumatic growth and life threatening physical illness: a systematic review of the qualitative literature. *British Journal of Health Psychology, 14*(2), 343–378.

Johnson, E. A., & O'Brien, K. A. (2013). Self-compassion soothes the savage ego-threat system: effects on negative affect, shame, rumination, and depressive symptoms. *Journal of Social and Clinical Psychology, 32*(9), 939–963.

Kashdan, T. B., & Kane, J. Q. (2011). Post-traumatic distress and the presence of post-traumatic growth and meaning in life: experiential avoidance as a moderator. *Personality and Individual Differences, 50*(1), 84–89.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*(12), 1048–1060.

Kline, R. B. (2005). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.

Larner, B., & Blow, A. (2011). A model of meaning-making coping and growth in combat veterans. *Review of General Psychology, 15*(3), 187–197.

Le, H., Schmidt, F. L., Harter, J. K., & Lauver, K. J. (2010). The problem of empirical redundancy of constructs in organizational research: an empirical investigation. *Organizational Behavior and Human Decision Processes, 112*(2), 112–125.

Leary, M. R., Tate, E. B., Adams, C. E., Allen, A. B., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: the implications of treating oneself kindly. *Journal of Personality and Social Psychology, 92*(5), 887–904.

Linley, P. A., & Joseph, S. (2004). Positive change following trauma and adversity: a review. *Journal of Traumatic Stress, 17*(1), 11–21.

Little, T. D., Lindenberger, U., & Nesselroade, J. R. (1999). On selecting indicators for multivariate measurement and modeling with latent variables: when "good" indicators are bad and "bad" indicators are good. *Psychological Methods, 4*(2), 192–211.

Longe, O., Maratos, F. A., Gilbert, P., Evans, G., Volker, F., Rockliff, H., & Rippon, G. (2010). Having a word with yourself: neural correlates of self-criticism and self-reassurance. *Neuro Image, 49*(2), 1849–1856.

López, A., Sanderman, R., Smink, A., Zhang, Y., van Sonderen, E., Ranchor, A., & Schroevers, M. J. (2015). A reconsideration of the self-compassion scale's total score: self-compassion versus self-criticism. *PloS One, 10*(7), e0132940. doi:10.1371/journal.pone.0132940.

MacBeth, A., & Gumley, A. (2012). Exploring compassion: a meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review, 32*(6), 545–552.

Martin, M. M., Staggers, S. M., & Anderson, C. M. (2011). The relationships between cognitive flexibility and dogmatism, intellectual flexibility, preference for consistency, and self-compassion. *Communication Research Reports, 28*(3), 275–280.

Muris, P., & Petrocchi, N. (2016). Protection or vulnerability? A meta-analysis of the relations between the positive and negative components of self-compassion and psychopathology. *Clinical Psychology & Psychotherapy.* doi:10.1002/cpp.2005.

Muthén, L. K., & Muthén, B. O. (1998). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.

Neff, K. D. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250.

Neff, K. D. (2003b). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–101.

Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity, 9*(3), 225–240.

Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality, 41*(4), 908–916.

Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: two different ways of relating to oneself. *Journal of Personality, 77*(1), 23–50.

Norris, F. H., Tracy, M., & Galea, S. (2009). Looking for resilience: understanding the longitudinal trajectories of responses to stress. *Social Science & Medicine, 68*(12), 2190–2198.

Park, C. L. (1998). Implications of posttraumatic growth for individuals. In R. G. Tedeschi, C. L. Park, & L. G. Calhoun (Eds.), *Posttraumatic growth: positive change in the aftermath of crisis* (pp. 153–177). Mahwah, NJ: Lawrence Erlbaum Associates, Inc..

Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality, 64*(1), 71–105.

Phillips, W. J., & Ferguson, S. J. (2012). Self-compassion: a resource for positive aging. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences.* doi:10.1093/geronb/gbs091.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891.

Santiago, P. N., Ursano, R. J., Gray, C. L., Pynoos, R. S., Spiegel, D., Lewis-Fernandez, R., & Fullerton, C. S. (2013). A systematic review of PTSD prevalence and trajectories in DSM-5 defined trauma exposed populations: intentional and non-intentional traumatic events. *PloS One, 8*(4), e59236. doi:10.1371/journal.pone.0059236.

Schmidt, S. D., Blank, T. O., Bellizzi, K. M., & Park, C. L. (2012). The relationship of coping strategies, social support, and attachment style with posttraumatic growth in cancer survivors. *Journal of Health Psychology, 17*(7), 1033–1040.

Schroevers, M. J., & Teo, I. (2008). The report of posttraumatic growth in Malaysian cancer patients: relationships with psychological distress and coping strategies. *Psycho-Oncology, 17*(2), 1239–1246.

Schulenberg, S. E., Strack, K. M., & Buchanan, E. M. (2011). The Meaning in Life Questionnaire: psychometric properties with individuals with serious mental illness in an inpatient setting. *Journal of Clinical Psychology, 67*(12), 1210–1219.

Seligowski, A. V., Miron, L. R., & Orcutt, H. K. (2015). Relations among self-compassion, PTSD symptoms, and psychological health in a trauma-exposed sample. *Mindfulness, 6*(5), 1033–1041.

Sirois, F. M., Molnar, D. S., & Hirsch, J. K. (2015). Self-compassion, stress, and coping in the context of chronic illness. *Self and Identity, 14*(3), 334–347.

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53*(1), 80–93.

Steger, M. F., & Kashdan, T. B. (2007). Stability and specificity of meaning in life and life satisfaction over one year. *Journal of Happiness Studies, 8*(2), 161–179.

Taku, K., Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2008). The role of rumination in the coexistence of distress and posttraumatic growth among bereaved Japanese university students. *Death Studies, 32*(5), 428–444.

Tang, S. T., Lin, K. C., Chen, J. S., Chang, W. C., Hsieh, C. H., & Chou, W. C. (2015). Threatened with death but growing: changes in and determinants of posttraumatic growth over the dying process for Taiwanese terminally ill cancer patients. *Psycho-Oncology, 24*(2), 147–154.

Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*(3), 455–471.

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: conceptual foundations and empirical evidence. *Psychological Inquiry, 15*(3), 1–18.

Thompson, B. L., & Waltz, J. (2008). Self-compassion and PTSD symptom severity. *Journal of Traumatic Stress, 21*(6), 556–558.

Vettese, L. C., Dyer, C. E., Li, W. L., & Wekerle, C. (2011). Does self-compassion mitigate the association between childhood maltreatment and later emotion regulation difficulties? A preliminary investigation. *International Journal of Mental Health and Addiction, 9*(5), 480–491.

Waite, F., Knight, M. T., & Lee, D. (2015). Self-compassion and self-criticism in recovery in psychosis: an interpretative phenomenological analysis study. *Journal of Clinical Psychology, 71*(12), 1201–1217.

Wang, Y., Shen, H., & Xie, H. (2015). Posttraumatic growth, posttraumatic stress symptoms, and psychological health in traumatically injured patients in mainland China. *Clinical Psychologist, 19*(3), 122–130.

Winthrop, A. L. (2010). Health-related quality of life after pediatric trauma. *Current Opinion in Pediatrics, 22*(3), 346–351.

Wong, C. C. Y., & Mak, W. W. S. (2016). Writing can heal: effects of self-compassion writing among Hong Kong Chinese college students. *Asian American Journal of Psychology, 7*, 74–82.

Wortman, C. B. (2004). Posttraumatic growth: progress and problems. *Psychological Inquiry, 15*(1), 81–90.

Wright, B. A. (1989). Extension of Heider's ideas to rehabilitation psychology. *American Psychologist, 44*(3), 525–528.

Yeung, N. C. Y., Lu, Q., Wong, C. C. Y., & Huynh, H. C. (2015). The roles of needs satisfaction, cognitive appraisals, and coping strategies in promoting posttraumatic growth: a stress and coping perspective. *Psychological Trauma: Theory, Research, Practice, and Policy.* doi:10.1037/tra0000091.

Zeller, M., Yuval, K., Nitzan-Assayag, Y., & Bernstein, A. (2015). Self-compassion in recovery following potentially traumatic stress: longitudinal study of at-risk youth. *Journal of Abnormal Child Psychology, 43*(4), 645–653.

Zessin, U., Dickhäuser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: a meta-analysis. *Applied Psychology: Health and Well-Being, 7*(3), 340–364.