

## **Association between virtues and posttraumatic growth: Preliminary evidence from a Chinese community sample after earthquakes**

Wenjie Duan, Pengfei Guo

Relationship, Vitality, and Conscientiousness are three fundamental virtues that have been identified recently. This study attempted to explore the relationship between the three constructs and post-traumatic growth (PTG) in three directions, including indirect trauma samples without post-traumatic stress disorder (PTSD), direct trauma samples without PTSD, and direct trauma samples with PTSD. A total of 340 community participants from Sichuan Province, Mainland China involved in the study, most of which experienced Wenchuan and Lushan Earthquake. Results indicated significant and positive correlations between virtues and PTG. In the indirect trauma samples, vitality explained 32% variance of PTG. In reference to the direct trauma sample without PTSD, both relationship and conscientiousness explained 32% variance of PTG; whereas in the direct trauma sample with PTSD, only conscientiousness accounted for 31% the variance in PTG. These results preliminarily revealed the role of virtues with important implications for strengths-based treatment.

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3 Community Sample after Earthquake

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14 **Association between Virtues and Posttraumatic Growth: Preliminary Evidence from a Chinese**  
15 **Community Sample after Earthquakes**

16 **INTRODUCTION**

17 Natural disasters, cancer, bereavement, and other life-threatening events with potentially  
18 irreversible consequences often lead to positive changes and transcendence known as posttraumatic  
19 growth (PTG, Calhoun & Tedeschi 2006; Tedeschi & Calhoun 2004). A promising research direction  
20 focuses on the effects of personal strengths on coping and responses to health- and wellbeing-related  
21 concerns and worries, such as traumatic events (Hampson & Friedman 2008).

22 To date, the most systematic approach for studying personal strengths is the Values in Action  
23 Classification developed by Peterson & Seligman (2004); this approach included 24 character strengths  
24 (e.g., hope, self-regulation, and gratitude) grouped into six core virtues (e.g., wisdom, courage, and  
25 humanity). They conceptualized virtue as “a property of the whole person and the life that person  
26 leads” (p. 87), which is a personal strength appreciated by the whole society (Peterson & Seligman  
27 2004). In the past decade, many studies revealed the positive relationship between these positive  
28 qualities and mental health (for review, see Niemiec 2013) and demonstrated that the use of strengths is  
29 a valid approach for enhancing wellbeing in diverse populations (Duan et al. 2014; Seligman et al.  
30 2005). Accordingly, the relationship between these qualities and PTG was explored using 1,739  
31 samples from different countries (Peterson et al. 2008). Findings indicated that kindness, love, bravery,  
32 hope, and religiousness show stronger relations with PTG than other strengths (Peterson et al. 2008).  
33 However, no correlation coefficient was higher than 0.35, thus reflecting weak correlation. Principal  
34 component factor analysis revealed a five-factor structure of virtues, namely, interpersonal, fortitude,

35 cognitive, transcendence, and temperance. Correlation analysis showed that all these five virtues  
36 correlated with PTG, but all the correlation coefficients were lower than 0.21 (Peterson et al. 2008).

37 Three issues should be noted regarding the study of Peterson et al. (2008). First, the virtue  
38 structure in the aforementioned study is questionable. Various studies have found that the 24 identified  
39 strengths can be grouped into different virtues in diverse cultures, and the groups include 3-, 4-, or 5-  
40 factor structures (Duan et al. 2012b; Ho et al. 2014a). Thus, the virtue structure should be clarified  
41 prior to delineating the function of virtues in facing trauma and should be explored and analyzed  
42 further. Duan et al. (2012b) adopted the combined emic and etic approaches to select 96 cross-  
43 culturally equivalent items from the original 240-item Values In Action Inventory of Strengths by  
44 using a Chinese population (Ho et al. 2014b). Exploratory and confirmatory factor analyses revealed 3  
45 virtues, namely, relationship, vitality, and conscientiousness (Duan et al. 2013). The relationship virtue  
46 reflects “the love, concern, and gratitude of a person toward others”; vitality reflects “the curiosity and  
47 zest for creativity of an individual”; and conscientiousness is “an intrapersonal virtue that describes  
48 people who persist in achieving goals and exhibit self-control,” which reflects the individual  
49 orientation of the virtues (Ho et al. 2014a). Therefore, the relationship between the three virtues and  
50 PTG should be reexamined. Second, the research conducted by Peterson et al. (2008) examined only  
51 the relationship among trauma samples, which accounted for 56% of the entire population. However,  
52 previous studies argued that stress-related life events could likewise facilitate stress-related growth,  
53 which is assessed by Posttraumatic Growth Inventory (PTGI), but to a lesser extent than traumatic  
54 events (e.g., LoSavio et al. 2011). The level of perceived stress that resulted from events might be the  
55 key cause of PTG, rather than the objective and specific events per se. Third, several individuals who

56 underwent trauma may develop posttraumatic stress disorder (PTSD), whereas others may not (Yehuda  
57 & Flory 2007). The above study failed to consider the influence of PTSD on PTG in the trauma  
58 samples. An inverted-U curve was also found between PTG and PTSD, which suggested that PTG  
59 decreased after a moderate level of PTSD (Levine et al. 2008). Nevertheless, an increasing interest was  
60 noted among mental health professionals in determining the strengths of their clients (McCrae 2011).

## 61 **CURRENT STUDY**

62 To expand our understanding of the function of strengths in PTG, the relationship between  
63 virtues and PTG should be explored. Basing on the above literature review, PTG in the current study  
64 refers to growth following stress-related events, including daily stressors and traumatic events.  
65 Individuals indirectly exposed to traumatic events can be recognized as persons who experienced  
66 stress-related events. Accordingly, both direct and indirect trauma groups would acquire PTG, and the  
67 differences between these two groups would be insignificant (Hypothesis 1). As previously discussed,  
68 a few traumatic individuals may develop PTSD, which implied that the contributions of the three  
69 virtues (relationship, vitality, and conscientiousness) to PTG vary depending on trauma type (i.e.,  
70 direct trauma vs. indirect trauma) and PTSD status (i.e., PTSD group vs. non-PTSD group)  
71 (Hypothesis 2). The current results will clarify the contributions of virtues in traumatic situations,  
72 which may facilitate a strength-based approach in both research and practice in the future.

## 73 **METHOD**

### 74 **Participants**

75 A total of 340 qualified respondents (109 males and 231 females) were recruited from different  
76 communities in Dujiangyan area, Sichuan, China, which were affected by the 2008 earthquake. A total

77 of 69 participants were aged 18–25, 101 were in the range of 36–35, 112 were in the range of 36–45,  
78 and 58 were above 46 years old. Only 51 participants have obtained a university degree or above. As  
79 expected, “natural disaster,” “sudden or unexpected death of someone close to you,” and “life-  
80 threatening illness or injury” were the three most endorsed items listed on the questionnaire on  
81 traumatic events (Table 1).

82 (Insert Table 1 Here)

### 83 **Procedures**

84 The announcement for study participation was published on community bulletin boards, which  
85 can be seen by most people who lived in the community. Individuals who were interested to participate  
86 were instructed to complete first the Life Events Checklist (LEC), and only the participants who  
87 directly or indirectly experienced trauma were qualified to complete the other scale during the  
88 following week (screening criteria are described in the Measures section). The Human Subjects  
89 Committee of Traditional Chinese Medicine Hospital Affiliated to Luzhou Medical College approved  
90 the study. All data collected were anonymous and confidential. Psychological assistance was provided  
91 to protect the subjects. Data were collected from December 2013 to April 2014.

### 92 **Measures**

93 *Life Events Checklist.* LEC was used to screen individuals who experienced direct or indirect  
94 trauma through 17 potential events (Gray et al. 2004). Participants are requested to rate each event on a  
95 five-point Likert scale (1 = happened to me, 2 = witnessed it, 3 = learned about it, 4 = not sure, 5 =  
96 does not apply). Participants who indicated at least one traumatic event as 1 = “happened to me” were  
97 defined as direct trauma samples, whereas respondents who indicated 2 = “witnessed it” and/or 3 =

98 “learned about it” were indirect trauma samples. Participants who selected 4 = “not sure” and/or 5  
99 “does not apply” in the checklist were excluded. Considering that all participants involved in this study  
100 were sampled within the earthquake zone (Dujiangyan area in Sichuan Province), rather than other  
101 place far away from the earthquake-prone area, they should not be treated as persons who lived far  
102 away from Sichuan and were affected by the earthquake only through radio and television. Thus, all  
103 the qualified participants may have experienced at least some indirect exposure to earthquake.

104 ***Chinese Virtues Questionnaire.*** Virtues were assessed using the Chinese Virtues Questionnaire,  
105 which is a 96-item simplified Chinese scale with good psychometric characteristics (Duan et al. 2013;  
106 Duan et al. 2012b). The respondents were requested to rate each item from 1 (very much unlike me) to  
107 5 (very much like me) on a five-point Likert scale. Item samples include “I can accept love from  
108 others” (Relationship), “I like to think of new ways to do things” (Vitality), and “I control my  
109 emotions” (Conscientiousness). A high mean score reflects a high degree of the virtue within an  
110 individual. In this study, the Cronbach’s  $\alpha$  values of the three subscales were 0.91 (relationship), 0.85  
111 (vitality), and 0.84 (conscientiousness).

112 ***Posttraumatic Growth Inventory-Chinese.*** A 15-item Chinese version of the PTGI (Ho et al.  
113 2004) measures growth following a traumatic event. The measurement requires individuals to indicate  
114 the extent of their experiences of changes as a result of crisis, ranging from 0 (not at all) to 5 (a very  
115 great degree). The reliability and validity of the 15-item version were accurate in previous studies (Ho  
116 et al. 2004). In the present sample, the Cronbach’s  $\alpha$  of the inventory was 0.84.

117 ***PCL-S.*** PTSD symptoms were evaluated by the 17-item PCL-S. Participants are requested to  
118 rate their experience from 1 (not at all) to 5 (extremely). Previous studies demonstrated that the

119 Chinese version can be used as a screening questionnaire among the Chinese population (Li et al.  
120 2010). Scores of 44 or above indicate a PTSD diagnosis (Blanchard et al. 1996). Responses of the  
121 diagnosed PTSD participants also fulfilled the criteria of DSM-IV, including a) “history of a  
122 traumatic stressor,” b) “persistent re-experiencing of the traumatic event,” c) “persistent avoidance of  
123 stimuli associated with the trauma and numbing of general responsiveness,” and d) “persistent  
124 symptoms of increased arousal.” In the current sample, the Cronbach’s  $\alpha$  of the entire scale was 0.93.

## 125 RESULTS

126 The descriptive statistics of all variables are listed in Table 2. ANOVA showed that the virtue  
127 of relationship and PTG exhibited significant differences among the three samples ( $p < 0.05$ ). Post-hoc  
128 tests further revealed that both the relationship and PTG of direct trauma with PTSD sample were  
129 significantly lower than those of the other groups ( $p < 0.05$ ). Correlation analysis (Table 3) revealed  
130 that different virtues showed significantly positive relations with PTG in the total sample and three  
131 subsamples, ranging from 0.39 to 0.56 ( $p < 0.01$ ).

132 (Insert Table 2 Here)

133 (Insert Table 3 Here)

134 Further regression analysis by stepwise method revealed that virtues served different functions  
135 in diverse subsamples (Table 4). In the indirect trauma sample, only vitality ( $Beta = 0.56, t = 6.44, p <$   
136  $0.001$ ) significantly explained 32% variance of PTG, whereas based on the direct trauma without  
137 PTSD sample, relationship ( $Beta = 0.38, t = 5.98, p < 0.001$ ) and conscientiousness ( $Beta = 0.29, t =$   
138  $4.54, p < 0.001$ ) also accounted for 32% variance of PTG. Finally, in the direct trauma with PTSD

139 sample, only conscientiousness ( $Beta = 0.56, t = 3.85, p < 0.01$ ) can contribute 31% explained variance  
140 to PTG.

141 (Insert Table 4 Here)

## 142 **DISCUSSION**

143 This research is based on a community sample of people directly or indirectly exposed to  
144 trauma (e.g., earthquakes). As expected, no difference of PTG existed between the indirect and direct  
145 trauma samples. A previous study indicated that a population indirectly hit by an earthquake could still  
146 grow after traumatic experiences (Yu et al. 2010). In the present study, some participants directly  
147 experienced an earthquake, whereas some might have indirectly experienced this event through their  
148 friends, witnessed the death of a close friend, or experienced the psychological distress caused by the  
149 death of a family member or a close friend. Thus, all the participants may undergo PTG. The growth  
150 also decreased with increased severity of PTSD, which was partly explained by the inverted-U curve  
151 between PTG and PTSD. As reflected by the present results, the correlation between PTG and PTSD  
152 was almost significant and negative, particularly in the PTSD sample ( $r = -0.31, p = 0.07$ ). Mol et al.  
153 (2005) also investigated 832 individuals and found that the scores of their PTSD were the same for  
154 some early-life and traumatic events, which partly revealed that some life events could also generate  
155 PTSD symptoms. All these results suggest that the objective traumatic events may not essentially lead  
156 to PTG or PTSD. According to the Transactional Model of Stress and Coping (Lazarus & Folkman  
157 1984), the perceived stress from these events could be triggered. Thus, further studies are necessary to  
158 understand the differences in PTG and PTSD after traumatic and non-traumatic events.

159 Our previous studies preliminarily demonstrated that three virtues are positively associated with  
160 positive health outcomes (Duan et al. 2012a; Duan et al. 2013; Tang et al. in press), such as satisfaction  
161 with life and flourishing, but negatively associated with negative health outcomes (Duan et al. 2013;  
162 Duan et al. 2015; Zhang et al. 2014b), such as depression, anxiety, general severity index, and  
163 pathological Internet use. These results indicated that the three virtues might be protective factors of  
164 mental health. Accordingly, personal virtues may facilitate rebounding for individuals who experienced  
165 trauma.

166 Individuals with different endorsed virtues often occupy different psychological resources (e.g.,  
167 optimism, emotional control, and gratitude). Thus, they can maximize the use of different resources  
168 (i.e., diverse virtues) in various contexts. For instance, an individual with high level of relationship  
169 virtue is more adept at obtaining social support from his/her friends and relatives to recover from the  
170 trauma and even obtain growth. Thus, the main results of the current study revealed the different  
171 potential functions of virtues (i.e., relationship, vitality, and conscientiousness) in PTG. In the indirect  
172 trauma samples, only vitality contributed to the variance of growth after trauma. In the direct trauma  
173 without PTSD sample, relationship and conscientiousness explained the variance of PTG, whereas in  
174 the PTSD sample, only conscientiousness was the significant contributor. Basing on the previous and  
175 current findings, we can speculate the different functions of virtues in various samples. Without  
176 directly experiencing trauma, most people are troubled by small stress, and some are indirectly affected  
177 by trauma. When similar scenarios occur, vitality can cause individuals to perceive less stress, thereby  
178 reducing psychological distress (Duan et al. 2015). Our previous study identified that only students  
179 with higher vitality have perceived less stress from minor life events, which consequently introduced

180 less psychological distress (Duan et al. 2015). Individuals with high vitality are also more willing to  
181 express their concerns to relieve stress and improve mental health (Zhang et al. 2014a). After being  
182 directly exposed to traumatic events, most people retain psychological balance without significant  
183 symptoms of PTSD (Bonanno et al. 2007). Therefore, interpersonal resources related to the virtue of  
184 relationship are necessary. Prati & Pietrantonio (2009) demonstrated that social support is a significant  
185 contributor to PTG in a meta-analysis of 103 studies. Individuals who are rated high in the virtue of  
186 relationship are more likely to adopt a supportive mechanism to overcome the predicaments caused by  
187 trauma. Finally, conscientiousness, also termed as self-regulation, always facilitates positive mental  
188 health and decreases psychopathology (Hagger 2010). Duan et al. (2015) found that individual  
189 conscientiousness can directly decrease psychological distress, regardless of the level of stress.  
190 Consequently, the intrapersonal strengths reflected by conscientiousness can be used to regulate  
191 emotion, cognition, and behavior to resolve conflicts caused by trauma, thus enhancing growth after  
192 trauma.

193         Some limitations should be noted. First, similar to some studies on trauma, the design of this  
194 study was cross-sectional rather than longitudinal. Results of this research and the hypothesized  
195 functions of virtues in the development process of a traumatic event should be replicated and examined  
196 in future longitudinal designs. Second, the direct and indirect trauma samples were divided based on  
197 self-reported measurements, wherein “indirect trauma” could be anything from hearing about the  
198 traumatic event from a friend to watching it on TV, although they lived in the earthquake zone. These  
199 participants were actually not trauma-exposure types according to DSM or ICD, thereby leaving future  
200 studies to distinguish the two samples objectively. Third, all the data were collected by self-reported

201 method, which may introduce common method bias. Future studies should adopt multiple methods for  
202 controlling the bias. Finally, this study is the first to examine the function of virtues in trauma research  
203 among Chinese. More psychological outcomes, including flourishing, depression, and anxiety, should  
204 be explored in the future.

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**Table 1** (on next page)

Demographic and Sample Characteristics

Table 1 *Demographic and Sample Characteristics*

## 2 Table 1

3 *Demographic and Sample Characteristics*

Variables	<i>n</i>	%
Gender		
Male	109	32.06%
Female	231	67.94%
Age		
18-25	69	20.29%
26-35	101	29.71%
36-45	112	32.94%
46 and above	58	17.06%
Education		
Secondary school and below	37	10.88%
Tertiary school	186	54.71%
College	66	19.41%
University and above	51	15.00%
Types of trauma		
Natural disaster	126	37.06%
Sudden, unexpected death of someone close to you	102	30.00%

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Life threatening illness or injury	56	16.47%
Fire or explosion	49	14.41%
Transportation accident	33	9.71%

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**Table 2** (on next page)

Descriptive Statistics and Group Differences

Table 2 *Descriptive Statistics and Group Differences*

## 2 Table 2

3 *Descriptive Statistics and Group Differences*

	Indirect Trauma		Direct Trauma		Direct Trauma		ANOVA	
	Sample ( $n = 88$ )		without PTSD		with PTSD		$F$	$Sig.$
	$M$	$SD$	$M$	$SD$	$M$	$SD$		
Relationship	4.24	.41	4.17	.52	3.93	.51	5.08	.01
Vitality	4.16	.47	4.16	.44	4.02	.37	1.58	.21
Conscientiousness	4.01	.49	3.87	.56	3.89	.49	2.30	.10
PTG	3.34	.62	3.34	.56	3.09	.41	3.11	.05
PTSD	-	-	2.01	.39	3.26	.41	-	-

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**Table 3** (on next page)

Correlations between Virtues and Posttraumatic Growth in Different Subgroups

Table 3 *Correlations between Virtues and Posttraumatic Growth in Different Subgroups*

## 2 Table 3

3 *Correlations between Virtues and Posttraumatic Growth in Different Subgroups*

	Posttraumatic Growth			
	Total Sample	Indirect Trauma Sample ( $n = 88$ )	Direct Trauma without PTSD Sample ( $n = 217$ )	Direct Trauma with PTSD Sample ( $n = 35$ )
Relationship	.48**	.44**	.50**	.53**
Vitality	.54**	.56**	.39**	.45**
Conscientiousness	.46**	.49**	.45**	.56**

4 \*\*  $p < .01$ .

5

**Table 4** (on next page)

Regression of Virtues on Posttraumatic Growth in Different Subgroups

Table 4 *Regression of Virtues on Posttraumatic Growth in Different Subgroups*

## 2 Table 4

3 *Regression of Virtues on Posttraumatic Growth in Different Subgroups*

	Indirect Trauma Sample (n = 88)				Direct Trauma without PTSD Sample (n = 217)				Direct Trauma with PTSD Sample (n = 35)			
	<i>R</i> <sup>2</sup>	<i>F</i>	<i>Beta</i>	<i>t</i>	<i>R</i> <sup>2</sup>	<i>F</i>	<i>Beta</i>	<i>t</i>	<i>R</i> <sup>2</sup>	<i>F</i>	<i>Beta</i>	<i>t</i>
	.32	40.05***			.32	50.22***			.31	14.827**		
Relationship			.07	.53			.38	5.98***			.27	1.29
Vitality			.56	6.44***			.07	1.04			.23	1.36
Conscientiousness			.17	1.37			.29	4.54***			.56	3.85**

4 \*\*  $p < .01$ ; \*\*\*  $p < .001$ 

5