

Psychometric properties of the Chinese Post-traumatic Growth Inventory in patients with chronic diseases

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KEY MESSAGE

The Chinese version of the Post-traumatic Growth Inventory is a reliable and valid instrument to assess the post-traumatic growth of Hong Kong Chinese patients with chronic disease.

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Introduction

After exposure to traumatic events, negative outcomes such as anxiety and stress disorders are often reported. However, positive changes, or post-traumatic growth (PTG), have also been increasingly documented¹ and can be reflected in self-perception, a changed sense of relationship with others, and a changed philosophy of life.² The Post-traumatic Growth Inventory (PTGI) has been widely used to measure PTG in five domains: appreciation of life, new possibilities, personal strength, spiritual change, and relating to others.³

Although the reliability of the PTGI has generally been supported, its psychometric properties among Chinese people remain unconfirmed. In a study of mainland Chinese people with skin disease, PTG has been understood as self-growth, new possibilities, and appreciation of life. Nonetheless, in studies of Chinese patients with cancer in Hong Kong and Taiwan, a higher-order model of PTG has been supported.^{4,5} The PTGI has not been validated in patients with non-cancer chronic conditions in Hong Kong. This study aimed to examine the psychometric properties of the Chinese version of the PTGI (CPTGI) among patients with chronic disease in terms of internal consistency, reliability, concurrent validity, underlying measurement model, and test-retest reliability.

Methods

Using stratified sampling, nine non-governmental organisations and parents' self-help groups from different districts were randomly selected. The targeted participants were first screened by the officers. The inclusion criteria were: (1) Chinese adult patients in Hong Kong with any kind of chronic illness; (2) currently under medical treatment for the illness; (3) non-cancerous or no cancer history; and

(4) no cognitive or psychiatric impairments.

The participants were told that the purpose of the study was to understand their psychological well-being after having been diagnosed with chronic illnesses. Informed consent was obtained from each participant before data collection. A subsample of the respondents (n=122) were randomly selected for a follow-up survey after 1 to 9 weeks to assess the test-retest reliability of the CPTGI.

The questionnaire consisted of demographic variables (age, sex, chronic disease, time of diagnosis, marital status, accommodation) and psychometric scales that assess PTG, anxiety and depression, hope, and coping. The CPTGI measures positive changes experienced by patients after a major life crisis. It comprises 21 items in the domains of appreciation of life, new possibilities, relating to others, personal strength, and spiritual change. The Chinese version of the Hospital Anxiety and Depression Scale comprises 14 items: half on depression and half on anxiety. The Chinese version of the Adult Trait Hope Scale measures an individual's hope on two subscales: pathways (4 items) for individual appraisals of the capability to surmount barriers and strive for goals, and agency (4 items) to assess individual general determination with respect to goals. The short version of the Coping Orientation to Problems Experienced scale comprises 28 items on 14 coping strategies: active coping, planning, positive reframing, acceptance, humour, religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioural disengagement, and self-blame.

Results

A total of 265 patients were included. Their mean age was 72.95 (standard deviation, 14.85; range, 20-100) years. Most (61%) had a primary education or lower.

Most (54%) were married. About 28% lived with their parents and/or children, 26% lived with spouses, 22% were solitary, and 19% lived in caring or nursing homes. Most (61%) took care of themselves, but 24% received care from family members, 12% from caring or nursing homes, and 3% from domestic helpers. The mean time since primary disease diagnosis was 3.88 (standard deviation, 3.28; range, 0-10) years. Diagnoses included hypertension (n=50), coronary heart disease (n=37), diabetes (n=26), Parkinson disease (n=26), stroke (n=19), and other chronic illnesses (rheumatoid arthritis, low back pain, and cardiac dysrhythmia).

All scales had satisfactory internal consistency reliability, with Cronbach's alpha ranging 0.66 to 0.85 (Table 1). No gender differences were significant on any scale or subscale.

Confirmatory factor analysis was conducted on the covariance matrix of the CPTGI scores. Competing models were specified according to the literature and included the original five-factor first-order model, a three-factor first-order model, a higher-order model, and a higher-order model without item 15 (Table 2).³⁻⁵

The two first-order models had poorer fit than the higher-order models, in which self, life orientation, and spiritual were combined under a latent factor (intrapersonal), whereas interpersonal was the fourth factor on its own. Removal of item 15 (as suggested in a study)⁵ did not generate a significantly better fit. The higher-order model in which all items were retained was adopted (Fig). Our hypothesis was supported by the results: PTG can be understood as a four-factor construct (self, spiritual, life orientation, interpersonal) in which a higher-order factor (intrapersonal) includes the self, spiritual, and life orientation factors.

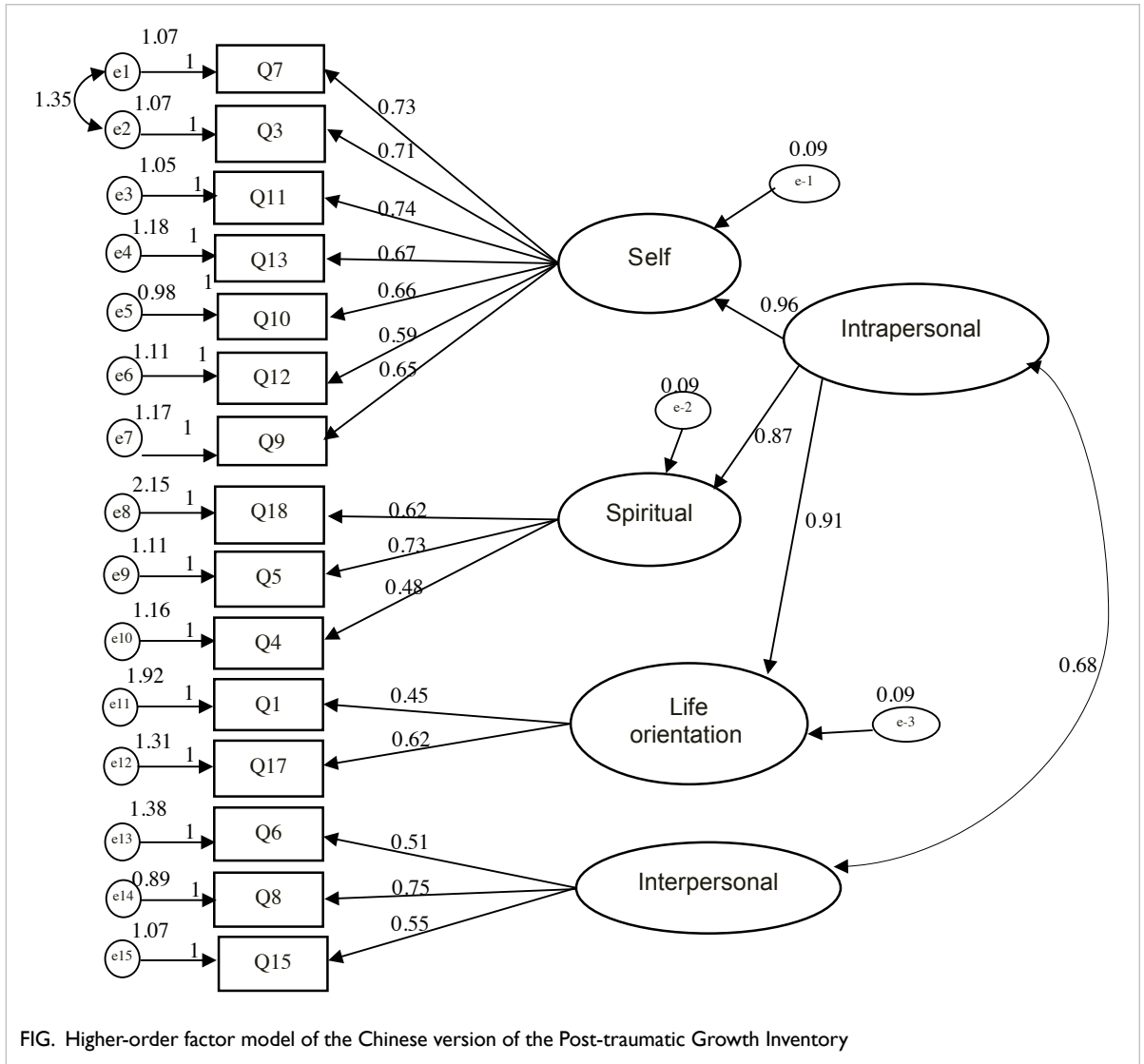
The concurrent validity of the CPTGI was examined by Pearson's correlations among all scales. Overall, the CPTGI correlated positively with hope (r=0.37) and coping (r=0.32) but negatively with anxiety and depression (r= -0.21), as predicted. These inter-factor relationships supported the construct validity of the CPTGI. Nonetheless, owing to fatigue, only a few participants could finish all four scales. Thus, interpretations of correlations between the Adult Trait Hope Scale and Coping Orientation to Problems Experienced scale should be cautious.

TABLE 1. Internal consistency and reliability of scales

Scale	No. of items	Male	Female	Total	Cronbach's alpha
Chinese version of Post-traumatic Growth Inventory	21	2.69±0.84	2.63±0.97	2.64 ±0.92	0.93
Appreciation of life	3	8.77±2.99	8.22±3.84	8.42±3.51	0.66
New possibilities	5	11.69±5.77	11.52±6.22	11.58±6.01	0.85
Relating to others	7	20.21±6.56	19.90±7.37	19.92±7.08	0.85
Personal strength	4	12.31±3.46	12.58±4.33	12.40±4.05	0.76
Spiritual change	2	4.88±2.92	4.82±3.03	4.82±2.97	0.66
Chinese version of Hospital Anxiety and Depression Scale	14	1.75±0.38	1.82±0.33	1.78±0.35	0.82
Anxiety	7	2.23±0.74	2.34±0.61	2.29±0.68	0.69
Depression	7	1.25±0.31	1.29±0.32	1.27±0.31	0.77
Chinese version of Adult Trait Hope Scale	8	6.07±1.43	5.02±1.42	5.65±1.47	0.86
Pathway	4	6.06±1.47	5.08±1.86	5.67±1.65	0.77
Agency	4	6.08±1.51	4.96±1.34	5.63±1.51	0.73
Coping Orientation to Problems Experienced scale	28	2.47±0.39	2.60±0.41	2.52±0.39	0.80

TABLE 2. Goodness-of-fit indices of different factor models

Factor model	χ^2	Degrees of freedom	$\chi^2 / \text{degrees of freedom}$	Goodness-of-fit index	Adjusted goodness-of-fit index	Comparative fit index	Tucker-Lewis index	Root mean square error of approximation	Standardised root mean square residual
Original five-factor first-order model	394.203	179	2.20	0.874	0.837	0.917	0.903	0.0670	0.0480
Three-factor first-order model	343.374	132	2.60	0.867	0.827	0.900	0.884	0.078	0.0531
Higher-order model	170.153	87	1.95	0.924	0.895	0.946	0.934	0.060	0.0445
Higher-order model without item 15	147.354	74	1.99	0.929	0.899	0.949	0.937	0.061	0.0437



In summary, the more hope a patient saw in life after experiencing trauma, the more growth he/she perceived. With regard to coping, positive coping strategies (positive reframing, religion, planning) correlated positively with PTG, but negative coping correlated negatively with PTG. The results of the PTGI correlated negatively with anxiety ($r = -0.15$ to -0.23).

The test-retest reliability values of CPTGI scores at weeks 1 and 9 were analysed using Pearson's product-moment correlation and dependent t -tests. All paired t -tests of within-subject differences were non-significant, indicating that there was no significant change between pre-test and post-test scores. Pearson's correlations between the test/retest scores on all subscales and the total scale were significant, but not high ($r = 0.33$ to 0.44).

Discussion

The CPTGI is a reliable and valid instrument for assessment of PTG in Chinese patients with chronic disease. All items should be included in the measurement of total PTG and domain-specific PTG; deletion of any item is not advisable. On the subscale level, the original five subscales had better internal consistency reliability than the four first-order factors had. This suggests that when measurement of specific domains of PTG is of concern, the original subscales should be adopted. When the overall PTG of patients is of interest, the higher-order model can be referenced, for instance, when designing a PTG enhancement programme for patients.

The concurrent validity of the CPTGI was also satisfactory. Overall, PTG was associated positively with hope and positive coping but negatively with

anxiety. Under the higher-order model, anxiety was related to intrapersonal growth but not interpersonal growth. The higher anxiety an individual had, the lower was his/her level of intrapersonal growth. Depression did not have a significant association with PTG (but this could be caused by the small sample size).

Based on the correlation between PTG and hope, we may interpret that when one acquires new understanding and perceptions of the self, one may acquire a higher capacity to surmount obstacles and grow even after trauma. Moreover, one may have stronger determination to overcome difficulties when he/she can appreciate new spiritual experiences after trauma.

Positive coping strategies (such as positive reframing, religion, and planning) were beneficial to PTG, whereas negative coping strategies (such as denial and substance use) may impede PTG. The associations between negative coping and PTG domains were as strong as that between positive coping and PTG. Health practitioners should focus not only on strengthening positive coping but also on reducing negative coping.

Health practitioners may use the CPTGI to assess the PTG of patients with chronic diseases to improve monitoring of patients' emotional and cognitive conditions. For example, specific vulnerable domains in individuals' post-traumatic well-being can be easily identified and managed with intervention programmes.

Our study has provided empirical support for the test-retest reliability of the CPTGI. This is crucial for an instrument that measures PTG, which is a long-term process for some people.

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