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PSYCHOMETRIC PROPERTIES OF THE DUTCH VERSION OF THE POSTTRAUMATIC GROWTH INVENTORY AMONG CANCER PATIENTS

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SUMMARY

In the current study, we investigated the psychometric properties of a Dutch translation of the *posttraumatic growth inventory* in a heterogeneous group of cancer patients. Its original five-factor structure was maintained. The internal consistency of the total scale, as well as its subdimensions, was satisfactory. As expected, the experience of posttraumatic growth was positively related to: emotional expression about the illness, openness to experience, and feelings of innerness. Furthermore, the scale appeared to be sensitive for the demographics age and gender. The experience of posttraumatic growth was not related to negative feelings such as avoidance, anxiety, depression, and neuroticism. Our Dutch translation of the instrument appeared to be a sound measure for the experience of posttraumatic growth in cancer patients. Copyright © 2006 John Wiley & Sons, Ltd.

KEY WORDS: posttraumatic growth; cancer; oncology; psychometric properties

INTRODUCTION

Cancer is a life-threatening illness and most of the time its treatment is highly aggressive. Even after successful treatment, uncertainty about recurrence of the illness remains. Therefore, cancer and its treatment can be a traumatic experience with many consequences for subsequent life. In addition to the known and extensively documented negative physical, psychological, and social consequences of cancer (Van 't Spijker *et al.*, 1997), there is a growing body of literature suggesting that people suffering from a traumatic experience (such as the diagnosis and treatment of cancer) can experience positive changes in life as well (Weiss, 2004; Cordova and Andrykowski, 2003; Cordova *et al.*, 2001; Manne *et al.*, 2004; Schroevers *et al.*, 2004; Pool, 2003; Pool *et al.*, 2003). For example,

people describe being less concerned with trivial matters, and experience an increase in their enjoyment and appreciation of life (Thornton, 2002).

The current variety of definitions and measures of positive changes after a negative life experience hamper the possibility to compare results (for a recent review see Linley and Joseph, 2004). Furthermore, until now, a psychometrically sound Dutch measure for the experience of posttraumatic growth is lacking. Therefore, we have sought for an adequate definition and measure to investigate this concept. We will use the term 'posttraumatic growth' of Tedeschi and Calhoun to refer to positive changes after cancer. They define posttraumatic growth as 'the experience of positive change that occurs as a result of the struggle with highly challenging life crises' (Tedeschi and Calhoun, 2004). Posttraumatic growth consists of positive changes in self-perception, interpersonal relationships and philosophies of life. To measure the concept, Tedeschi and Calhoun (1996) developed the posttraumatic growth inventory (PTGI).

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In a validation study (Tedeschi and Calhoun, 1996) the internal consistency of the total PTGI was $\alpha = 0.90$ and the test-retest reliability for the total PTGI was acceptable at $r = 0.71$. It has become a relatively popular instrument for measuring posttraumatic growth in the international literature (Powell *et al.*, 2003; Bates, 2004; Maercker and Zoellner, 2004; Ho *et al.*, 2004).

In this study we describe the factor structure and reliability of a Dutch translation of the PTGI and, using exploratory methods, investigate its relationship with other measures in a group of Dutch cancer patients diagnosed at least one year earlier and having completed primary treatment. Tedeschi and Calhoun (2004) argue, that it is the *struggle* that may lead to posttraumatic growth. In our opinion it is reasonable to assume that in the first year after diagnosis cancer patients are very pre-occupied with the first shock and with treatment, and that this struggle evolves in the first year, eventually resulting in the experience of posttraumatic growth.

Expectations concerning relations with other measures: emotional expression, innerness, openness to experience, age and gender

The importance of *emotional expression* for the ability to experience posttraumatic growth is known from the literature (Tedeschi and Calhoun, 2004; Lutgendorf and Antoni, 1999; Weiss, 2002; Park *et al.*, 1996; Manne *et al.*, 2004). Therefore, we expect a positive relationship between the experience of posttraumatic growth and *emotional expression* related to the cancer experience.

Feelings of *innerness* can be described as the process of striving for or discovering wholeness. They are manifested in feelings of strength in times of crisis, calmness or serenity in dealing with uncertainty in life, guidance in living, being at peace with one's self and the world, and feelings of ability (Garssen *et al.*, 2001). The relation between feelings of innerness and the experience of posttraumatic growth has not been studied previously, but because of their conceptual overlap, we do expect a relatively strong relation.

Individuals *open to new experiences* are interested in new situations, new ideas and new experiences and are less afraid of new situations (Costa Jr and McCrae, 1997; Hoekstra *et al.*, 2003). Tedeschi and Calhoun (1996) found a moderate association of $r = 0.21$ between openness to experience and posttraumatic growth.

Therefore, we also expect a moderate relation (see also Maercker and Zoellner, 2004).

We expect a negative relationship with *age*, indicating that the younger the respondents, the more the experience of posttraumatic growth. This expectation is congruent with findings in the literature (Powell *et al.*, 2003; Lechner *et al.*, 2003; Widows *et al.*, 2005) and can be explained by the fact that in younger people the diagnosis and treatment of cancer is more strongly interfering with their developmental growth stage (Havighurst, 1972; Mor *et al.*, 1994; Boon and Huser, 1996). Older patients may already have learned their life lessons, while younger patients are more in a process of learning, and therefore may be more open to see the cancer experience as a life lesson (Tedeschi and Calhoun, 1996) and experience more benefits from perceiving it as a life lesson (Schroevers *et al.*, 2004).

Concerning *gender*, studies have shown contradictory results. Most studies found significantly higher scores for women compared to men in reporting posttraumatic growth (Weiss, 2004; Lehman *et al.*, 1993; Park *et al.*, 1996; Tedeschi and Calhoun, 1996). We found one study showing no differences between men and women (Polatinsky and Esprey, 2000). Despite these contradictory results we expect women to report more growth because, based on clinical experience, women are more emotionally expressive than men.

Explorative relations: feelings of intrusion and avoidance (traumatic impact), feelings of anxiety and depression, neuroticism

According to the literature (McMillen, 2004; Tedeschi and Calhoun, 2004; Park and Fenster, 2004; Greenberg, 1995), patients may experience *feelings of intrusion next to* the experience of growth. Tedeschi and Calhoun (2004) argue that patients experiencing feelings of intrusion are actually confronted with their situation, and therefore these feelings may function as a mechanism for the ability to experience posttraumatic growth. Based on these theoretical considerations, we expect a positive relationship between feelings of intrusion and the experience of posttraumatic growth. In relation to *avoidance*, as the other possible indicator of the traumatic impact of a severe life-event, much less is known. Park and Fenster (2004) investigated the relation between avoidance and posttraumatic growth in a sample

of undergraduates who experienced various stressful events, and found no relationship. A rationale may be that people using these strategies avoid to face (aspects of) their situation, and therefore may be less capable of experiencing feelings of growth. However, evidence is too scarce at the moment to speculate about this relationship, and therefore we have investigated it in an exploratory way in the present study.

In relation to anxiety and depression some researchers have found an association with the experience of posttraumatic growth (Ho *et al.*, 2004; Frazier *et al.*, 2001; McMillen *et al.*, 1997), while others did not (Cordova *et al.*, 2001; Milam *et al.*, 2004; Cadell *et al.*, 2003). However, the types of traumatic life experiences and measures used differed among these groups, and may therefore possibly not be comparable to each other as well as to our group of cancer patients. Therefore, we have investigated the relationship between posttraumatic growth and anxiety and depression in an exploratory way, without specific predictions.

Individuals scoring high on the personality trait neuroticism, emotionally instable individuals, are expected to experience more feelings of, among others, anger, frustration, and guilt. They are less capable of handling difficult situations (Hoekstra *et al.*, 2003). According to this, it can be assumed that people with neurotic traits do report less posttraumatic growth. However, empirical results concerning the relationship between posttraumatic growth and neuroticism are scarce (Tedeschi and Calhoun, 1996, 2004; Sheikh, 2004), and consequently investigated here in an exploratory way.

METHODS

Subjects and procedures

A sample of 294 cancer patients (82 males and 212 females) participated and the study was approved by the Medical Ethical Committee of the University Medical Center Groningen, the Netherlands. Patients were recruited from two hospitals and one center for psycho-oncological care in the northern part of the Netherlands. The inclusion criteria were: (a) having had the diagnosis at least one year ago; (b) having finished primary treatment; (c) no participation in other studies, and (d) being 18 years or older. Respondents in the two hospitals were informed about the

study by their physicians who handed out a study brochure containing information and a participation form. Respondents of the psycho-oncological institute were approached by sending them a written questionnaire, together with a letter and a brochure explaining the study, and a participation form. Respondents who decided to participate completed a questionnaire about the experience of posttraumatic growth after the diagnosis and treatment of cancer.

MEASURES

The posttraumatic growth inventory and its translation

The PTGI as developed by Tedeschi and Calhoun (1996) consists of 21 items, all positively formulated and comprising five factors: (1) Relating to others (7 items: e.g. 'I learned a great deal about how wonderful people are'); (2) New possibilities (5 items: e.g. 'I established a new path for my life'); (3) Personal Strength (4 items: e.g. 'I discovered that I'm stronger than I thought I was'); (4) Spiritual Change (2 items: e.g. 'I have a stronger religious faith'); and (5) Appreciation of Life (3 items: e.g. 'I have a greater appreciation for the value of my own life'). The answers are rated 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'). Adding the scores of the five subfactors gives the total PTGI-score.

In our Dutch version of the PTGI we used the original 21 items in the same sequence, and with the same response categories. The items were translated with permission from the original authors by three independent translators and were subsequently compared. The translated items were translated back into English by an independent translator to check the validity of the translation.

Loss Processing scale in case of Serious Disease

To measure emotional expression we used the factor expressing emotions of the Loss Processing scale in a Serious Disease (*LPSD*), which consists of 4 items. The items are rated on a five-point scale of '0' ('not at all') to '5' ('extremely'). The psychometric qualities of this newly developed

instrument are good (article in preparation). In the current study the α of this subfactor was 0.64.

Spirituality Assessment Scale

To assess innerness or inner resources, we used the dimension innerness of Howden's Spirituality Assessment Scale (*SAS*) which consists of 9 items. The items are rated on a six-point scale of '1' ('strongly disagree') to '6' ('strongly agree'). The scale was validated in the Netherlands (Garssen *et al.*, 2001). In the current study the α of this subfactor was 0.82.

NEO-five factor inventory

We used the personality dimensions openness to experience and neuroticism of the NEO-five factor inventory (*NEO-FFI*). The scale was well validated in the Netherlands (Hoekstra *et al.*, 2003). Each dimension consists of 12 items. Scores range from 12 to 60. Some items were reversed according to the manual before calculating the total scores. In this study α 's were 0.73 for openness and 0.86 for neuroticism.

Impact of Events Scale

To measure feelings of intrusion and avoidance about the cancer experience we used the Impact of Events Scale (*IES*) developed by Horowitz *et al.* (1979) and translated into Dutch by Kleber and Brom (1986). The scale was addressed to the experience of cancer and its treatment. The scale measures avoidance and intrusion, during the past week using 15 items, of which 8 items measure avoidance, and 7 intrusion. Respondents are asked to rate each item of the *IES* on a scale of '0' ('not at all'), '1' ('rare'), '3' ('sometimes') and '5' ('often'). Scores for the intrusion subscale range from 0 to 35, and for the avoidance subscale from 0 to 40. The total score (the two subscales together) ranges from 0 to 75. The scale is well validated in the Netherlands (Kleber and Brom, 1986). The α coefficients in the current study were; avoidance 0.86, intrusion 0.87, total score 0.92.

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (*HADS*) is a measure of anxiety (7 items) and

depression (7 items). Spinhoven *et al.* (1997) performed a validation study on the *HADS* in the Netherlands, and its qualities appeared to be satisfactory. Each item of this scale is rated on a four-point scale scored from '0' to '3'. The ranges for the subscales are from 0 to 21, and for the total score from 0 to 42. In the present study anxiety had an α coefficient of 0.89 and depression of 0.78.

Analysis

First, we used simultaneous component analysis (*SCA*) (Ten Berge and Kiers, 1990) to measure the difference between the empirical and the theoretical factor structure, and calculated correlations among the identified factors and correlations of the factors with the total score of the translated *PTGI*. Second, to measure the reliability of the translated *PTGI* and its dimensions we calculated internal consistency and the corrected inter-item correlations of the different factors. Third, we calculated correlations between the translated *PTGI* and other measures to test our predicted relationship of the translated *PTGI* with other measures, and the exploratory relationships.

RESULTS

Respondents

In the two hospitals of 412 respondents who received information about the study, 271 (65.8%) agreed to participate by returning the participation form. In cases where the questionnaire was not received within three weeks, a reminder was sent. A total of 236 (57.3%) respondents actually filled in and returned the questionnaire. Eight respondents were excluded because of incomplete questionnaires, and four respondents had heard their diagnosis less than one year ago. Thus, 224 questionnaires were used finally.

Of the 95 respondents approached in the psycho-oncological institute, 73 (76.8%) completed the questionnaire and returned it together with the participation form. One respondent was excluded because of an incomplete questionnaire, and two respondents had heard their diagnosis less than one year ago. Thus, 70 questionnaires were available.

Adding the number of returned questionnaires of the two hospitals and the psycho-oncological

institute ($N = 309$), divided by the number of respondents who received information about the study ($N = 507$), the total response rate was 61%.

Medical and social characteristics of the patients are presented in Table 1.

Construct validity: comparison of empirical and theoretical factor structure

We tested if our data from Dutch cancer patients fitted the original factor structure of the English version of 21 items and five factors, as developed by Tedeschi and Calhoun (1996). The total variance accounted for by SCA was 14.53 (69.2%). The total variance accounted for by principal component analysis was 14.88 (70.8%). Thus, the difference in explained variance appeared to be 1.64%, which is an acceptable difference to use the original factor structure.

Correlations among the factors ranged from $r = 0.44$ to 0.70 , and the correlations of the five factors with the total translated PTGI-score ranged from $r = 0.64$ (spiritual change) to $r = 0.89$ (new possibilities) (Table 2). These findings are comparable to those of Tedeschi and Calhoun (1996), and indicate that the factors measure common facets,

but that the different factors have separate contributions as well.

Reliability

As can be seen in Table 3, the α for the total scale of 0.95 is high. Also the subscales show high α 's (0.84 and higher), except for the relatively low α of 0.65 for the factor 'spiritual change'. We also calculated the mean inter-item correlations: they appeared to be relatively high (Table 3), but an investigation at item level showed little overlap.

Relation with other concepts/measures

Table 4 summarizes the findings concerning correlations of the translated PTGI with the aforementioned hypothesized relationships.

Emotional expression

There was a positive, and significant relationship between the score on the translated PTGI and emotional expression ($r = 0.40$, $p < 0.001$). Correlations for the separate translated PTGI dimensions varied from 0.18 ($p < 0.001$) (spiritual change) up to 0.46

Table 1. Characteristics of the respondents ($N = 294$)

Age (years)			Cancer site	Men ($N = 82$; 27.9%)	Women ($N = 212$; 72.1%)
Mean (S.D.)	55.56	(12.22)	Breast cancer	—	149 (70.28%)
Range	21–84		Gynecological cancer	—	33 (15.57%)
			Prostate cancer	34 (42.50%)	—
Time since diagnosis (years)			Testicular cancer	6 (7.50%)	—
Mean (S.D.)	3.90	(2.50)	Head/neck cancer	12 (15%)	4 (1.89%)
			Skin cancer	3 (3.75%)	6 (2.83%)
Marital status			Lung cancer	4 (5%)	2 (0.94%)
Partner	226	(76.9%)	Cancer of the brain	5 (6.25%)	—
No partner	67	(22.8%)	Intestinal cancer	6 (7.50%)	4 (1.89%)
Missing	1	(0.3%)	(Non)Hodgkin	8 (10%)	7 (3.30%)
			Other	7 (8.75%)	7 (3.30%)
Children					
Yes	231	(78.6%)			
No	63	(21.4%)			
Education					
Primary	20	(6.8%)			
Low	94	(32%)			
Middle	73	(24.8%)			
High	89	(30.3%)			
Otherwise	15	(5.1%)			
Missing	3	(1%)			

Table 2. Inter-factor correlations and factor-total correlations of the Dutch translation of the PTGI ($N = 282$)

	Total	1	2	3	4	5
PTGI-total score	—	0.88***	0.89***	0.85***	0.64***	0.86***
1. Relating to others		—	0.65***	0.66***	0.43***	0.70***
2. New possibilities			—	0.70***	0.60***	0.74***
3. Personal strength				—	0.46***	0.70***
4. Spirituality					—	0.44***
5. Appreciation of life						—

*** $p < 0.001$ (2-tailed); 1 = Relating to others, 2 = New possibilities, 3 = Personal strength, 4 = Spiritual change, 5 = Appreciation of life.

Table 3. Internal consistency and inter-item correlations per factor of the Dutch translation of the PTGI

Factors (number of items)	Cronbach's α	Inter-item correlations (Mean)
Relating to others: (7 items)	0.89	0.38 to 0.72 (0.53)
New possibilities: (5 items)	0.89	0.50 to 0.71 (0.62)
Personal strength: (4 items)	0.84	0.47 to 0.68 (0.56)
Spiritual change: (2 items)	0.65	0.48
Appreciation of life: (3 items)	0.89	0.68 to 0.80 (0.73)
Total scale: (21 items)	0.95	

($p < 0.001$) (relating to others). They were all significant and in line with our expectation (Table 4).

Innerness

Consistent with our expectation, the total translated PTGI-score and its separate dimensions were relatively strongly related to feelings of innerness ($r = 0.50$; $p < 0.001$). As expected, the strongest relationship was found between innerness and spiritual change ($r = 0.62$, $p < 0.001$) (Table 4).

Openness to experience

As expected, we found a positive, although moderate, correlation between openness to experience and the total translated PTGI-score ($r = 0.24$, $p < 0.001$). The strongest correlation was found between openness and new possibilities ($r = 0.27$, $p < 0.001$) (Table 4).

Age

There was a predicted significant negative correlation between age and the total translated PTGI-score ($r = -0.33$, $p < 0.001$), indicating that the older the participants, the less the experience of posttraumatic growth or *vice versa*. This significant negative relationship was found for all the subdimensions of the translated PTGI (Table 4).

Gender

As expected, women reported significantly more posttraumatic growth than men. The strongest differences were found for new possibilities ($t = -3.45$, $p < 0.001$) and personal strength ($t = -3.93$, $p < 0.001$) (Table 5).

Traumatic impact

There was a moderate correlation of $r = 0.24$ ($p < 0.001$) between feelings of intrusion and posttraumatic growth, which indicates that the experience of stress in the form of intrusion and growth can co-exist. Intrusion was significantly, although not strongly, related to all of the dimensions of the translated PTGI. We did not find a significant relationship between the experience of posttraumatic growth and the use of avoidance ($r = 0.05$, n.s.) (Table 4).

Feelings of anxiety and depression

We did not find an association between the experience of posttraumatic growth and anxiety ($r = 0.09$, n.s.) (Table 4) or depression ($r = -0.04$, n.s.). Although there appeared to be some small differences in growth scores between 'non-cases', 'doubtful cases' and

Table 4. Correlations between PTGI-scores and other measures ($N=222$)

	Total-PTGI	1	2	3	4	5
Hypothesized relations:						
Emotional expression						
Emotional expression	0.40***	0.46***	0.26***	0.32***	0.18***	0.32***
Innerness						
Innerness	0.50***	0.30***	0.48***	0.44***	0.62***	0.39***
Personality						
Openness to experience	0.24***	0.15**	0.27***	0.19***	0.26***	0.18***
Age	-0.33***	-0.27***	-0.32***	-0.27***	-0.19***	-0.29***
Explorative relations:						
Traumatic impact						
Avoidance	0.05	0.03	0.05	0.06	0.06	0.01
Intrusion	0.24***	0.22***	0.20***	0.15***	0.19***	0.22***
Feelings of depression and anxiety						
Depression	-0.04	-0.06	0.00	-0.09	0.08	-0.05
Anxiety	0.09	0.07	0.09	0.05	0.11*	0.06
Personality						
Neuroticism	0.04	0.02	0.05	-0.04	0.12*	0.04

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$ (1-tailed); 1 = Relating to others, 2 = New possibilities, 3 = Personal strength, 4 = Spiritual change, 5 = Appreciation of life; $N=222$ because there are some missing values.

Table 5. Mean scores on the Dutch translation of the PTGI and its subdimensions for the total sample, and male ($N = 75$) compared to female ($N = 207$)

	Total Mean (S.D.)	Male Mean (S.D.)	Female Mean (S.D.)	T-test ¹
PTGI dimensions (possible scores)				
PTGI total score (0–105)	47.87 (24.04)	39.94 (23.35)	50.75 (23.69)	-3.40***
Relating to others (0–35)	18.01 (8.65)	16.07 (9.41)	18.99 (8.13)	-2.55*
New possibilities (0–25)	8.94 (6.95)	6.74 (6.03)	9.89 (7.02)	-3.45***
Personal strength (0–20)	9.50 (5.60)	7.45 (5.26)	10.33 (5.48)	-3.93***
Spirituality (0–10)	2.55 (2.99)	2.00 (2.87)	2.73 (2.99)	-1.83
Appreciation of life (0–15)	8.44 (4.42)	7.68 (4.48)	8.82 (4.32)	-1.93

* $p \leq 0.05$; *** $p \leq 0.001$ (1-tailed); ¹Comparisons between male and female on PTGI-scores.

'definite cases' of depression, these were not significant.

Neuroticism

There was no significant association between neuroticism and the translated PTGI ($r = 0.04$, n.s.) or any of its dimensions (Table 4).

DISCUSSION

In this study, we examined the psychometric properties of a Dutch translation of the PTGI in a heterogeneous group of cancer patients, and compared it to the original PTGI of Tedeschi and Calhoun (1996). The data showed that the factor structure of the translated PTGI was comparable with the original factor structure,

and thus can be maintained in a population of cancer patients.

In relation to the reliability of the translated PTGI it appeared that the internal consistency of the total scale, as well as of the separate factors was high. The only exception concerned the relatively low α coefficient of the factor 'spiritual change'. However, this factor comprises only two items, and it is known that the strength of the α also depends on the length of the scale. Therefore, in future research, one or two spirituality items could be added to this factor. We investigated hypothesized relations with other concepts and the translated PTGI. As expected, the experience of posttraumatic growth appeared to be related to emotional expression, openness to experience, and innerness. Furthermore, the experience of posttraumatic growth appeared to be sensitive for age and gender.

In addition, we investigated the relationships between posttraumatic growth and feelings of intrusion, avoidance, depression, and neuroticism in an explorative way. Our results showed, that of all of these measures, only feelings of intrusion were related to the experience of posttraumatic growth. There are different ways to interpret the finding that the experience of posttraumatic growth appears not to be related to the negative feelings of avoidance, anxiety, depression and neuroticism. It is possible that some individuals, who report feelings of posttraumatic growth, are denying negative aspects of their experience. However, in our sample, some individual patients with high scores on one or more of these negative feelings did also report high feelings of posttraumatic growth. Therefore, it is more likely that negative feelings of avoidance, depression, guilt, anger, etc. are not necessarily negatively related to feelings of posttraumatic growth, because it are in fact different constructs, different ways of experiencing reality, that actually can co-exist.

Level of posttraumatic growth

The mean score on posttraumatic growth in our sample was 47.9 (S.D. 24.0) on a possible range of 0–105. Thus, our sample scores approximately 45% of the maximum score on posttraumatic growth. This percentage is somewhat lower than was found for other studies, e.g. the mean scores reported by Weiss (2002) ($M = 60.2$ (57%); S.D. 18.81) and Cordova *et al.* (2001) ($M = 64.1$ (61%); S.D. 24.8) in samples of breast cancer patients, and of Ho

et al. (2004) ($M = 69.9$ (67%); S.D. total PTGI-score not reported) and of Widows *et al.* (2005) ($M = 64.7$ (62%); S.D. 21.30) in heterogeneous groups of cancer patients. Comparison of the studied samples on age and time since diagnosis showed that they are more or less comparable. However, most of these studies investigated breast cancer samples consisting of females, while we have included both men and women. Therefore, gender differences might account for differences in the level of posttraumatic growth, which is in line with our finding in the current study that women report more posttraumatic growth. In addition, difference can also be attributed to cultural factors (McMillen, 2004). Future research could investigate this more thoroughly.

Suggestions for future research

Some specific suggestions for future research can be offered concerning the role of intrusion, emotional expression, openness to experience, and the role of different cancer sites and prognosis.

Intrusion: As found in our sample of cancer patients, and as already known from other studies (e.g. Park and Fenster, 2004; Cadell *et al.*, 2003), the experience of posttraumatic growth and feelings of intrusion about the negative life experience can co-exist. Future research could explore more deeply what the specific characteristics are in intrusive thoughts about the cancer experience that foster the experience of posttraumatic growth.

Emotional expression: Tedeschi and Calhoun (1996) argue that having others to share one's feelings with, can be an aid in offering the possibility to make narratives, a structured story of the new reality one is confronted with, which offers perspectives that can be integrated in a change in life regard. Thus, emotional expression can be seen as a determinant of the experience of posttraumatic growth. From the literature it is also known (e.g. Harvey *et al.*, 2004) that reactions of those who are close to the patient are critical in how someone deals with his or her experience. Future research might explore more deeply whether the aspect of *narration* or the aspect of *having close others* is determining this relation, as not every intimate other reacts with empathy and concern (Wortman, 2004).

Openness to experience: People open to experiences tend to *investigate* new 'facts of life' and see

them as less threatening (Tedeschi and Calhoun, 1996). Tedeschi and Calhoun argue that it is not clear if this concerns a relatively stable personality trait, as is argued by Costa and McCrae (1997), or that people *develop* more of this trait as a consequence of the traumatic experience. This question is important for our understanding of the influence of openness to experience as a possible predictor of the experience of posttraumatic growth. Future research can investigate the stability of 'openness' versus its change because of a traumatic life experience, in a longitudinal design, that should start measuring the presumed trait before traumatic experiences, such as a cancer diagnosis and treatment, have occurred.

Different cancer sites and prognosis: In the current study, we were not able to compare patients with different cancer sites and prognoses due to small numbers. However, we imagine that there may be differences in the level of posttraumatic growth depending on cancer site, and especially, depending on prognosis. This would be an important research question to investigate in future research.

CONCLUSION

The Dutch translation of the PTGI appears to be a sound measure of the experience of posttraumatic growth in cancer patients and offers the opportunity to investigate the degree to which negative, life-threatening events contribute to positively valued changes, and the human potential to use negative life experiences for personal growth.

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