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Development and Evaluation of the Posttraumatic Growth Status Inventory

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Posttraumatic growth reflects beneficial psychological processes in persons with traumatic experiences. Existing measures of growth were criticized due to their retrospective self-report format that may cause biases in capturing the growth processes in individuals with several specific kinds of trauma, such as physical or psychological disabilities of close family members, bereavement and some others kinds of traumatic experience. In this case, the feelings of guilt may prevent the persons from being aware of the favorable personal changes. The objective of this study was to develop and to evaluate an alternative measuring instrument that uses a status quo response format instead of retrospective items and covers additional areas of growth-related changes. The samples comprised 440 adult persons with traumatic experience, including 181 parents of children with mental and/or physical disabilities. Exploratory and confirmatory factor analyses revealed a 7-factors solution, corresponding to the following subscales: Relationships to Others, New Possibilities, Personal Strength, Appreciation of Life, Spiritual Changes, Generativity, and Openness. Results showed good reliability and concurrent validity. The PGSI is recommended particularly for use in longitudinal studies as well as in samples of persons whose trauma relates to a severe psychological or physical disability in their families.

Keywords: Posttraumatic Growth; Coping; Resources; Inventory

Introduction

In the past decade, the possibilities of multifaceted positive psychological outcomes, as a consequence of a traumatic life experience, such as an onset of severe health problems in a person her/himself or in a close family member, bereavement or experience of violence, became more and more the objective of theoretical and empirical research work. The approaches to describe the underlying psychological changes led to creating scientifically-founded concepts like posttraumatic growth (PTG, Calhoun, & Tedeschi, 1999; Tedeschi & Calhoun, 2004), adversarial growth (Linley & Joseph, 2004), thriving (O'Leary & Ickovics, 1995), benefit finding (Affleck & Tennen, 1996), and stress-related growth (Park, 1996). From these terms, describing comparable processes in the aftermath of a traumatic event, the term "posttraumatic growth" seems to be the most established. The concept 'posttraumatic growth' serves as an expression for processes of changing life orientations and priorities as well as the achievement of a new level of feelings and self-awareness. These processes are initiated by the attempts to adapt to highly challenging life circumstances that can produce high levels of psychological distress. The person's struggle with the new reality in the aftermath of trauma is essential in influencing the degree and the individual profile of posttraumatic growth. Eventually, the processes of growth involve a movement beyond pre-trauma levels of adaptation, they represent rather ongoing development as a static outcome (Tedeschi & Calhoun, 2004). Persons often characterize the corresponding changes as valuable enrichment in their lives. The following domains of perceived personal growth processes were discussed in empirical literature: changes in self like feelings of being strong and more self-assured, a new sense of increased closeness in relationships with others, open-mindedness, religiosity/spirituality changes, as well as alterations in philosophy of life including increased life appreciation and the attempt to live each day to the fullest (Schaefer & Moos, 1992; Calhoun & Tedeschi, 1999; Tedeschi & Calhoun, 2004; Danoff-Burg & Revenson, 2005).

In order to capture growth processes, studies use the Posttraumatic Growth Inventory (PTGI, Tedeschi, & Calhoun, 1996), the Benefit Finding Scale (BFS, Antoni et al., 2001; Tomich & Helgenson, 2004), or the Stress-Related Growth Scale developed by Park and collaborators (SRGS, Park, Cohen, & Murch, 1996). These measures differ in regard to the following aspects which will be addressed in turn: a) the target population, for whom the particular measure was designed, b) priority at the focal point in the assessment procedure, c) the degree to which a measure allows for the differentiation between various growth domains, (d) and general connotation of the items.

a) The first discrepancy concerns the target population. Whereas the PTGI and the SRGS were developed for and are commonly applied in populations with different kinds of traumatic experience, the BFS was originally designed specially for using with individuals whose trauma relates to severe medical conditions, primarily actual or past cancer. Recently, this measure

was also used to capture beneficial psychological changes in family caregivers (Kim, Schulz, & Carver, 2007).

b) When regarding the content, the growth measures differ slightly in the focal point in the assessment procedure. All three measuring instruments represent the growth facets relationships to the others, and personal strength, respectively.

However, the Benefit Finding Scale only contains a great number of items capturing family relationships growth and acceptance. In contrast, the PTGI as well as the SRGS, but not the BF measures religious/spiritual changes. Furthermore, the PTGI includes items that relate to "life appreciation" and "new possibilities" growth domains, which are not covered sufficiently by the SRGS and the BFS. At last, the SRGS is a single measure which comprises several items capturing self-understanding and affect-regulation as additional growth aspects.

c) The degree to which each of the measures allows for the differentiation between various growth domains depends on the dissimilarity in items content and on the underlying factorial structure of the questionnaires, which may serves as a foundation for composition of separate subscales. For the PTGI, the stability of a five-factor structure was proved in empirical studies (Tedeschi & Calhoun, 1996; Maercker & Langner, 2001; Taku et al., 2008).

Less unambiguous were the results of factor analyses on the BFS and the SRGS items. Various investigations revealed different factorial solutions [Antoni et al., 2001 (BFS, 1 factor); Weaver et al., 2008 (BFS, multiple factor models); Kim, Schulz, & Carver, 2007 (BFS, 6 factors); Park, Cohen, & Murch, 1996 (SRGS, 1 factor); Armeli, Gunthert, & Cohen, 2001 (SRGS, 8 factors); Maercker & Langner, 2001 (SRGS, 1 factor)]. As a consequence, no established subscales were created; the total scores only had been commonly used in studies as a global growth assessment.

d) The fourth difference concerns the general connotations of each of the separate items. The BFS inquires about things "The disease taught me to do or to feel", suggesting a somewhat passive role for the affected persons, whereas the PTGI and the SRGS ask for changes, which "one has experienced as a result of traumatic events", seeing respondents as more "active" subjects.

On the whole, existing measures of growth proved to be very useful in the research on positive adaptation and beneficial psychological processes in the aftermath of significant traumatic events. Nevertheless, they were also criticized in the literature due to several limitations. The main criticism arises out of the retrospective self-report format: All currently available measures ask for subjective experiences of trauma related changes; they do not capture the "status quo" of growth processes. The retrospective measurement of changes implies, that people can correctly compare their actually attributes with their pre-trauma characteristics. However, the recollection of how they were prior to the time of traumatic life event may be distorted due to cognitive biases. For example, McFarland and Alvaro (2000) observed that traumatic event victims tended to derogate their pre-event characteristics. Another study addressed the issue, whether current methods of measuring PTG (i.e., linked questions to stressful event) generally create a positive bias which may undermine the data validity (Smith & Cook, 2004). In order to examine positive biases in self-reported growth, Smith and Cook compared reports of growth from two groups of individuals. In the first group, participants completed the Posttraumatic Growth Inventory in relation to a specific stress-

ful event. In the second group, PTGI questions were not linked to specific events. Instead, participants were instructed to generally think about the past 4 years, and indicate the degree to which specific, personal changes occurred. In the "unlinked group" only, individuals exposed to traumatic events reported greater growth in Personal Strength and Relationships to Others than participants who did not experience a traumatic event within last four years. The authors conclude that current measurements may actually underestimate PTG to a small but significant degree. Linking questions about PTG to specific stressors could influence participants to be cautious about attributing their growth experiences to a stressful event.

Furthermore, due to a retrospective item format, current growth scales are less appropriate in measuring the beneficial growth processes in individuals whose traumatic experience is related to several specific conditions like a physical disease or a psychological disorder in their families. In this case, the feelings of guilt may prevent the persons from being aware of the favorable personal changes (Peters & Jackson, 2009; Johnson, O'Reilly, & Vostanis, 2006; Alexander & Wilz, 2010). Qualitative research demonstrates several concrete examples of such intrapsychic ambivalence. For instance, a mother of a child with severe health-related problems reported barriers to acknowledge positive changes: "The harm of my child cannot be profitable for me in any way" (Schirmer & Alexander, 2013).

Another criticism of the currently available growth scales is that they do not cover all potentially relevant growth domains (e.g., Park & Lechner, 2006). Thus, according to findings from qualitative research, positive changes often occur in areas like more attentiveness for one's own needs and feelings (Mohr et al., 1999), self-care (e.g., Siegel & Schrimshaw, 2000; Pakenham, 2007; Affleck et al., 1987), open-mindedness and the way one treats others, particularly the pleasure in supporting others and in sharing one's own knowledge and helpful life experience (Cadell & Sullivan, 2006; Danoff-Burg & Revenson, 2005; Updegraff et al., 2002). The last mentioned intrapersonal changes often occur in relation to several specific kinds of trauma, including experience concerned to severe physical or psychological health conditions in the family (e.g. Alexander & Wilz, 2010; Barskova & Oesterreich, 2009). None of the existing growth measures includes subscales which address the corresponding growth areas.

In regard to these criticisms, the goal of the study was to develop and to evaluate a Status Quo Measure of Posttraumatic Growth that should overcome several problems of the existing questionnaires. Firstly, the item format of a newly developed inventory should allow to avoid or to reduce cognitive biases during information recall up to a substantial degree. In order to sidestep potential response distortions caused through interfered feelings of guilt or shame (which arise particularly often in people whose traumatic experience relates to a misery of their close relatives, such as a physical disease or a severe psychological disorder), the items should inquire what a respondent currently senses, feels, thinks and/or does, without building an explicit connection to a definite critical life event. Secondly, a new measure of growth was supposed to differentiate between separate growth domains, including growth areas highlighted in current empirical literature on beneficial growth processes in relatives of chronically disabled persons. On the whole, the new measuring instrument (the Posttraumatic Growth Status Inventory, PGSI) should facilitate a multidimensional construct-adequate capturing of complex intra-personal growth-related proc-

esses in individuals with different kinds of traumatic experience.

In order to estimate the concurrent validity of the PGSI, we aimed for capturing the correlations between the PGSI subscales and the psychological health indicators as well as corresponding correlations between the PGSI and several measures of coping behavior. As demonstrated in empirical investigations, posttraumatic growth has been found to be positively linked to several criteria of psychological health and to the adaptive coping strategies, in case a sufficiently long period of time has passed since the initial traumatic event (Siegel & Schrimshaw, 2007; Ho, Chan, & Ho, 2004; Lechner et al., 2006; Mc Millen & Cook, 2003; Morris, Shakespeare-Finch, & Scott, 2007; Schmidt et al., 2012; Kountrouli, Anagnostopoulos, & Potamianos, 2012). Further studies showed significant negative relationships between the posttraumatic growth and maladaptive, dysfunctional coping, like substance abuse and behavioral disengagement (Urcuyo et al., 2005; Milam, 2004; Loiselle et al., 2011).

In view of the results from these studies, we resolved to use the mental health- and coping-related variables as appropriate criteria in testing the concurrent validity of the PGSI in the final stage of the study. We expected negative associations of the PGSI with depression, anxiety, physical complaints and maladaptive coping strategies. In contrast to this, we hypothesized, that the correlations between the PGSI and different adaptive coping strategies, such as active coping, seeking for social support and regenerative coping would be positive.

Method

Participants and Procedure

The general purpose of this study was to develop a measuring instrument of posttraumatic growth that, due to its status quo item format (as well as capacity to capture additional growth areas), may be particularly appropriate for using with individuals who experienced several specific kinds of trauma, such as a physical disease or a psychological disorder in a close family member. In addition to this, the questionnaire should be, overall, applicable in studies focusing on beneficial psychological processes in the aftermath of different kinds of serious traumatic experience. Consequently, in the stage of item selection and the initial psychometric screening, we decided to select participants with a broad array of significant psychological traumas. In the second stage, the psychometric properties and the factorial structure of the newly developed inventory were repeatedly tested, especially in samples of individuals with disease-related traumata.

In accordance with this procedure, the data collected from sample one were used to complete the item selection, to identify the factorial structure underlying the newly developed Posttraumatic Growth Status Inventory and to screen psychometric properties of the separate PGSI subscales. The first sample consisted of 118 university students and 96 employed adults with different kinds of significant traumatic experience. Several advertisements at the university and an advertisement at a local newspaper provided information about the project. Due to the fact that the whole questionnaire packet was somewhat long and required ca. sixty minutes to fill-out all measures, the participants could pick up the questionnaire at the university and complete it at home. In an attempt to reduce the missing data and to foster the motivation, all participants received ten Euros and a brief anonymous feedback concerning their individual test scores in comparison with the norm values of the used measuring instruments (when available) and the mean values from the whole sample.

Sample two was recruited in order to test the stability of the initial factorial solution that was identified in sample one, and to provide empirical evidence concerning the validity and the reliability of the newly developed Posttraumatic Growth Status Inventory. As mentioned above, an important aim of the study was to develop a measure of posttraumatic growth that should be suitable to capture growth processes in individuals whose trauma relates to their close relatives' highly stressful experience, such as a mental or a physical disability in their families. Consequently, the second sample should include individuals with this kind of trauma. To recruit the eligible participants, we contacted professionally moderated self-help groups for parents of children with different kinds of disabilities as well as several doctors' offices. One hundred eighty-one parents of children with mental or physical disabilities and 45 adult persons whose trauma related to their own severe medical conditions gave their consent to participate in the study and completed the questionnaires. The corresponding return rate resulted in 92%. To foster commitment, similar to sample one, the participants received anonymous detailed feedback regarding their individual test scores in comparison with the mean values from their reference group as well as the information about the main results of the whole study, after completion of the investigation.

Measures

Demographics and Information about Traumatic Events

All participants responded to several questions concerning demographic information. As preview research demonstrated the role of emotional support as an important predictor on posttraumatic growth and, generally, positive psychological adjustment (Barskova & Oesterreich, 2009; Taylor & Stanton, 2007), the respondents were also asked to which extent they have the possibility to talk with a supportive person about their problems in a confidential way, if necessary. In addition, participants of sample one (mixed sample of university students and employed adults with different kinds of traumatic experience) were asked to provide information about the traumatic life event they had experienced within the past five years, including the nature of the event and the time elapsed since the event. Participants of the sample two (whose trauma was related to either their own severe medical condition or to their child mental or physical disability) were asked about the time elapsed since the diagnosis and the extent to which the awareness of the diagnosis was upsetting for them, with scores ranging from 0 (hardly upsetting) to 3 (completely upsetting).

Coping

To assess what coping strategies participants preferred in dealing with stressful events in their lives, we used the Brief COPE questionnaire (Carver, 1997). The Brief COPE includes 14 subscales: active coping, planning, positive reframing, acceptance, use of humor, turning to religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame. Response options ranged from 0 (I don't do this at all) to 3 (I do this a lot). Previous research has demonstrated the internal

reliability and convergent validity of the Brief COPE subscales (Carver, 1997; Muller & Spitz, 2003). Several subscales of the questionnaire may be classified as adaptive, functional coping behavior (e.g., active coping, planning, and using emotional support), the others capture rather maladaptive, dysfunctional co-ping (e.g., substance use, behavior disengagement, and self-blame).

In order to estimate the degree to which participants use re-generative coping that is not captured by the Brief COPE, we composed a short scale consisting of 4 items (e.g., "I learn specific relaxation techniques"). The internal consistency of this additional short scale was acceptable (Cronbach's alpha of .71 in sample one and Cronbach's alpha of .73 in sample two).

Health Indicators

The Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997) was applied to capture the degree of the posttraumatic stress disorder symptoms (PTSD) in the aftermath of traumatic events. The IES-R is a 22-item scale assessing intrusive thoughts, avoidance, and hyperarousal symptoms consistent with PTSD. Participants were asked to focus on the time immediately after their traumatic experience and then indicate how much they were distressed or bothered during this time by each "difficulty" listed. Items were rated for frequency of occurrence on a 5-point scale ranging from 0 ("not at all") to 4 ("extremely"). The convergent validity of the IES-R was examined in previous studies by assessing the correlations between the IES-R and the PTSD checklist and could be classified as "high" (Creamer, Bell, & Failla, 2003).

Somatization, depression and anxiety subscales from the Brief Symptom Inventory (BSI, Derogatis, 1993) were used to assess recent mental health status. The somatization subscale captures psychological distress resulting from the perception of body dysfunction (e.g., cardiovascular, gastrointestinal, and respiratory). The depression subscale addresses symptoms of clinical depressive syndrome, such as withdrawal of interest in life activities, dysphoric affect, and loss of energy. Typical anxiety symptoms measured with the anxiety subscale are nervousness, restlessness, and tension. Previous studies have revealed satisfactory internal reliability of above .70 and the good convergent validity for the separate BSI subscales (Derogatis & Melisaratos, 1983; Derogatis, 1993). Concordant to the results from the previous research, the internal reliabilities of the BSI subscales reached in our study (in the sample two) adequate values of .84, .86, and .83 for anxiety, depression, and somatization subscales, respectively.

To receive additional information concerning participants' somatic complaints, we applied the Freiburg Complaint List (the FBL-R, Batra, Slifkin, & Fahrenberg, 1995). The FBL-R is a self-report standardized questionnaire that lists different general as well as specific physical complaints including tiredness, pain, sensory, cardiovascular, and gastrointestinal symptoms. The respondents were asked how often they experience each of the different somatic complaints mentioned in the questionnaire. The total score of the FBL-R was used in our study as an indicator of the self-reported physical well-being. Prior research provided empirical evidence for the concurrent validity of the Freiburg Complaint List. In a representative sample of adults, highly significant correlations were found between FBL-R scores and indicators of illness, health concern, and utilization of health services (Fahrenberg, 1995).

Posttraumatic Growth

Participants of sample one responded to the initially 48 items which should constitute the newly developed Posttraumatic Growth Status Inventory. Some of the items were adapted from existing scales, and others were generated from the relevant empirical and theoretical literature and from the interviews with individuals facing various traumatic events (for authors' quailtative research and literature review see Barskova & Oesterreich, 2009; Schirmer & Alexander, 2013).

A substantial part of the persons (n = 45) who were interviewed in the stage of the item generation, were individuals with a traumatic experience related to severe physical conditions or psychological disabilities of their close relative (a child or a spouse living in the same home). Each item from the initial item pool was rated using a 7-point Likert scale, ranging from 1 (does not apply) to 7 (completely applies). Items addressed the following nine potential growth domains: appreciation for life (e.g., "Every day is special to me"), relationships to others (e.g., "I know I can depend on others in difficult times"), new possibilities (e.g., "I know from experience that difficult and fearful events can bring about various unexpected possibilities"), personal strength (e.g., "I can handle difficulties well"), spirituality (e.g., "I have a pronounced religious or spiritual faith"), openness (e.g., "I enjoy listening to others opinions even when they contradict what my convictions are"), treating others (e.g., "I enjoy sharing my experiences to help others to find a solution to their problems"), sustainability (e.g. "Sometimes, I reflect how my life would be after the next five years"), and world view (e.g., "I am interested in other cultures"). In the second sample, respondents completed the *final form* of the newly developed PGSI that contained 36 items.

Participants of both samples also completed the Posttraumatic Growth Inventory (PTGI, Tedeschi, & Calhoun, 1996). The PTGI is a 21-item questionnaire that measures the degree of the positive changes experienced in the aftermath of a traumatic event. The PTGI contains five subscales. The internal consistency for the total score and separate subscales of the PTGI has been reported as satisfactory (Cronbach's Alpha coefficient for the total score = .90; Relating to others = .85; Personal Strength = .72; New Possibilities = .84; Spiritual Change = .85; and Appreciation of Life = .67). Further, women were found to receive higher scores than men (Tedeschi & Calhoun, 1996).

Data Analyses

Data analyses procedure included *seven major stages*. First, the exploratory factor analysis (EFA) was conducted among the data of sample one. All 48 items from the original pool were entered into the exploratory factor analysis. The purpose of this phase was to specify a statistically and meaningfully viable model of the factor structure underlying the newly developed questionnaire and to identify items with inappropriate item parameters that should be eliminated. At stage two, in light of the results of the exploratory factor analysis, item selection took place, followed by the labeling of the factors and specification of subscales' composition in phase 3. During stage four, we completed a brief preliminary assessment of the PGSI subscales internal consistency and estimated their correlations with corresponding subscales of the retrospective posttraumatic growth measure from Tedeschi and Calhoun (1996) as measures for criterion validity. After this, the correlations between the PGSI sub-

scales and post-event symptoms of posttraumatic stress disorder, such as avoidance, intrusions and hyperarousal, were calculated. In terms of concurrent validity, we expected that the PGSI subscales would be positively associated with symptoms of posttraumatic stress disorder experienced immediately in the aftermath of a traumatic event.

At stage 5, using the data of the sample two, we conducted the Confirmatory Factor Analysis (CFA) upon the remaining thirty-six items to examine the construct validity and the stability of the factorial solution. Further, we tested the criterion and concurred validity as well as the Cronbach's Alpha reliability of the finally 36-item version of the Posttraumatic Growth Status Inventory (stage 6 and stage 7) in sample two. Similarly to the procedure in sample one, the criterion validity was estimated by analyzing the correlations between the newly developed PGSI subscales and the "classical" measure of posttraumatic growth from Tedeschi and Calhoun (1996). The concurrent validity was assessed in this final stage by calculating the correlations between the PGSI subscales and psychological health indicators as well as corresponding correlations between the PGSI and several measures of coping behavior. As it is recommended in the guidelines on estimating the validity of the measures comprising of the multiple subscales (APA, 1999; Crocker & Algina, 1986), we used several kinds of potentially associated variables in order to provide a possible differentiated picture of concurrent validity for each separate subscale. By reason that the validity estimation procedure of this kind bears a predominantly descriptive character, we refrained from the application of the alpha error corrections, as it is common in the initial testing of the psychometric properties of the newly developed measuring instruments with a multi-factorial structure (APA, 1999; Crocker & Algina, 1986).

Confirmatory Factor Analysis

An import part of this study was the application of the confirmatory factor analysis (CFA) in sample 2 to examine construct validity and stability of the factorial solution of the PGSI. In contrast to the EFA, the aim of which is simply to identify the factor structure underlying the set of variables, the goal of the CFA is to test a hypothesized factor structure or statistical model and to assess its fit to the data.

The estimation of model fit was based on multiple criteria that reflected statistical and practical considerations. The reported goodness-of-fit statistics include chi-square value, the normed chi-square (chi square/df), as well as the Goodness of Fit Index (GFI) and the Root Mean Square Error of Approximation (RMSEA). The statistically significant chi square indicates that a significant proportion of variance in the data remains unexplained by the model; however a statistically significant chi-square can often be produced as an artifact of sample size and small variations in the data (Hu & Bentler, 1995). The normed chi-square (chi square/df) should fall within the levels of 1.0 to 3.0 for acceptable fit (Carmines & McIver, 1981). The RMSEA expresses the lack of fit due to reliability and also model (mis)specification. RMSEA should be smaller than .08 for acceptable fit, values ranging from .08 to .10 indicate mediocre fit, and those greater than .10 indicate poor fit (Byrne, 2001; MacCallum, Browne, & Sugawara, 1996). The GFI is the Goodness of Fit Index. The GFI can be classified as absolute index of fit because it basically compares the hypothesized model (i.e., factorial structure) with no model at all. The GFI varies from 0 to 1, but theoretically can yield meaningless

negative values. By convention, GFI should by equal to or greater than .90 to accept the model (Jöreskog & Sörbom, 1984; Loehlin, 2004). By this criterion the present model is accepted.

Results

Step 1: Item Selection and Preliminary Assessment of Validity and Reliability of the Newly Developed Subscales Based on the Data from the Sample One

The Descriptive Characteristics of Sample One

As reported above, sample one consisted of 118 undergraduate students who experienced a highly stressful event during the past five years as well as 96 employed adults who also stated that they were traumatized by a personally significant event within the same 5-years period of time. The average age in this sample was 32 years; sixty-five percent of the respondents were women (n = 140) and thirty-five percent were men (n = 74). The events the study participants had experienced were categorized as follows: a) bereavement (25%); b) serious disease of close relatives (19%); c) severe enduring interpersonal conflicts with one significant person (14%); d) completely change of the familiar surroundings (12%); e) personal illness or accident (6%); f) grave work-related or academic problems (6%); g) social abuse (by a group of people) (4%); h) a victim of violence (4%); i) injury-producing accidents in immediate family (3%); j) pregnancy-related problems (2%); k) witness of violence (1%); l) bankruptcy (1%); m) tsunami (.5%); n) other (2.5%). On the average, participants' most stressful event occurred 35.78 months (SD = 21.05), i.e., approximately three years prior to data collection.

Item Selection Based on Results of the Exploratory Factor Analysis

All 48 items from the original pool were entered into an exploratory factor analysis using principal components extraction and oblique rotation. The oblique rotation was chosen by reason that, corresponding with previous research (Tedeschi & Calhoun, 1996; Maercker & Langner, 2001), the different domains of posttraumatic growth were expected to be correlated. The factor solution was determined by the number of factors generated with eigenvalues greater than 1, as well as by theoretical considerations. Because the factor solutions for students and non-students were virtually identical, data from the sub-samples of participated students and employed adults with traumatic experience were combined. Eight factors had an eigenvalue greater than one. Examination of the pattern of factor loadings revealed 8 items that had factor loadings less than .30. These items were dropped. The remaining forty items were subjected to another exploratory factor analysis. Results of this second factor analysis were principally the same as the original factorial solution. Each item loaded highest on its respective factor and had relatively low loadings (<.30) on all other factors. Corresponding to the content of the items which constituted the separate factors, the factors were labeled as following: relationships to others, personal strength, new possibilities, spirituality/religiosity, openness, generativity, appreciation for life, and sustainability. Eight subscales with the similar labels as those of the separate factors were composed based on the results from the factor analysis.

As a next analysis step, the Pearson inter-correlations between the separate subscales were calculated. Somewhat sur-

prisingly, the sustainability subscale showed very low correlations with other subscales of the questionnaire, a part of which was even non-significant negative, indicating that sustainability does not constitute a facet of posttraumatic growth. Consequently, the four items of this subscale were also eliminated. For the remaining seven inventory subscales (**Table 1**), positive statistically significant inter-correlations were demonstrated (**Table 2**).

Preliminary Assessment of the Psychometric Properties of the PGSI

The thirty-six items of the resulting Posttraumatic Growth Status Inventory (PGSI) are listed in **Table 1**, along with the scale names. Response options of the items are "does not apply", "hardly applies", "somewhat applies", "partially applies", "applies", "more applies", and "completely applies". The short definitions of the seven subscales are as follows. The relationships to others subscale refers to warm, trustfully relationships to other people, the generativity subscale reflects pleasure in supporting others and in sharing one's own knowledge and helpful life experience, the appreciation of life area links to

active lifestyle and the attempt to live each day to the fullest, and the openness area relies to open-mindedness, philosophic or scientific interests. Finally, three further subscales capture sense of personal strength, appreciation for religious/spiritual things, and recognition of new possibilities for one's life, respectively. Cronbach's alpha coefficients of the total PGSI score and its separate subscales exceeded in sample one the recommended criterion of .70 for acceptable instrument internal reliability (Nunnaly & Bernstein, 1994).

The Cronbach's alpha of the total PGSI score reached a value of .92, indicating a high degree of internal reliability. The known-groups validity of the PGSI was estimated via dichotomizing the variable "IES values" by a median split and comparing the PGSI subscales means of persons whose reported IES values in the first weeks after a critical event were high with those of persons with low IES values. In accordance to the expectations, the PGSI values of individuals with a high level of PTSD symptoms following a stressful event were higher than the posttraumatic growth scores of persons who did not suffer from pronounced stress disorder symptoms, with the exception of the subscale "personal strength". T-tests for independent

Table 1.
The composition of the PGSI subscales.

Subscale	Items
Area: Relationships to Others	r1. I make no secret about my feelings. (1) r2. I accept the fact that I need others. (6) r3. I have sympathy for others. (13) r4. I invest a lot in my relationships. (17) r5. I know I can depend on others in difficult times. (24) r6. I know a lot about how good people can be. (29)
Area: Generativity	g1. I enjoy teaching someone something new. (2) g2. I enjoy sharing my experiences to help others to find a solution to their problems. (8) g3. I can identify with others feelings. (11) g4. Occasionally I help others with conflict of interests to arrive at a satisfactory solution. (25) g5. If I have the chance, I help others by offering ways for improvement and positive criticism. (33)
Area: Personal Strengths	p1. I am inclined to change the things that need to be changed. (3) p2. I can handle difficulties well. (5) p3. I have a strong sense of self-confidence. (9) p4. I am strong enough to master unseen and unusual problems. (22)
Area: Appreciation of Life	a1. Every day is special to me. (4) a2. Life is interesting and colorful for me. (12) a3. I have more distinct ideas about what is important in life now than a couple of years ago. (19) a4. I do a lot with my life. (35)
Area: Spirituality/Religiosity	s1. I have an appreciation for religious things. (15) s2. I have an appreciation for spiritual things. (18) s3. I have thought a lot about religions and religious topics. (26) s4. I have a pronounced religious or spiritual faith. (32)
Area: New Possibilities	n1. My lifestyle is changing and developing. (7) n2. I have gained new interests for sometime now. (10) n3. Sometimes I accomplish something that others find important and extraordinary. (14) n4. I know from experience that difficult and fearful events can bring about various unexpected possibilities. (27) n5. I have been walking on a different path in my life for sometime now. (30) n6. New opportunities are available to me that I did not even notice a couple of years ago. (36)
Area: Openness	o1. I enjoy discussing topics which concern the development of society. (16) o2. I have a feeling of unity with nature. (20) o3. I enjoy listening to others opinions even when they contradict what my convictions are. (21) o4. I have thought a lot about the meaning of life. (23) o5. I enjoy reading philosophic or scientific literature. (28) o6. I have understanding for people whose lifestyles are completely different than mine. (31) o7. I am interested in other cultures. (34)

Note: The numbers in brackets correspond to the item numbers in the final version of the whole inventory.

Table 2.
Intercorrelations between the PGSI subscales in sample one (N = 214).

	Relationships to Others	Generativity	Personal Strength	Spirituality/Religiosity	Openness	Appreciation of Life
Generativity	.578**					
Personal Strength	.346**	.373**				
Spirituality/Religiosity	.278**	.192**	.107*			
Openness	.490**	.444**	.316**	.462**		
Appreciation of Life	.626**	.429**	.603**	.268**	.486**	
New Possibilities	.396**	.367**	.398**	.337**	.497**	.646**

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

samples showed that these differences were significant for the PGSI total score (t = 1.90; $p < .05$) as well as the following subscales: relationships to others (t = 1.75; $p < .05$), generativity (t = 1.93; $p < .05$), openness (t = 3.01; $p < .01$), and new possibilities (t = 1.74; $p < .05$). **Table 3** contains more detailed information concerning the size of bivariate correlations between three main kinds of PTSD symptoms (intrusions, avoidance and hyperarousal) and different PGSI subscales. The total score of PGSI was significant positively related to intrusion and hyperarousal symptoms, experienced during the first weeks after a traumatic event, however, neither PGSI total score nor any of the PGSI subscales were statistically significant associated with avoidance symptoms.

Further, Pearson correlations between the PGSI subscales and the corresponding subscales from the retrospective growth measuring instrument of Tedeschi and Calhoun (1996) were computed as estimates of criterion validity. For generativity and openness PGSI areas, the total score of the PTGI measure from Tedeschi and Calhoun was used as criterion value. All correlation coefficients were highly statistically significant, they ranged from r = .35 (for generativity subscale) to r = .78 (for religiosity/spirituality subscale), indicating sufficient criterion validity. The results are summarized in **Table 4.**

Step 2: Estimating Stability of the Factorial Solution and Assessing the Psychometric Properties of the PGSI Based on the Data from Sample Two

Descriptive Characteristics of Sample Two

A second sample of individuals with traumatic experience was recruited with the aim to evaluate the psychometric properties of the newly developed Posttraumatic Growth Status Inventory in groups of individuals whose trauma related to enduring stress conditions. This sample consisted of two subgroups. The first subgroup included 110 parents of children with serious mental disabilities (Down syndrome; n = 56, autism or Asperger syndrome; n = 54) as well as 71 parents of visually handicapped children. Thirty-four percent of all children had other comorbid physical disabilities, such as congenital heart defects, epilepsy, cerebral palsy, sensory problems, and others. The second subgroup of sample two included n = 45 individuals whose traumatic experience was related to their own severe medical condition.

The parents were on the average forty-one years old, the majority was well-educated (13.58 years of formal education, on the average) and 142 (78%) were married. Seventy-five percent were mothers and twenty-five percent were fathers. Seven years

passed on the average since the child's diagnosis. The mean age of the children was ten years.

The individuals with a disease-related trauma (n = 45) were on the average thirty-nine years, with the mean of formal education of 13.72 years. Seventy-nine percent were men. Similarly to the sub-sample of parents, the diagnosis dated back approximately 7 years. The most frequently documented illnesses in this subgroup were HIV, cardiac diseases and cancer.

In the entire sample, the majority of participants (78%) characterized the first awareness of the diagnosis as a "definitely upsetting" event. The explorative analyses of relationships between the PGSI and respondents' demographic characteristics yielded a weak statistically significant correlation between PGSI total score and gender (r = .16), indicating that women's values were slightly higher than those of the men. **Table 5** demonstrates the means for PGSI subscales depending on the kind of the traumatic event.

Confirmatory Factor Analysis and Estimation of Reliability

In order to estimate the stability of the factorial solution gained based on the exploratory factor analysis upon the data from sample one, we conducted the confirmatory factor analysis (CFA) in the second mixed sample of individuals with traumatic experience using maximum likelihood method. On the whole, the initial seven-factorial model demonstrated a reasonably good fit to the data: the RMSEA = .078; chi square = 1385 (df = 584; p = .00); chi square /df = 2.37; GFI = .965. **Figure 1** shows the results the CFA including the factor loadings of the separate items and the subscales composition.

Cronbach's alpha coefficients are displayed in **Table 5**. Internal consistency reliabilities were sufficiently high and, similarly to the analogous estimations in sample one, the recommended criterion of .70 for acceptable instrument internal reliability (Nunnaly & Bernstein, 1994) was exceeded for all PGSI subscales. The Cronbach's alpha reliability of the total PGSI score was with .93 very high.

Analysis of Criterion Validity, Correlations between PGSI and Indicators of Mental Health

In order to examine the criterion validity of the PGSI-subscales, we calculated the correlations with corresponding subscales of the "classical" measure of trauma-related changes from Tedeschi and Calhoon (1996). The external validity criterion for the generativity and openness domains was the total score of the Tedeschi and Calhoun's questionnaire. The results (**Table 4**) provide good support for criterion validity (r = .32 for life apprecia-

Table 3.
Correlations between PGSI subscales and PTSD symptoms in sample one (N = 214).

	Relationships to Others	Generativity	Personal Strength	Spirituality/ Religiosity	Openness	Appreciation of Life	New Possibilities	PGSI Total
IES Intrusions	.12[*]	.13[*]	−.08	.08	.25[**]	.01	.10	.14[*]
IES Avoidance	.06	.09	−.04	.02	.04	.08	.07	.07
IES Hyperarousal	.07	.05	−.20[**]	.23[**]	.22[**]	−.03	.10	.11[*]
IES Total	.11[*]	.11[*]	−.15[*]	.14[*]	.22[**]	.03	.12[*]	.14[*]

Note: In sample one (N = 214) Cronbach's alpha coefficients of the three IES subscales reached values of .80, .72, and .80, of the IES total the value of .85. [*]$p < .05$; [**]$p < .01$.

Table 4.
Criterion validities of the PGSI subscales in sample one (N = 214) and sample two (N = 226).

	Relationships to Others	Generativity	Personal Strength	Spirituality/ Religiosity	Openness	Appreciation of Life	New Possibilities	PGSI Total
Sample One	.58[**]	.35[**]	.47[**]	.78[**]	.41[**]	.60[**]	.66[**]	.67[**]
Sample Two	.63[**]	.37[**]	.40[**]	.74[**]	.40[**]	.32[**]	.58[**]	.59[**]

Note: The coefficients represent Pearson correlations between PGSI subscales and corresponding subscales of PTGI from Tedeschi and Calhoun (1996). For generativity and openness subscales, the correlations with the total score of the PTGI were calculated.

Table 5.
The means and standard deviations for PGSI subscales and PGSI total in both sub-samples of sample two, and Cronbach's alpha reliabilities of the PGSI subscales.

	Relationships to Others M (SD)	Generativity M (SD)	Personal Strength M (SD)	Spirituality/ Religiosity M (SD)	Openness M (SD)	Appreciation of Life M (SD)	New Possibilities M (SD)	PGSI Total M (SD)
Parents	28.58 (5.84)	26.56 (4.44)	20.29 (4.07)	15.89 (7.01)	33.67 (6.70)	19.42 (4.32)	27.02 (6.55)	171.42 (28.51)
Disease Related Trauma	28.29 (6.61)	25.30 (5.58)	18.68 (4.80)	14.43 (6.73)	35.10 (7.82)	19.39 (4.64)	27.07 (7.63)	168.28 (32.64)
Total Sample Female	28.92 (6.09)	26.89 (4.36)	20.23 (4.15)	15.83 (7.09)	33.79 (6.72)	19.64 (4.46)	27.80 (6.63)	173.10 (28.93)
Male	27.21 (6.11)	24.73 (5.47)	19.13 (4.71)	14.88 (6.79)	33.43 (7.69)	18.58 (4.33)	24.97 (6.64)	162.93 (31.79)
Cronbach's Alpha	.79	.81	.83	.91	.75	.78	.80	.93

Note: "Parents": Parents of children with mental or physical disabilities (n = 181). "Disease related trauma": Individuals with a severe medical condition (n = 45). Cronbach's alpha coefficients represent the reliabilities of the PGSI subscales in the whole sample two (N = 226).

tion subscale to r = .74 for religiosity/spirituality subscale).

To test whether the PGSI-subscales are substantially associated with depression, anxiety and somatization symptoms, we analyzed the Pearson correlations of the PGSI-subscales with the BSI and the FBL. The results are illustrated in **Table 6**. The PGSI areas were almost without any exemption statistically significant inversely associated with BSI anxiety subscale (r = −.15 to r = −.38). Additionally, all PGSI domains with exemption of the religiosity/spirituality domain were statistically significant inversely related to BSI depression symptoms (r = −.20 to r = −.53). Further, all PGSI areas with exemption of the "new possibilities" subscale showed statistically significant negative correlations with BSI somatization scale (r = −.16 to r = −.30) as well as with psychosomatic symptoms measured with the FBL (r = −.12 to r = −.30). On the whole, these results indicated that a higher level of posttraumatic growth was related to a low level of anxiety, depression and somatization symptomatology.

Analysis of Relationships between the PGSI and Frequency of Using Different Adaptive and Maladaptive Coping Strategies

In order to test concurrent validity, Pearson correlations be-

tween PGSI subscales and different coping strategies were calculated. As discussed in the literature on stress and coping, one and the same coping strategy may be more or less adaptive, depending on the special kind of the major stressful event and on the individual life situation (Meichenbaum, 1985; Antonowsky, 1987; Connor-Smith & Flachsbart, 2007). Taking into consideration this knowledge from previous research with a long tradition, we decided to accomplish two separate analyses on the relationships between PGSI growth domains and coping strategies, because of the very different nature of traumatic events in both subgroups (parents of children with mental and/or physical disabilities and individuals whose trauma related to their own severe medical conditions). The results from the corresponding analyses are presented in **Table 7**.

Correlations between PGSI and Coping Strategies in the Parents Sub-Sample

In the sub-sample of 181 parents of children with mental and/or physical disabilities, the data analyses yielded the following empirical results. Both, the relationships to others and generativity PGSI subscales were positively associated to several potentially adaptive coping strategies, including active coping,
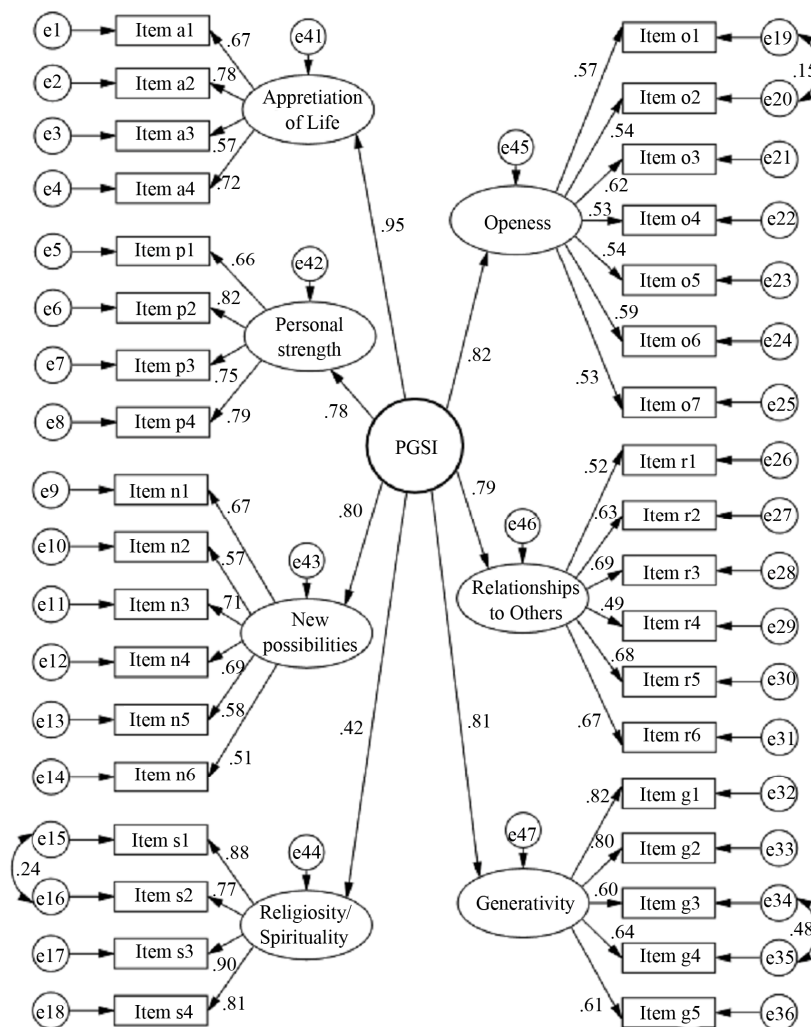
Figure 1.
Confirmatory factor analysis, factorial structure of the PGSI.

Table 6.
Correlations between PGSI subscales and mental health indicators in sample two (N = 226).

	Relationships to Others	Generativity	Personal Strength	Spirituality/ Religiosity	Openness	Appreciation of Life	New Possibilities	PGSI Total
BSI Anxiety	−.33**	−.27**	−.35**	−.15*	−.20**	−.38**	−.15*	−.33**
BSI Depression	−.37**	−.32**	−.46**	−.08	−.20**	−.53**	−.27**	−.40**
BSI Somatization	−.30**	−.24**	−.24**	−.17**	−.16**	−.29**	−.11	−.27**
FBL Psychosomatic Complaints	−.29**	−.18**	−.30**	−.12*	−.19**	−.33**	−.10	−.27**

Note: In the sample two (N = 226), Cronbach's alpha coefficients of the three BSI subscales reached the values of .84, .86, and .87, of the FBL the value of .92. *p < .05; **p < .01.

Planning, positive reframing, turning to religion, as well as using emotional and instrumental support.

On the other side, there were statistically significant negative correlations of these PGSI areas with two kinds of dysfunctional coping behavior; substance use and behavioral disengagement. The personal strength subscale showed similar correlations with adaptive and dysfunctional coping strategies.

Beyond this, the personal strength area was significant negatively associated with self-blame (r = −.29) and positively associated with acceptance that ranks among potentially adaptive coping behavior (r = .14). The religiosity/spirituality subscale was not associated with active coping and planning. However, data analyses offered positive associations between religiosity/spirituality PGSI area and other adaptive coping strategies

Table 7.
Correlations between PGSI subscales and frequency of using different coping strategies, in both subgroups of sample two (parents of children with disabilities, n = 181, and persons with a severe medical condition, n = 45).

	Relationships to Others	Generativity	Personal Strength	Spirituality/ Religiosity	Openness	Appreciation of Life	New Possibilities	PGSI Total
Active Coping	.25** [.29*]	.20** [.12]	.33** [.40**]	.11 [−.21]	.23** [.10]	.39** [.35*]	.33** [.40*]	.34** [.26*]
Planning	.15* [.09]	.23** [.33*]	.17* [.23]	.01 [.10]	.29** [.04]	.15* [.21]	.21** [.04]	.23** [.18]
Positive Reframing	.34** [.39**]	.36** [.39**]	.50** [.53**]	.12 [.28**]	.40** [.42**]	.51** [.55**]	.51** [.42**]	.52** [.56**]
Acceptance	−.03 [.02]	−.08 [.14]	.14* [.07]	.05 [.24]	.16* [.10]	.07 [.02]	.10 [−.09]	.09 [.09]
Humour	−.01 [.00]	.08 [.25]	.06 [.16]	.07 [.38*]	.16* [.45**]	.07 [.03]	.09 [.14]	.10 [.32*]
Religion	.16* [.01]	.13* [−.19]	−.01 [−.29*]	.77** [.63**]	.35** [.03]	.15* [.11]	.21** [.23]	.39** [.14]
Using Emotional Support	.53** [.40**]	.35** [.07]	.14* [.18]	.22** [−.08]	.37** [.15]	.24** [.28*]	.37** [.40**]	.44** [.27*]
Using Instrumental Support	.55** [.34*]	.44** [−.03]	.23** [.12]	.18* [−.23]	.38** [.05]	.22** [.15]	.26** [.30*]	.44** [.14]
Denial	−.09 [.12]	−.00 [−.30*]	−.13 [−.38**]	.08 [−.06]	−.05 [−.09]	−.20** [−30*]	−.10 [−.05]	−.08 [−.21]
Self-Distraction	−.06 [.00]	−.06 [.05]	−.10 [.13]	−.12 [.02]	−.05 [.17]	−.21** [.13]	−.11 [.09]	−.14* [.11]
Venting	.17* [.00]	−.05 [.00]	−.08 [−.11]	.16* [.03]	.04 [.12]	.13 [−.11]	.22** [.03]	.13* [.01]
Substance Use	−.14* [−.10]	−.21** [−.17]	−.20** [−.29*]	−.05 [.10]	−.08 [.23]	−.15* [−.27*]	−.05 [−.07]	−.15* [−.07]
Behavioural Disengagement	−.21** [−34*]	−.15* [−.36*]	−.23** [−.28*]	.01 [−.09]	−.08 [−.31*]	−.23** [−.44**]	−.11 [−.35*]	−.17* [−.41*]
Self-Blame	−.04 [−.20]	−.01 [−.15]	−.29** [−.35*]	.04 [−.07]	.07 [−.06]	−.27** [−32*]	−.07 [−.05]	−.08 [−.20]
Regenerative Coping	.17* [.37**]	.08 [.39**]	.16* [.27*]	.09 [.08]	.27** [.53**]	.27** [.37**]	.29** [.24]	.26** [.43**]
Availability of a Confident	.44** [.40**]	.30** [.12]	.23** [.32*]	.19** [.06]	.27** [.07]	.37** [.37**]	.27** [.41**]	.40** [.31*]

Note: The coefficients without any brackets represent the Pearson correlations in the sub-sample of parents. The coefficients in *square brackets* represent the corresponding Pearson correlations in the sub-sample of persons with a disease-related trauma. *$p < .05$, **$p < .01$.

(r = .22 for using emotional support and r = .18 for instrumental support). The correlations between this PGSI subscale and maladaptive coping strategies were not significant.

The openness PGSI domain was positive statistically significant related to eight adaptive coping strategies (active coping, planning, positive reframing, acceptance, turning to religion, using emotional and instrumental support, and humour) and it was not related to any kind of dysfunctional coping behavior. The appreciation of life and the new possibilities PGSI subscales showed positive associations with six adaptive coping strategies (active coping, planning, positive reframing, turning to religion, using emotional and instrumental support). In addition, for the appreciation of life area, but not for the new possibilities PGSI area, the negative statistically significant correlations with four maladaptive coping strategies (denial, substance use, behavioral disengagement, and self-blame) were demonstrated. Five of seven growth subscales (relationships to others, personal strength, openness, life appreciation, and new possibilities) as well as the PGSI total score were positively correlated with regenerative coping (r = 16 to r = .29). Finally, the PGSI total score was positive, statistically significant associated to six potentially adaptive coping strategies (active coping, planning, positive reframing, turning to religion, using emotional and instrumental support) and it was significant negatively correlated with two kinds of dysfunctional coping (sub-

stance use and behavioral disengagement).

Correlations between PGSI and Coping Strategies in the Sub-Sample of Persons with Their Own Disease-Related Trauma

Following correlation patterns between PGSI areas and different kinds of coping behavior were demonstrated in the sub-sample of 45 persons with a severe medical condition (**Table 7**). The relationships to others and the new possibilities PGSI subscales were positively associated to the four different potentially adaptive coping strategies (active coping, positive reframing, using emotional and instrumental support). They were also negatively related to behavioral disengagement (r = −.34 and r = −.35); the correlations with other potentially maladaptive coping strategies were not significant. The personal strength and the appreciation of life PGSI areas were positively correlated with active coping and positive reframing, both of these subscales were also negative, statistically significant related to three potentially dysfunctional coping strategies (substance use, behavioral disengagement, and self-blame). The generativity and the openness PGSI domains showed positive, statistically significant correlations with positive reframing. Beyond this, the generativity subscale was positively associated with planning (r = .33), and the openness domain with coping through humorous handing of stressful life situations (r = .45). Both generativity

and openness subscales were negatively related to behavioral disengagement (r = −.36 and r = −.31). The religiosity/spirituality subscale was positively correlated with three adaptive coping strategies (positive reframing, humour, and turning to religion). However, similarly to findings from the parents sub-sample, it was not associated with any dysfunctional coping strategies. For five PGSI areas (with exemption of religiosity/spirituality and new possibilities subscales, respectively), positive statistically significant correlations with regenerative coping were demonstrated (r = .27 to r = .53).

Are There Systematic Differences in Pattern of Correlations between PGSI and Various Coping Strategies across both Groups: Parents of Children with Mental and/or Physical Disabilities vs. Individuals with a Disease-Related Trauma?

Data analyses revealed several similarities in patterns of correlations between both subgroups constituting the second sample: parents of children with mental and/or physical disabilities vs. individuals with their own disease-related trauma. Thus, the personal strength and life appreciation subscales were most consistently negative correlated with maladaptive coping strategies in both groups. Alike, the "relationships to other" PGSI subscale showed consistent positive associations with adaptive coping behavior in parents as well as in the outpatients group.

Interestingly, statistical analyses offered also several differences in pattern of correlations between both subgroups. Whereas functional coping strategies "planning", as well as "coping through active seeking emotional and instrumental support" were consistently positive correlated with PGSI factors in the parents sample, they were not statistically significant associated to the most of PGSI factors in the sample of persons with their own disease-related trauma. By contrast, coping through humorous handling of burdensome life situations was more frequently linked to PGSI subscales for the outpatients sample than for the sample of parents. Additionally, denial and behavioral disengagement as maladaptive coping strategies were definitely more strongly related to PGSI subscales in the outpatients group than in parents of children with disabilities.

Regarding differences in the relative impact of the separate PGSI domains, the generativity and openness subscales yielded a stable pattern of positive, statistically significant correlations with several kinds of adaptive coping behavior in parents' sample, but not in the sample of individuals whose traumatic experience was related to their own severe medical condition.

Discussion

The aims of the study described in this paper were to develop and to evaluate a measuring instrument that allows for capturing the current status in processes of growth in the aftermath of traumatic experience. Unlike contemporary available retrospective growth questionnaires (the PTGI, the SRGS and the BSI), the new measure was designed to estimate the actual profile of different growth related aspects. Accordingly, when completing the PGSI, respondents do not need to remember their crucial experience and to recall how they were prior to the stressful event; they should simply describe their actual behavior, thinking and feeling. This kind of item format was chosen in order to avoid distortion through potential cognitive biases, documented in previous investigations (McFarland & Alvaro, 2000; Smith & Cook, 2004). Additionally, taking into account findings from recent empirical literature on posttraumatic growth (Cadell &

Sullivan, 2006; Danoff-Burg & Revenson, 2005; Updegraff et al., 2002; Pakenham, 2007), the initial item pool contained items asking for self-awareness, world view and the way of treating others, beside the items focused on already well-known growth areas (such as relationships to others, personal strength, and appreciation of life) as they are addressed in the currently most established retrospective measure of PTG from Tedeschi and Calhoun (1996). The findings provide evidence of sound reliability, as well as good convergent and concurrent validity of the Posttraumatic Growth Status Inventory subscales. The results of the confirmatory factor analysis yielded support for stability of the initial factorial solution. Interestingly, five extracted factors, e.g. personal strength and appreciation of life, correspond to the growth facets which were identified in factor analyses upon growth related items in other studies (e.g., Tedeschi & Calhoun, 1996). This attests to the soundness and satisfying validity of the construct 'posttraumatic growth'. The PGSI contains seven subscales and permits the capturing of personal changes in the following growth domains: relationships to others, spirituality/religiosity, appreciation of life, generativity, openness, personal strength, and new possibilities. In comparison to the "classical" retrospective posttraumatic growth measure from Tedeschi and Calhoun (1996), the PGSI assesses growth associated processes in two additional areas, generativity and openness. The 7-stage item response format permits a precise differentiation between various degrees in the distinct growth related characteristics.

Comparison of mean PGSI scores showed significant differences between participants who suffered from less or more symptoms of posttraumatic stress disorder in the first time after a traumatic event. Thereby, the known-groups validity of the newly developed questionnaire could be demonstrated. Further, the acceptability of the PGSI is demonstrated by minimal missing data (2.7% in sample one and 2.4% in sample two). On the whole, the study provides empirical evidence for good psychometric properties and practicability of the newly developed growth status inventory.

A particular strength of the PGSI is its applicability in samples of individuals whose trauma evolved from the confrontation with suffering of others, for example, parents of children with psychological and physical disabilities, persons who witnessed violence, and, generally, care-givers and close relatives of people with life-threatening illnesses. As shown in other studies, (e.g., Alexander & Wilz, 2010), feelings of guilt may account for barriers to acknowledge beneficial trauma-related changes in these populations. In the stage of the item generation, those participants of our study, whose traumatic experience related to their family members (child's, spouse's, or parent's) severe health conditions or disabilities, reported in individual semi-structured interviews about the comparable difficulties to reflect on possible beneficial trauma-related change due to moral considerations. A measuring instrument, like the PGSI, that focuses solely on current experience, without any connection to past live events, can help to sidestep the corresponding barriers and to attenuate the tendency to distortions due to social desirability. This reduction of corresponding distortions may partially explain the fact, that the internal consistencies of the PGSI subscales were higher in our study than the internal consistencies of comparable subscales of the retrospective-oriented PTGI questionnaire (e.g., in sample two, .83 vs. .73 for the subscale "personal strength" and .78 vs. .72 for the subscale "life appreciation"). Altogether, the results of our study imply that the

validity of individual reports on growth related processes could be increased by the means of using item format which focuses on the actual experience and not on perceived inner changes.

Additionally, the newly developed measure may be very useful for capturing positive personal changes in samples of individuals whose trauma relates in a particular degree to experience of stigmatization, like potentially stigmatizing diseases (e.g., mental disorders, HIV) as well as social or sexual abuse. As documented in empirical literature, the proceeding of the stigma-associated feelings of "spoiled identity" (Goffman, 1986) often lead to inducing the re-examination of old values and priorities and to efforts of creating a new definition of self identity. The active establishment of an alternative identity as a positive adjustment instead of a resignation requires openness to a new experience and enhanced tolerance towards other ways of life and other ways of communication. Since the PGSI contains a separate openness subscale which addresses this special component of positive individual psychological changes, this inventory may be more appropriate in capturing the corresponding processes than the conventional posttraumatic growth and benefit finding measuring instruments. Although a part of our study's participants were individuals who experienced traumas with such stigmatization potential, further research is required to provide additional evidence concerning the applicability of the PGSI in these specific populations.

Another area of application for the PGSI may be longitudinal studies designed to investigate different stages in processes of posttraumatic growth in persons with enduring stress conditions subsequent to an acute traumatic event, such as a case of severe disability-related health problems in a person her/himself or in a close family member. Two groups of persons with analogous kinds of traumatic experience were participants of our study: parents of children with psychological and physical disabilities as well as individuals whose trauma related to their own severe medical conditions. In both samples, good psychometric properties of the PGSI were demonstrated. Additionally, the data analyses offered the ability of the PGSI to differentiate between individuals with dissimilar kinds of traumatic experience. The pattern of correlations between the separate PGSI subscales and various potentially adaptive and maladaptive coping strategies were partially different in parents and outpatients samples. Thus, "coping though active seeking instrumental or emotional support" and "planning" were more consequently related to the separate growth domains in the parents sample than in the sample of individuals with an illness-related trauma. It may point to important differences in potential adaptive significance of coping behavior. For parents caring for children with mental disabilities, positive personal changes in terms of growth may involve acquirement of such essential skills as mobilization of their social networks for help in caring the child and for informational support. The efforts to mobilize the social environment would be inevitably related to the necessity to overcome feelings of shame due to the 'particular kind' of the child's disability and to accept the new after-child-diagnosis life situation. To undergo this experience could require personal strength and individual development in terms of personal growth. Attention-grabbing is also another systematic dissimilarity, and precisely in use of denial as a coping strategy that was more consistently negatively linked to PTG areas in the outpatients' sample than in the parents' sample. What may imply denial for persons raising children with autism or Down syndrome? It could basically imply the recognizing the feeling that "my child

is o.k.". In fact, this kind of perception neither necessarily leads to dysfunctional behavior, nor it should be an indication of resistance to the processes of trauma-related growth. Conversely, if persons with a severe disease respond with denial to their diagnosis or to their physical symptoms, it may be frequently linked to a lack of compliance with medical treatment as well as to the insistence on several old maladaptive unhealthy habits as a phenomenon that is opposite to personal changes in terms of stress-related growth.

Limitations and Considerations

Despite generally promising study results, several limitations should also be kept in consideration concerning the findings reported above.

First, a mixed sample of undergraduate students and adults with significant traumatic experience were used at the stage of item selection. It might stand to reason to query whether the students can be representative for the population of traumatized individuals. However, it is not unusual, to use the students samples at the initial phase in the development of psychological measuring instruments (Stanton et al, 2000; Tedeschi & Calhoun, 1996). Furthermore, students are comparable to the general population pertaining to experience with trauma (Vrana & Lauterbach, 1994).

Second, a cross-sectional study design was used to evaluate the psychometric properties of the PGSI. A cross-sectional investigation does not permit any unambiguous conclusions in terms of causality. Consequently, the direction of relationships between separate PGSI areas and indicators of mental health, such as anxiety, depression and psychosomatic symptoms as well as between PGSI and different coping strategies remained unclear. Future longitudinal studies with repeated measurements are warranted to test corresponding causation hypotheses. Additional longitudinal studies may also be necessary to provide more information about the alterability of the PGSI values across various periods of time.

A further limitation relates to the issue of the potential unambiguousness of the construct "posttraumatic growth" in terms, as it could be captured by the newly developed questionnaire. How can we be sure that the PGSI items assess the posttraumatic growth processes as a result of an individual's traumatic experience, given the fact that the participants are asked to describe their behavior, thinking and feelings, without the explicit reference to the traumatic event? Indeed, it is a general difficulty with the operationalisation of complex psychological constructs that we can seldom be fully confident of definite sources/triggers for the multifaceted psychological processes, like intrapersonal growth. A number of common cognitive biases, such as illusory correlation, subjective validation, social desirability bias, or backfire effect (Tversky & Kahnemann, 1974; Fiedler, 1991; Danton & Ortegren, 2011; Sanna, Schwarz, & Stocker, 2002), may contribute to misattribution, if the respondents were explicitly asked about perceived causes of their inner changes. The PGSI refrains from asking about subjective attribution of reported inner growth processes to a concrete severe traumatic experience. However, there is other, implicit evidence of potential relationships. Firstly, the PGSI focuses on seven areas, which are well-documented in empirical and theoretical literature as domains of posttraumatic growth. Accordingly, high statistically significant correlations between the separate PGSI subscales and the corresponding PTGI growth

areas were demonstrated in our data analyses. Secondly, the PGSI is designed to be applied in studies with individuals who experienced verifiable psychological traumas, like a physical or mental disability in their close relatives, their own severe medical conditions or other kinds of trauma. Thirdly, the comparison of the PGSI scores from different measuring times, as well as from the interventional and the control groups, should provide additional evidence about links between trauma-related experiences and corresponding changes in the processes of intra-psychical growth.

Due to a specific item format focusing on current state, the PGSI offers the potential to capture slight positive as well as inverse-directed alterations in processes of posttraumatic growth with a higher precision than the alternative existing "retrospective" growth scales. However, this particular feature of the newly developed inventory should be examined in more detail in further investigations.

To summarize, the study provides empirical evidence for good psychometric properties and practicability of the newly developed Posttraumatic Growth Status Inventory. The PGSI is recommended particularly for use in longitudinal studies as well as in samples of persons whose trauma relates to a severe psychological or physical disability in their families.

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