Transdiagnostic Validation of the German Benefit Finding Scale (BFSC) for Youth With Chronic Conditions

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Abstract

We examined the psychometric properties of the 10-item Benefit Finding Scale (BFSC) in a transdiagnostic sample of German youth facing chronic conditions (N = 304; 12 – 21 years). Exploratory factor analysis with a first subsample revealed a one-dimensional factor structure. Confirmatory factor analysis with a second subsample verified the one-dimensionality with an acceptable fit. The BFSC exhibited acceptable internal consistency (α = .87 – .88). Benefit finding (BF) was positively correlated with age, disease severity, optimism, self-esteem, self-efficacy, sense of coherence, and support seeking. There were no correlations with avoidance, wishful thinking, emotional reaction, and health-related quality of life. Sex differences in BF were not consistent across subsamples. BF was negatively associated with social status. The BFSC is a psychometrically sound and transdiagnostic instrument to assess BF in youth and may facilitate further research on positive adaptation processes in response to chronic conditions.

Introduction

Stress and coping research is shifting from focusing exclusively negative effects of chronic conditions (CC) to an emphasis on ways in which these conditions promote positive life changes (Park et al., 2009). Benefit finding (BF), defined as individual differences in perceiving positive life changes resulting from adversity and negative life stressors (Helgeson et al., 2006; Park, 2009), herein, emerged as a key construct and gained increasing attention in the context of CC (Algoe & Stanton, 2009). Positive life changes may manifest themselves in domains including intrapersonal benefits (e.g., feeling stronger and wiser), interpersonal benefits (e.g., feeling closer with friends and family), and changes in priorities and goals (e.g., reordering goals and emphasis of enjoyment in life) (Tedeschi & Calhoun, 2004). There is first meta-analytic evidence that BF in response to several health stressors is associated with lower levels of depression and global distress as well as more positive well-being (Helgeson et al., 2006). While BF was studied among adults with various CC (Helgeson et al., 2006; Park, 2009), studies among youth are lacking (Meyerson et al., 2011).

CC are highly prevalent in youth (van der Lee et al., 2007) and constitute an additional challenge in their life. Transdiagnostic characteristics of the CC, namely chronicity, functional impairments, physical disability, or pain, and need for extensive (permanent) health care, can interfere with the mastery of common developmental tasks (e.g., forming friendships, establishing first romantic relationships, school transitions or striving for autonomy and emancipation from parents) (de Ridder et al., 2008; Warschburger, 2015). So far, studies on BF in youth are limited to populations with cancer (Barakat et al., 2006; Maurice-Stam et al., 2011; Phipps et al., 2007) and type 1 diabetes (Helgeson et al., 2009; Rassart et al., 2017; Tran et al., 2011). However, only one measure for BF was psychometrically evaluated for children and children and adolescents with cancer (Phipps et al., 2007). The Benefit Finding Scale for Children (BFSC) was adapted by pediatric clinicians from scales used among adult patients with cancer (Phipps et al., 2007). Conducting a principal component analysis (PCA), the authors identified a single component, which accounted for 41% of the variance, and showed that the BFSC had an adequate
internal consistency. Further studies on children and adolescents with cancer supported the reliability and construct validity of the BFSC (e.g., Maurice-Stam et al., 2011).

However, it is crucial to ensure the measure provides appropriate psychometric properties, when it is introduced to new populations (Loehlin, 2004), namely youth facing different CC. To the best of our knowledge, this is the first study validating a BF measure for a transdiagnostic sample of youth facing different CC, simultaneously providing the first age-appropriate, German version. The study aimed at examining the factor structure of the BFSC, using both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Moreover, we examined the scale’s construct validity by focusing on associations with positive intra- and interpersonal resources and coping strategies. Convergent constructs were selected based on previous reported correlates of BF, such as optimism, self-esteem, self-efficacy, empathy, acceptance, social support, and support seeking (Cassidy et al., 2014; Helgeson et al., 2006; Phipps et al., 2007). Discriminant constructs were chosen based on theoretical considerations. We hypothesized BF to be unrelated to measures of negative emotional reactions and passive coping strategies (Compas et al., 2012), such as cognitive avoidance, wishful thinking, and distancing oneself from the CC. Finally, we tested the BFSC against a measure of health-related quality of life (hrQoL), as an independent criterion (concurrent validity).

**Methods**

**Translation process**

The translation process followed the WHO guidelines (World Health Organization, 2018). With authorization of the authors of the BFSC (Phipps et al., 2007), two psychologists independently translated the BFSC into German. In an expert panel, discrepancies between both versions were discussed and a pre-final version provided. This version was then back translated by a bilingual person. Finally, a pilot group of youth ($N=5$) proved the items for understanding.

**Procedure**

Data were collected between June 2018 and August 2019 by an online questionnaire. The sample was recruited via social networks (e.g., Facebook), via various self-help forums, rehabilitation facilities, and outpatient clinics in Germany. Inclusion criteria were as follows: participants’ age between 12 and 21 years, informed consent, the presence of CC confirmed by the Children with Special Health Care Needs Screener (Bethell et al., 2002), and the completion of the entire questionnaire. Participants received gift coupons (10 Euros) as incentives.

**Participants**
The final sample for data analyses consisted of $N = 304$ participants aged 12 to 21 years ($M = 17.15$, $SD = 2.80$; 62.2% female). According to the MacArthur Scale (Goodman et al., 2001), participants had a mean subjective social status of 6.36 ($SD = 1.54$; range = $1 - 10$). Most participants, 69.4% ($n = 211$) reported to have one CC and 30.6% ($n = 93$) reported multiple CC. The most prominent diagnoses were endocrine, nutritional, and metabolic diseases (34.9%), diseases of the digestive system (25.3%), and diseases of the nervous system (8.9%). The mean of years since diagnosis was 6.70 years ($SD = 5.74$).

**Measures**

**Benefit finding**

BF was assessed with the German translation of the BFSC (Phipps et al., 2007). Responses were recorded on a 5-point Likert scale ranging from “not at all true for me” to “very true for me”.

**Intrapersonal Resources**

Psychological resources were assessed with the following six-item subscales from the “Fragebogen zur Erfassung von Ressourcen im Kindes- und Jugendalter” (FRKJ 8-16; Lohaus & Nussbeck, 2016): optimism, self-esteem, self-efficacy, sense of coherence, and empathy. Respondents rated their answers on a 4-point Likert scale ranging from “never true” to “always true”. The internal consistencies in the present study (original study) were as follows: optimism: $\alpha = .89$ ($\alpha = .74$), self-esteem: $\alpha = .88$ ($\alpha = .85$), self-efficacy: $\alpha = .87$ ($\alpha = .83$), empathy: $\alpha = .83$ ($\alpha = .83$), sense of coherency: $\alpha = .83$ ($\alpha = .70$).

**Coping with a disease**

The Coping with a Disease Inventory (CODI; Petersen et al., 2004) was developed to assess coping strategies in children and adolescents with CC. The CODI consists of 28 items representing six subscales: acceptance, avoidance, cognitive-palliative coping, distance, emotional reaction, and wishful thinking. Responses were given on a 5-point Likert scale ranging from “never” to “always”. The internal consistencies in the present study (original study) were as follows: acceptance: $\alpha = .89$ ($\alpha = .83$), avoidance: $\alpha = .80$ ($\alpha = .72$), cognitive-palliative coping: $\alpha = .54$ ($\alpha = .69$), distance: $\alpha = .81$ ($\alpha = .70$), emotional reaction: $\alpha = .88$ ($\alpha = .82$), wishful thinking: $\alpha = .79$ ($\alpha = .81$). As the internal consistency of the subscale cognitive-palliative coping was poor, this subscale was discarded from further analyses.

**Social support**

The Berlin Social Support Scales (BSSS; Schulz & Schwarzer, 2003) were used to assess perceived social support and support seeking on a 4-point Likert scale ranging from “strongly agree” to “strongly disagree”. The internal consistencies in the present (original) study were $\alpha = .93$ ($\alpha = .85$) for perceived support and $\alpha = .87$ ($\alpha = .81$) for support seeking.

**Health-related quality of life**
The 12-item short form for the DISABKIDS chronic generic module (DCGM-12) was applied to assess general subjective hrQoL in children and adolescents with CC (Schmidt et al., 2006). The items cover mental, social, and physical hrQoL. Responses were recorded on a 5-point Likert scale ranging from “never” to “always”. As two items are referring to pharmacological treatment and as some participants (18.1%) in our sample had no prescribed medication, we calculated total scores for a 10-item version, too. Cronbach’s alpha of the present (original) study reached $\alpha = .90$ (DCGM-12; $\alpha = .84$) and $\alpha = .91$ (DCGM-10).

**Disease history**

In addition, subjective disease severity and the age at diagnosis were assessed with single items (“I perceive my illness as severe” - 5-point Likert scale ranging from “not at all true for me” to “very true for me”; “How old were you when your illness was diagnosed by a doctor?”).

**Data analysis**

The main analyses were conducted using R (R Core Team, 2019). A two-step analytic procedure, consisting of an EFA followed by a CFA, was performed to test the factor structure (Worthington & Whittaker, 2006). First, the total dataset was split into subsamples for EFA ($n = 100$) and CFA ($n = 204$) via random sampling in IBM SPSS version 27.0. The respective sample sizes fulfilled the subject to item ratio of 10:1 and were therefore considered to be sufficient, given the level of the reported factor loadings < .50 (Tabachnick & Fidell, 2013) and recommendations from simulations studies (e.g., Mundfrom et al., 2005). The factor structure of the BFSC was assessed in the first subsample ($n = 100$) using Ordinary Least Squared extraction (OLS). OLS is known to provide results similar to Maximum Likelihood (ML) and is considered as more robust to non-normal distributed data (Osborne, 2014). A quartimax rotation was used, as we expected a single, orthogonal factor (Osborne, 2014). Factor loadings were interpreted as follows (Tabachnick & Fidell, 2013): .71 and above excellent, .63 – .70 very good, .55 – .62 good, .33 – .45 fair, and .32 or lower poor.

Data from the second subsample ($n = 204$) were subjected to CFA using lavaan (Rosseel, 2012). Hypothesized modelling was based on the results of the EFA in the first subsample, as well as the expected one-dimensional factor structure. The CFA was performed with ML estimation with robust (Huber-White) standard errors and a scaled test statistic that is (asymptotically) equal to the Yuan-Bentler test statistic (Muthén & Muthén, 2017). Because $\chi^2$ test is sensitive to sample sizes, three indices were used to assess the model fit. An acceptable model fit was indicated by using the cut-off values of these indices: comparative fit index (CFI) of $\geq 0.90$, root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) of $\leq 0.08$ were considered as acceptable (Hu & Bentler, 1999).

As a measure of internal consistency, Cronbach’s $\alpha$ was calculated. In both subsamples, we examined sex differences and correlations with age, social status, disease severity, and time since diagnosis (age minus age at diagnosis). Effect sizes were calculated and interpreted by applying Cohen's guidelines (Cohen, 1977): $d = 0.20 – 0.50$ small, $d = 0.50 – 0.80$ medium, $d \geq 0.80$ large effect sizes. Convergent as well as
discriminant validity was examined via Pearson correlations with respective variables \((r>.10\) small, \(r>.30\) medium, \(r>.50\) large effect size; Cohen, 1992). As the level of missing data in the EFA subsample was very low (<1%), missing data were imputed using multiple imputation via fully conditional specification implemented by the MICE algorithm (van Buuren & Groothuis-Oudshoorn, 2011). Multiple imputation is a robust missing data handling procedure that requires the least stringent assumptions about missing data mechanism compared to other traditional data handling methods (Enders, 2010).

**Results**

**Acceptance of BFSC**

Nearly all participants (98.7%) missed no items on the BFSC. In total, the BFSC showed 0.2% missing data points, indicating a very low level of missing data. Little’s Test was not significant, \(\chi^2(33) = 13.72, p = .99\), suggesting that the missing data pattern was Missing Completely at Random.

**EFA**

Means and standard deviations for all BFSC items are presented in Table 1. The data was suitable for EFA based on item distribution, average correlation to other items, and item-total correlation (Clark & Watson, 1995). Bartlett’s test of sphericity indicated correlation adequacy, \(\chi^2(45) = 391.85, p < .001\), and the Kaiser-Meyer-Olkin (KMO) measure indicated sampling adequacy, MSA = 0.87. The parallel analysis (Horn, 1965) as well as the scree plot examination (Cattell, 1966) recommended extraction of one factor. The results of the OLS EFA indicated that only a single factor should be extracted \((\lambda = 4.29)\), explaining 42.9% of the total variance. As can be seen in Table 1, most items had good-to-excellent factor loadings except for item 4.
Table 1

Items of the Benefit Finding Scale, descriptive statistics, and item-factor loadings in the first sample (n = 100).

| Items                                              | M    | (SD) | Loading |
|----------------------------------------------------|------|------|---------|
| Having had my illness…                              |      |      |         |
| 1. …has helped me become a stronger person          | 3.46 | 1.17 | .64     |
| 2. …has helped me learn who my real friends are     | 3.19 | 1.50 | .63     |
| 3. …has helped me know how much I am loved          | 3.10 | 1.34 | .65     |
| 4. …has helped me make some new best friends       | 2.34 | 1.43 | .38     |
| 5. …has helped me learn to deal better with my problems | 3.02 | 1.24 | .62     |
| 6. …has helped me be more patient                  | 2.84 | 1.32 | .67     |
| 7. …has taught me to be more loving of others       | 2.90 | 1.26 | .77     |
| 8. …has brought my family closer together          | 2.89 | 1.39 | .52     |
| 9. …has taught me what is really important in life  | 3.43 | 1.35 | .80     |
| 10. …has taught me to be happy and enjoy good things when they happen | 3.55 | 1.30 | .72     |

Further analyses

Cronbach’s alpha reached $\alpha = .87$ (95% CI = .83 – .91). There were no significant sex differences between females ($M = 3.10; SD = 0.97$) and males ($M = 3.03; SD = 0.81$), $t(98) = -0.39, p = .695, d = -0.81$ (95% CI = -.49 – .32). BF was positively correlated with self-esteem, self-efficacy, sense of coherence, empathy, and support seeking. No significant correlations were found with hrQoL, optimism, perceived support, acceptance, avoidance, distance, and emotional reaction (see Table 2). Furthermore, BF was positively associated with age ($r = .24, p = .01$), but not with social status ($r = -.10, p = .318$), disease severity ($r = .12, p = .221$), and time since diagnosis ($r = -.01, p = .886$).
Table 2
Means, standard deviations and correlations between benefit finding and all measured variables in the EFA sample \( (n = 100) \) and CFA sample \( (n = 204) \).

|                           | Correlations | \( M (SD) \)   | \( M (SD) \)   | Range |
|---------------------------|--------------|----------------|----------------|-------|
|                           | (EFA)        | (CFA)          | (EFA)          | (CFA) |
| Benefit Finding           | -            | -              | 3.07 (0.91)    | 3.16 (0.94) | 1–5   |
| Optimism                  | 0.18         | 0.33**         | 2.74 (0.68)    | 2.64 (0.72) | 1–4   |
| Self-esteem               | 0.29**       | 0.27**         | 2.53 (0.67)    | 2.56 (0.67) | 1–4   |
| Self-efficacy             | 0.27**       | 0.29**         | 2.55 (0.59)    | 2.64 (0.61) | 1–4   |
| Sense of coherence        | 0.22*        | 0.27*          | 2.94 (0.57)    | 2.92 (0.62) | 1–4   |
| Empathy                   | 0.33**       | 0.27**         | 2.98 (0.59)    | 2.95 (0.58) | 1–4   |
| Acceptance                | 0.13         | 0.14*          | 3.66 (0.90)    | 3.69 (0.95) | 1–5   |
| Avoidance                 | 0.13         | -0.04          | 3.19 (0.98)    | 3.10 (1.04) | 1–5   |
| Distance                  | 0.09         | -0.22**        | 2.55 (1.01)    | 2.40 (0.98) | 1–5   |
| Emotional reaction        | -0.05        | 0.14           | 2.60 (1.04)    | 2.68 (1.02) | 1–5   |
| Wishful thinking          | 0.04         | -0.01          | 3.80 (1.12)    | 3.80 (1.07) | 1–5   |
| Social support            | 0.11         | 0.24**         | 3.47 (0.67)    | 3.43 (0.69) | 1–4   |
| Support seeking           | 0.26**       | 0.37**         | 2.64 (0.76)    | 2.70 (0.82) | 1–4   |
| HrQoL-12\(^a\)            | -0.04        | -0.11          | 3.32 (0.80)    | 3.22 (0.80) | 1–5   |
| HrQoL-10\(^b\)            | -0.09        | -0.04          | 3.32 (0.85)    | 3.21 (0.83) | 1–5   |

Note: \(^a\) Health-related quality of life for the 12-item version. \(^b\) Health-related quality of life for the 10-item version. * \( p < .05 \). ** \( p < .01 \).

CFA

Based on EFA results, we examined the fit of the hypothesized one-factor solution using CFA in the second subsample. The standardized estimates of factor loadings for the best-fitting model were predominantly good-to-excellent (see Figure 1). Item 4 showed a fair factor loading. Fit indices were as follows: RMSEA = 0.13 with 90% CI = 0.11 – 0.16, CFI = 0.86, SRMR = 0.07 and \( \chi^2(35) = 126.40, p < .001 \). Since the fit indices values were not within the acceptable range, modification indices were consulted to improve the model (Whittaker, 2012). After freeing two error covariances (Items 2 and 3, Items 3 and 8), the one-dimensional model provided an acceptable fit to the data: RMSEA = 0.07 with 90% CI = 0.04 - 0.09, CFI = 0.96, SRMR = 0.05 and \( \chi^2(33) = 62.42, p = .001 \).
Further analyses

The internal consistency for the BFSC total score was adequate (Cronbach’s α = .88; 95% CI = .86 – .91). Significant sex differences were observed between females (M = 3.29; SD = 0.95) and males (M = 2.96; SD = 0.90), t(202) = -2.41, p = .02, d = -0.35 (95% CI = -.63–-.06). BF was significantly and positively correlated with optimism, self-esteem, self-efficacy, sense of coherence, empathy, acceptance, perceived support, and support seeking, but not with hrQoL, avoidance, wishful thinking, and emotional reaction (see Table 2). There was a significant and negative correlation between BF and distance. Moreover, BF was positively associated with age (r = .16, p = .020) and disease severity (r = .17, p = .015) but not with time since diagnosis (r = .03, p = .684). There was a negative correlation between BF and social status (r = -.29, p < .001).

Discussion

The purpose of this study was to provide a German version of the BFSC (Phipps et al., 2007) and examine its psychometric properties among youth with various CC. Previous studies have observed a one-dimensional factor structure of the BFSC in English-speaking (Phipps et al., 2007) and Dutch-speaking (Maurice-Stam et al., 2011) samples of children and adolescents with cancer. Our results are consistent with this literature: Using EFA, we found that all ten items of the German BFSC loaded onto the same latent dimension. Furthermore, using CFA in a second subsample, we were able to confirm that this one-dimensional model had an adequate fit following modification. Although the overall pattern of loadings was meaningful, item 4 showed only fair factor loadings, which, however, was in accordance with previous validation studies. To ensure comparability with the original study, we did not exclude this item from further analyses.

In addition, the results of our study uphold the internal consistency and construct validity of the BFSC. The BFSC showed positive correlations with a wide range of convergent constructs, while there were no significant correlations with discriminant constructs, including avoidance, wishful thinking, distance, and emotional reaction. However, it should be acknowledged that the associations between BF and acceptance, social support and distance were not consistent across subsamples. Replicating the findings of the original study (Phipps et al., 2007), the BFSC was not significantly related to hrQoL. This highlights the notion that positive experiences (e.g., “Having had my illness has helped me to deal better with my problems”) do not simply imply an absence of negative experiences (e.g., “Does your condition get you down”), but that both represent rather independent and co-occurring dimensions. Future studies should consider alternative criterions for validation by including measures of positive well-being and satisfaction with life.

While previous studies reported no sex differences between females and males (Maurice-Stam et al., 2011; Phipps et al., 2007), we observed higher scores for females, but only in our second subsample. Indeed, there is meta-analytic evidence indicating that females engage in more positive reappraisal and more positive self-talk than males (Tamres et al., 2002). This indicates that female youth might perceive
higher levels of benefit in response to their CC than male youth do. Studies with adequately sized samples of females and males are warranted to clarify whether BFSC scores are invariant across participant sex. Contrary to previous studies, we found that BF was positively associated with age, but not with time since diagnosis. This finding might indicate that depends more on the developmental level and skills and does not "naturally" increase over time when coping with the disease. However, given the fact that participants of previous studies were considerably younger with mean ages around 12 years (Maurice-Stam et al., 2011; Phipps et al., 2007), conclusions about the role of age and time since diagnosis should be drawn with caution. Longitudinal studies over the course of the disease including different age groups are needed to investigate BF in youth from a developmental perspective. Moreover, our findings suggest that youth with lower subjective social status and higher subjective disease severity perceive more benefits in response to their CC. Findings concerning disease severity mirror those found in a previous study (Barakat et al., 2006), however, there is evidence questioning the linearity of the relation between BF and disease severity (Meyerson et al., 2011). Considering research on stress-related growth, it appears there may be an inverted "U" relation, suggesting that BF experiences may be highest at moderate levels of disease severity (Meyerson et al., 2011). Findings regarding social status are not consistent with previous reports, which found no significant association between these variables using objective indicators (Barakat et al., 2006; Phipps et al., 2007). Evidence from prospective data indicates that the subjective social status might be a more influential predictor for health status and change in health status than the objective social status (Singh-Manoux et al., 2005).

Overall, the present study had several strengths, namely the very good data quality, and the sufficient sample size. Our study covered a broad age range and a wide range of underlying chronic diseases enhancing the generalizability of our results. It should be further stressed that a methodological sound approach with an EFA-to-CFA strategy was applied, thereby overcoming the limitations of previous studies using a PCA, which is inappropriate for the identification of latent constructs and factor structure of a set of variables (Widaman, 1993). By focusing on intra- and interpersonal resources and coping strategies, our study provides initial evidence for potentially relevant starting points for diagnostic comparisons as well as transdiagnostic programs promoting BF in youth with different CC.

Several limitations must be acknowledged, though. First, the recruitment strategy may have resulted in a selection bias towards generally lower levels of distress, as youth with higher levels of distress might be less likely to participate in online surveys. Second, the cross-sectional design of our study precluded the assessment of test-retest reliability or stability of BF over time. To further strengthen the psychometric basis for the BFSC, studies with adequately-sized samples are needed to verify whether BFSC scores are invariant across group membership (e.g., sex group and diagnostic group) and measurement occasion (Putnick & Bornstein, 2016). Finally, future studies should examine whether benefit finding predicts positive adaptive outcomes, not only directly, but incrementally over and above established constructs, such as emotion regulation (e.g., positive reappraisal), to further ensure the validity of BF. Despite these limitations, the available evidence confirmed the one-dimensional factor structure of the BFSC also in German. This is important as it will facilitate comparison across cultures and diagnoses in future work. The BFSC is an economic, psychometric sound and transdiagnostic measure that accounts for positive
life changes of youths’ responses to CC. Its application in future research will help to get a more comprehensive picture of the psychosocial consequences of CC.

Declarations

Ethics approval and consent to participate.

The study was conducted in accordance with the principles of Good Clinical Practice, the Declaration of Helsinki (https://www.wma.net/wpcontent/uploads/2016/11/DoH-Oct2008.pdf), and current ethical standards. Informed consent was obtained from each participant. Depending on the age of the participant, informed consent from the legal representative or guardian was also required. The central Ethics Committee of Potsdam University approved the study (date 02/02/18, request number 52/2017).

Consent for publication.

Not applicable.

Availability of data and material.

Fully anonymized data will be available from the corresponding author on reasonable request.

Competing interests.

The authors declare that they have no competing interests.

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Authors' contributions.

PW designed the study and all authors contributed to the present design. PW, FB, and RvR are responsible for the realization of the present study. RvR and PW wrote the draft of this manuscript. All authors contributed to the further writing and approved the final manuscript. PW is its guarantor.

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Figures

**Figure 1**

Path diagram and estimates for the one-dimensional model of the Benefit Finding Scale. The large oval is the latent construct, with the rectangles representing measured variables, and the small arrow with numbers representing the residual variables (variances). The path factor loadings are standardized with significance levels were determined by critical ratios (all p < .001).