Psycho-Oncology
Psycho-Oncology **19**: 255–263 (2010)
Published online 9 March 2009 in Wiley InterScience (www.interscience.wiley.com). **DOI**: 10.1002/pon.1540

Factor structure of the Beck Hopelessness Scale in individuals with advanced cancer

Rinat Nissim[1]*, David B. Flora[2], Robert A. Cribbie[2], Camilla Zimmermann[3,4], Lucia Gagliese[1,2,3] and Gary Rodin[1,3,4]

[1]*Behavioural Sciences and Health Research Division, Toronto General Research Institute, University Health Network, Toronto, Canada*
[2]*Department of Psychology, York University, Toronto, Canada*
[3]*Faculty of Medicine, University of Toronto, Toronto, Canada*
[4]*Department of Psychosocial Oncology and Palliative Care, Princess Margaret Hospital, University Health Network, Toronto, Canada*

** Correspondence to: Behavioural Sciences and Health Research Division, Toronto General Research Institute, Toronto General Hospital, University Health Network, 200 Elizabeth Street, Toronto, Ont., Canada M5G 2C4. E-mail: rinat.nissim@uhn.on.ca*

Received: 22 July 2008
Revised: 10 December 2008
Accepted: 17 December 2008

Abstract

***Objective*: Although the Beck Hopelessness Scale is often used with the seriously ill, its factor structure has been given relatively little consideration in this context.**

***Methods*: The factor structure of this scale was examined in a sample of 406 ambulatory patients with advanced lung or gastrointestinal cancer, using a sequential exploratory-confirmatory factor analysis procedure.**

***Results*: A two-factor model was consistent with the data: The first factor reflected a negative outlook and was labeled 'negative expectations'; the second factor identified a sense of resignation and was labeled 'loss of motivation.'**

***Conclusions*: Implications regarding scoring of the scale in this population are discussed, as are implications of the two-factor structure for our understanding of hopelessness in individuals with advanced cancer.**

Keywords: hopelessness; factor analysis; advanced illness; cancer; oncology

Introduction

Hopelessness has been defined as a set of cognitive schemata involving negative expectations concerning oneself and one's future [1]. It was first operationalized with the publication of the 20-item Beck Hopelessness Scale (BHS) [1]. This self-report scale, which was originally developed and validated among adult psychiatric patients, quickly became the most frequently used measure of hopelessness in psychiatric, healthy, and medical populations.

The development of the BHS considerably advanced research on the construct of hopelessness [2]. Hopelessness is often considered a manifestation of depression [3], but it may also represent a psychological state that is distinct from depression. In particular, hopelessness plays a unique and critical role in the development of suicidal ideation [4], and when measured by the BHS, has been shown among psychiatric patients to be a stronger predictor of suicidality than depression [5].

Recently, the growing debate over legalization of physician-assisted suicide has prompted research on suicidality among individuals with advanced medical illness. This research has consistently reported a strong association between hopelessness and suicidal ideation in this population [6]. In hospitalized palliative-care patients with cancer, hopelessness, as measured by the BHS, was more strongly correlated with suicidal ideation than was depression [7]. Similarly, it was strongly correlated with the desire for hastened death, while controlling for depression and physical distress, in hospitalized palliative-care patients with advanced cancer [8] or advanced AIDS [9]. Lastly, hopelessness was shown to have a strong association with refusal of life-saving treatments by medically ill, elderly patients [10]. Other research has indicated that hopelessness among individuals with advanced medical illness is strongly associated with other clinically important outcomes, such as demoralization, impaired spiritual well-being, and poor quality of life [11–13]. Moreover, hopelessness was found to be predictive of cancer mortality at the population level [14], and reduced survival time in cancer patients [15], even after controlling for the effects of depression and other medical risk factors.

Although hopelessness is a clinically important construct in individuals with an advanced medical

illness, its underlying meaning in this population remains poorly understood [16]. In particular, when individuals with advanced illness endorse a large number of items on the BHS, it is unclear to what extent their elevated scores reflect a realistic appraisal of a 'hopeless' medical prognosis or a psychological state of hopelessness [17]. This is an important distinction because although the state of hopelessness is associated with negative psychological outcomes in the context of a medical illness [11], awareness of a terminal prognosis is actually associated with less distress and lower depression levels compared with a lack of such awareness [18]. This potential difficulty in the interpretation of elevated BHS scores is highlighted by Abbey *et al.* [19], who examined the utility of BHS items in a sample of palliative-care patients. They observed that certain items, such as item 5 ('I have enough time to accomplish the things I want to do'), have a high negative endorsement rate, but a low item-total correlation. They suggested that these items may reflect a realistic attitude rather than a pessimistic cognitive style, a finding with implications for the dimensionality of the BHS in the context of advanced illness.

Recently, the dimensionality of the BHS was investigated by Rosenfeld *et al.* [17], in a sample of individuals with advanced AIDS. Their confirmatory factor analysis (CFA) supported a three-factor model. The first factor in this model included nine items and reflected a positive future orientation (e.g. item 1: 'I look forward to the future with hope and enthusiasm'). The second factor contained six items and reflected the tendency not to attempt to change one's situation (e.g. item 20: 'There's no use in really trying to get anything I want because I probably won't get it'). The third factor, which contained five items, reflected a generally pessimistic outlook on the future (e.g. item 7: 'My future seems dark to me'). The authors also examined the correlations among the three factors of the BHS and other measures of physical and psychological distress. However, the statistical significance of these correlations was not reported and, therefore, the concurrent validity of the three factors was not established.

The extent to which Rosenfeld *et al.*'s [17] three-factor model can be generalized to other samples of individuals with an advanced medical illness is unclear. The authors noted the similarity between their three-factor model and previous factor models of the BHS derived from psychiatric samples (e.g. [1,20–23]) and cautioned that their factor structure may reflect the influence of comorbid psychiatric disorders rather than advanced medical illness. Indeed, over half of their sample had either a current or previous substance abuse disorder, thus making it comparable to psychiatric samples described by others (e.g. [23]). Hence, an examination of the factor structure of the BHS in a different population with advanced medical disease is warranted.

In the present study, we assessed the factor structure of the BHS among individuals with advanced cancer who had an expected survival of 6–18 months. The investigation in this study was limited to individuals with advanced gastrointestinal (GI) or lung cancer. Lung and GI cancers are the two most common fatal cancers worldwide [24]. Both are typically diagnosed at an advanced stage, in which the illness entails a progressive course, multiple physical symptoms, and limited survival [25,26]. Based on the factor analyses of the BHS that we performed on data from this population, we make recommendations about how the BHS should be scored and interpreted, and provide preliminary evidence for the utility of a two-factor conceptualization by examining simple relationships between scores based on the factors and important outcome variables. We also discuss the implications of the emerging factor structure of the BHS for our understanding of hopelessness in individuals with advanced cancer.

Method

Participants

Data were collected as part of a larger study of psychosocial adjustment in patients with advanced cancer [27]. This study received approval from the University Health Network Research Ethics Board, and all participants provided informed written consent. Participants were recruited from consecutive patients attending their outpatient medical or radiation oncology clinic appointments with a treating oncologist at Princess Margaret Hospital (PMH), University Health Network, a comprehensive cancer center in Toronto, Canada. Patients were eligible if they had been diagnosed with Stage IIIA, IIIB or IV lung or Stage IV GI cancer, were 18 years of age or older, and were able to speak and read English sufficiently to provide informed consent and complete questionnaires. Patients were excluded if they had a diagnosis of carcinoid or neuroendocrine carcinoma, or if significant cognitive impairment was documented on the medical chart or demonstrated by a failure to meet the predetermined cut-off score of <20 on the Short Orientation-Memory-Concentration Test [28], which was administered by a member of the research staff at the time of recruitment to the study. Once recruited, patients were briefly interviewed by a member of the research staff to obtain demographic information, and to rate performance status based on the Karnofsky criteria [29]. They were then given a package of self-report questionnaires to complete in the clinic or at home. Medical and demographic data were extracted

DOI: 10.1002/pon

from the medical record of each patient and from the initial brief interview (for a complete description of the study procedure see [27]).

Measures

Participants completed the BHS [1] as part of a comprehensive package of self-report instruments. The BHS includes 9 positive and 11 negative true/false statements about the future. After reverse scoring of positively worded items, items can be summed to give a total score ranging from 0 to 20, with a higher score reflecting increased hopelessness.

Other self-report instruments were included in the package to assess physical and psychosocial distress (for a complete description of the measures, see [27]). Physical symptoms were assessed using the Memorial Symptom Assessment Scale (MSAS) [30] and the Brief Pain Inventory (BPI) [31]. The MSAS [30] is a multidimensional self-report scale developed to assess the presence, frequency, severity, and distress associated with common symptoms of cancer. A 10-item MSAS Global Distress Index (MSAS-GDI) is considered to be a measure of overall symptom distress. The MSAS-GDI is the average of the frequency of four prevalent psychological symptoms (feeling sad, worrying, feeling irritable, and feeling nervous) and the distress associated with six prevalent physical symptoms (lack of appetite, lack of energy, pain, feeling drowsy, constipation, dry mouth). The BPI [31] is a widely used numeric rating scale of pain intensity (rated from 0 'no pain' to 10 'pain as bad as you can imagine') and pain interference (rated from 0 'does not interfere' to 10 'completely interferes') in the past 24 h.

Psychological distress was assessed using the Beck Depression Inventory-II (BDI-II) [32] and the Schedule of Attitudes Toward Hastened Death (SAHD) [33]. The BDI-II [32] is a 21-item self-report measure of the intensity of symptoms of depression and is consistent with the criteria of the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR) for major depressive disorder. Items (rated 0–3) are summed to give a total score ranging from 0 to 63, with higher scores reflecting more severe depressive symptoms. The SAHD [33] is a 20-item self-report true/false measure of the desire for hastened death that has been validated in cancer patients in a palliative-care setting. After reverse scoring of positively worded items, items are summed to give a total score ranging from 0 to 20, with a higher score reflecting a higher desire for hastened death.

Finally, physical functioning was rated by a member of the research staff with patient input, using the Karnofsky Performance Status (KPS) scale [29], a widely used observer-rated measure of the extent to which individuals can carry out normal activities and self-care, and which has been used as a predictor of survival [34,35]. Ratings are made along a continuum ranging from 100 (normal activities, no complaints, no evidence of disease) downward in decrements of 10 to 0 (dead).

Data analysis

Because previous research has not provided clear guidance on the number of factors underlying the BHS in this population, we investigated the BHS factor structure using a sequential exploratory-confirmatory approach (see [36]). The dataset was randomly divided into two independent sub-samples, with the first sub-sample used for exploratory factor analysis (EFA). The factor model implied by the EFA was then cross-validated with the second sub-sample using CFA. Both EFA and CFA were conducted with a method that is considered to be appropriate for binary (true/false) items, namely least squares model estimation from the tetrachoric correlation matrix (see [37–40]). Cases with missing data were excluded. Factor analyses were conducted using Mplus version 3.12 [41].

Both the EFA and CFA were conducted using a robust-weighted least-squares estimator recommended for factor analyses of binary scales [42]. In the EFA, factors were rotated with an oblique rotation (Promax) to reflect our expectation that the underlying factors may be correlated. Determination of the number of factors to retain in the final solution was based on a number of criteria. First, we inspected the scree plot of eigenvalues. Second, we examined the percent of total variance explained by each factor solution. Third, we evaluated the ease of factor interpretability. Fourth, we examined the root-mean-square error of approximation (RMSEA) fit statistic, with a value of less than 0.06, indicating good fit with binary outcomes [43]. For interpretation of the rotated factor pattern, an item was considered salient for a factor if the loading was greater than or equal to 0.40. Cross-loadings were allowed.

We then conducted a CFA on a second sub-sample to cross-validate the factor structures derived from our EFA. Model fit was evaluated based on five goodness-of-fit indices, including the Tucker–Lewis Index (TLI), the Comparative Fit Index (CFI), the RMSEA, and the weighted root-mean-square residual (WRMR). All are considered to work well with binary data and to be superior to the traditional chi-square criterion for model evaluation, which tends to be inflated when tetrachoric correlations are used [42]. When used with binary outcomes, TLI and CFI values of less than 0.90 indicate lack of fit, values between 0.90 and 0.95 indicate reasonable fit, and values

DOI: 10.1002/pon

between 0.95 and 1.00 indicate good fit; for WRMR, values of less than 0.95 indicate good fit [43]. The RMSEA is a particularly useful statistic for examining model fit (e.g. [44]), with a value of less than 0.06 indicating good fit with binary outcomes [43]. Comparison of nested models (see [45]) was also conducted, which required the use of a method described by Satorra [46] for chi-square difference tests (namely, the chi-square difference test for the Satorra–Bentler scaled chi-square statistics) because the robust weighted least squares estimation method elicits a re-scaled chi-square statistic (see [42]).

Once a final factor structure was obtained, reliability analyses were performed to determine the internal consistency (Cronbach's alpha) of the obtained factors. Lastly, to provide a preliminary investigation of the criterion validity of the BHS factor structure, correlational analyses were conducted to examine the associations among the sum scores representing the emerging BHS factors and concurrent variables of physical and psychological distress.

Results

Sample characteristics

A total of 1247 consecutive patients who attended the ambulatory outpatient clinics at PMH between November 1, 2002 and December 4, 2006 (recruitment in the lung tumor site began in January 2004) were considered for participation in this study. Three hundred sixty-one patients were excluded because they were not able to speak English sufficiently or because of cognitive impairment. Of the 886 eligible patients, 531 (60%) consented to participate in the study. Patients who refused study participation ($N = 355$) did not differ from the participants in terms of gender or primary cancer site (GI vs lung; these were the only data available for comparison due to strict guidelines at our institution regarding privacy and confidentiality of patient information).

Of the 531 patients who consented to participate, 21 died and 91 withdrew from the study prior to returning their questionnaires, and 13 had not yet returned their questionnaires by the time of the present analyses, leaving a total of 406 participants with returned questionnaires. The 406 participants included 234 men (57.6%), and the mean age of participants was 61.5 years (SD 11.1, range 21–88). Because recruitment of lung patients began more than 1 year after recruitment of GI patients had started, the majority of participants (283; 69.7%) had GI cancer. However, tests for potential sample bias indicated that there were no statistically significant differences on any of the demographic or distress variables between the GI and lung patients.

The mean BHS total score of participants was 5.3 (SD 4.7, range 0–20), and 100 participants (25%) reported moderate to severe levels of hopelessness, based on a BHS cut-off score of $\geqslant 8$ suggested by Beck *et al.* [5]. Additional sample characteristics and descriptive values for distress measures are provided in Table 1.

Table 1. Sample characteristics ($N = 406$)

Variable domain	Variable	Description
Demographic information	Gender: f/n (%)	
	Male	234/406 (57.6%)
	Female	172/406 (42.4%)
	Age (years) mean (sd); range	61.5 (11.1) (21–88)
	Marital Status: f/n (%)	
	Married or common law	290/406 (71.5%)
	Separated or divorced	52/406 (13.3%)
	Widowed	22/406 (5.4%)
	Single	42/406 (10.3%)
	Education (beyond high school): f/n (%)	338/406 (83.2%)
	Canadian born f/n (%)	256/402 (63.1%)
	Mean family income (mean (sd)) (based on postal code)	93 954 (61 502)
	Cancer site: f/n (%)	
	GI	283/406 (69.7%)
	Lung	123/406 (30.3%)
Psychometric markers	Overall symptom distress mean (sd) (range)	2.1 (0.9) (0–4.6)
	Pain intensity (average) mean (sd) (range)	1.5 (1.9) (0–8.5)
	Pain interference mean (sd) (range)	3.6 (5.1) (0–20)
	Performance status mean (sd) (range)	81.5 (9.4) (40-90)
	Depression mean (sd) (range)	10.9 (7.4) (0–51)
	Hopelessness mean (sd) (range)	5.3 (4.7) (0–20)
	Desire for hastened death mean (sd) (range)	1.7 (2.2) (0–12.9)

Overall symptom distress was assessed using the MSAS-GDI [30]; pain intensity, and pain interference—the BPI [31]; performance status—the KPS [29]; depression—the BDI-II [32]; hopelessness—the BHS [1]; desire for hastened death—the SAHD [33].

DOI: 10.1002/pon

Factor analyses

Prior to the factor analyses, a listwise deletion of cases with missing values was conducted, resulting in the deletion of 65 cases (16%). An inspection of the frequency of missing data by individual items did not identify any single item that contributed to most of the deletions. The remaining dataset of 341 cases was then randomly divided into two sub-samples: The first contained $N = 170$ cases and provided data for EFA and the second sub-sample of $N = 171$ provided data for CFA.

Exploratory factor analysis

The scree plot suggested that either a one- or two-factor model would adequately fit the data and were retained for subsequent inspection. The one-factor model accounted for 58.26% of the variance in item scores, with factor loadings for all items exceeding the 0.40 cut-off. However, the RMSEA statistic of this model was 0.075, suggesting mediocre model fit. The two-factor model accounted for 69.09% of the variance in item scores and had a RMSEA of 0.03, indicating good model fit. Both of the factors had good interpretability. The first factor included twelve items with moderate to high factor loadings (>0.40). Items generally reflected a negative outlook, and therefore the factor was labeled 'negative expectations.' The second factor included 10 items with moderate to high factor loadings (>0.40). It included items reflecting a sense of resignation and giving-up. This factor was named 'loss of motivation.' Two items, item 11 and item 12, cross-loaded on both factors. The correlation between factors was moderate (0.57).

Confirmatory factor analysis

A CFA to test the one- and two-factor models derived from the EFA was conducted with data from the sub-sample of 171 cases. According to the RMSEA, the one-factor model had a mediocre fit to the data, RMSEA = 0.080, TLI = 0.981, CFI = 0.983, and WRMR = 0.997. The two-factor model had a better fit to the data, RMSEA = 0.058, TLI = 0.990, CFI = 0.991, and WRMR = 0.831. Factor loadings for the two-factor model were all statistically significant ($p<0.05$), except those involving items 11 and 12. These items, which cross-loaded on both factors in the EFA, had non-significant loadings on the first factor and significant loadings on the second factor. Therefore, we further constrained the model, removing items 11 and 12 from the first factor. The final model included 10 items on each factor (see Table 2 for factor compositions and loadings) and fit the data well, RMSEA = 0.057, TLI = 0.990, CFI = 0.991, and WRMR = 0.845. A high inter-factor correlation was obtained (0.85). In addition, a chi-square difference test revealed that the two-factor model fitted the data significantly better ($p<0.01$) than the one-factor model (which was specified as a two-factor model with an inter-factor correlation equal to one). We therefore concluded that the CFA demonstrated superiority of the two-factor model, and proceeded to assess the internal consistency reliability of sub-scales calculated from sum scores created by summing the items loading on a given factor. The internal consistency (Cronbach's alpha)

Table 2. Item composition of the two-factor model

Factor 1–negative expectations	**Factor loadings**
1. I look forward to the future with hope and enthusiasm	0.877
2. I might as well give up because there is nothing I can do about making things better for myself	0.780
3. When things are going badly, I am helped by knowing they cannot stay that way forever	0.725
5. I have enough time to accomplish the things I want to do	0.650
6. In the future, I expect to succeed in what concerns me most	0.888
7. My future seems dark to me	0.947
13. When I look ahead to the future, I expect that I will be happier than I am now	0.788
15. I have great faith in the future	0.962
18. The future seems vague and uncertain to me	0.823
19. I can look forward to more good times than bad times	0.871
Factor 2–loss of motivation	**Factor loadings**
4. I cannot imagine what my life would be like in 10 years	0.325
8. I happen to be particularly lucky, and I expect to get more of the good things in life than the average person	0.534
9. I just can't get the breaks, and there is no reason I will in the future	0.922
10. My past experiences prepared me well for the future	0.732
11. All I can see ahead of me is unpleasantness rather than pleasantness	0.927
12. I don't expect to get what I really want	0.855
14. Things just won't work out the way I want them to	0.902
16. I never get what I want so it's foolish to want anything	0.883
17. It is very unlikely that I will get any real satisfaction in the future	0.977
20. There is no use in really trying to get anything I want because I probably won't get it	0.866

DOI: 10.1002/pon

Table 3. Correlations with the BHS sub-scale scores ($N = 406$)

	Negative expectations	Loss of motivation
Overall symptom distress	0.082	0.129**
Pain intensity (average in past 24 h)	−0.062	0.141*
Pain interference	−0.057	0.189**
Depression	0.201**	0.329**
Desire for hastened death	0.361**	0.165**
Performance status	−0.108*	−0.027

*$p<0.05$; **$p<0.01$; Overall symptom distress (MSAS-GDI); pain intensity and pain interference (BPI); hopelessness (BHS); depression (BDI-II); desire for hastened death (SAHD); performance status (KPS).

of each factor of the two-factor model was acceptably high (0.86 for the first factor and 0.83 for the second factor).

Correlational analyses

We used exploratory correlational analyses to examine the associations among the sub-scales reflecting the two factors and other criterion variables (see Table 3). Because of the strong correlation between the two sub-scales ($r = 0.69$, $p<0.001$), partial correlations were calculated among each sum score and the criterion variables to adjust for the shared variability between the two sub-scales. None of the demographic variables was significantly correlated with either factor. However, there were differences between the two factors in terms of their pattern of correlations with the following measures: Only the first, 'negative expectations' factor, was significantly negatively correlated with physical performance status, as measured by the KPS scale [29]. On the other hand, only the second, 'loss of motivation' factor, was significantly positively correlated with the degree of symptom distress, as measured by the MSAS [30], and pain intensity and pain interference in the past 24 h, as measured by the BPI [31]. Depression, as measured by the BDI-II [32], and the desire for hastened death, as measured by the SAHD [33], were significantly correlated with both factors. Nonetheless, the 'loss of motivation' factor had a higher positive correlation with depression and the 'negative expectations' factor had a higher positive correlation with the desire for hastened death. It is important to acknowledge, however, that the statistically significant correlations reported in Table 3 are relatively weak to moderate.

Discussion

The present study assessed the factor structure of the BHS in a sample of advanced cancer patients, a population in which the scale is often used. Our study supported a two-factor model. The first factor included 10 items whose endorsement reflects a general negative outlook (e.g. item 18: 'The future seems vague and uncertain to me'). This factor was labeled 'negative expectations.' The second factor also included 10 items and reflects a sense of resignation and giving-up (e.g. item 20: 'There is no use in really trying to get anything I want because I probably won't get it'). This factor was named 'loss of motivation.' Correlational analyses between scores on the two factors and important outcome variables pointed to modest differences in the criterion validity of the two sub-scales created from the two factors. However, these analyses reflect only preliminary exploratory results, as the primary focus of this study was establishing the factor structure of the BHS in the current population.

The distinction made by our factor solution between the two dimensions of hopelessness may be particularly important in the context of an advanced medical illness. In particular, a negative outlook, as tapped by the 'negative expectations' factor, may demonstrate a circumscribed pessimistic assessment of the future, rather than a dysfunctional cognitive scheme, in the context of a poor medical prognosis. In keeping with this view, the 'negative expectations' factor in our study had a statistically significant negative correlation with ratings on the KPS scale [29], suggesting that as functional impairment grows, one's anticipation of the future becomes more negative.

The 'loss of motivation' factor taps a sense of helplessness, meaninglessness, and loss of control. It corresponds to recent published clinical observations of the demoralization syndrome [11]. This syndrome is characterized by existential despair, a breakdown in goal-directed behavior, and helplessness, all brought about by the physical and psychosocial challenges of a medical or mental illness. The 'loss of motivation' factor was unique in the strength of its positive correlations with measures of pain intensity and interference, and with overall symptom distress. This association may serve to highlight the adverse impact of pain and physical distress on a sense of personal agency and control [47]. It is consistent with the concern that disturbing, though potentially treatable, symptoms, may lead to demoralization and helplessness [48].

It is important to note that our correlational analyses indicated that both factors were significantly correlated with variables that are considered to be closely linked to hopelessness, namely, depression and the desire for hastened death [3,6]. Although this finding may point to a limitation in the utility of the two-factor model, it may also be caused by the multidimensionality of the constructs of depression and the desire for hastened death in the context of advanced cancer. Indeed, a recent study [49] reporting on qualitative interviews with advanced cancer patients in our sample found that

DOI: 10.1002/pon

high levels of desire for hastened death were related to two distinct experiences: an expression of helplessness and despair, and a manifestation of the recognition that death is imminent and cannot be resisted. Additional examination of the multiple facets of the desire for hastened death and their relationships with the construct of hopelessness is warranted.

The two-factor solution of the BHS among those with advanced cancer highlights the need for more detailed analyses of the construct of hopelessness in this population, and for potential refinement of the BHS to disentangle the awareness of a 'hopeless' medical prognosis from a psychological state of helplessness. The dimensionality of the BHS revealed in the present study calls for caution when considering the use of shorter versions of the BHS in the population of individuals with advanced cancer, such as those suggested by Abbey *et al*. [19], Aish and Wasserman [37], or Yip and Cheung [50]. Although these shorter versions of the BHS may be useful in reducing burden on patients, they may fail to distinguish between the different facets of hopelessness.

The two-factor structure that we have identified in a sample of patients with advanced cancer does not support Rosenfeld *et al*.'s [17] findings in a study, which was the first to examine the dimensionality of the BHS in the context of advanced disease. Rosenfeld *et al*.'s [17] study of a sample of individuals with advanced AIDS generated a three-factor model. They acknowledge that their model may not generalize to other medically ill populations because of the high rate of previous or current substance abuse disorders in their sample. Indeed, their factor solution is similar to that reported by factor analytic studies of the BHS conducted in psychiatric populations (e.g. [1,20–23], while our two-factor solution is more similar to that reported in non-psychiatric populations (e.g. [51–53]).

Individuals with an advanced medical illness are sometimes viewed as 'hopeless' by default [17], although medical futility and the psychological state of hopelessness are not necessarily linked [54]. In that regard, most participants in our sample had relatively low total scores on the BHS, with only 25% scoring in the moderate to severe range. The low mean score of the BHS reported here is comparable to those reported in previous studies with hospitalized palliative-care patients with cancer [8,55].

This study is an important step towards identifying the factor structure of the BHS in a population consisting exclusively of advanced cancer patients, a population in which the scale is often used. The strengths of this study lie in its method: we assessed the factor structure of the BHS using a sequential exploratory-confirmatory procedure, with modern methods (i.e. analysis of tetrachoric correlations) that account for the binary nature of BHS item data. The latter is a clear strength, given that traditional, linear factor analytic methods relying on product–moment correlations or covariances (e.g. the principal-components analysis with Pearson's correlations conducted by Beck *et al*. [1] on the BHS) are designed for continuous and linearly related observed variables, and are not considered appropriate for binary questionnaire items, such as those from the BHS (e.g. [38,40]). In particular, the factor analytic method we used is resistant to item wording effects [40]. Thus, although most of the first, 'negative expectations' factor items are positively worded and most of the second, 'loss of motivation' factor items are negatively worded, this two-factor structure is unlikely to be merely an artifact of item wording.

Several limitations must be considered in the interpretation of the data. Although the consent rate of 60% was relatively high for a study in patients with advanced disease, participants may have differed in some undetected way from those who declined participation. In addition, the sample was drawn from outpatient oncology clinics of two tumor sites in a comprehensive cancer center. These patients may differ in important ways from other patients with other cancer diagnoses or from patients with advanced disease in the community, who may be too disabled to attend an outpatient oncology clinic. Lastly, our sample was characterized by relatively high income levels and high physical performance status, both of which may impact the level and dimensionality of the hopelessness construct.

Further research is needed to determine whether the two-factor structure emerges in other medical populations and to better establish its reliability and validity. In addition, an examination of whether the factor structure of the BHS remains stable over time, in the context of a progressive medical illness, is recommended, as well as an examination of the construct of hopelessness among especially vulnerable groups of cancer patients, including those unable to attend outpatient clinics and those with linguistic barriers, which may limit the ability to communicate verbally with health-care providers. By conceptualizing the BHS according to distinct factors, we may increase the utility of the BHS as a measure of distress in the medically ill, and achieve a deeper understanding of the hopelessness construct and its role in suicide risk, psychological well-being, and life expectancy in this population.

References

1. Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: The Hopelessness Scale. *J Consult Clin Psychol* 1974;**42**:861–865.

DOI: 10.1002/pon

2. Glanz LM, Haas GL, Sweeney JA. Assessment of hopelessness in suicidal patients. *Clin Psychol Rev* 1995;**15**:49–64.
3. Shahar G, Bareket L, Rudd MD, Joiner TE. In severely suicidal young adults, hopelessness, depressive symptoms, and suicidal ideation constitute a single syndrome. *Psychol Med* 2006;**36**:913–922.
4. Wetzel RD, Margulies T, Davis R. Hopelessness, depression, and suicide intent. *J Clin Psychiatry* 1980;**41**:159–160.
5. Beck AT, Steer RA, Beck JS, Newman CF. Hopelessness, depression, suicidal ideation, and clinical diagnosis of depression. *Suicide Life Threat Behav* 1993;**23**:139–145.
6. Hudson PL, Kristjanson LJ, Ashby M *et al*. Desire for hastened death in patients with advanced disease and the evidence base on clinical guidelines: a systematic review. *Palliat Med* 2006;**20**:693–701.
7. Chochinov HM, Wilson KG, Enns M, Lander S. Depression, hopelessness and suicidal ideation. *Psychosomatics* 1998;**39**:366–370.
8. Breitbart W, Rosenfeld B, Pessin H *et al*. Depression, hopelessness, and desire for death in terminally ill cancer patients. *J Am Med Assoc* 2000;**284**:2907–2911.
9. Rosenfeld B, Breitbart W, Gibson C *et al*. Desire for hastened death among patients with advanced AIDS. *Psychosomatics* 2006;**47**:504–512.
10. Menon AS, Campbell D, Ruskin P, Hebel JR. Depression, hopelessness, and the desire for life-saving treatments among elderly medically ill veterans. *Am J Geriatr Psychiatry* 2000;**8**:333–342.
11. Kissane D, Clarke D, Street A. Demoralization syndrome, a relevant psychiatric diagnosis for palliative care. *J Palliat Care* 2001;**17**:12–21.
12. Sullivan MD. Hope and hopelessness at the end of life. *Am J Geriatr Psychiatry* 2003;**11**:393–405.
13. McLeod JE, Clarke DM. A review of psychosocial aspects of motor neurone disease. *J Neurol Sci* 2007;**258**: 4–10.
14. Everson SA, Goldberg DE, Kaplan GA *et al*. Hopelessness and risk of mortality and incidence of myocardial infarction and cancer. *Psychosom Med* 1996;**58**:113–121.
15. Lehto US, Ojanen M, Dyba T, Aromaa A, Kellokumpu-Lehtinen P. Baseline psychosocial predictors of survival in localized melanoma. *J Psychosom Res* 2007;**63**:9–15.
16. Kylma J. Despair and hopelessness in the context of HIV—a meta-synthesis on qualitative research findings. *J Clin Nurs* 2005;**14**:813–821.
17. Rosenfeld B, Gibson C, Kramer M, Breitbart W. Hopelessness and terminal illness: the construct of hopelessness in patients with advanced AIDS. *Palliat Support Care* 2004;**2**:43–53.
18. Chochinov HM, Tataryn DJ, Wilson KG, Enns M, Lander S. Prognostic awareness and the terminally ill. *Psychosomatics* 2000;**41**:500–504.
19. Abbey JG, Rosenfeld B, Pessin H, Breitbart W. Hopelessness at the end of life: the utility of the hopelessness scale with terminally ill cancer patients. *Br J Health Psychol* 2000;**11**:173–183.
20. Dyce JA. Factor structure of the Beck Hopelessness Scale. *J Clin Psychol* 1996;**52**:555–558.
21. Hill RD, Gallagher D, Thompson LW, Ishida T. Hopelessness as a measure of suicidal intent in the depressed elderly. *Psychol Aging* 1988;**3**:230–232.
22. Steer RA, Kumar G, Beck AT. Hopelessness in adolescent psychiatric inpatients. *Psychol Rep* 1993;**72**: 559–564.
23. Steer RA, Oguchi MY, Platt JJ. Hopelessness in IV drug users not in treatment and seeking HIV testing and counselling. *Drug Alcohol Depend* 1994;**34**:99–103.
24. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics: 2002. *CA Cancer J Clin* 2005;**55**:74–108.
25. Collins LG, Haines C, Perkel R, Enck RE. Lung cancer: Diagnosis and management. *Am Fam Physician* 2007;**75**:56–63.
26. Diaz-Rubio E. New chemotherapeutic advances in pancreatic, colorectal, and gastric cancers. *Oncologist* 2004;**9**:282–294.
27. Rodin G, Zimmermann C, Rydall A *et al*. The desire for hastened death in patients with metastatic cancer. *J Pain Symptom Manage* 2007;**33**:661–675.
28. Katzman R, Brown T, Fuld P, Peck A, Schechter R, Schimmel H. Validation of a short Orientation-Memory-Concentration Test of cognitive impairment. *Am J Psychiatry* 1983;**140**:734–739.
29. Karnofsky DA, Burchenal JH. The clinical evaluation of chemotherapeutic agents in cancer. In *Evaluation of Chemotherapeutic Agents*, Macleod CM (ed.). Columbia University Press: New York, 1949; 191–205.
30. Portenoy RK, Thaler HT, Kornblith AB *et al*. The Memorial Symptom Assessment Scale, an instrument for the evaluation of symptom prevalence, characteristics and distress. *Eur J Cancer* 1994;**30A**:1326–1336.
31. Cleeland CS. Measurement of pain by subjective report. In *Advances in Pain Research and Therapy*, Chapman CR, Loeser JD (eds). Raven: New York, 1989; 391–403.
32. Beck AT, Steer RA, Brown GK. *Manual for the Beck Depression Inventory-II*. Psychological Corporation: Texas, 1996.
33. Rosenfeld B, Breitbart W, Stein K *et al*. Measuring desire for death among patients with HIV/AIDS: the schedule of attitudes toward hastened death. *Am J Psychiatry* 1999;**156**:94–100.
34. Evans C, McCarthy M. Prognostic uncertainty in terminal care: can the Karnofsky Index help? *Lancet* 1985;**25**:1204–1206.
35. Firat S, Byhardt R, Gore E. Comorbidity and KPS are independent prognostic factors in stage III non-small cell lung cancer (MSCLC): an institutional analysis of NSCLP patients treated on 4 RTOG studies. *Int J Radiat Oncol Biol Phys* 2002;**54**:357–364.
36. Gerbing DW, Hamilton JG. Viability of exploratory factor analysis as a precursor to confirmatory factor analysis. *Struct Equation Model* 1996;**3**:62–72.
37. Aish A, Wasserman D. Does Beck's Hopelessness Scale really measure several components? *Psychol Med* 2001;**31**:367–372.
38. Chang EC, D'Zurilla TJ, Maydeu-Olivares A. Assessing the dimensionality of optimism and pessimism using a multimeasure approach. *Cognit Ther Res* 1994;**18**: 143–160.
39. Steer RA, Beck AT. Factors of the Beck Hopelessness Scale, fact or artifact? *Multivariate Experiment Res* 1997;**11**:131–144.
40. Woods CM. Factor analysis of scales composed of binary items: illustration with the Maudsley Obsessional Compulsive Inventory. *J Psychopathol Behav Assess* 2002;**24**:215–223.
41. Muthén LK, Muthén BO. *Mplus. Statistical Analyses with Latent Variables. User's Guide* (3.0 edn). Muthén & Muthén: Los Angeles, CA, 2004.
42. Flora DB, Curran PJ. An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychol Methods* 2004;**9**:466–491.
43. Yu CY, Muthén B. *Evaluation of Model Fit Indices for Latent Variable Models with Categorical and Continuous Outcomes* (*Technical Report*). University of California at

DOI: 10.1002/pon

Los Angeles, Graduate School of Education and Information Studies, Los Angeles, 2002.
44. MacCallum RC, Austin JT. Applications of structural equation modeling in psychological research. *Ann Rev Psychol* 2000;**51**:201–226.
45. Maruyama GM. *Basics of Structural Equation Modeling*. Sage: Thousand Oaks, CA, 1998.
46. Satorra A. Scaled and adjusted restricted tests in multi-sample analysis of moment structures. In *Innovations in Multivariate Statistical Analysis*. A Festschrift for Heinz Neudecker. Heijmans RDH, Pollock DSG, Satorra A (eds). Kluwer Academic Publishers: London, 2000; 233–247.
47. Hitchcock LS, Ferrell BR, McCaffery M. The experience of chronic nonmalignant pain. *J Pain Symptom Manage* 1994;**9**:312–318.
48. Emanuel EJ, Fairclough DL, Emanuel LL. Attitudes and desires related to euthanasia and physician-assisted suicide among terminally ill patients and their caregivers. *J Am Med Assoc* 2000;**284**:2460–2468.
49. Nissim R, Gagliese L, Rodin G. The desire for hastened death in individuals with advanced cancer: a longitudinal qualitative study. *Soc Sci Med.*, submitted for publication.
50. Yip PS, Cheung YB. Quick assessment of hopelessness: a cross-sectional study. *Health Qual Life Outcomes* 2006;**4**:13.
51. Marshall GN, Wortman CB, Kusulas JW, Hervig LK, Vickers RR. Distinguishing optimism from pessimism, Relations to fundamental dimensions of mood and personality. *J Pers Soc Psychol* 1992;**62**:1067–1074.
52. Steed L. Further validity and reliability evidence for Beck Hopelessness Scale scores in a nonclinical population. *Educ Psychol Meas* 2001;**61**:303–316.
53. Tanaka E, Sakamoto S, Ono Y, Fujihara S, Kitamura T. Hopelessness in a community population, Factorial structure and psychosocial correlates. *J Soc Psychol* 1988;**138**:581–590.
54. Schneiderman LJ, Jecker NS, Jonsen AR. Medical futility: its meaning and ethical implications. *Ann Intern Med* 1990;**112**:949–954.
55. Benzein E, Berg A. The level of and relation between hope, hopelessness and fatigue in patients and family members in palliative care. *Palliat Med* 2005;**19**: 234–240.

DOI: 10.1002/pon