Published in final edited form as:
Psychooncology. 2001 ; 10(3): 206–217.

Assessing Self-Efficacy for Coping with Cancer: Development and Psychometric Analysis of the Brief Version of the Cancer Behavior Inventory (CBI-B)

Carolyn A. Heitzmann,
Department of Psychology, University of Notre Dame

Thomas V. Merluzzi,
Department of Psychology, University of Notre Dame

Pascal Jean-Pierre,
University of Rochester Cancer Center, University of Rochester

Joseph A. Roscoe,
University of Rochester Cancer Center, University of Rochester

Kenneth L. Kirsh, and
Pharmacy Practice and Science, University of Kentucky

Steven D. Passik
Associate Attending Psychologist, Memorial Sloan Kettering Cancer Center

Abstract

Introduction—The Cancer Behavior Inventory-Brief Version (CBI-B), a 12-item measure of self-efficacy for coping with cancer derived from the longer 33-item version (CBI-L), was subjected to psychometric analysis.

Method—Participants consisted of three samples: 735 cancer patients from a multi-center CCOP study, 199 from central Indiana, and 370 from a national sample. Samples were mixed with respect to initial cancer diagnosis. Participants completed the CBI-B and measures of quality of life, optimism, life satisfaction, depression, and sickness impact.

Results—EFA with oblique rotation yielded four factors in the first sample: 1) Maintaining Independence and Positive Attitude; 2) Participating in Medical Care; 3) Coping and Stress Management; and 4) Managing Affect, which were confirmed in subsequent samples. Cronbach α coefficient for the 12-item CBI-B ranged from .84 to .88. Validity of the CBI-B was demonstrated by positive correlations with measures of quality of life and optimism and negative correlations with measures of depression and sickness impact.

Discussion—The CBI-B is a valid brief measure of self-efficacy for coping that could be easily integrated into clinical oncology research and practice and also be used in screening patients.

Keywords

self-efficacy; coping; cancer; quality of life

Correspondence concerning this article should be addressed to Thomas V. Merluzzi, Department of Psychology, 121 Haggar Hall, University of Notre Dame, Notre Dame, IN 46556. tmerluzz@nd.edu.

Self-efficacy theory posits that the greater a person's confidence is in his or her ability to execute a course of action, the higher the probability that a desired goal will be attained. This high confidence, or perceived self-efficacy, is based on judgments that a person makes about how well he or she can perform certain behaviors required to manage or cope with prospective situations (1). Peoples' beliefs or expectations regarding their ability to exercise control or mastery over their behaviors represent a central and pervasive mechanism of human agency, which plays a major role in goal seeking and attainment (2,3).

Cancer diagnosis, treatment, and survivorship are experiences that could challenge the coping capacity of those affected and threaten psychosocial functioning and quality of life. Previous studies showed that patients with higher coping self-efficacy are more likely to engage in effective strategies and demonstrate greater persistence in trying to achieve desired psychosocial (e.g., better adjustment and quality of life) and medical outcomes (e.g., fewer and/or less intense symptoms and side effects) as compared to those with lower self-efficacy (3). Finding ways to accurately assess self-efficacy for coping could facilitate identification of coping strengths and weaknesses that need to be reinforced or modified in order to minimize the burdens of cancer for patients. Assessment of coping self efficacy is especially important at diagnosis and throughout treatment to determine appropriate psychosocial care and need for follow-up services. The present study involved the psychometric validation of a brief measure of self-efficacy for coping with cancer (Cancer Behavior Inventory-Brief Version; CBI-B), which is based on an already well-established measure (Cancer Behavior Inventory – Long Version; CBI-L; 4, 5). The brief measure would facilitate the assessment of coping efficacy in clinical oncology research and practice settings where patient burden is a critical issue.

In the context of health and illness, self-efficacy expectations are a part of a general process of self-regulation. People with high self-efficacy expectations for coping are better able to engage the resources needed to meet the challenges involved in coping with stressors compared to those low in self-efficacy (6). With respect to improving health in non-cancer populations and coping with illness, high-efficacy expectations have been associated with adherence to exercise regimens (7,8,9), successful weight control (10) adaptive coping with pain (11,12), adjustment to rheumatoid arthritis (13,14), and smoking cessation (15,16,17). In general, individuals with higher self-efficacy report fewer problems associated with psychological distress and demonstrate greater persistence in working towards attaining specific goals than those with low self-efficacy (3).

Research in psychosocial oncology suggests that self-efficacy plays a significant role in patients' ability to cope with stress related to their cancer diagnosis and treatment (4,18,19). Studies have suggested that those cancer patients who feel more efficacious in their ability to cope are better adjusted (4,20), enjoy a higher quality of life (21), may live longer (22), and experience less depression (23) than those who feel less confident in their ability to cope.

The current study focuses on the development of a brief measure of patients' perceived self-efficacy to cope with cancer and its treatments. This measure was derived from a well-established, 33-item measure, the Cancer Behavior Inventory (CBI-L; 4, 5). Development of the brief version is based on the need for shorter assessment instruments that are reliable, valid, easy to administer, and not burdensome for patients. Also, the briefer version may be used in screening patients to determine the need for psychosocial services or support. The importance of accurately screening patients for distress and coping deficiencies was recently highlighted by an Institute of Medicine report on the need for more adequate psychosocial resources for cancer patients (24). The provision of adequate resources is predicated upon an accurate assessment of the needs of persons with cancer.

The CBI-L, on which the brief version is based, includes 33 items and seven subscales:1) Maintenance of Activity and Independence; 2) Coping with Treatment-Related Side Effects; 3) Accepting Cancer/Maintaining Positive Attitude; 4) Seeking and Understanding Medical Information; 5) Affective Regulation; 6) Seeking Support; and 7) Stress Management for Medical Appointments. The dimensions of the CBI-L reflect the major coping tasks that a person with cancer confronts when dealing with the disease, treatments, and long-term management. Original validation of the measure included subscales based on Principal Components Analyses (PCA), which indicated the original seven factors. Recent work on more diverse and representative national samples (25) has suggested a five-factor model based on Exploratory and Confirmatory Factor Analyses (EFA; CFA; Mplus, 26).

In the five-factor model structure, the original seven components are well represented (25); in fact, because EFA and CFA are based on model fit, these reduced models may better account for the high correlations in the original seven-factor component structure. The assumption of the current study is that the CBI-B would also tap into these same underlying factors of patients' self-efficacy for coping with cancer. This assumption does require that the brief CBI have a strong relationship with the long version. For that reason, items from the brief CBI were culled from the long version—including those items that were most representative of the domains of coping and were the most stable in previous analyses.

Merluzzi and colleagues (4;5) initially developed the CBI-L in order to address the need for a comprehensive measure of self-efficacy for coping, specifically within the field of psychosocial oncology. Whereas self-efficacy for coping has been investigated in the more broad literature on health and illness, relatively few researchers have examined this construct fully as it relates to cancer. The few brief measures of coping self-efficacy that exist currently were not developed to the point of the CBI-L and therefore do not yet lend themselves to shortening at this point (18,20,21).

One example, the *Stanford Inventory for Cancer Patient Adjustment* (SICPA; 18) is a measure of self-efficacy, which has been used on occasion in research in which investigators have reported internal consistency and validity coefficients (e.g., 19,23). The SICPA, however, has not been subjected to a rigorous psychometric analysis; thus, the structure and validity of the measure have not been thoroughly explored or peer reviewed. Moreover, the SICPA does not include items that represent coping with side effects and symptoms, which are critical components of cancer treatments such as chemotherapy and radiation therapy. Additionally, this measure does not include items that represent the cognitive aspects of coping such as maintaining a positive attitude or maintaining hope.

Another instrument, the *Strategies Used by People to Promote Health* (SUPPH; 20) is described by the authors as a measure of self-care self-efficacy. Initial reports indicated that the SUPPH contained four factors: 1) Stress Reduction; 2) Coping Strategies; 3) Treatment Decisions; and 4) Positive Attitude; albeit, it should be noted that the preponderance of items loaded onto the stress and coping factors. More recently, a factor analysis of the 29-item SUPPH was performed on data from 278 prostate cancer patients. Results yielded two factors, which were labeled Physiological/Emotional Efficacy and Performance Efficacy (27). The latter factor included a coherent group of items that reflect a stress reduction component. The first factor, however, appeared to be a combination of a number of constructs including stress, coping, treatment decision making, and positive attitude. Future research will need to investigate the structure of the items of the SUPPH; revisions will be necessary in order to establish a reliable and coherent factor structure that represents the various components of self-efficacy.

A third measure, the *Stanford Emotional Self-Efficacy Scale* (SESES; 21) focuses mainly on emotional expression to others, issues of death and dying, and the ability to remain focused on the present. This measure emerged from a program of research on group interventions for women with advanced breast cancer. Although brief (15 items), the SESES is a specialized measure, not meant to be comprehensive in its scope, and thus is not comparable to the SICPA, the SUPPH or the CBI-L. To date, the CBI-L is the most comprehensive and methodologically sound measure of self-efficacy for coping with cancer. Thus, deriving a brief measure of self-efficacy for coping from the long version of the CBI is based on the comprehensive nature of the CBI, the history of psychometric work on the CBI, and the continued refinement and peer review of the measure (4,5).

The goal of this research was to develop a brief measure of coping self-efficacy for cancer with the same strong psychometric qualities as the CBI-L. The CBI-B was developed in order to make it more feasible for use in clinical trials without compromising the psychometric quality of the measure. Because it is based on the long version, we anticipated that those domains of coping found in the long version would emerge in the FA of the brief version. As noted above, if the brief version of the CBI is viewed as a proxy for the long version, then it is important for the brief version to demonstrate close coherence to the structure of the long version.

Method

Participants

This study included participants from three research projects. Each sample completed a battery of questionnaires that included the CBI-B and a medical and demographic data form. For some participants, information was also extracted from patients' medical records with patients' permission; information included cancer type, stage at diagnosis, type of treatment, status in treatment, and other pertinent medical information. All participants were treated in accordance with the ethical principles of the American Psychological Association and were provided written informed consent to indicate their willingness to participate in the studies without coercion.

Sample 1—This sample included 735 cancer patients receiving cancer treatment at 17 geographically distinct community oncology clinics affiliated with the University of Rochester Cancer Center Community Clinical Oncology Program (URCC CCOP). Ninety-one percent of these patients were female, and 70% were married. Median age of participants was 51 years. About 70% of the sample reported being employed; 25 % of these participants reported their position as "professional" employment. Ninety-four percent of patients completed high school. The sample was predominantly European American (89%). African Americans and Asian Americans represented 5% and 3% of the sample, respectively. Most of the patients presented with breast cancer (83%). EFA of the CBI-B was conducted using Sample 1.

Sample 2—This sample included 199 patients recruited from sites across the Community Cancer Care, Inc. (CCC) Network of Indiana. Fifty-seven percent of participants were female and 70% were married. Median age of participants was 63 years. Twenty-six percent of the sample reported being employed, 23% were disabled, and 37% were retired. Forty-one percent completed high school. This sample was predominantly European American (89%), with African Americans comprising 9% of the sample. These patients were being treated primarily for breast cancer (20%), lung cancer (23%), colon cancer (14%), and lymphoma (10%). Thirty-one percent of patients had Stage IV cancer at diagnosis.

Confirmatory Factor Analysis (CFA) of the CBI-B (based on the results of the EFA model tested using Sample 1) was conducted using data from Sample 2.

Sample 3—This sample consisted of 370 patients and survivors recruited nationally with the greatest percentage coming from Indiana, Illinois, and Michigan. Patients in this sample were primarily female (64%), married (63.3%), and protestant (45.1%). Median age was 73 years. The sample was mostly White (74.4%), but included a substantial number of African Americans (20.3%). Asians constituted 1.6% of the sample. These patients were either current patients or survivors with breast (46%), prostate (16.1%), colon (5.4%), and lung (4.1%) cancers. A second CFA on the revised CBI-B was conducted using data from Sample 3.

Measures

Self-Efficacy for Coping—The Cancer Behavior Inventory – Long Version (CBI-L; 4,5) was developed as a comprehensive measure of self-efficacy for coping with cancer. The revised version of the CBI (CBI-L) consists of 33 items and seven subscales, including: 1) Maintenance of Activity and Independence; 2) Coping with Treatment-Related Side Effects; 3) Accepting Cancer/Maintaining Positive Attitude; 4) Seeking and Understanding Medical Information; 5) Affective Regulation; 6) Seeking Support; and 7) Stress Management for Medical Appointments. These subscales reflect major coping tasks facing cancer patients when dealing with the disease and treatments. Cronbach alpha coefficients for the seven subscales of the CBI-L range from .82 to .89 and .94 for the entire scale (5). The CBI-L has strong convergent validity based on high correlations with measures of adjustment, optimism, depression, and quality of life; as well as good discriminant validity as demonstrated by low correlations with social desirability (28). The CBI-L was completed by Sample 3.

The Cancer Behavior Inventory-Brief Version (CBI-B) was constructed by including two items with high factor loadings from each factor of the first version of the CBI-L (4) and two additional items from the stress management scale that was added to the second version (5). In cases where the two items with highest factor loading had almost identical content, the item with the next highest factor loading, which was not redundant in content, was chosen for inclusion. For example, “asking physicians questions” was the highest loading item on the factor labeled *Seeking and Understanding Medical Information*. The next two highest loading items were “asking technologists questions” and “asking nurses questions”. Thus, to avoid redundancy the next highest loading item, “actively participating in treatment decisions,” was chosen. The second author and a colleague (MMS), who were the developers of the CBI-L, made the initial determination of exceptions followed by discussion within a research team that was very familiar with the long form of the CBI. Therefore, the initial version of the CBI-B used in this study contained 14 items that were highly representative of the factors on the CBI-L and capitalized on extensive item development that accompanied the creation and refinement of the CBI-L.

Similar to the long form of the Cancer Behavior Inventory (4,5), following each item of the CBI-B (e.g., seeking information about cancer) was a Likert-type scale that ranged from 1 (not at all confident) to 9 (totally confident), reflecting the degree of confidence the patient has that he or she can perform that particular coping behavior. All samples completed this measure and those data were used to establish the structure of the CBI-B. All subsequent measures, listed below, were used in establishing the validity of the CBI-B. Unless otherwise indicated the alpha coefficients were derived from research by the authors of the instruments.

Quality of life—The Functional Assessment of Cancer Therapy Scale (FACT; 29) is a 28-item measure of quality of life that contains four scales: Physical Well-Being (α = .82); Social/Family Well-Being (α = .69); Emotional Well-Being (α = .74); and Functional Well-Being (α = .80). Cronbach's alpha for the entire scale was .89. Test-retest reliability ranged from .82 to .92 over a 3–7 day interval. Patients responded to the FACT items on a 5-point Likert-type scale ranging from 1 (not at all) to 5 (very much). The FACT was completed by participants in all three samples. Additionally, patients in Sample 2 completed the FACT-Fatigue and FACT-Anemia subscales. These subscales measure the extent to which these symptoms affect patient quality of life. Cronbach's α for the FACT-Fatigue is .95 and .96 for the FACT-Anemia.

Coping—The Life Orientation (Optimism) Test (LOT; 30) is an 8-item measure (with 4 filler items) of dispositional stress resistance. Each item is rated on a 5-point scale ranging from "strongly agree" to "strongly disagree". After some items are reversed, the ratings are summed across items. Internal consistency in this study, using the Cronbach α coefficient, for the LOT was .77. The authors reported that test-retest reliability over 4 and 6 week intervals was .79 and .72, respectively (30). The LOT was completed by patients from Samples 1 and 3.

The 28-item Brief COPE (31) is the shortened form of the original COPE Inventory and assesses a variety of behaviors (e.g., self-distraction, positive reframing, and denial). Using a 4-point Likert-type scale ranging from 1 (I haven't been doing this at all) to 4 (I've been doing this a lot), participants rate the frequency with which they used each coping response. In order to compile across smaller domains of the COPE two aggregate scales were formed: Avoidant Coping (denial, substance use, disengagement and self-blame; α = .60) and Problem Focused Coping (active coping, instrumental support, positive reframing, and planning; α = .74). Thus, these aggregate scales were used in the analysis of the validity of the CBI-B. The COPE was completed by Sample 3.

The Brief Religious Coping Scale (32) is a 14-item measure that was designed to assess two rather distinct patterns of religious coping. The positive coping scale (7 items) includes items related to forgiveness, seeking spiritual support, and collaborative spiritual coping. The negative scale (7 items) includes items concerning spiritual discontent, punishing God reappraisals, and reappraisal of God's powers. The correlation between the two scales is .17, and, though significant, indicates that the scales are not highly related. The internal consistency, based on a community sample, was .90 for the positive scale and .81 for the negative scale. The validity of the RCOPE is based on correlations with both mental and physical health variables. The RCOPE was completed by participants in Sample 3.

Satisfaction with Life—The Satisfaction with Life Scale (SWLS, 33) is a brief, 5-item global-measure of current life satisfaction in which subjects rate each item on a 7-point scale from 'strongly agree' to 'strongly disagree'. A test-retest coefficient has been reported at .82 with a two month interval (33). Significant and moderately strong correlations were obtained with other lengthier measures of life satisfaction, which supports the validity of the SWLS. The item, "The conditions of my life are excellent" was omitted because patients in prior studies indicated that the item was inappropriate given that they were dealing with a potentially life-threatening disease. The SWLS was completed by Sample 3.

Disease impact—The Sickness Impact Profile (SIP; 34) is a global measure of the impact of any disease or disability on various aspects of a person's life and was designed for use with individuals from diverse socio-demographic and cultural backgrounds. Twelve categories of functioning are grouped into 3 dimensions: 1) physical impact; 2) psychosocial impact; and 3) impact on independence. In order to focus more specifically on the physical

impact of cancer and treatments, the 45-items that constitute the three physical impact subscales (ambulation, mobility, and body care and movement) were used. Patients were asked to check only those items that apply to their specific situation. For each participant a total score was calculated by summing the weighted scores from the manual for all checked items. Test-retest reliability of the SIP was estimated to be .92 and internal consistency was estimated to be .94 (34). This measure was completed by patients from Sample 3.

Affect—The Zung Self-Rating Depression Scale (ZSDS; 35,36) is a self-report depression questionnaire comprising 20 items. Items of the ZSDS are balanced so that half the items are positively worded and half are negatively worded. The items cover mood and anxiety, motor function, and cognitive, social, and vegetative symptoms of depression. Participants rated each item based on how they felt during the preceding week using the 4-point Likert-type scale with 4 representing the most unfavorable response. The sum of the 20 items, after 10 items were reverse-scored provided a raw depression score. Overall, the ZSDS has been shown to be valid and to have high internal consistency, as indicated by a Cronbach α coefficient of .84 (35). Participants in Sample 2 completed this measure.

The Center for Epidemiologic Studies-Depressed Mood Scale (CES-D; 37) is a 20-item scale that assesses current level of depressed affect. Participants rated the frequency of each item on a four-point scale that ranged from rarely (less than 1 day) to most of the time (5 to 7 days). Internal consistency for this scale was .89 in a sample of cancer patients (38). The CES-D was completed by Sample 3.

Expectations for side effects—Participants completed a questionnaire that asked for their expectancies for side effects prior to receiving chemotherapy treatment. Items were rated on a 5-point Likert-type scale ranging from 1 (I am certain I will NOT have this) to 5 (I am certain I WILL have this). Side effects included common symptoms such as nausea, vomiting, fatigue, and hair loss. Responses to the items were summed to form a single score. Participants in Sample 1 completed these items.

Medical and demographic information—In all samples, a signed release of information form was obtained that allowed for the compilation of data about stage of cancer, time since diagnosis, and type of treatment. Participants in all three samples also responded to items requesting demographic information.

Procedure

Samples 1 and 2—At each data collection site, trained research personnel collected data from participants. Procedures for data collection were similar across sites. After giving their assent, patients were approached about involvement in a research study examining coping with cancer. If patients agreed to participate in the study, a signed informed consent was obtained and they were asked to respond to items in questionnaires that included the aforementioned measures. In one study an intervention followed the initial data collection; however, only the pretest data was used in this study. Participants were asked to complete the packet and return it to the research assistant or office staff.

Sample 3—In conjunction with local agencies that serve low-income and ethnic minorities, and with the help of a minority health consultant and medical professionals in area hospitals, information was distributed about participating in the study. In addition, patients were contacted through advertisements in the local newspapers, on university list-serves, and outreach to religious and social organizations. In most circumstances, after completing a consent form, participants were mailed materials at their home address or place of employment upon their request. Participants completed the packet and mailed it back in a

stamped, addressed envelope that was provided to them. The packet of questionnaires took approximately one hour to complete, and researchers were available by phone to address any questions or concerns that participants may have had while completing the measures. Finally, all participants in Sample 3 were compensated for their participation.

Overview of Structural Models

In this study, Exploratory Factor Analysis (EFA) was used to investigate the factor structure of the CBI-B. Then, to validate the factor structure obtained in the first sample, subsequent samples were used to compute Confirmatory Factor Analyses (CFA) and to maximize the fit to the data. The ultimate goal was to produce a clinical and research tool that would be a single-score measure and provide a rapid and highly valid assessment of coping self-efficacy.

For the EFA (Table 1), the 14 items of the CBI-B were used in analysis, whereas 12 items were subsequently utilized in final CFAs (Table 2) after two items were deleted. Maximum-Likelihood (ML) method of estimation was used; assumptions for using this method were met, including approximate normal distribution of the data for items. All analyses were conducted using Mplus, version 3.12. Generally, Mplus uses all data that is available to estimate the parameters of the model using full information ML. Missing values in the datasets appeared to be randomly and evenly distributed and there were reasonably large sample sizes in each dataset.

Several criteria were used to assess significance of model fit including the chi-square statistic (χ^2) and χ^2/df ratio, the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Standard Root Mean Square (SRMR). A well-fitted model would ideally have a non-significant χ^2 statistic; however, for larger samples around 200 or greater, as in the case of this study, the χ^2 will invariably be significant and is not the optimal measure of fit. A better index of fit, which was used in this research, is a χ^2/df ratio between two and five with lower values indicating better fit (39). In addition, adequate fit is indicated by indices .90 or greater and values of up to .08, representing reasonable errors of approximation (40). In order to compare models, a Likelihood Ratio Test of Significance (LRTS) was calculated if models were nested, or Akaike Information Criteria (AIC), Baysian Information Criteria (BIC), and Sample-Size Adjusted BIC were used, with lower values indicating better fit. In addition, χ^2 change was used to assess incremental fit compared to previous models. For all models, model modifications were made only in adding cross-loadings in order to avoid correlation of errors in the measurement model.

Model 1—To understand the underlying factor structure of the CBI-B, EFA was conducted using data from Sample 1. A seven-factor extraction was carried out using the promax oblique rotation method. (Table 1).

Model 2—A Confirmatory Factor Analysis (CFA) was conducted using data from Sample 2. A factor structure was specified, according to results from EFA in Model 1, with correlated factors and no error correlations.

Model 3—This model was specified to be the same as the previous model, the only difference being a cross loading of item 14 was first added to factor 3 as suggested by the modification index of Model 2 (M.I. = 122.61). Data were from Sample 2.

Model 4—In this 12-item model, both items 5 and 14 were eliminated due to their low factor loadings suggested by the EFA, as well as the problems noted in the prior CFA models. Data were from Sample 2.

Model 5—A second CFA was conducted using data from Sample 3. The aforementioned four-factor structure was specified with the 12 variables used in Model 4. Essentially, Model 5 was a replication of Model 4 with a more ethnically representative sample.

Results

Structure of the CBI-B

Model 1—EFA was conducted in order to determine the smallest number of meaningful factors underlying the items in the CBI-B. A seven-factor extraction, based on the original seven components of the long form of the CBI, was carried out using the promax oblique rotation method. First, eigenvalues were examined using the eigen-criterion of greater than 1.0; according to this rule, factors with eigenvalues over 1.0 are good indicators of latent factors. A four-factor solution was the appropriate model based upon eigenvalues for the first four factors in Model 1 (4.91, 1.46, 1.28, and 1.06).

The χ^2/df values were 14.37, 9.79, 6.81, 4.32, and 4.07 for factor solutions one through five, respectively, suggesting that the four and five-factor models provided a good fit to the data. Besides the non-convergence in the EFA with 6 and 7 factors, further indication that the four-factor model was an adequate fit was indicated by improvement of RMSEA from 0.14 for the one factor solution to 0.07 for the four and five factor solutions. Another indication of the adequacy of the four-factor solution was the reduction in residual error over the three-factor solution. Whereas the five-factor solution showed only slight improvement in residual error variances, it also showed evidence of over-fitting with an estimated residual variance of item 8 of −0.41. Thus, the four-factor solution appeared optimal.

Finally, the factor loadings were examined. The factor loadings in the four-factor promax rotated solution provided some indication that a model with simple structure may be adequate for these data. Factor loadings for the four factor model ranged from −.17 to .79. The five factor solution was eliminated because item 9 cross-loaded on factors four and five, with a loading of .31. For three factors, the structure was less clear in that items 5 and 14 did not load highly on either factor. Also, items 8 and 9 showed evidence of cross-loading. The highest cross-loading for the three-factor model was .46, whereas the highest cross-loading in the four factor model was .19; thus, the four-factor model provided the best support for the simple structure for the data.

In the four-factor structure, items 1, 2, and 3 loaded highly on factor 1 with loadings ranging from .48 to .79; this factor reflected patients' striving for independence and maintaining a positive attitude. Items 8 and 9 loaded highly on factor 2 (.66 and .72, respectively); this factor represented patients' participation in their medical care. Items 6, 7, 12, and 13 loaded highly on factor 3 with factor loadings ranging from .43 to .74; this factor reflected patients' coping and stress management. Finally, items 4, 10, and 11 loaded highly on factor 4 with loadings ranging from .32 to .79; this factor reflected patients' management of affect.

In terms of item variance, the range of estimated residual variances was from .21 to .97. However, it should be noted that items 5 and 14 did not load well on any of the factors. These items may not be good discriminators and subsequent models were tested in which these items were deleted. Overall, the analyses suggest that a four-factor solution provided the best fit the data.

Model 2—In order to test the factor structure based on results suggested by the EFA in Sample 1, CFA was carried out utilizing data from Sample 2. Model 2 was specified (as indicated by the EFA) with the first three items loading on factor 1; items 5, 8, 9, and 14 loading onto factor 2; items 6, 7, 12, and 13 loading on factor 3; and items 4, 10, and 11

loading on factor 4. ML estimation produced a χ^2/df of 7.11; however, the RMSEA (.08) and the SRMR (.07) values were adequate, and the CFI was very close to criterion (.89).

The factor loadings were moderately high (.50 to .90); however, it should be noted that again that items 5 and 14 did not have high loadings, with values of .00 and .32 respectively. Further evidence of the inadequacy of item 5 was that all loadings were significant (t > 1.96), with the exception of item 5 loading on factor 2 (t = .09).

The model modification indices suggested quite a few parameters that could be added to the model to improve the model fit. To avoid correlation of the errors of measurement in the model, modifications were made only in adding cross-loadings. In this vein, it should be noted that correlations remained moderately high among the factors throughout, with little variation based on the modifications. R^2 values also showed little variation based on the modifications; the largest change in value was for item 14, which increased from .10 to .27 from Model 2 to 3.

Model 3—A cross loading of item 14 was first added to factor 3; thus, Model 3 was specified the same as Model 2, with the exception of this cross-loading. This parameter was suggested by the modification index of Model 2 (M.I. = 122.61). Thus, item 14, which examines patients' confidence in "remaining relaxed while waiting an hour for an appointment" was allowed to load on both the factor reflecting participation in medical care, and the factor reflecting coping and stress management. The χ^2/df was 5.36, which was close to criterion. The CFI value was .93; the AIC and BIC indices were also reduced (from 45988.98 to 45861.07 and 46151.23 to 46028.09, respectively), as was the RMSEA from .08 to .07. The SRMR was reduced from .07 in Model 2 to .05 in Model 3. Thus, this model appeared to fit the data reasonably well.

The factor loadings remained high (nearly the same as in the previous model), although items 5 and 14 were still problematic with very low negative loadings on factor 2 (−.01 and −.01 respectively) although item 14 did have a loading of .52 on factor 3. All factor loadings were significant (t > 1.96), with the exception of items 5 (t = −0.14) and 14 (t = −0.33). Several modifications were considered based on M.I., but no significant improvements to model fit were found without a large number of modifications.

Model 4—In Model 4, both items 5 and 14 were eliminated due to their low factor loadings for the EFA, as well as the problems noted in the prior CFA models. ML estimation produced a χ^2/df of 5.37, which was close to criterion. Additionally, the RMSEA (.07) and SRMR (.04) values improved, and the CFI was .95. According to previously mentioned criteria, this model has good fit to the data. Finally, the χ^2 difference between Models 3 and 4 was highly significant (χ^2 difference = 117.45, df =22, p<.001) also indicating significant improvement in fit.

The factor loadings ranged from .32 to .90 and all loadings were significant (t > 1.96). R^2 values indicate that items 1, 4 to 6, 7, and 12 had lower values, ranging from .10 to .37; however the majority ranged from .53 to .81, indicating that the variance explained by these items was moderate to large. Again, several modifications were considered based on modification indices., however no significant improvements to model fit were found without a large number of modifications.

Model 5—This model, which was conducted on a different sample than Model 4, was a replication CFA based on Model 4 in which items 5 and 14 were deleted. ML estimation produced a χ^2/df value of 4.84, which indicated a good fit. Additionally, while the RMSEA value was greater than .08 (RMSEA = .11), the CFI was .91, and the SRMR was .06 were

consistent with a criteria for a good fit. In addition, as with Model 4, Model 5 fit the data significantly better than Model 3 (χ^2 difference = 143.10, *df* =22, p<.001). Thus on most criteria, this model was a good fit to the data.

The factor loadings were moderately high, with loadings ranging from .32 to .93. It should be noted that the loading for item 4 (.32) was the only loading below .45, and all loadings were significant ($t > 1.96$). The R^2 value for item 4 was low, but the remaining items had moderate to high R^2 values, ranging from .38 to .86. Finally, modifications did not significantly improve fit.

These analyses strongly suggested that Models 4 and 5 were the best fitting CFA models. When items 5 and 14 are eliminated, Models 4 and 5 provided higher factor loadings, all of which were significant and adequate fit indices to suggest the best fit to the data. These models also reiterated that items 5 and 14 were poorly performing items. The result is a briefer version of the CBI-B (12 versus 14 items) that is structurally sound based on the fit indices.

Reliability of the CBI-B

The internal consistency of the of the 12-item CBI-B, as indicated by the Cronbach alpha coefficient, was .84, .84, and, .88 for Samples 1, 2, and 3, respectively. The correlation of the CBI-B and the CBI-L (without corresponding CBI-B items in the CBI-L) was .95 (Sample 3).

Validity of the CBI-B

The CBI-B was statistically significantly correlated with measures of quality of life, satisfaction with life, and disease impact. Specifically, the CBI-B was positively correlated with the FACT-G total score (*r* =.43, S1; *r* =.40, S2; *r* = .60, S3). Correlations with subscales of the FACT were as follows: Physical Well-Being (*r* =.26, S1; *r* =.20, S2; *r* = .40, S3); Social/Family Well-Being (*r* =.33, S1; *r* =.31, S2; *r* = .46, S3); Emotional Well-Being (*r* =.38, S1; *r* =.36, S2; *r* = .59, S3); and Functional Well-Being (*r* =.34, S1; *r* =.43, S2; *r* = .53, S3). The CBI-B was also positively correlated with the LOT-R optimism scale (*r* = .37, S1; *r* = .56, S3.) and the SWLS (*r* = .48, S3). Finally, The CBI-B was significantly, but modestly correlated with the aggregate scales of the COPE that represent problem focused coping (*r* = .18, S3). All correlations were significant at $p < .001$ with the exception of the correlation with the problem focused coping aggregate scale, which was significant at the .05 level. These positive correlations indicate the concurrent validity of the CBI-B; in other words, the greater the self-efficacy for coping that a patient has, the greater their perceived quality of life, optimism, and satisfaction with life.

The CBI-B correlated negatively with measures related to several indicators of more detrimental aspects of coping, as well as the impact of cancer on physical functioning as assessed by the SIP. The CBI-B was correlated with the FACT Fatigue (*r* = −.39; S2), and Anemia scales (*r* = −.45; S2) as well as with the Sickness Impact Profile (*r* = −.38; S3). The CBI-B was also negatively correlated with an aggregation of scales from the COPE that indicated avoidant coping strategies (i.e., denial, substance use, disengagement, and self-blame) (*r* = −.32; S3). The highest single correlation among those scales was with the self-blame scale (*r* = −.33; S3) indicating that to some extent self-efficacy is inversely associated with tendencies toward self-criticism. Furthermore, there was a modest negative correlation between the CBI-B and the negative scale of the Religious Coping Scale (*r* = −.28; S3). In addition, there was a negative correlation between the CBI-B and the Zung Depression Scale (*r* = −.52, S2) as well as between the CBI-B and the CES-D (*r* = −.55, S3), indicating that lower levels of self-efficacy for coping were associated with higher depression scores.

Finally, the CBI-B was also significantly negatively correlated with patient expectations for side effects ($r = -.24$, S1); patients were less likely to have negative expectations about the side effects of treatment if they had high self-efficacy for coping with the disease and its treatments. All correlations with these measures were significant at $p < .01$.

Discussion

The purpose of the present study was to conduct a reliability, structural, and validity analysis of the CBI-B, a brief measure of self-efficacy for coping for cancer. Our analyses revealed that the CBI-B adequately assessed major factors of the coping process and was reliable and valid. The CBI-B was significantly correlated with the CBI-L and could be utilized in lieu of the full CBI-L to obtain a general estimate of coping efficacy while helping to reduce patient burden.

The CBI-B does have a coherent underlying structure that taps into the major factors similar to those contained in the CBI-L. These factors of coping reflected the major issues faced by many people with cancer during the course of their illness and included aspects of coping that are intimately tied to the process of adjusting to cancer. The first factor, Maintaining Independence and Positive Attitude, represents the patient's ability to maintain independence, a positive attitude, and a sense of humor. The loss of independence represents a transition that could cause a major readjustment of goals and tasks of daily living. Additionally, maintaining a positive attitude reflects the task of remaining hopeful despite encountering challenging circumstances. The second factor, Participating in Medical Care, represents the patient's confidence in his or her ability to seek medical information as well as support. It includes not only coping behaviors that focus on being involved in and actively participating in medical care but also the active process of seeking support and expressing one's self as opposed to passively receiving support or harboring negative feelings. The third factor, Coping and Stress Management, represents the patient's ability to remain relaxed in the face of stress caused by or in the anticipation of cancer treatments as well as the more dreaded aspects of cancer treatment, dealing with physical changes (i.e., hair loss) and managing nausea and vomiting. The fourth factor, Managing Affect, represents the patient's ability to express a range of emotions including anger as well as to seek opportunities to share fears and concerns.

The correlations of the CBI-B with measures of quality of life, coping, optimism, and disease impact provide support for the validity of the brief, 12-item version of the Cancer Behavior Inventory. The CBI-B correlated positively with the FACT, a measure of quality of life indicating that participants with higher scores on self-efficacy for coping with cancer may feel more efficacious in engaging in behaviors that are associated with higher quality of life. Similarly, the positive correlation of the CBI-B with the LOT-R and the negative correlation with expectancies for side-effects reflect that personal agency and the expectancy for positive outcomes are also aspects of effective coping. Along those same lines, the negative relationships between the CBI-B and depression (CES-D; ZSDS) and disease impact provide some indication that cancer patients who feel efficacious in coping may be less likely to have negative emotional states and are less physically debilitated by the disease and its treatments.

Research and Clinical Implications

The CBI-B may be a useful adjunct to other measures in clinical research. For intervention studies, the CBI-B may be used as a process measure to detect cognitive changes (i.e., changes in personal agency) during the course of the intervention. In addition, as an outcome measure, the CBI-B may complement measures of adjustment, stress, and depression. In these contexts, the CBI-B reflects efficacy expectations that, in theory, may

mediate the relation between the new knowledge and skills obtained in interventions and valued outcomes. For example, in a psychosocial intervention, the relation between the cognitive knowledge and skills gained and the reduction of distress or increase in quality of life may be accounted for by the mediation of self-efficacy for coping.

The CBI-B also has potential use in a clinical setting as a screening device. The CBI-B may be used to identify patients who need psychosocial services, or who might be referred for further testing. Patients may be assessed using the CBI-B at any point during the disease trajectory, and medical professionals may use such data to integrate self-efficacy for coping into treatment. As a brief form (12 items), it is an efficient measure to identify efficacy in patients throughout the course of their illness.

Limitations and Future Directions

In the current study, perhaps the most notable limitation is that there is no examination of concurrent validity of the CBI-B with other self-efficacy scales such as the *Stanford Inventory for Cancer Patient Adjustment* (SICPA; 18); *Strategies Used by People to Promote Health* (SUPPH; 20); and the *Stanford Emotional Self-Efficacy Scale* (SESES; 21). However, this study does have measures that were associated with self-efficacy including quality of life, satisfaction with life, and disease impact. The other self-efficacy measures, while narrower in focus than the CBI-B, might be correlated with CBI-B based on some general common construct of control; however, the specific domains of self-efficacy are most critical according to self-efficacy theory, and in that respect the CBI-B represents a broader base of coping behaviors than the other measures. Future studies should address this limitation more clearly by measuring the CBI-B directly against other both general self-efficacy and self-efficacy specific to coping with cancer.

Additionally, whereas the multiple models testing with large and somewhat diverse samples (especially Sample 3) is a strength of this research, the cross-sectional nature of the data analyzed places limitations on understanding the role of coping self-efficacy over time. Longitudinal designs may be useful in determining if coping self-efficacy relates to psychological and physical resilience over time as well as how coping self-efficacy affects the transition from being on treatment to being a survivor. Also, future research might delve into differences in self-efficacy as a function of medical and demographic variables. For example multi-group analysis of measurement invariance could be utilized to compare the factor structure of the CBI-B as a function of ethnicity, gender, stage at diagnosis, SES, and so on.

In summary, the CBI-B, similar to the CBI-L, has been subjected to stringent psychometric analyses and, as a brief form, represents a structurally sound, reliable, and valid measure of self-efficacy for coping with cancer that is highly correlated with the long version of the Cancer Behavior Inventory (CBI-L; 5). In addition, the factors that constitute the measure represent some of the major coping tasks that cancer patients face during diagnosis and treatment. The CBI-B could be useful in clinical trials as a process and outcome measure, and as a brief reliable screening tool. Future studies should establish normative data for the CBI-B in order to enable a more precise interpretation of scores and to enhance the clinical and empirical utility of this measure.

Acknowledgments

This research was supported by grants from the National Cancer Institute at University of Notre Dame (CA88603 and CA94914) and University of Rochester (CA37420).

References

1. Bandura A. Human agency in social cognitive theory. American Psychologist. 1989; 44:1175–1184. [PubMed: 2782727]
2. Bandura, A. Social foundations of thought and action: A social cognitive theory. New Jersey: Prentice Hall; 1986.
3. Bandura, A. Self-efficacy: The exercise of control. New York: Freeman; 1997.
4. Merluzzi TV, Martinez-Sanchez MA. Assessment of self-efficacy in coping with cancer: Development and validation of the cancer behavior inventory. Health Psychology. 1997; 16:1–8.
5. Merluzzi TV, Nairn RC, Hegde K, Martinez Sanchez MA, Dunn L. Self-efficacy and coping with cancer: Revision of the Cancer Behavior Inventory (Version 2.0). Psycho-Oncology. 2001; 10:206–217. [PubMed: 11351373]
6. Bandura A. Social cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes. 1991; 50:248–287.
7. Fruin DJ, Pratt C, Owen N. Protection Motivation Theory and adolescents' perception of exercise. Journal of Applied Social Psychology. 1992; 22:55–69.
8. Anderson ES, Wojcik JR, Winett RA, Williams DM. Social-cognitive determinants of physical activity: The influence of social support, self-efficacy, outcome expectations, and self-regulation among participants in a church-based health promotion study. Health Psychology. 2006; 25:510–520. [PubMed: 16846326]
9. Rhodes RE, Plotnikoff RC. Understanding action control: Predicting physical activity intention-behavior profiles across 6 months in a Canadian sample. Health Psychology. 2006; 25:292–299. [PubMed: 16719600]
10. Linde JA, Rothman AJ, Baldwin AS, Jeffery RW. The impact of self-efficacy on behavior change and weight change among overweight participants in a weight loss trial. Health Psychology. 2006; 25(3) 282-29.
11. Litt MD. Self-efficacy and perceived control: Cognitive mediators of pain tolerance. Journal of Personality and Social Psychology. 1988; 54:149–160. [PubMed: 3346804]
12. Meredith P, Strong J, Feeney JA. Adult attachment, anxiety, and pain self-efficacy as predictors of pain intensity and disability. Pain. 2006; 123:146–154. [PubMed: 16644132]
13. O'Leary A, Shoor S, Long K, Holman HR. A cognitive-behavioral treatment for rheumatoid arthritis. Health Psychology. 1988; 7:527–544. [PubMed: 3063517]
14. Beckham JC, Rice JR, Talton SL, Helms MJ, Young LD. Relationship of cognitive constructs to adjustment in rheumatoid arthritis patients. Cognitive Therapy and Research. 1994; 18:479–496.
15. Carey KB, Carey MP. Changes in self-efficacy resulting from unaided attempts to quit smoking. Psychology of Addictive Behavior. 1993; 7:219–224.
16. Baldwin AS, Rothman AJ, Hertel AW, Linde JA, Jeffery RW, Finch EA, Lando HA. Specifying the determinants of the initiation and maintenance of behavior change: An examination of self-efficacy, satisfaction, and smoking cessation. Health Psychology. 2006; 25:626–634. [PubMed: 17014280]
17. Yzer MC, Van den Putte B. Understanding smoking cessation: The role of smokers' quit history. Psychology of Addictive Behaviors. 2006; 20:356–361. [PubMed: 16938076]
18. Telch CF, Telch MJ. Group skills instruction and supportive group therapy for cancer patients: A comparison of strategies. Journal of Consulting and Clinical Psychology. 1986; 54:802–808. [PubMed: 3794024]
19. Cunningham AJ, Lockwood GA, Cunningham JA. A relationship between perceived self-efficacy and quality of life in cancer patients. Patient Education and Counseling. 1991; 17:71–78. [PubMed: 1997998]
20. Lev EL, Eller LS, Kolassa J, Gejerman G, Colella J, et al. Exploratory factor analysis: Strategies used by patients to promote health. World Journal of Urology. 2007; 25:87–95. [PubMed: 17066263]
21. Giese-Davis, J.; Koopman, C.; Butler, LD.; Classen, C.; Morrow, GR.; Spiegel, D. Self-efficacy with emotions predicts high quality of life in primary breast cancer patients. Self-efficacy and

Cancer: Theory, Assessment, and Treatment; Symposium conducted at the meeting of the Society of Behavioral Medicine; San Diego. March 1999; Brady, M. (chair)

22. Merluzzi, TV.; Nairn, RC. An exploration of self-efficacy and longevity in persons with cancer. Self-efficacy and Cancer: Theory, Assessment, and Treatment; Symposium conducted at the meeting of the Society of Behavioral Medicine; San Diego. March 1999; Brady, M. (chair)
23. Weber BA, Roberts BL, Resnick M, Deimling G, Zauszniewski J, Musil C, Yarandi H. The effect of dyadic intervention on self-efficacy, social support, and depression for men with prostate cancer. Psycho-Oncology. 2004; 13:47–60. [PubMed: 14745745]
24. Adler, N., et al. Cancer Care for the Whole Patient: Meeting Psychosocial Health Needs. Washington D.C.: National Academies Press; 2007. Joint report by the National Institutes of Health and Institute of Medicine
25. Heitzmann CA, Merluzzi TV. An assessment of the invariance of the structure of coping for African American persons with cancer. Manuscript in preparation.
26. Muthèn, LK.; Muthèn, BO. Mplus 2.1. Los Angeles, CA: Muthèn & Muthèn; 2002. [Computer program]
27. Lev EL, Eller LS, Kolassa J, Gejerman G, Colella J, et al. Exploratory factor analysis: Strategies used by patients to promote health. World Journal of Urology. 2007; 25:87–95. [PubMed: 17066263]
28. Paulhus, DL. Socially desirable responding: The evolution of a construct. In: Braun, HI.; Jackson, DN.; Wiley, DE., editors. The role of constructs in psychological and educational measurement. Mawah, NJ: Erlbaum; 2002. p. 49-72.
29. Cella DF, Tulsky DS, Gray G, et al. The functional assessment of cancer therapy scale: Development and validation of the general measure. Journal of Clinical Oncology. 1993; 11:570–579. [PubMed: 8445433]
30. Scheier MF, Carver CS. Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. Health Psychology. 1985; 4:219–247. [PubMed: 4029106]
31. Carver CS. You want to measure coping but your protocol's too long: Consider the Brief COPE. International Journal of Behavioral Medicine. 1997; 4:92–100. [PubMed: 16250744]
32. Pargament KI, Smith BW, Koenig HG, Perez L. Patterns of positive and negative religious coping with major life stressors. Journal for the Scientific Study of Religion. 1998; 37:710–724.
33. Diener E, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. Journal of Personality Assessment. 1985; 49:71–75. [PubMed: 16367493]
34. Bergner M, Bobbit RA, Carter WB, Gilson BS. The Sickness Impact Profile: Development and final revision of a health status measure. Medical Care. 1981; 19:787–805. [PubMed: 7278416]
35. Zung W. Factors influencing the self-rating depression scale. Archives of General Psychology. 1967; 16:543–547.
36. Dugan W, McDonald M, Passik S, et al. Use of the Zung self-rating depression scale in cancer patients: Feasibility as a Screening tool. Psycho-Oncology. 1998; 7:483–493. [PubMed: 9885089]
37. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement. 1977; 1:385–401.
38. Antoni MH, Lehman JM, Kilbourn KM, Boyers AE, Culver JL, Alferi SM, et al. Cognitive-behavioral stress management intervention decreases the prevalence of depression and enhances benefit finding among women under treatment for early-stage breast cancer. Health Psychology. 2001; 20:20–32. [PubMed: 11199062]
39. Marsh HW, Hocevar D. Application of confirmatory factor analysis to the study of self-concept: first and higher-order factor models and their invariance across groups. Psychological Bulletin. 1985; 97:562–582.
40. Browne, MW.; Cudeck, R. Alternative ways of assessing model fit. In: Bollen, KA.; Long, JS., editors. Testing Structural Equation Models. London: Sage Publications; 1993. p. 136-162.

Table 1

Means, Standard Deviations, and Rotated Factor Loadings from the EFA (Model 1)

			Factors of the CBI-B			
Items	***M***	***SD***	**1**	**2**	**3**	**4**
1. Maintaining independence	7.72	1.40	**.48**	.11	.14	−.05
2. Maintaining a positive attitude	7.61	1.47	**.78**	−.07	.19	.01
3. Maintaining a sense of humor	7.91	1.34	**.79**	.06	−.07	.04
5. Using denial.	4.52	2.77	.04	**−.17**	.06	.12
8. Actively participating in treatment decisions	8.09	1.26	.16	**.66**	.17	.09
9. Asking physicians questions	8.20	1.19	.10	**.72**	.06	.20
14. Remaining relaxed while waiting at least one hour for my appointment	6.33	2.16	.09	**−.19**	.17	−.02
6. Maintaining work activity	6.99	1.81	.17	−.03	**.43**	−.03
7. Remaining relaxed throughout treatments and not allowing scary thoughts to upset me	6.49	2.02	.13	−.00	**.58**	−.03
12. Managing nausea and vomiting.	6.68	1.82	−.11	.04	**.71**	.11
13. Coping with physical changes	6.63	1.91	−.01	.03	**.74**	.01
4. Expressing negative feelings about cancer	6.26	2.17	.11	−.04	−.08	**.33**
10. Seeking consolation	7.26	1.86	−.03	−.01	.03	**.79**
11. Sharing feelings of concern	7.56	1.61	.03	.08	.08	**.74**
Eigenvalues:			4.91	1.46	1.28	1.06

Note: *N* = 735, Boldface indicates highest loadings for each component.

Table 2

Means, Standard Deviations, and Factor Loadings from the CFA with Sample 3 (Model 5)

			Factors of the CBI-B			
Items	***M***	***SD***	**1**	**2**	**3**	**4**
1. Maintaining independence	7.46	1.80	**.68***			
2. Maintaining a positive attitude	7.37	1.66	**.89***			
3. Maintaining a sense of humor	7.68	4.98	**.83***			
8. Actively participating in treatment decisions	7.79	1.59		**.83***		
9. Asking physicians questions	7.98	1.56		**.89***		
6. Maintaining work activity	6.97	2.14			**.62***	
7. Remaining relaxed throughout treatments and not allowing scary thoughts to upset me	6.91	2.06			**.70***	
12. Managing nausea and vomiting.	6.84	2.28			**.64***	
13. Coping with physical changes	6.68	1.94			**.82***	
4. Expressing negative feelings about cancer	6.11	2.29				**.32***
10. Seeking consolation	6.80	2.07				**.93***
11. Sharing feelings of concern	7.04	1.95				**.88***

Note: $N = 199$,

* ($t < 1.96$); parameters are significant.

Table 3

Fit Indices of CFA Measurement Models Based on the Four-Factor EFA (Model 1)

Model	*N*	χ^2	*df*	χ^2/df	RMSEA	CFI	SRMR
Model 2							
14 items no modifications	199	505.14	71	7.11	.08	.89	.07
Model 3							
With modification to item 14	199	375.22	70	5.36	.07	.93	.05
Model 4							
Elimination of items 5, 14	199	257.77	48	5.37	.07	.95	.04
Model 5							
Replication of Model 4	370	232.12	48	4.84	.11	.91	.06

Note: All chi-square values were significant ($p < .01$). All factor loadings were significant ($t > 1.96$). RMSEA = root-mean-square error of approximation; CFI = comparative fit index; SRMR = standard-root-mean-square.