

Proposal No: 99-02
Topic: BSI Depression and Anxiety Scales

Lead CCSS Investigator: Susan Parsons

Collaborators: Zeltzer

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99-02

CHILDHOOD CANCER SURVIVOR STUDY
Analysis Concept Proposal

Submitted: June 21, 1999

1. **Title:** Confirmatory Factor Analysis of the BSI Depression and Anxiety Scales in the Survivor Population.
2. **Working Group and Investigators:** This proposed publication will be within the Neurological/Psychosocial Working Group. The proposed investigators (name/e-mail/fax) will include:

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3. Background and Rationale

Advances in the treatment of childhood cancers have brought dramatic increases in the survival rates for many diseases. This success has resulted in a large cohort of childhood cancer patients now surviving into adulthood, and has increased interest in issues of treatment toxicity and long-term effects. In addition to studies of medical late effects many investigators have begun to examine the quality of life and psychological outcome among childhood cancer survivors. As interest in this area has grown questions about the best ways to measure and report on quality of life and psychological adaptation have been raised. The limitations of physician ratings and proxy reporting have been widely raised, leading the majority of investigators to advocate the use of some form of patient self-report.

A number of self-report measures of health related quality of life have been used with survivors of childhood cancers to assess the impact of cancer and treatment on general health status. Psychological outcomes have been assessed principally by using symptom scales developed originally for psychiatric populations. The advantage of this approach has been the ability to use previously validated scales and constructs and to have normative data to use as a basis for comparison. Disadvantages of "borrowing" measures from the psychiatric setting have tended to be overlooked. Namely the scales developed from examinations of psychiatric samples may not be sensitive to the specific symptoms or constellations of symptoms that may be characteristic of cancer survivors. Scales developed for use in a psychiatric population can be inappropriate and even misleading when applied to atypical populations. For example, factor analytic studies of the Child Behavior Checklist and Youth Self Report have shown that the scales developed from normative populations are quite different from factors derived from psychiatric samples. In a study using the Brief Symptom Inventory (BSI) with bereaved parents, factor analysis revealed that the scales of the BSI did not hold up as coherent factors in this population. The authors of this study concluded that the standard scales "can not be uncritically generalized" to this population, and that studies using the BSI with bereaved parents would require specialized scoring and interpretation.

Understanding how symptom scales perform in specific populations like childhood cancer survivors is important for a variety of reasons. The ways in which symptoms cluster together onto a single scale reflect the relationship between symptoms in a specific populations. For example, if in the general population symptoms of depression and symptoms of physical pain form part of separate factors it suggests that pain and depression are independent aspects of functioning in the general population. If in a group of individuals with chronic medical problems we find that symptoms of depression and pain cluster onto the same factor, it would indicate that in this population the experience of pain and depression are highly correlated and represent a single aspect of functioning.

A second reason for examining the psychometric properties of scales in distinct populations is to develop the most parsimonious scores. Factor analysis and other scale development methods are essentially descriptive techniques used to reduce a large number of items to a more manageable number of scales. If the scales are appropriate to the populations they will reduce the data into an accurate summary of scores with a small or modest loss of information. If the scales are not well suited to a specific population, however, the scale scores provided are not an accurate representation of the test items and valuable information is lost.

As part of the long-term follow-up survey, CCSS subjects completed items comprising the Depression, Anxiety and Somatic Complaints scales of the Brief

Symptom Inventory. Although these scales have been used in other studies of cancer patients and survivors, little is known about the measurement properties of the scales in this population. Determining how the standard BSI scales function in this group as compared to the normal population will give us important information about the psychological adaptation of survivors. For example, we will be able to determine if the symptoms of anxiety on the BSI represent a coherent dimension of functioning that is distinct from depression or physical complaints. In addition to determining how the standard scales function, we will use factor analytic techniques to develop scales specific for the survivor population, and evaluate whether or not these scales represent a more parsimonious and interpretable system for reporting the results of the BSI items. Since a number of CCSS studies will use the BSI items to measure psychosocial functioning it will be important to have determined a standard method for scoring and reporting these items that is most appropriate.

4. **Specific Aims/Objectives/Research Hypothesis:** This publication is designed to evaluate the measurement properties of the BSI Anxiety, Depression, and Somatic Complaints subscales and to propose a uniform system of reporting scores for use in studies utilizing these scales in other CCSS studies. The three main objectives are:
 - 1). To score the BSI subscales in the CCSS sample using standard scoring algorithms as described in the BSI manual and compare these results to established norms from various populations.
 - 2). To derive sample-specific factor structure for the BSI items included in the CCSS survey and compare resultant factor scores with existing standards.
 - 3). To assess the psychometric properties of the standard and sample-derived BSI scales for internal consistency reliability, item-scale relationships, and construct validity by comparing results to responses to CCSS-based items on occupational functioning and functional impairment.
 - 4). To propose a standardized approach to summarizing and scoring these items based on the above-proposed analyses for use in other CCSS studies utilizing the BSI items.

5. Analysis Framework:

a. Subject population: CCSS survivor group who completed the adult (age 18+) follow-up survey.

b. Variables to be included:

Demographic Variables: gender, ethnicity, religion, age at study entry, marital status, education, employment status and income.

BSI scale items: J.16-36.

Functional status items: Functional impairment N.9-15, Employment O.5-9.

c. Specific tables;

1) Internal consistency of standard and sample-derived BSI scales, item to item and item to scale correlations.

2) Factor structure of items J.16 to J.36. Unrotated and rotated factors, factor loadings and communalities.

3) Correlations between standard and sample-derived BSI scores and variables of occupational functioning and functional impairment.



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June 18, 1999

Anna Meadows, M.D.
Chair, CCSS Publications Committee
The Children's Hospital of Philadelphia
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Dear Dr. Meadows:

Enclosed you will find a copy of the Analysis Concept Proposal for submission to the Publications Committee of CCSS. Dr. Christopher Recklitis, a clinical psychologist within the Department of Pediatric Oncology at the Dana Farber Cancer Institute, and I have been working closely with Lonnie Zeltzer about the analysis of psychosocial items included in the original CCSS survey. In our review of these items we have discovered that for the respondents over 18 years of age, these items represent three of the subscales of the Brief Symptoms Inventory, a well-validated psychological self-report scale, originally developed by Derogatis and co-workers in 1983. This instrument has been used in its entirety in a variety of populations; consequently, normative data are available for a wide-range of populations. Our proposed analysis will evaluate the ways in which the items included in the CCSS survey come together principally to form categories of depression and anxiety for childhood cancer survivors and compare these results with other populations. In the absence of this type of [factor] analysis, we do not know whether or not the items form categories similar to those described in previous populations or if the items interact with each other in distinct ways in this survivor population. The sample size provides us with an extraordinary opportunity to better understand this. By performing "confirmatory factor analysis," it is our hope that this analysis will then serve as a standard or basis for the inclusion of psychosocial outcomes in other proposed analyses from the CCSS database. This, too, represents a unique opportunity to understand the ways in which childhood cancer survivors perceive their psychosocial functioning and also may serve as a model for standardizing such analyses in outcomes research.

As you know, I have longstanding interest in quality of life research and in psychosocial outcomes of cancer care. I especially look forward to formally collaborating with Lonnie Zeltzer and other members of the CCSS study team on this project. In addition, you will note that we have identified a statistician who is expert in factor analysis to collaborate with me and Drs Recklitis and Zeltzer.

Teaching Affiliates
of Harvard Medical School

Thank you for your consideration of this proposal. I look forward to receiving comments and any critique from the committee.

Yours truly,

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