

UNCLASSIFIED

AD NUMBER
ADB257296
NEW LIMITATION CHANGE
TO Approved for public release, distribution unlimited
FROM Distribution authorized to U.S. Gov't. agencies only; Proprietary Info.; Sep 99. Other requests shall be referred to US Army Medical Research and Materiel Command, Fort Detrick, MD 21702-5012.
AUTHORITY
USAMRMC ltr 18 Jan 2001.

THIS PAGE IS UNCLASSIFIED

Award Number: DAMD17-94-J-4236

TITLE: Biopsychosocial Research Training in Breast Cancer

PRINCIPAL INVESTIGATOR: Michael Antoni, Ph.D.

CONTRACTING ORGANIZATION: University of Miami
Coral Gables, Florida 33124

REPORT DATE: September 1999

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Distribution authorized to U.S. Government agencies only (proprietary information, Sep 99). Other requests for this document shall be referred to U.S. Army Medical Research and Materiel Command, 504 Scott Street, Fort Detrick, Maryland 21702-5012.

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

20000822 082

NOTICE

USING GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA INCLUDED IN THIS DOCUMENT FOR ANY PURPOSE OTHER THAN GOVERNMENT PROCUREMENT DOES NOT IN ANY WAY OBLIGATE THE U.S. GOVERNMENT. THE FACT THAT THE GOVERNMENT FORMULATED OR SUPPLIED THE DRAWINGS, SPECIFICATIONS, OR OTHER DATA DOES NOT LICENSE THE HOLDER OR ANY OTHER PERSON OR CORPORATION; OR CONVEY ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY RELATE TO THEM.

LIMITED RIGHTS LEGEND

Award Number: DAMD17-94-J-4236
Organization: University of Miami

Those portions of the technical data contained in this report marked as limited rights data shall not, without the written permission of the above contractor, be (a) released or disclosed outside the government, (b) used by the Government for manufacture or, in the case of computer software documentation, for preparing the same or similar computer software, or (c) used by a party other than the Government, except that the Government may release or disclose technical data to persons outside the Government, or permit the use of technical data by such persons, if (i) such release, disclosure, or use is necessary for emergency repair or overhaul or (ii) is a release or disclosure of technical data (other than detailed manufacturing or process data) to, or use of such data by, a foreign government that is in the interest of the Government and is required for evaluational or informational purposes, provided in either case that such release, disclosure or use is made subject to a prohibition that the person to whom the data is released or disclosed may not further use, release or disclose such data, and the contractor or subcontractor or subcontractor asserting the restriction is notified of such release, disclosure or use. This legend, together with the indications of the portions of this data which are subject to such limitations, shall be included on any reproduction hereof which includes any part of the portions subject to such limitations.

THIS TECHNICAL REPORT HAS BEEN REVIEWED AND IS APPROVED FOR PUBLICATION.

Patricia Madson 8/2/02

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY <i>(Leave blank)</i>		2. REPORT DATE September 1999		3. REPORT TYPE AND DATES COVERED Final (1 Sep 94 - 31 Aug 99)	
4. TITLE AND SUBTITLE Biopsychosocial Research Training in Breast Cancer			5. FUNDING NUMBERS DAMD17-94-J-4236		
6. AUTHOR(S) Michael H. Antoni, Ph.D.			8. PERFORMING ORGANIZATION REPORT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Miami Miami, Florida 33102-5405			10. SPONSORING / MONITORING AGENCY REPORT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012			11. SUPPLEMENTARY NOTES		
12a. DISTRIBUTION / AVAILABILITY STATEMENT Distribution authorized to U.S. Government agencies only (proprietary information, Sep 99). Other requests for this document shall be referred to U.S. Army Medical Research and Materiel Command, 504 Scott Street, Fort Detrick, Maryland 21702-5012.			12b. DISTRIBUTION CODE		
13. ABSTRACT <i>(Maximum 200 words)</i> A total of 5 trainees were enrolled in the training program, all graduate students in the APA-approved clinical health psychology program. Four of these trainees have completed their graduate coursework and have commenced or completed APA-approved clinical internships. Of these four, three have defended their dissertations and one is in the final stages of defending her dissertation. One trainee, now funded through a Maytag Fellowship, has defended her thesis, has initiated her dissertation work and is applying for clinical internship this year. All training was closely coordinated with ongoing ACS-funded and NCI-funded biopsychosocial breast cancer research projects. Trainees also participated in preparing new grant proposals focusing on the biopsychosocial aspects of breast cancer and implemented projects funded with seed money from our cancer center. All trainees co-authored at least one empirical manuscript and presented their breast cancer-related research at national scientific meetings. All trainees were exposed through coursework to experimental design and statistics as well as psychosocial, biobehavioral and pathophysiologic perspectives on breast carcinoma and other chronic diseases. The latter focus is extended through the program's monthly Breast Cancer Research Seminar, weekly Psycho-Oncology Clinical Workshop, weekly Breast Cancer Team Research meeting, and monthly Psychoneuroimmunology Journal Club meeting. All trainees also completed clinical practica at a variety of sites including those specifically focused in psycho-oncology and other areas of health psychology. This report summarizes the activities and accomplishments of the training program across the following areas: Symposia/Didactic Experiences; Active Biopsychosocial Breast Cancer Research Protocols; Cancer Center Programs, Facilities and Resources; Trainee Progress; and Publications and Presentations of Training Program Faculty and Trainees. All trainees made excellent progress in academic, research and clinical training during their tenure in the training program.					
14. SUBJECT TERMS Breast Cancer			15. NUMBER OF PAGES 171		
17. SECURITY CLASSIFICATION OF REPORT Unclassified			16. PRICE CODE		
18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified		19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT Limited	

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the U.S. Army.

___ Where copyrighted material is quoted, permission has been obtained to use such material.

___ Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

___ Citations of commercial organizations and trade names in this report do not constitute an official Department of Army endorsement or approval of the products or services of these organizations.

___ In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and use of Laboratory Animals of the Institute of Laboratory Resources, national Research Council (NIH Publication No. 86-23, Revised 1985).

___ For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

___ In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.

___ In the conduct of research utilizing recombinant DNA, the investigator(s) adhered to the NIH Guidelines for Research Involving Recombinant DNA Molecules.

___ In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.

 9-20-99
PI - Signature Date

Table of Contents

INTRODUCTION.....	1
A. Statement of the Problem.....	1
B. Background of Previous Work.....	1
C. Purpose of the Present Work.....	3
D. Methods of Approach.....	3
 BODY.....	 4
A. Execution of Training Program Design.....	4
Trainee Selection.....	5
Training Structure.....	5
Coursework.....	6
B. Program Development and Growth.....	6
Symposia/Didactic Training Experiences.....	6
Ongoing monthly psycho-oncology research seminar.....	6
Weekly psycho-oncology clinical workshop.....	7
Weekly breast cancer research meeting.....	7
Other training-related activities.....	7
Clinical rotations.....	8
Research rotations.....	8
Training in Responsible Conduct of Research.....	9
SCCC Programs, Facilities and Other Training Resources.....	9
Courtelis center for research and treatment in psychosocial oncology.....	10
SCCC Breast cancer research program.....	11
SCCC Biopsychosocial oncology program.....	11
Other Training-Related Activities.....	11
Trainee Evaluation.....	12
C. Progress Report	
Funded Research in Breast Cancer.....	12
Pending Biopsychosocial Breast Cancer Research Protocols.....	14
Trainee Progress in the Training Program.....	15
Jessica Lehman.....	16
Bonnie McGregor.....	16
Amy (Eisenberg) Boyers.....	18
Susan Alferi.....	18
Christina Wynings.....	19
Publications and Presentations of Training Faculty and Trainees.....	19
 KEY ACCOMPLISHMENTS.....	 41
 CONCLUSIONS.....	 41
 STATEMENT OF WORK: STATUS REPORT.....	 43

(5) INTRODUCTION

A. Statement of the Problem

A diagnosis of breast cancer and subsequent treatment can bring about significant distress, disruption and sexual dysfunction in the lives of women who experience them. Factors such as socioeconomic status, treatment modality, patient perceptions, coping strategies and social support have all been shown to influence the ways in which women adjust to these events. Behavioral interventions developed on the basis of the results of systematic studies of this adjustment process have the potential to foster positive expectancies about the future, can alter patient's coping responses and health maintenance behaviors, increase their sense of support from others, and facilitate an attitude of re-engagement with life. While studies of ethnic minority women have been conducted on breast cancer incidence and survival rates and on tendencies to use or avoid mammography (i.e., primary prevention) virtually no data exist on the predictors of psychosocial sequelae of breast cancer in these groups (i.e., secondary prevention). This represents a serious limitation in our ability to develop effective behavioral interventions to facilitate the adjustment process in these populations. A major focus of our research group has been to evaluate the efficacy and underlying mechanisms of behavioral intervention designed to facilitate psychosocial adjustment to breast cancer and its treatment, and to modify factors possibly associated with physical health and disease recurrence in breast cancer patients.

In order to address these research agenda it is necessary to bring together a multidisciplinary team of talented investigators with expertise in social psychology, behavioral medicine, clinical health psychology, biostatistics/epidemiology, psychiatry and oncology. Traditionally, however, lack of communication among scientists in different disciplines and limited competence in the methodologies of different disciplines have been major obstacles to successful integrative research. The present Training Program was designed to improve such communication and methodological competence through academic, practical, and research experiences focused on training in biopsychosocial aspects of breast cancer.

B. Background of Previous Work

Over the past 10 years, two large training programs (NHLBI training program: HL07426-15; NIMH training program: MH18917-01) have facilitated the training of several pre-doctoral graduate students and post-doctoral fellows in our division of Health Psychology. Each of these training programs has brought together multidisciplinary faculty to train our students and fellows through the development of coursework, weekly research meetings, exposure to major scientists in the field who served as consultants, laboratory rotations, and closely supervised research and clinical experiences. Our present roster of research activities includes, but is not limited to two 5-year funded program projects (P01), several individual investigator awards focused upon breast cancer (ACS-funded, NCI-funded), and a series of pilot studies used to develop and test experimental interventions with breast cancer patients. We recently received preliminary notice for an award of a Center for Psycho-Oncology Research (P50). This Center will be focused on testing the effects of psychosocial interventions on quality of life and physical health outcomes in patients with breast cancer as well as those with other cancers. Many of the activities planned for this Center are a direct extension or result of activities that were initiated during the period of this training grant. Included within this Center will be a number of pilot studies that also emanate from activities that were initiated or supported through the present training grant. These outcomes attest to the extensive amount of research training that was available through the training program.

A unique feature of this training program is the fact that it exists within the context of ongoing research studies, program projects, centers and co-existing training grants all centered around the examination of the effects of behavior and ethnicity on adjustment to and progression of chronic diseases. Specifically, the NHLBI training grant and program project are focused upon

examining the influence of behavior, ethnicity and gender on stress responsivity, hypertension and diabetes. A new focus of this work which commenced in YR 2 and continued throughout this DOD training grant, examines the effects of cognitive-behavioral stress management (CBSM) intervention on mental and physical health status patients who are recovering from a myocardial infarction. The NIMH training grant and program project are both dedicated to exploring the effects of behavior and ethnicity on adjustment to and management of HIV-1 infection. During YR 3 another NIMH-funded R01 project commenced (P.I.: S.Weiss, co-P.I.: N. Schneiderman) to investigate the effects of a CBSM intervention (developed by Dr. Antoni) on adjustment in women with AIDS.

Several ongoing psycho-oncology research projects led by Dr. Antoni focus on the influence of behavior on health outcomes in minority women recently diagnosed with early-stage breast cancer or pre-clinical cervical neoplastic changes. One of these, an NCI-funded project (NCI 5 P30CA14395) examines the role of stressors, coping and social support upon cervical neoplasia and related immune measures in African American women who carry multiple viral risk factors for cervical carcinoma. A completed second study funded by the American Cancer Society (ACS #PBR-82) explored the role of coping and social support as predictors of adjustment to mastectomy among African American and Hispanic American breast cancer patients. With the completion of this study there was a large amount of data available for analysis by pre-doctoral trainees in the Breast Cancer Training Program and each trainee utilized this and other cancer-related databases to generate abstracts and manuscripts for presentation and publication during the training period.

Several additional programs led or co-led by Drs. Antoni, Carver and Weiss and training program faculty were funded and commenced during the ongoing DOD training program period. These included:

- (1) an NCI-funded R01 project (1R01CA64710-01) entitled "Coping with Breast Cancer in Younger Women" (P.I. : C. Carver, co-P.I.: M. Antoni)
- (2) an NCI-supplemental project (1R01CA64710-01) entitled "Lifestyle and Breast Cancer in Cultural and Sexual Minorities" (P.I.: C. Carver)
- (3) an NCI-funded project entitled " PDQ/PIF Evaluation in Multiethnic Populations" (P.I.: S.Weiss)
- (4) a developmental grant funded by the Sylvester Cancer Center entitled " Stress Management Intervention for Women with Breast Cancer"(P.I. : G. Ironson)
- (5) an NCI-funded R01 project (R01CA97-018) entitled "Quality of Life in Adult Cancer Survivors" (P. I.: C. Carver)
- (6) an NCI funded R01 project (2R01CA/HD64710-05A1) entitled "Facilitating Positive Adaptation to Breast Cancer" (P.I.: M. Antoni)

It is noteworthy that each of these projects examines the role of stress and coping variables or the efficacy of psychosocial interventions with breast cancer patients, thus providing a large number of training opportunities in secondary prevention of breast cancer for the trainees. Each trainee is involved in research activities on at least one of these breast cancer projects.

During YR3 the Sylvester Comprehensive Cancer Center (SCCC) made funds available to serve as seed money for innovative oncology research ideas generated by our University's faculty

and post-doctoral fellows. A number of pre-doctoral trainees (S. Alferi, B. McGregor) were involved in "co-writing" these small grants, which were funded by the SCCC to do completely novel projects or to supplement pre-existing parent studies in order to address new questions. To date this has resulted in one trainee receiving funding to do an extensive immunologic assessment of breast cancer patients participating in one of the NCI intervention trials (B. McGregor). Another trainee received funding for a project evaluating the effects of a CBSM intervention on objective (hormonal) indices of distress and arousal in breast cancer patients participating in this NCI trial. During YR 4 these two supplemental projects provided both an important training facet for these students as well as contributing in a significant way to our research program.

In sum, during the period of this training program we were able to provide rich training in psycho-oncology and breast cancer. First, we had available for study a large multiethnic population of breast cancer patients. Second, our medical complex, including the SCCC, is the major treatment center for breast cancer patients in South Florida and is actively involved in ongoing clinical trials and basic biomedical research protocols. Moreover, the Courtelis Center for Research and Treatment in Psychosocial Oncology at the SCCC, led by Dr. Weiss, the co-P.I. of this training grant, has developed into a major treatment and research center within the university and continues to play a central role in providing clinical and research training opportunities for our trainees. Third, at the heart of the pre-doctoral training program, we have a comprehensive curriculum and well-developed pre-doctoral graduate program in clinical health psychology. Fourth, we have a substantial number of extramurally funded research projects that are investigating relationships among psychosocial variables, health, adjustment and behavioral management of chronic diseases such as breast cancer, cervical cancer, HIV infection, and cardiovascular disease. Fifth, we have a collegial, interactive faculty with demonstrated expertise in social psychology, behavioral medicine/clinical health psychology, epidemiology and biostatistics, psychiatry and oncology as these disciplines relate to the study of breast cancer. Sixth, we have a large pool of trainee applicants to our graduate program and post-graduate positions who are both qualified and interested in entering our training program and developing research careers. Seventh, our faculty is experienced in the intricacies of conducting collaborative research and training and has already worked together in administering two other health-related training grants.

C. Purpose of the Present Work

This program was designed to provide multidisciplinary research training in biopsychosocial aspects of breast cancer in the context of predoctoral training in Clinical Health Psychology leading to the terminal degree of Ph.D..

D. Methods of Approach

This program provides multidisciplinary research training in biopsychosocial aspects of breast cancer. Training is closely coordinated with ongoing research projects in breast cancer being conducted by Training Program faculty. The Training Program makes use of the faculty, resources, and experiences that are readily available at SCCC and those that we have secured from our ongoing NIMH and NHLBI training grants and parallel NIMH and NHLBI program projects (P01) that are focused on other chronic disease processes. Trainees are graduate students in Psychology (Health Psychology/Behavioral Medicine) and have offices in the Behavioral Medicine Research Center on the campus of the University of Miami School of Medicine Complex or at the Behavioral Medicine Research Building on the Coral Gables campus. The program was designed to offer the trainees the complete APA-approved academic program in Clinical Health Psychology in addition to participating in academic (didactic), research, and clinical activities specific to the biopsychosocial aspects of breast cancer. To accomplish these training goals, in addition to coursework, each trainee participated in our regularly scheduled psycho-oncology and breast

cancer seminar/workshops held at the SCCC; and underwent rotations in the psychosocial assessment, behavioral interventions, and statistics core laboratories at our Behavioral Medicine Research Center (BMRC) and at the SCCC. In addition each trainee was given the opportunity to complete other rotations in the immunology and biochemistry assay core laboratories at the University of Miami School of Medicine. They gained direct research experience working on federally-funded research projects with several training faculty members who were actively working in research on breast cancer. One faculty member from the Health Psychology faculty was designated as primary preceptor and one faculty member from the Departments of Medicine, Immunology/Microbiology, or Psychiatry served as the secondary preceptor for each trainee. All trainees were exposed through coursework to experimental design and statistics as well as psychosocial, biobehavioral and pathophysiologic perspectives on breast carcinoma that are provided by way of didactic research seminars and clinical workshops.

(6) BODY

A. Execution of Training Program Design

Training was closely coordinated with ongoing biopsychosocial breast cancer research projects including NCI-funded projects examining factors predictive of women's adjustment to surgical mastectomy for primary disease. This included an NCI-funded project that was exclusively focused on the implementation of a group-based cognitive behavioral stress management (CBSM) intervention with women recovering from mastectomy. Because the protocol for this project required that we recruit and screen a new cohort of patients every 5 weeks and then follow them over four time points with an assessment battery, there was ample opportunity for all trainees to have extensive experiences in patient contact for the purposes of assessment and intervention training. After completing a detailed 10-week training program in the use of the CBSM intervention, each trainee co-led (with a clinical psychologist) several 10-week CBSM groups during the training period. All trainees also participated in collecting data on two other breast cancer protocols. S. Alferi was involved in one of these studies examining the effects of CBSM on psychological adjustment, quality of life and immune system functioning in breast cancer patients who had already completed their adjuvant therapies (P.I.: G. Ironson), while B. McGregor worked on another protocol examining the psychosocial factors predictive of psychological adjustment to breast cancer diagnosis and treatment in sexual minority women (P.I.: C. Carver). All five of the trainees enrolled were graduate students in Psychology (Health Psychology/Behavioral Medicine) and had offices in the Behavioral Medicine Research Center and affiliated buildings on the campuses of the University of Miami including the School of Medicine Complex and SCCC.

In the current program each trainee participated in regular (weekly and monthly) psycho-oncology and breast cancer didactic seminars, workshops, grand rounds and tumor boards; underwent rotations in the psychosocial assessment, behavioral interventions, and statistics core laboratories; and had the opportunity to complete other rotations in the clinical immunology and biochemistry assay core laboratories within the University's School of Medicine. All 5 trainees (S. Alferi, A.(Eisenberg) Boyers; J. Lehman; B. McGregor; C. Wynings) defended their Master's thesis during the training period. Four trainees (A.(Eisenberg) Boyers; J. Lehman; B. McGregor; C. Wynings) also completed all of their coursework and have commenced or completed an APA-approved clinical internship. Three of these trainees have defended their dissertations and one (J. Lehman) defended her dissertation proposal and completed all aspects of her data analyses. A fifth trainee, S. Alferi, the most recent to join the program, has completed her Master's thesis and Ph.D. qualifying examination and will defend her dissertation proposal this year. Nearly all aspects of this thesis and dissertation work have focused on biopsychosocial aspects of breast cancer. All trainees were exposed through coursework to experimental design and statistics as well as psychosocial, biobehavioral and pathophysiologic perspectives on breast carcinoma and other

chronic diseases. The latter focus was extended by their attendance at the Psycho-Oncology Clinical Workshop, Breast Cancer Team Research Meeting, Psycho-Oncology Research Seminar and the Psychoneuroimmunology Journal Club meeting.

Trainee selection . During the entire period of the training program, five (5) trainees participated in the program. In September 1994 at the inception of the program, three (3) trainees (C. Wynings, J. Lehman, R. Perczek) were admitted by unanimous vote of the Executive Committee. These students were recruited directly through the existing ranks of Clinical Psychology students who had been admitted at an earlier point. Christina Wynings was transferred from an NIMH training grant in Behavioral Immunology and AIDS and Jessica Lehman was transferred from a Research Assistantship on an NIMH-funded project on AIDS. Ruben Perczek was an entering (first-year) graduate student who had already secured a Research Assistantship in an NIMH Minority Health project but was transferred to the present program prior to the commencement of the academic semester due to an expressed interest in psycho-oncology. All of the positions vacated by these trainees were immediately filled by other graduate students. All three trainees expressed a strong interest in focusing their Clinical Health Psychology training in psycho-oncology in general and/or breast cancer and women's health issues in particular. The Executive Committee was unanimous in recommending all three of these candidates for positions on the present program. It was decided to delay the admission of the fourth trainee until the annual Health Psychology admissions meeting (2/95) for the 1995-96 class so as to provide the opportunity to recruit an additional first-year graduate student.

After receiving over 100 applications for the Clinical Health Psychology program, Dr. Antoni culled a set of five applicants who had the most outstanding files based upon Graduate Record Exam scores, grade-point average, excellence demonstrated in prior research experiences, strong letters of recommendation, and an expressed interest in pursuing breast cancer and psycho-oncology as their chief focus during graduate studies in health psychology. Dr. Antoni then presented the candidates to the Executive Committee and a first choice and first alternate were selected. During this period one of the initially appointed trainees, R. Perczek, expressed a strong interest in moving his research focus into a related area within psycho-oncology—biopsychosocial factors in prostate cancer—and secured a position as a Research Assistant on a VAMC-funded research project that ultimately commenced in 8/95. Although he retained Dr. Carver as his primary supervisor his focus of study no longer coincided with this training program and the Executive Committee was unanimous in their decision to allow him to transfer. Based upon this information, in 3/95 the Executive Committee decided to offer trainee positions to both the first choice and first alternate candidates, one for the position to be vacated by R. Perczek and one for the fourth trainee slot that was held open. After traveling to Miami and completing two days of intensive interviews each candidate accepted our offer and each joined the program in 8/95. These trainees are Bonnie McGregor and Amy (Eisenberg) Boyers. At the end of YR 2, C. Wynings completed all of her clinical, research and academic responsibilities and secured a one-year clinical internship which commenced in September, 1996. After reviewing over 100 applicants to our program, the Executive Committee chose Susan Alferi to succeed Ms. Wynings.

The trainees and their preceptors were thus as follows: J. Lehman-C.S. Carver; S. Alferi-M.Antoni/G. Ironson/ S.Weiss, B. McGregor-M. Antoni/B.Blomberg, A. (Eisenberg) Boyers-M. Antoni/ C. Carver, and C. Wynings-M. Antoni/G.Ironson. The progress of each trainee is detailed in a latter section of this report.

Training structure. Throughout the training period a considerable amount of coursework and didactic training was available for trainees, though the major emphasis of the training program is upon direct involvement in research and focused clinical practica. All trainees (as well as other Health Psychology graduate students) spent a substantial portion of their time (approximately 20 hrs per week) conducting research throughout the calendar year. To facilitate this, all Health Psychology students were restricted to 10 credits of coursework per semester. In addition to

research and coursework the trainees completed clinical practica ranging from 7 - 10 hrs/week during the Fall, Spring and Summer semesters each year. The balance of their time was spent attending various didactic experiences (detailed below) as part of the Training Program.

Coursework. Through courses offered in the Health (Clinical) Psychology Program all trainees received combined training in behavioral medicine research and the development of closely related skills useful for research in health clinical psychology. Briefly, all trainees were required to take a rigorous three semester experimental design and statistics sequence. The first semester of the experimental design and statistics sequence reviews introductory statistics, principles of experimental design, basic computer applications and data management. Subsequently, trainees take courses in Advanced Psychological Statistics and in Multiple Regression Statistics. Trainees also completed *Core* courses in Psychobiology, Psychopathology, Social Psychology, and Developmental Psychology. In addition to *Core* courses each trainee completed three courses in Assessment (general psychological assessment and two advanced specialty courses such as Psychological Assessment of Physical Disorders and Neuropsychological Assessment, Advanced Projective Assessment), two additional courses in Pathology (from Fundamentals in Behavioral Medicine, Advanced Behavioral Medicine, Psychoneuroimmunology, Psychophysiology, Psychopharmacology, Advanced Experimental Psychopathology and Psychosomatics), and three courses in Intervention (chosen from Introduction to Psychological Intervention, Cognitive Behavioral Intervention, Psychological Intervention in Physical Disorders, Group Therapy, Family Therapy). At the time of pre-registration each trainee reviewed their academic progress and chose their coursework for the subsequent semester during a face-to-face meeting with their primary preceptor.

B. Program Development and Growth

In addition to coursework each pre-doctoral trainee participated in regular (weekly and monthly) psycho-oncology and breast cancer didactic seminars, workshops, grand rounds and tumor boards; undergoes rotations in the psychosocial assessment, behavioral interventions, and statistics core laboratories; and has the opportunity to complete other rotations in the clinical immunology and biochemistry assay core laboratories within the University's School of Medicine. Each trainee gained experience working on research projects with several training faculty members who are actively working in research on breast cancer. All trainees were exposed through coursework to psychosocial, biobehavioral and pathophysiologic perspectives on breast carcinoma and other chronic diseases. The latter focus was extended by their attendance at the weekly Psycho-Oncology Clinical Workshop, weekly Breast Cancer Team Research Meeting, monthly Psycho-Oncology Research Seminar and the monthly Psychoneuroimmunology Journal Club meeting. This section provides a summary of these experiences and facilities since they are central to the focus of this training program—the biopsychosocial aspects of breast cancer. This section is divided into (1) Symposia/Didactic Experiences, (2) Training in Responsible Conduct of Research, (3) Cancer Center Facilities and Resources, and (4) Trainee Evaluation Methods.

1. Symposia/Didactic Experiences. The following activities constitute the present symposia/didactic experiences that are made available to trainees for the purpose of providing specific exposure to the biopsychosocial aspects of breast cancer. Some of these activities have mandatory attendance for trainees while others are optional:

a. Ongoing Monthly Psycho-Oncology Research Seminar. This seminar was coordinated by Drs. Antoni, Weiss, and Schneiderman. The seminar met in the conference room of the SCCC for approximately 1 - 1.5 hours and was attended by surgical oncologists, psychiatrists, clinical psychologists, social case workers, and nurses who staff the SCCC, VAMC and the University of Miami School of Medicine. Finally, trainees attended these talks as well as

SCCC Grand Rounds talks that are pertinent to breast cancer and other aspects of oncologic research.

b. Weekly Clinical Psycho-Oncology Workshop. This workshop was directed by Alicia Capitaine-Ceballos, Ph.D., the Director of Clinical Services in the Psychosocial Oncology program housed at the Courtelis Center for Research and Treatment in Psychosocial Oncology at the SCCC. This weekly seminar uses a small group format to discuss clinical issues relevant to the psychological treatment of cancer patients.

c. Weekly Breast Cancer (NCI) Research Meeting. Each week all trainees attended a 2-hour research meeting conducted by Drs. Antoni, Weiss, Carver and Ironson in the Behavioral Medicine Research Building on the Coral Gables campus. Each meeting focused on two components: ongoing implementation of research protocols, and discussions of theoretical topics relevant to biopsychosocial aspects of breast cancer. Each week all trainees attended a two-hour research meeting conducted by Drs. Antoni, Carver, Ironson and Weiss in the Behavioral Medicine Research Building on the Coral Gables campus. Each meeting focused on two components: ongoing implementation of research protocols, and discussions of theoretical topics relevant to biopsychosocial aspects of breast cancer. Thus in the first hour, issues related to the day-to-day conduct of the ongoing ACS and NCI protocols are discussed. Specific topics centered around subject recruitment, assessment, randomized intervention methods, tracking and retention of subjects, data management and analytic strategies, preparation of reports for publication and presentations for scientific conferences. In most cases each trainee received their day-to-day supervision from one of the 4 post-doctoral fellows associated with this project who in turn reported to Drs. Antoni, Carver and Ironson concerning their research progress. In the second hour of this meeting Drs. Carver, Antoni and Weiss led the group in discussions of various theoretical models underlying psychosocial research with breast cancer patients. Included here were topics such as the role of personality factors (e.g., optimism) in emotional adjustment to mastectomy and adjuvant therapy (C. Carver) and the theoretical framework underlying the use of cognitive behavioral stress management intervention to aid in this adjustment process. In addition to detailing the theoretical components of their work, faculty led the group in discussion surrounding design, assessment and analytic strategies available to pursue this line of research. These meetings were critical in shaping the direction and scope of trainees' thesis and dissertation plans that crystallized during the training period.

d. Other Training-Related Activities

d. 1. Weekly Multidisciplinary Tumor Board Meeting. This provided trainees an opportunity to gain knowledge into the medical aspects of diagnosis and treatment procedures for breast cancer patients at various stages of disease. Dr. Sharlene Weiss led all aspects pertaining to psychosocial research and clinical activities during this meeting and fostered the involvement of interested trainees.

d. 2. SCCC Grand Rounds. The SCCC Grand Rounds, held each Friday at noon, provided trainees with opportunity to see research presented by leaders in the fields of oncology, immunology/microbiology, psychosocial oncology, epidemiology, and medical ethics. Most talks were presented by speakers from other universities as supported by funding from the SCCC.

d.3. Monthly Psychoneuroimmunology (PNI) Journal Club. This training activity was led by health psychology faculty (M. Antoni, G. Ironson) and SCCC faculty (B. Blomberg, M. Fletcher, M. Kumar) who met with trainees and other health psychology graduate students and post-doctoral fellows to discuss recent articles and innovations in areas of design, assessment and intervention that are relevant to ongoing and planned PNI research in immunologic-related diseases and neoplasias. Cross fertilization of ideas from graduate students and fellows working in different disease areas (e.g., AIDS, cardiovascular disease, and cervical and breast carcinoma) was especially encouraged in this informal format. Theoretical and practical issues involved in setting up independent research projects that supplement ongoing protocols were discussed and trainees were encouraged to propose small pilot protocols that can be supported by Training Program funds. All pilot projects that were deemed by the faculty to be worthy of further

discussion were brought to the attention of other Training faculty with special expertise in the technical aspects of these lines of inquiry (e.g., Dr. M. Fletcher, Director of the Clinical Immunology Laboratory at the University of Miami School of Medicine). In any cases where these ideas led to changes or embellishments in ongoing protocols, of course all of the procedures prescribed by the University's Institutional Review Board were strictly followed. In general the *PNI Journal Club* experience provided a regular source of research updates and stimulates independent thinking and expansion of ongoing hypothesis testing in a supportive collegial atmosphere. In addition each trainee was furnished with an internet account that allowed them to access large research information databases and services including the PNI research networks, MEDLINE/MEDSCAPE and PSY ABSTRACTS.

d. 4. *Intensive Supervision for the Stress Management Group Intervention.*

Each week trainees attended a one-hour group supervision meeting that was focused on the intervention implemented in two ongoing breast cancer protocols that are evaluating the effects of cognitive behavioral stress management (CBSM) interventions. All trainees and fellows attended these supervisory sessions which were grouped into two parts: an initial 10-wk training program and a continuing supervision of ongoing groups.

e. *Clinical Rotations.* In addition to research and coursework all trainees were given the opportunity, after completing the appropriate pre-requisites, to take one or more clinical practicum rotations in Clinical Health Psychology that are currently available through our collaboration with the SCCC, Mt. Sinai Medical Center, the Division of Biobehavioral Medicine in the Department of Psychiatry, and the Veterans Administration Medical Center's Psychology Service. A new clinical practicum coordinated between the Department of Psychology and the Division of Radiation Oncology commenced during YR 3 and continued throughout the training period. This practicum provided trainees with clinical assessment and intervention experiences with SCCC oncology patients who are undergoing radiation therapy and involves psychiatric screening, as well as individual, conjoint and family therapy consultation work. Another clinical practicum in psychosocial oncology was offered at Mt. Sinai Medical Center in Miami Beach. This practicum offered experiences in assessment and intervention with cancer patients dealing with a wide variety of issues such as pain and adjustment following surgery. All clinical practicum rotations typically required 8 - 10 hrs/week over a span of two semesters.

Evaluation of the progress of trainees on each of these clinical rotations followed a standard format developed by the Department of Psychology wherein each trainee is assigned an on-site supervisor who meets with the trainee for at least two hours in individual and group supervisory sessions. The on-site supervisor reported to a designated clinical faculty member in the Department of Psychology on the trainee's progress twice each semester and provided the clinical committee with an extensive written evaluation of the trainee's progress. The clinical committee jointly determined the sufficiency of the trainee's performance at the end of each semester.

f. *Research Rotations.* An important part of our program was the opportunity it offered trainees to participate in multiple *Research Rotations*. Trainees were encouraged to participate in more than one project and to work in more than one Core facility before becoming fully committed to research in a particular laboratory. In terms of Core Rotations, students were exposed to the Psychosocial/Psychiatric Assessment (Dr. Antoni), Statistics (Dr. Ironson), Biochemistry (Dr. Kumar), Immunology (Dr. Fletcher) and Behavioral Intervention (Drs. Antoni and Ironson) laboratories concerned with ongoing projects involving cancer patients and other chronic disease populations. In addition to the initial Core rotations, trainees were expected to maintain continuing interactive collaboration between their selected research project and the Cores. During the training program period we developed an additional research laboratory alliance designed to provide training opportunities with immunologic assays specific to breast cancer. This laboratory, supervised by a new member the training faculty, Dr. Bonnie Blomberg (Associate

Professor of Immunology/Microbiology), is located in the Rosenstiel Building just adjacent to the SCCC. Here Dr. Blomberg has worked very closely with one of our trainees (B. McGregor) to develop specific assays for breast cancer such as lymphoproliferative responses to the mucin, MUC-1, and ELISA for IgG antibodies to MUC-1, and a Lymphokine-activated killer cell assay for a breast cancer-related antigen. Through an SCCC-sponsored seed grant Ms. McGregor was able to develop and pilot test the effects of CBSM on a small battery on immunologic measures. These pilot data were instrumental in the preparation of a Center grant entitled "Center for Psycho-Oncology Research, which was recently funded by the NCI.

Evaluation of trainee progress in each of these rotations was conveyed to Dr. Antoni and Weiss by each on-site supervisor on a monthly basis. Each trainee's progress on their research assignment was evaluated by their primary supervisor in the Psychology department who summarized their progress to the Health Psychology division faculty once each semester. Feedback on progress in academic, research, and clinical training activities was provided to trainees in writing at the end of each semester in the training program. We have also developed other research rotations within the SCCC, one focusing in the area of bone marrow transplant and another in the area of genetic screening and counseling of patients with a familial history of breast cancer.

2. Training in Responsible Conduct of Research. All graduate students in the Division of Health Psychology (including trainees) were required to take the University of Miami course in Research Ethics. This course, which meets for two three-hour sessions, covers six topics: (1) Scientific Misconduct, Responsibility and Data Management; (2) Publication and Authorship; (3) Intellectual Property and Conflicts of Interest; (4) Use of Animals in Research; (5) Human Subjects and Informed Consent; (6) Handling Fraud and Misconduct.

Because much of our research training involves clinical investigation, one training grant meeting per year is devoted to experimenter-subject interactions. Topics range from the need for sensitivity to subject's needs, confidentiality, the need not to inadvertently mislead subjects, etc. All predoctoral students in the Health (Clinical) Psychology program also take a course on Introduction to Clinical Methods. This course, which provides an introduction to clinical interviewing and assessment, lays out during multiple sessions, the requirements of appropriate professional conduct.

During YR 3 the Division of Health Psychology hired a new faculty member, Ron Franco-Duran, Ph.D. Dr. Duran, who is an Hispanic American Assistant Professor, developed a course on Ethics, Ethnicity and Gender, which became a mandatory course within the division. This full semester course provides a more detailed presentation of ethics material also covered in the mandatory university course and deals with ethical, practical and design issues involved in research protocols requiring informed consent and the inclusion of women and minorities. In addition to formal coursework, each member of the training grant faculty was urged to discuss informally with trainees, ethical issues as they pertain to supervision. Training grant faculty are also reminded to be vigilant for any potential breaches of ethics, perceptions of intimidation, etc. The Division of Health Psychology periodically sponsors single session workshops pertaining to ethical issues. For example, the Division invited Dr. Wilhemena Black, the University's Director of Human Resources and Affirmative Action to conduct a workshop on sexual harassment. In summary, we believe that it is important to educate both pre- and postdoctoral trainees in the responsible conduct of research.

3. SCCC programs, facilities and other training resources.

The Sylvester Comprehensive Cancer Center (SCCC) is located on and functions as a matrix center within the campus of the University of Miami School of Medicine. The SCCC was actually the first of six centers established by the School of Medicine and has been in operation since 1974.

The Center is made up of a coordinated network of research and clinical facilities. The research facilities include the Fox Cancer Research Complex (including the Papanicolaou Building and the Louis Fox Building), Rosenstiel and Glaser Medical Science Buildings, R. Bun Gautier Molecular Biology Building, the McKnight Vision Research Building, the Behavioral Medicine Research Center, and the Mailman Center for Child Development. The clinical facilities include the Sylvester Clinical Facility, the University of Miami Hospital and Clinics, Jackson Memorial Hospital, Profession Arts Building, Cedars of Lebanon Hospital, Veterans Administration Medical Center, and the Hope Lodge facility for cancer patients. All of these research and clinical facilities are housed on the Medical School campus consortium. In addition to these sites, the SCCC is affiliated with the Department of Psychology on the Coral Gables campus and multiple primary Health Care Centers in the Greater Miami Metropolitan Area. There are three major advances in the SCCC that occurred during the period of the training program which are especially relevant to the program: the creation of the Courtelis Center for Research and Treatment in Psychosocial Oncology, the expansion of the SCCC Breast Cancer Research Program, and the formation of the SCCC Biopsychosocial Oncology Program.

a. Courtelis Center for Research and Treatment in Psychosocial Oncology

In September, 1995 the Courtelis Center for Research and Treatment in Psychosocial Oncology was formally opened. This Center, created in part from a donation of \$1.2 million from the Alec Courtelis Corporation, is housed on the second floor of the SCCC and has been designed to offer state of the art multi-specialty services to cancer patients, their families and the medical staff who treat them. The central missions of the Center are:

- (1) to organize current knowledge of the interactions of biological, environmental, psychological, behavioral and social variables related to the prevention and control of disease and the promotion of health;
- (2) to develop effective treatment interventions to reduce the impact of environmental, physical, psychological and social stressors on health and well being that emerge in the context of dealing with chronic disease;
- (3) to explore at the individual, social and environmental levels as creative means to promote health and to protect individuals against the deleterious effects of stress.

In addition to these general missions the Center's specific objectives are to *develop effective treatment interventions* for cancer patients to enable them to develop and enrich their social support networks, improve their quality of life, and gain illness-related coping skills; to *support a combined research, clinical, and training program* devoted to mind-body interactions and their effects on health and well being; to *conduct working consensus conferences, seminars, and workshops* to translate research findings into practical guidelines for clinicians; and to *train students in the health profession and established health researchers* in the methodological issues related to the study of biopsychosocial factors and health and in the clinical issues related to healing and recovery.

The Center provides: psychiatric, psychological and social work consultation; individual, family and group counseling; stress reduction techniques such as biofeedback, relaxation, and imagery techniques and massage; acupuncture; nutritional counseling; pastoral counseling; a patient education library; and a community outreach program made up of seminars, workshops and retreats which integrate physical, psychological and spiritual dimensions of healing. The Center is staffed by a multidisciplinary team of clinical psychologists, psychiatrists, clinical social workers, nurses, and post-doctoral fellows and provides a training site for psychology interns and pre-doctoral health psychology graduate students. The Center's facilities are also the site for breast cancer research protocols being conducted by training program faculty and their trainees. This Center is truly one of the first of its kind in this country and provided unique research and clinical training opportunities for trainees in the program.

b. SCCC Breast Cancer Research Program

Although the SCCC Breast Cancer Research Program has been in existence since 1993, it was expanded and restructured during 1994 to take on its present form. The overall aim of this program is to expand multidisciplinary and interprogrammatic studies of breast cancer by coordinating a framework for a variety of breast cancer-related research activities. Some of this coordination was accomplished by *convening regular meetings of the P.I.s of relevant research projects; establishing a comprehensive breast cancer database* that links conventional clinical and laboratory parameters of disease with epidemiologic and biomarker studies for clinical research and correlation with laboratory studies of tumor cell biology; *recruiting new clinical and basic science investigators* to the center, and *promoting research that allows rapid translation* of basic science and epidemiologic observations into preclinical and clinical applications. The Breast Cancer Research Program is organized into three project areas--*Basic Science Program, Clinical Research Program, and Cancer Control Program*--and a central core facility, the multidisciplinary Breast Cancer Evaluation Center whose director is Sharlene Weiss, Ph.D., the co-P.I. of this training program. The *Basic Science Program* is made up of components in Regulation of Growth and Progression, Tumor Immunology, and Hormonal Regulation. The *Clinical Research Program* is made up of components in Experimental Therapeutics, Biomarkers, and Clinical Trials. The *Cancer Control Program* is made up of components in Early Detection and Community Outreach, Cancer Etiology, and Biopsychosocial Studies.

c. SCCC Biopsychosocial Oncology Program

The Psychosocial Oncology Program was the newest program to be developed at the SCCC having just been established in the past year through the efforts of its director, Sharlene Weiss, Ph.D., the co-P.I. of this training program. The overall aim of the program is to expand multidisciplinary studies of the interactions between biological, psychological and behavioral aspects of cancer with a special focus on multiethnic populations. This research program encompasses the Multidisciplinary Breast Cancer Center, the Psycho-Oncology component of the Cancer Control Program, and the Courtelis Center for Research and Treatment in Psychosocial Oncology. This program achieves its aims *by providing core resources for pilot studies* to develop and/or integrate common data elements for cross-study comparisons of different populations; *establishing collaborative relationships with ongoing programs in other departments* (e.g., psychology, psychiatry) and laboratories to foster multidisciplinary research; *convening regular seminars and research meetings between P.I.s of ongoing projects* and potential new investigators and others in training to facilitate communication between laboratory and clinical investigators; and *by establishing a comprehensive psycho-oncology database* for all clinical oncology patients. The SCCC has provided Clinical Research Service shared resources (e.g., data managers, biostatisticians, programmers), laboratory space, space for clinical activities, and financial support to facilitate the rapid development of this program. All of these developments were instrumental in the continued growth of the research and clinical opportunities available to trainees.

4. Other training-related activities. Another major facet of the training program involves trainee participation in local and national scientific conferences where they have the opportunity to present their research findings and hear from experts in the field. *The symposium on Stress and Coping* sponsored by the Department of Psychology and the School of Medicine at the University of Miami is an annual 2-day Symposium focused each year on Stress and Coping processes as related to physical diseases. This symposium is attended by training faculty and trainees and involved empirically-based presentations by national and international behavioral medicine researchers. Although the topics of these talks do not exclusively focus on psycho-oncology many generic issues relevant to adjustment to chronic disease and in the conduct of behavioral medicine research (statistical analytic models, stress-coping theoretical models, and methodological issues involved in the assessment of coping) are included. During each year of the training period, training faculty and trainees also presented a number of abstracts and papers in the scientific programs of the Society of Behavioral Medicine, the International Psycho-Oncology

Society, American Psychosomatic Society and the American Psychological Association. All students attending these meetings to present the results of their research were subsidized for their travel costs by the Department of Psychology and the Graduate Student Association at our university.

5. Trainee evaluation. Each predoctoral student in the Department of Psychology was evaluated at the end of every semester in terms of course grades, reports from research and practicum supervisors, and general academic progress (e.g., Masters thesis, Ph.D. Qualifying examinations). These evaluations were first made by the Health Psychology Faculty and then by the entire Department of Psychology Faculty. The written outcome of these evaluations as well as a written report from each trainee's principal research supervisor was forwarded to the training grant Executive Committee (Antoni, Weiss, and Carver) for further evaluation. Since the Master's thesis committee invariably consists entirely of faculty from the training grant program, this provides the training grant faculty with an opportunity to assess each predoctoral trainee's research potential in considerable detail. Trainees were evaluated twice yearly by the Executive Committee so that decisions could be made regarding altering the individual program (e.g., more emphasis upon writing or statistics) and mentors.

C. PROGRESS REPORT

C1. Funded Research in Breast Cancer

One essential feature of the training program experience is its ability to offer trainees the opportunity to work on research projects focused on the biopsychosocial aspects of breast cancer. As stated previously, based upon ongoing grants, trainees have the opportunity to work on one of several different projects. At present this portfolio includes:

(a) An ACS-funded study (ACS #PBR-82; "Coping With Breast Cancer Among Low SES Blacks and Hispanics") exploring the role of coping and social support as predictors of adjustment to mastectomy among African American and Hispanic American breast cancer patients (P.I.: M. Antoni). This study recruited patients through the Breast Health Center within the SCCC. Although this project was completed recently it now provides a large database for trainees and fellows to examine relations between psychosocial predictor variables and adjustment to breast cancer over the months following surgery. One trainee, S. Alferi, successfully defended her Master's Thesis on a project drawn from this database (see individual trainee progress report for details).

(b) The Cross-sectional portion of an NCI-funded R01 project (1R01CA64710-01) entitled "Coping with Breast Cancer in Younger Women" (P.I. : C. Carver, co-P.I.: M. Antoni). This project identifies the major concerns of breast cancer patients in the months following mastectomy and examines the psychosocial predictors of affective, interpersonal and psychosexual adjustment over this period. The chief variables under investigation include vulnerability/resilience, mediating variables of coping, perceptions of partner reactions to surgery, and quality of life. Trainees contribute significantly to the recruiting, scheduling and interviewing of over 240 women for this project. One trainee (A. Eisenberg) successfully defended her Master's thesis and J. Lehman defended her dissertation proposal on projects drawn from this database.

(c) Clinical trial portion of NCI-funded R01 project (1R01CA64710-01) entitled "Coping with Breast Cancer in Younger Women" (P.I. : C. Carver, co-P.I.: M. Antoni). This project was initiated during YR 2 and evaluates the efficacy of a group-based cognitive behavioral stress management (CBSM) intervention on an independent cohort of post-mastectomy patients. This intervention program was tailored to the special needs of younger early-stage breast cancer patients based upon the results of the prior ACS study as well as Part 1 of this NCI-funded project. Trainees participated extensively in the tailoring of the *Therapist Manual* as well as the *Participant Workbook* used to implement this program by way of weekly meetings with Dr. Antoni during the development of this protocol. The major outcomes in this study are affective, interpersonal and

psychosexual functioning. Trainees are intimately involved in data management and analyses and were similarly involved in the preparation of research reports under the supervision of Drs. Carver and Antoni. As of this date, this study has recruited over 130 women into the trial and all 12-month follow-up assessments will be completed as of the Fall of 1999. Three trainees (S. Alferi, B. McGregor, A. (Eisenberg) Boyers) drew from this database to conduct their dissertation research.

These three trainees are using different aspects of this study as the basis for their dissertations. A. (Eisenberg) Boyers investigated the immediate effects of CBSM (at 10-weeks) on patients' perceptions of having experienced positive benefits from having breast cancer. She also examined psychosocial mediators (e.g., coping) of these CBSM effects. B. McGregor investigated the effects of CBSM on immunologic status of breast cancer patients over a 3-month follow-up using a panel of general and more specific cell-mediated and humoral immune indices that she developed and pilot-tested in collaboration with Drs. Blomberg (Dept. of Microbiology/Immunology) and Antoni (Dept. of Psychology). Ms. McGregor has worked extensively over the training period to complete the laboratory protocols for conducting these assays. S. Alferi is investigating the effects of CBSM on distress and arousal levels using self-report (questionnaire and interview) and physiological (weekly pre-post CBSM session salivary cortisol) indicators to explore mechanisms underlying the distress-reducing effects of CBSM in breast cancer patients for her dissertation research. She formulated a weekly sample collection protocol and learned the Radioimmunoassay (RIA) technique for assaying salivary cortisol levels in cooperation with Dr. Kumar, the Director of our Biochemistry Core Laboratory;

(d) An NCI-supplemental project (1R01CA64710-01) entitled "Lifestyle and Breast Cancer in Cultural and Sexual Minorities" (P.I.: C. Carver, co-P.I.: G. Ironson). This study is a supplement to the parent project just described, and examines the special needs of lesbian breast cancer survivors, their concerns and their psychosocial adjustment. Based upon the results of this phase of the study a pilot study will develop and test the effectiveness of a CBSM intervention designed to meet the special needs and concerns of this specific sub-population of breast cancer patients. During the training period, Ms. Bonnie McGregor successfully defended a Master's Thesis (co-chaired by Drs. Carver and Antoni) examining the influence of sexual disclosure and social support on emotional adjustment following surgery in sexual minority breast cancer patients.

(e) An SCCC Developmental grant entitled "Stress Management Intervention for Women with Breast Cancer" (P.I. : G. Ironson). This project tests the effects of a 10-week cognitive behavioral stress management intervention on the quality of life, distress, coping and immunologic status of women with early-stage breast cancer (who have completed adjuvant treatments) in a randomized experimental design. Women complete a comprehensive biopsychosocial assessment battery (including psychosocial interviews and questionnaires) and blood draws for immunologic assays) at pre-intervention, post-intervention and at follow-up. Two trainees played an active role on this project during the training period: S. Alferi completed psychosocial assessments, and B. McGregor participated in the blood draws and immune assays for this study.

(f) A 2-year project funded by the SCCC Psychosocial Oncology Program entitled "Immunologic changes during Cognitive Behavioral Stress Management in Women with Early Stage Breast Cancer" to incorporate immune measures into an ongoing CBSM intervention with breast cancer patients (P.I., B. Blomberg; **Trainee: B. McGregor**). This project was funded by the SCCC in YR 3 and provided supplies and technical support to examine the effects of CBSM on lymphocytes phenotypes including T-cell subpopulations, B-lymphocytes, and natural killer (NK) cells as well as immune function measures such as lymphoproliferative responses to CD3 cross-linking, Th1 and Th2 cytokine production, interleukin (IL)-2 enhanced NK cell cytotoxicity to the breast cancer cell line MCF7, and B-cell proliferative responses to anti-mu and IL-4. During YR 4, B. McGregor completed assays for cellular phenotyping, lymphoproliferative responses to CD3 cross-linking, Th1 and Th2 cytokine levels in the sera and production in response to challenge across 3 time points for several cohorts of women completing the CBSM intervention protocol. The NK cell cytotoxicity assay was pilot tested and will be conducted on frozen samples.

(g) A 2-year project funded by the SCCC Psychosocial Oncology Program entitled "Salivary Cortisol Levels in Response to Relaxation Training in Early Stage Breast Cancer Patients" to evaluate weekly salivary cortisol responses in patients participating in the 10-week CBSM program and to relate these physiological responses to mood changes within each CBSM session and over the entire intervention period (P.I.: Dr. Antoni, **Trainee: S. Alferi**). This project was funded by the SCCC in YR 3 and provided supplies and technical support to conduct assays on weekly pre-post CBSM session salivary cortisol responses in 25 breast cancer patients in CBSM and in 25 breast cancer patients in the control group and 25 age-matched healthy women who provided a single saliva sample matched for time of day with the CBSM pre-session samples. This project seeks to develop and test valid objective indices of distress reduction for tracking the progress of breast cancer patients enrolled in relaxation and distress reduction protocols. This salivary sampling protocol was implemented in all cohorts of women involved in the CBSM protocol. S. Alferi has conducted assays determining salivary cortisol changes within and across CBSM sessions and is beginning to analyze her data in order to prepare abstracts for presentation at scientific meetings.

(h). A 4-year NCI project (R01CA97-018) entitled "Quality of Life in Adult Cancer Survivors" (P. I.: C. Carver). This project involves several prospective studies designed to examine a number of psychosocial factors that may serve as predictors of optimal psychosocial adjustment, quality of life and survival time in long-term survivors of breast cancer. The project is unique in that all of the psychosocial data (optimism, coping, social support) were collected 8 - 10 years ago in over 500 women who have been followed intensively since that time. In some cases this allows us to test which factors are most prevalent in those who eventually become long-term survivors. For approximately 130 women we will also test the effects of a psychosocial intervention on quality of life and survival time over up to a 5-year follow-up period. This project will provide extensive opportunities for future trainees, graduate students and post-doctoral fellows to develop their research interests in psycho-oncology and breast cancer.

(i). A 5-year NCI project (2R01CA/HD64710-05A1) entitled "Facilitating Positive Adaptation to Breast Cancer". This clinical trial is testing the effects of CBSM on positive adaptation, quality of life, and immune status in 200 women who are adjusting to the initial diagnosis and treatment for mid- to early-stage breast cancer (P.I.: M. Antoni). This project is unique in that it is the first to test the parallel effects of a stress management program on positive adaptation indicators and measures of immune surveillance of breast cancer-related antigens. We will be evaluating CBSM among White, Hispanic (both English- and Spanish-speaking), and Black women who are newly diagnosed with and treated for early/middle stage breast cancer (Stages I-III). The project further examines the impact of positive contributions (as well as distress), by examining the effects of CBSM in a variety of life spheres at 3 months and 9 months after the intervention. The intervention is hypothesized to improve psychosocial adjustment and foster a sense of positive growth, and foster a more rapid return to pre-diagnosis quality of life, indexed by levels of positive and negative mood, fatigue symptoms and sleep quality, and disturbances in social and psychosexual functioning. We also will examine how changes in these spheres are paralleled by changes in aspects of immune functioning relevant for future risk of disease recurrence, including lymphocyte subpopulations; lymphoproliferative responses to anti-CD3; interleukin-2 (IL-2) and interferon-gamma (IFN- γ) production during lymphoproliferative challenge; and recombinant (r)IL-2- and rIFN- γ -stimulated natural killer cell cytotoxicity to K562 targets, and three breast-cancer lines, MB453, SKBR3, and MCF-7.

C2. Pending Biopsychosocial Breast Cancer Research Protocols

(a) A 3-year project submitted to the DOD designed to examine the effects of CBSM on distress and immune status in breast cancer patients who have completed their adjuvant therapies

(P.I.: G. Ironson). This project initially received a very favorable priority score (< 10th centile) but was not funded. It is currently being reconsidered.

(b) A 5-year Center grant (1 P50-CA84944-01) entitled "Center for Psycho-Oncology Research". This Center is designed to conduct behavioral, psychological, social, and biomedical research on the interrelationships among cognition, emotion, biological processes, and physical health in patients with different forms of cancer including breast cancer, prostate cancer and AIDS-related cervical neoplasia. The Center will systematically evaluate the efficacy group-based Cognitive Behavioral Stress Management (CBSM) intervention in Projects 1, 2 and 3, and a pharmacological hormonal treatment in Project 4, for improving quality of life and physical health in patients with different types of cancer or carcinogenic processes associated with reproductive health or hormonal functioning. *Project 1* will (a) evaluate the effects of CBSM intervention on psychological distress, quality of life and biopsy-determined level of cervical cellular atypia; and (b) examine the putative psycho-biological mediators (psychosocial, endocrine, and immunologic changes) of intervention effects observed. *Project 2* will (a) investigate the effects of CBSM intervention on quality of life and disease status (change in CA15-3 antigen levels) in women with early-mid stage breast cancer, and (b) examine the putative psycho-biological mediators of intervention effects observed. *Project 3* will (a) investigate the effects of CBSM in combination with Viagra (sildenafil citrate) on quality of life and physical health in older men with prostate cancer, and (b) examine the putative psycho-biological mediators of intervention effects observed. *Project 4* will (a) evaluate the effects of estrogen therapy (chronic low-dose oral 17- β estradiol therapy) on mood and quality of life, and physical health in patients with metastatic prostate cancer, and (b) examine the putative psycho-biological mediators of intervention effects observed. The Center will also support and conduct pilot studies of interventions in men and women with other cancers such as malignant melanoma, and will also develop and test other forms of intervention as well as Spanish translations of CBSM for Spanish-speaking Breast and Prostate cancer patients.

These ongoing, recently funded and pending projects deal with evaluating the concerns of breast cancer patients and the efficacy (and underlying mechanisms of action) of psychosocial interventions with this population across a wide range of ages and ethnic groups. Our ultimate goal is to have a comprehensive program of research that addresses the major concerns of breast cancer patients from different ethnic groups, socioeconomic groups and age groups at multiple stages of disease through the use of prospective natural history studies whose results lead directly to the development of theoretically-driven and empirically-validated psychosocial interventions. These interventions are specifically tailored to the chief concerns of breast cancer patients, and are designed to influence a set of theoretically-derived mediators of psychosocial adjustment and physical health for each group. Our goal has been to couch all of these activities in the context of a joint collaboration between the Department of Psychology, the SCCC, the Miami VAMC, and the Departments of Medicine and Psychiatry at the University of Miami. This collaborative arrangement not only facilitates the conduct of this research but also provides a state of the art training environment.

C3. Trainee Progress in the Training Program

All predoctoral trainees in our DOD training program were evaluated each semester for their progress in three general categories: academic and research progress, publication and presentations, and clinical activities. *Academic and research progress* was evaluated through grades in graduate courses within the clinical health psychology doctoral program, formal end-of-semester evaluations determined by health psychology faculty, progress toward the completion of the Master's thesis and doctoral dissertation, evaluation of weekly involvement in breast cancer research protocols and related activities, and participation in the preparation of grant proposals. *Publication and presentations* refer to the trainees' involvement the preparation of manuscripts pertinent to breast cancer and psycho-oncologic topics, and the preparation and presentation of abstracts at scientific meetings. Specific publications and presentations of trainees and training program faculty are listed at the end of this report. *Clinical activities* are also evaluated by way of

the written reports of on-site supervisors which are further evaluated by the Clinical Committee in the Department of Psychology. Only those trainees who successfully fulfill the qualitative and quantitative criteria for their clinical practica are allowed to proceed to subsequent clinical placements. We now review the progress of these pre-doctoral trainees.

Jessica Lehman

GRE: 1340

G.P.A.: 3.87 Goshen College

Preceptor: C.S. Carver, Ph.D.

Ms. Lehman completed advanced pre-doctoral coursework in family therapy, neuroanatomy, psychological intervention in physical disorders, and social psychology. As part of our graduate program requirement she also taught an undergraduate course in the Psychology of Women. She has formulated her dissertation project which examines how coping strategies and optimism predict impairment of daily activities post-diagnosis and treatment during the initial 6 months after surgery in two samples of early stage breast cancer patients. This dissertation, chaired by Dr. Carver, includes over 240 women who have completed the NCI-funded and ACS-funded projects mentioned previously. Throughout the training period, Ms. Lehman was extensively involved in both the ACS and NCI projects of Drs. Antoni and Carver. She worked 15-20 hrs /week in various project activities including: recruiting subjects, conducting psychosocial interviews, training new students, maintaining liaison with the surgical oncology offices, managing the project database, and entering data from the interviews. During the training period Ms. Lehman also co-authored a number of empirical manuscripts and authored or co-authored a number of abstracts presented at the Society of Behavioral Medicine and American Psychological Association meetings. Ms. Lehman co-led 7 separate CBSM groups as part of the NCI protocol during the training program.

Throughout the training period, Ms. Lehman attended weekly meetings of the Breast Cancer research team, the monthly PNI Journal Club meetings, the weekly Clinical Psycho-oncology workshop and several of the breast-cancer focused meetings at the SCCC. In addition to these activities Ms. Lehman completed one clinical practicum rotation at the SCCC where she gained specific assessment and intervention experience with patients with different types of cancer. This post also involved co-leading orientation seminars for cancer patients (a majority of which are breast cancer patients) preparing for bone marrow transplant and providing psychological support for patients in the transplant unit during their stay. In her final year in the program she completed a clinical practicum at Mt. Sinai Hospital's psychosocial oncology service where she gained experience in psychosocial intervention with breast cancer and prostate cancer patients. She completed a clinical internship at West Virginia University during the July 1998 -June 1999 period and is in the process of completing the final phase of her dissertation. Based upon her coursework and dissertation progress, her active participation in breast cancer research protocols and the evaluations of her on-site clinical supervisors, she was rated as having made excellent progress in academic coursework, teaching, research training and clinical training.

Bonnie McGregor

GRE Total: 1250

GPA:3.28 Pacific Lutheran

Preceptors: M.H. Antoni, Ph.D., B. Blomberg, Ph.D.

Ms. McGregor completed her B.S. degree from Pacific Lutheran University in 1984 and before completing two years in a histocompatibility lab conducting tissue typing and cross matching for bone marrow, kidney and heart transplants. This post-graduate experience led her to the research that she conducted for the next 7 years on examining B-lymphocyte defects and cytokine regulation abnormalities in bone marrow transplant patients at the Fred Hutchinson Cancer Center at the University of Washington School of Medicine. During this period Ms. McGregor also managed the clinical immunology laboratory service for the cancer center and was responsible for tracking changes in immune function over the one-year post-transplant period and acquiring, organizing, and analyzing patient data for both research and clinical purposes. Ms. McGregor expressed a particular interest in focusing her graduate training in Health Clinical

Psychology in the area of psychosocial intervention and psychoneuroimmunologic aspects of psycho-oncology with a special emphasis on breast cancer.

During her time in the training program Ms. McGregor has enrolled for the full academic load of core courses, has worked 15 -20 hrs/wk on research-related activities and was extensively involved in two NCI-funded studies. One project examines the effects of a CBSM intervention on early-stage breast cancer patients' adjustment following mastectomy. As part of her work on this project, Ms. McGregor developed a sub-project to assess immunologic changes that occur over the intervention period. This subproject was approved by the University's IRB and commenced in early 1996. This sub-project will form the basis for her dissertation and will require one additional year to complete. In order to conduct the immune assays for this study, Ms. McGregor obtained space in the immunology laboratory directed by Dr. Bonnie Blomberg, an Associate Professor of Immunology and Microbiology at the University of Miami School of Medicine. In addition to conducting more general assays for lymphocyte phenotypes and cellular and humoral immune functioning in Dr. Blomberg's lab, Ms. McGregor is working to develop antigen-specific immune assays for her research with breast cancer patients in collaboration with the Clinical Research Laboratory at the SCCC under the supervision of Dr. Parotosh Ghosh. Dr. Blomberg is overseeing all of Ms. McGregor's activities in Microbiology/Immunology while Dr. Antoni is supervising all of her activities in psychosocial assessment and intervention. Initially some of the supplies necessary for setting up the laboratory protocol for conducting these assays was supported by the training grant. During the past year Ms. McGregor was successful in obtaining seed money from the SCCC to cover some additional supplies and technical support to conduct a more extensive battery of assays on these samples. In the context of developing the blood draw and assay activities for this protocol this trainee gained specific experience in biopsychosocial applications of psychotherapeutic interventions and psychoneuroimmunology to breast cancer—her primary interest area. To date a number of cohorts enrolled in the NCI intervention study have provided blood samples as part of the protocol for this substudy.

Ms. McGregor also took a leadership role in the data collection for an NCI study examining psychosocial factors predictive of emotional adjustment to breast cancer in sexual minority women. This required her to coordinate data collection from several urban centers across the country. She used this database for her Master's thesis, a study investigating the role of sexual orientation disclosure and social support in adjustment to mastectomy in this subpopulation which she successfully defended. Shortly thereafter Ms. McGregor successfully passed her clinical qualifying examinations and went on to defend her dissertation proposal. She was successful in landing a clinical internship at the Seattle VAMC. In the summer of 1999, Ms McGregor defended her dissertation, a project testing the effects of CBSM on positive adaptation to breast cancer, distress levels and lymphoproliferative responses to anti-CD3 cross-linking. She was successful in demonstrating that women in the CBSM intervention showed significantly greater lymphoproliferative responses than controls at a point 6 months after surgery. During her final year Ms. McGregor presented a paper at the American Psychosomatic Society based upon her dissertation research. Throughout the training program, Ms. McGregor attended all of the mandatory trainee meeting activities, and also attended the monthly PNI Journal Club meetings and several activities at the SCCC. She was also very successful in establishing excellent working relationships with the Research Assistants and Post-Doctoral Fellows working in Microbiology/Immunology and other breast cancer psycho-oncology research at the University's Medical School and at the SCCC.

Based upon her coursework, research and clinical performance, including her participation in breast cancer research protocols and the procurement of seed money for supplemental projects, presentation of research findings at scientific meetings, and the evaluations of her on-site clinical supervisors, this trainee was viewed as making outstanding progress in the training program.

Amy (Eisenberg) Boyers GRE Total: 1320

G.P.A: 3.51 U. Penn.

Preceptors: M. H. Antoni, Ph.D., C.S. Carver, Ph.D.

Before joining the program Ms. Boyers completed her undergraduate training at the University of Pennsylvania where she worked in the laboratory of Dr. Martin Seligman conducting studies on the correlates of attributional style. After completing her degree she worked at the Memorial Sloan-Kettering Cancer Center as a full-time research assistant with Sharon Manne, Ph.D. conducting an NCI-funded longitudinal study examining how couples cope with breast and colon cancer and chemotherapy treatment over a 4-month period. During the training period, Ms. Eisenberg completed a full academic load of advanced coursework in health psychology applications to assessment and intervention with medical patients and also completed the sequence in advanced multivariate statistical analysis. She worked 15 -20 hrs/wk on breast cancer research-related activities.

She was extensively involved in an NCI cross-sectional study examining major concerns post-mastectomy and factors associated with adjustment in the months following surgery. On this team she gained experience in patient contact and recruitment, telephone administration of questionnaire packets, coordinating with the network of surgical oncology offices involved in the study, and database management. Based upon her work on this project Ms. Eisenberg developed a special interest in studying how breast cancer patients' perception of positive experiences surrounding diagnosis of cancer are predictive of emotional adjustment in the months following surgery, an area that formed the basis of her Master's thesis. She successfully defended her Master's thesis and passed her clinical qualifying examinations. She attended weekly meetings of the Breast Cancer research team, monthly PNI Journal Club meetings and the monthly Biopsychosocial research meeting at the SCCC. During the training period, Ms. Eisenberg served as a group leader for several CBSM groups in the NCI intervention project.

Ms. Eisenberg co-authored (with Sharon Manne, Ph.D. and Deborah Miller, Ph.D) an cancer-related abstract that was presented at the 1997 annual meeting of the Society of Behavioral Medicine. She also presented an abstract at the 1997 Society of Behavioral Medicine conference and others at the 1998 and 1999 American Psychosomatic Society meetings—all based on the breast cancer work she conducted at Miami. During YR 4, Ms. Boyers completed a clinical practicum at the Division of Radiation Oncology at the SCCC where she gained assessment and intervention experience with patients undergoing radiation therapy for breast cancer and other conditions. During the summer of 1999, Ms. Boyers defended her dissertation, a study testing the effects of CBSM on positive growth in women recovering from mastectomy. She found that women assigned to CBSM showed a greater sense of benefit or positive growth emanating from the cancer experience. These positive psychological changes were accompanied by increases in optimism and emotional processing (awareness and expression) over the 10-week treatment period. She recently commenced her clinical internship training and is in the process of preparing empirical manuscripts based upon her thesis and dissertation work.

Based upon her coursework and thesis progress, her participation in breast cancer research protocols, presentation of research findings at scientific meetings, and the evaluations of her on-site clinical supervisors, this trainee was judged to have made excellent progress in the training program.

Susan Alferi GRE Total: 1270

G.P.A: 3.93 U.Miami

Preceptors: M.H. Antoni, Ph.D., G. Ironson, M.D., Ph.D.

Ms. Alferi was admitted to the program in August, 1996. Before coming to the program she had obtained a number of years experience working with behavioral medicine researchers at the University of Miami concurrent with her completion of an undergraduate degree in Psychology in

which she graduated magna cum laude. She is currently enrolled in a full load of academic coursework, attends the weekly NCI Research group meeting and is working on the NCI project in the role of recruitment, screening and psychosocial interviewing of women with early-stage breast cancer. Her duties on the project currently include organizing the participant files, reviewing all incoming mail, coordinating participant tracking, coordinating cohort windows and target dates, conducting phone screens and data entry. As part of the project, she has also been a co-therapist of the 10-week CBSM intervention on another study of breast cancer patients being conducted by Drs. Ironson and Weiss. During YR 4 Susan successfully defended her Master's thesis examining ethnic and cultural differences in partner relationships of breast cancer patients. During YR 3 she prepared a grant proposal (with Dr. Antoni) which was funded by the SCCC to examine the effects of relaxation training on salivary cortisol in breast cancer patients throughout the 10 week CBSM intervention. During YR 4 she implemented this protocol in a number of cohorts of women enrolled in our NCI intervention study. This study will serve as the basis of her dissertation.

During YR 4 Ms. Alferi first-authored an empirical manuscript examining relations between religiosity and coping strategies and emotional adjustment after mastectomy in women with early-stage breast cancer. This paper was published in the *Journal of Health Psychology* in 1999. She also first-authored two other manuscripts. One focused on the role of social support in facilitating emotional adjustment following diagnosis and treatment for breast cancer in Hispanic women. Another examined patterns of use of complementary therapies in breast cancer patients. She also presented an abstract based upon her research at the Society of Behavioral Medicine in April, 1998 and another at the American Psychosomatic Society meeting in April, 1999. Based upon her coursework, her participation in breast cancer research protocols and the procurement of seed money for supplemental projects, empirical publications and presentation of research findings at scientific meetings, and the evaluations of her on-site clinical supervisors, this trainee was judged to be making outstanding progress in the training program.

Christina Wynings

GRE: 1440

G.P.A.: N/A Yale/Stanford

Ms. Wynings joined the training program in 1994 and successfully defended her dissertation and completed an APA-approved clinical internship at the Northwest Dade Community Center in Ft. Lauderdale, Fl. in 1996. After completing her internship, she submitted a proposal to the DOD for a post-doctoral fellowship in psychosocial research in breast cancer that was designed to apply her thesis and dissertation findings concerning the buffering effects of social support in trauma victims to the context of breast cancer patients adjusting to surgery and treatment for breast cancer. Unfortunately this proposal did not receive a priority score in the fundable range. She is in the process of applying for post-doctoral fellowships in the area of psychosocial oncology.

C4. Publications and Presentations of Training Faculty and Trainees During the Training Period

*trainee

PUBLICATIONS IN REFEREED JOURNALS

Antoni, M.H., Wagner, S., Cruess, D., Kumar, M., Lutgendorf, S., Ironson, G., Dettmer, E., Williams, J., Klimas, N., Fletcher, M.A., & Schneiderman, N. (in press) Cognitive behavioral stress management reduces distress and 24-hour urinary free cortisol among symptomatic HIV-infected gay men. *Annals of Behavioral Medicine*.

Antoni, M.H., Cruess, D., Wagner, S., Lutgendorf, S., Kumar, M., Ironson, G., Klimas, N., Fletcher, M.A., & Schneiderman, N. (in press) Cognitive behavioral stress management effects on anxiety, 24-hour urinary catecholamine output, and T-

- Cytotoxic/suppressor cells over time among symptomatic HIV-infected gay men. *Journal of Consulting and Clinical Psychology*.
- Cruess, D., Antoni, M.H., Schneiderman, N., Ironson, G., McCabe, P., Fernandez, J., Wagner, S., Klimas, N. & Kumar, M. (in press) Cognitive behavioral stress management increases free testosterone and decreases psychological distress in HIV seropositive men. *Health Psychology*.
- Carver, C. S., Harris, S. D., Lehman, J. M*, Durel, L. A., Antoni, M. H., Spencer, S. M., & Pozo-Kaderman, C. (in press) How important is the sense of personal control? Studies of early stage breast cancer patients. *Personality and Social Psychology Bulletin*.
- Penedo, F., Antoni, M.H., Schneiderman, N., Ironson, G., Malow. R., Wagner, S., Hurwitz, B., & LaPerriere, A. (in press) Dysfunctional attitudes, coping and psychological distress among HIV-infected gay men. *Cognitive Therapy and Research*.
- Storek, J., Mendelmen, P., Witherspoon, R., McGregor, B.* & Storb, R. (in press) IgG response to pneumococcal polysaccharide-protein conjugate is not better than IgG response to polysaccharide in marrow transplant recipients and in normal adults. *Clinical Infectious Disease*
- Cruess, D., Antoni, M.H., Kumar, M. & Schneiderman, N. (in press, 1999) Reductions in salivary cortisol are associated with mood improvement during relaxation training among HIV-1 seropositive men. *J. Behavioral Medicine*.
- Woods, T., Antoni, M.H., Ironson, G., & Kling, D. (1999) Religiosity is associated with affective status in symptomatic HIV-infected African American women. *Journal of Health Psychology, 4*, 317 – 326.
- Alferi, S.*, Culver, J., Carver, C.S., Arena, P. & Antoni, M.H. (1999) Religiosity, religious coping and distress: A prospective study of catholic and evangelical Hispanic women in treatment for early stage breast cancer. *Journal of Health Psychology, 4*, 343 – 356.
- Spencer, S., Lehman, J.*, Wynings, C.*, Arena, P., Carver, C.S., Antoni, M.H., Derhagopian, R., Ironson, G., & Love, N. (1999) Concerns about breast cancer and relations to psychological well-being in a multi-ethnic sample of early stage patients. *Health Psychology, 18*, 159 - 169.
- Woods, T., Antoni, M.H., Ironson, G., & Kling, D. (1999) Religiosity is associated with affective and immune status in symptomatic HIV-infected gay men. *Journal of Psychosomatic Research, 46*, 165 - 176.
- Mulder, C., de Vroome, E., van Griensven, G., Antoni, M. H., & Sandfort, T. (1999). Distraction as a predictor of the virological course of HIV-1 infection over a 7-year period in gay men. *Health Psychology, 18*, 107 - 113.
- Lutgendorf, S., & Antoni, M.H. (1999) Emotional and cognitive processing in a trauma disclosure paradigm. *Cognitive Therapy and Research., 23*, 423 - 440
- Cruess, D., Antoni, M.H., Schneiderman, N., Ironson, G., Fletcher, M.A., & Kumar, M. (1999). Cognitive behavioral stress management effects on DHEA-S and serum cortisol in HIV seropositive men. *Psychoneuroendocrinology, 24*, 537-549.

- Carver, C. S., Pozo-Kaderman, C., Price, A., Noriega, V., Harris, S. D., Derhagopian, R. P., Robinson, D. S., & Moffatt, F. L., Jr. (1998). Concern about aspects of body image and adjustment to early stage breast cancer. *Psychosomatic Medicine*,
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues*, 54, 245-265.
- Perna, F., Antoni, M.H., Kumar, M., Cruess, D., & Schneiderman, N. (1998) Cognitive behavioral intervention effects on mood and cortisol during athletic training. *Annals of Behavioral Medicine*, 20, 92 -98.
- Burnett, K., Ironson, G., Benight, C., Wynings, C*, Greenwood, D., Carver, C. S., Cruess, D., Baum, A., & Schneiderman, N. (1998). Measurement of perceived disruption during rebuilding following Hurricane Andrew. *Journal of Traumatic Stress*.
- Byrnes, D., Antoni, M.H., Goodkin, K., Efantis-Potter, J., Simon, T., Munajj, J., Ironson, G., & Fletcher, M.A. (1998) Stressful events, pessimism, natural killer cell cytotoxicity, and cytotoxic/suppressor T-cells in HIV+ Black women at risk for cervical cancer. *Psychosomatic Medicine*, 60, 714 - 722.
- van der Pompe, G., Antoni, M.H., & Heijnen, C. (1998) The effects of surgical stress and psychological stress on the immune function of operative cancer patients. *Psychology and Health*, 13,1015-1026.
- van der Pompe, G., Antoni, M.H. & Heijnen, C. (1998) The relations of plasma ACTH and cortisol levels with the distribution and function of peripheral blood cells in response to a behavioral challenge in breast cancer: An empirical exploration by means of statistical modeling. *International Journal of Behavioral Medicine*, 4, 145 - 169.
- Malow, R., McPherson, S., Klimas, N., Antoni, M.H., Schneiderman, N., Penedo, F., Ziskind, D., & Page, B.(1998) Adherence to complex combination antiretroviral therapies in HIV+ drug abusers. *Psychiatric Services*, 49, 1021 - 1022.
- van der Pompe, G., Antoni, M.H, & Heijnen, C. (1998) The effect of mild acute stress on immune cell distribution and natural killer cell activity in breast cancer patients. *Biological Psychology*, 48, 21 - 35.
- Lutgendorf, S., Antoni, M.H., Ironson, G., Starr, K., Costello, N., Zuckerman, M., Klimas, N., Fletcher, M.A., & Schneiderman, N. (1998) Changes in cognitive coping skills and social support mediate distress outcomes in symptomatic HIV-seropositive gay men during a cognitive behavioral stress management intervention. *Psychosomatic Medicine*, 60, 204-214.
- Becht, M., van Tilburg, M., Vingerhoets, A., Nyklicek, I., de Vries, J., Kirschbaum, C., Antoni, M.H., & van Heack, G. (1998) Flood: A pilot study on the consequences for well-being and health of adults and children. *Dutch Journal of Psychiatry*, 5, 277 - 289.
- Carver, C. S. (1998). Generalization, adverse events, and development of depressive symptoms. *Journal of Personality*, 66, 609-620.
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

- Benight, C., Antoni, M.H., Kilbourn, K., Ironson, G., Kumar, M., Fletcher, M.A., Schneiderman-Redwine, L., Baum, A., & Schneiderman, N. (1997) Coping self-efficacy buffers psychological and physiological disturbances in HIV-infected men following a natural disaster. *Health Psychology, 16*, 1-8.
- Carver, C. S. (1997). Adult attachment and personality: Converging evidence and a new measure. *Personality and Social Psychology Bulletin, 23*, 865-883.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*, 92-100.
- Carver, C. S. (1997). The Internal-External scale confounds internal locus of control with expectancies of positive outcomes. *Personality and Social Psychology Bulletin, 23*, 580-585.
- Carver, C. S. (1997). Dynamical social psychology: Chaos and catastrophe for all. *Psychological Inquiry, 8*, 110-119.
- Ironson, G., Wynings, C*, Schneiderman, N., Baum, A., Rodriguez, M., Greenwood, D., Benight, C., Antoni, M.H., LaPerriere, A., Huang, H., Klimas, N., & Fletcher, M.A. (1997) Post traumatic stress symptoms, intrusive thoughts, loss and immune function after Hurricane Andrew. *Psychosomatic Medicine, 59*, 128 - 141.
- LaPerriere, A., Ironson, G., Antoni, M.H., & Schneiderman, N. (1997) Psychoneuroimmunologic benefits of exercise. *Sports Medicine.*
- McKinney, C., Antoni, M.H., Kumar, M., Tims, F., & McCabe, P. (1997) Effects of guided imagery and music (GIM) therapy on mood and cortisol in healthy adults. *Health Psychology, 16* (4), 1-12.
- Lutgendorf, S., Antoni, M.H., Ironson, G., Klimas, N., Fletcher, M.A., Schneiderman, N. (1997) Cognitive processing style, mood and immune function following HIV seropositivity notification. *Cognitive Therapy and Research, 21*, 157 - 184.
- Van der Pompe, G., Duivenvoorden, H., Antoni, M.H., Visser, A., & Heijnen, C. (1997) Effectiveness of a short-term group psychotherapy program on endocrine and immune function in breast cancer patients: An exploratory study. *Journal of Psychosomatic Research, 42*, 453 - 466.
- Lutgendorf, S., Antoni, M.H., Ironson, G., Klimas, N., Starr, K., McCabe, P., Cleven, K., Fletcher, M.A. & Schneiderman, N., (1997) Cognitive behavioral stress management decreases dysphoric mood and Herpes Simplex Virus-Type 2 antibody titers in symptomatic HIV-seropositive gay men. *Journal of Consulting and Clinical Psychology, 65*, 31 - 43.
- van der Pompe, G., Antoni, M.H., & Heijnen, C. (1996) Elevated basal cortisol levels and attenuated ACTH and cortisol responses to acute stress in women with metastatic breast cancer. *Psychoneuroendocrinology, 21*, 361 - 374.
- Lollis, C., Johnson, E., Antoni, M.H., & Hinkle, Y. (1996) Characteristics of African Americans with multiple risk factors associated with HIV/AIDS. *Journal of Behavioral Medicine, 19*, 55 -70.
- Van der Pompe, G., Antoni, M.H., Visser, A., & Garssen, B. (1996) Adjustment to breast

cancer: The psychobiological effects of psychosocial interventions. *Patient Education and Counseling*, 28, 909-919.

- Starr, K., Antoni, M.H., Hurwitz, B., Rodriguez, M., Ironson, G., Fletcher, M.A., Kumar, M., Patarca, R., Lutgendorf, S., Quillian, R., Klimas, N., & Schneiderman, N. (1996) Patterns of immune, neuroendocrine, and cardiovascular stress responses in HIV seropositive and seronegative men. *International Journal of Behavioral Medicine*, 3, 135-162.
- Mulder, N., Antoni, M.H., Duivenvoorden, H., Kauffman, R., & Goodkin, K. (1995) Active confrontational coping predicts decreased clinical progression over a one-year period in HIV-infected homosexual men. *Journal of Psychosomatic Research*, 39 (8), 957-965.
- Lutgendorf, S., Klimas, N., Antoni, M.H., Brickman, A. & Fletcher, M.A. (1995) Relationships of cognitive difficulties to immune measures, depression and illness burden in chronic fatigue syndrome. *Journal of Chronic Fatigue Syndrome*, 1 (2), 23-41.
- Antoni, M.H., Goldstein, D., Ironson, G., LaPerriere, A., Fletcher, M.A., & Schneiderman, N. (1995) Coping responses to HIV-1 serostatus notification predict concurrent and prospective immunologic status. *Clinical Psychology and Psychotherapy*, 2 (4), 234-248.
- Zuckerman, M., & Antoni, M.H. (1995) Social support and its relationship to psychological physical and immune variables in HIV infection. *Clinical Psychology and Psychotherapy*, 2 (4), 210-219.
- Lollis, C., Antoni, M.H., Johnson, E., Chitwood, D., & Griffin, D. (1995) Does the health belief model predict risky sexual practices in injection drug users? *Clinical Psychology and Psychotherapy*, 2 (4), 227-233.
- Antoni, M.H., & Emmelkamp, P. (1995) Editorial on Special Issue on HIV/AIDS. *Clinical Psychology and Psychotherapy*, 2, (4), 199-202.
- Ironson, G., Antoni, M.H., & Lutgendorf, S. (1995) Can psychological interventions affect immunity and survival? Present findings and suggested targets with a focus on cancer and human immunodeficiency virus. *Mind/Body Medicine*, 1 (2), 85-110.
- Lutgendorf, S., Antoni, M.H., Ironson, G., Fletcher, M.A., Penedo, F., VanRiel, F., Baum, A., Schneiderman, N., & Klimas, N. (1995) Physical symptoms of chronic fatigue syndrome are exacerbated by the stress of Hurricane Andrew. *Psychosomatic Medicine*, 57, 310-323.
- McKinney, C., Antoni, M.H., Kumar, A. & Kumar, M. (1995) The effects of guided imagery and music (GIM) on depression and β -endorphin levels in healthy adults: A pilot study. *Journal of the Association for Music and Imagery*, 4, 67-78.
- Mulder, N., Antoni, M.H., Emmelkamp, P., Veugelers, P., Sandfort, T., van der Vijver, F., & de vries, M. (1995) Psychosocial group intervention and the rate of decline of immunologic parameters in asymptomatic HIV-infected homosexual men. *Journal of Psychotherapy and Psychosomatics*, 63, 185-192.
- Visser, A., & Antoni, M.H. (1994) Current perspectives on AIDS/HIV education and counseling. *Patient Education and Counseling*, 24, 191-198.

van der Pompe, G., Antoni, M.H., Mulder, N., Heijnen, C., Goodkin, K., de Graeff, A., Garszen, B., & de Vries, M. (1994) Psychoneuroimmunology and the course of breast cancer, an overview.: The impact of psychosocial factors on progression of breast cancer through immune and endocrine mechanisms. *Psycho-Oncology*, 3, 271 - 288. .

BOOKS

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Chesney, M. & Antoni, M.H. (in press) *Health psychology and HIV disease: From transmission to treatment*. American Psychological Association Press.

Antoni, M.H., Schneiderman, N., & Ironson, G. *Stress Management for HIV-Infection*. Society of Behavioral Medicine Clinical research Guidebook Series. N.J.: Erlbaum Press (under revision).

CHAPTERS

Spencer, S. M., Carver, C. S., & Price, A. A. (in press). Psychological and social factors in adaptation to cancer. In J. Holland, W. Breitbart, P. Jacobsen, M. Lederberg, M. Loscalzo, M. J. Massie, & R. McCorkle (Eds.), *Textbook of psycho-oncology*. New York: Oxford University Press.

Antoni, M.H. & Cruess, D. (in press) AIDS. In G. Fink (Ed), *Encyclopedia of Stress*. New York: Academic Press.

Antoni, M.H., (in press) Psychoneuroimmunology. In A. Kazdin (Ed), *The Encyclopedia of Psychology*. American Psychological Association and Oxford University Press.

Antoni, M.H., Ironson, G. & Lutgendorf, S. (in press) Psychosocial intervention in HIV infection. In: K. Nott & K. Vedhara (Eds) *Psychosocial And Biomedical Interactions In HIV Infection*

Antoni, M.H. (in press) Cognitive behavioral stress management intervention effects on depressed mood, distress levels and immunity in HIV-infected persons. In S. Johnson, P. McCabe, and N. Schneiderman (Eds), *Stress, Coping and Depression*. Hillsdale N.J.: Erlbaum.

Carver, C. S., Spencer, S. M., & Scheier, M. F. (in press). Motivation, optimism, and mental health. In H. S. Friedman (Ed.), *Encyclopedia of Mental Health*. San Diego: Academic Press.

Carver, C. S., & Scheier, M. F. (in press). Themes and issues in the self-regulation of behavior. In R. S. Wyer, Jr. (Ed), *Advances in social cognition* (Vol. 12). Mahwah, NJ: Erlbaum. (target article)

Ironson, G., Antoni, M.H., & Lutgendorf, S. (in press) Psychosocial interventions for HIV-infected persons. In M. Chesney, M. & M.H. Antoni, M.H. (Eds), *Health psychology and HIV disease: From transmission to treatment*. American Psychological Association Press.

- LaPerriere, A., Kilbourn, K., Schneiderman, N., Antoni, M.H., Fletcher, M.A., Ironson, G., & Klimas, N. (in press) Exercise medicine in AIDS. In A. Laperierre (Ed), *A handbook of exercise medicine*. N.Y.: Gordon & Beach Science Publishers, Inc.
- Carver, C. S. (1998). Optimism. In E. Blechman & K. Brownell (Eds.), *Behavioral medicine for women: A comprehensive handbook*. New York: Guilford.
- Spencer, S. M., Carver, C. S., & Price, A. A. (1998). Psychological and social factors in adaptation to cancer. In J. Holland, et al. (Eds.), *Textbook of psycho-oncology*. New York: Oxford University Press.
- Ironson, G., Antoni, M.H., Schneiderman, N., LaPerriere, A., Klimas, N., Greenwood, D., & Fletcher, M.A. (1998) Stress management interventions and psychosocial predictors of progression of HIV-1 infection. In K. Goodkin (Ed.), *Psychoneuroimmunology, Stress, Mental Disorders and Health*. Washington, D.C.: American Psychiatric Press.
- Fletcher, M.A., Ironson, G., Goodkin, K., Antoni, M.H., Schneiderman, N., & Klimas, N. (1998) Stress and immune function in HIV-1 disease. In I.R. Hubbard and E.A. Workman (Eds), *Handbook of Stress Medicine*. Boca Raton, FL: CRC Press.
- Antoni, M.H. & Schneiderman, N. (1998) HIV/AIDS. In A. Bellack & M. Hersen (Eds), *Comprehensive Clinical Psychology*. (pp. 237 - 275). N.Y.: Elsevier Science.
- Ironson, G., Antoni, M.H., & Woods, T. (1998). Psychosocial intervention in HIV infection. In A. D. Watkins (Ed), *The physician's handbook of mind-body medicine*. Edinburgh, U.K.: Churchill Livingstone.
- Antoni, M.H. (1997) Integrating the MCMI and the MMPI. In T. Millon & R. Davis (Eds), *The Millon Inventories*. N.Y.: Guilford Press.
- Antoni, M.H., Millon, C., & Millon, T. (1997) Psychological assessment in health care delivery: The MBHI and beyond. In T. Millon & R. Davis (Eds), *The Millon Inventories*. N.Y.: Guilford Press.
- Antoni, M.H. (1997) Cognitive behavioral stress management for gay men learning of their HIV-1 antibody test results. In J. Spira (Ed.), *Group therapy for patients with chronic medical diseases*. (pp. 55 - 91) N.Y.: Guilford Press.
- Antoni, M.H. (1997) Emotional disclosure in the face of stress: Physiological correlates. In A. Vingerhoets, F. van Bussel & J. Boelhouwer (Eds.), *The (non) Expression of Emotions in Health and Disease*. Tilburg, NTH: Tilburg University Press.
- Malow, R.M., Ireland, S.J., Ziskind, D., Alberga, L., Roatta, V.G., Alferi, S.M.*, & Penedo, F.J. (1997). Acceptability of virucides as an HIV preventive among non-injection cocaine dependent men. *NIDA Research Monographs*.
- Carver, C. S. (1997). Associations to automaticity. In R. S. Wyer, Jr. (Ed.), *Advances in social cognition* (Vol. 10, pp. 95-103). Mahwah, NJ: Erlbaum.
- Weiss, S. (1997) Stress Management. In *World Book Health and Medical Annual*. Chicago, IL: World Book, Inc.

- Antoni, M.H. (1996) Effects of a cognitive behavioral intervention on HIV progression. In Hall, N. et al. (Eds) *Mind-body interactions and disease and the psychoneuroimmunological aspects of health and disease*. (pp. 289 - 294). NIH Monograph: Health Dateline Press.
- Schneiderman, N., Antoni, M.H., Ironson, G., Lutgendorf, S., Hurwitz, B., Klimas, N., LaPerriere, A., & Fletcher, M.A. (1996) Psychoneuroimmunologie und HIV/AIDS. In M. Schedolwski, & U. Tewes (Eds.), *Psychoneuroimmunologie* (pp. 577 - 633). Germany: Spektrum Akademischer Verlag.
- Greenwood, D., Szapocznik, J., McIntosh, S., Antoni, M., Ironson, G., Tejada, M., Clarington, L., Samuels, D., & Sorhaindo, L. (1996) African american women, their families and HIV/AIDS. In R. Resnick and R. Rozensky (Eds), *Health psychology through the life span: Practice and research opportunities*. Washington, D.C: American Psychological Association.
- Antoni, M.H., & Goodkin, K. (1996) Cervical neoplasia, human papillomavirus and psychoneuroimmunology. In H. Friedman et al (Eds), *Psychoneuroimmunology and Infectious Disease* (pp. 243 - 262). Boca Raton, FL: CRC Press.
- Antoni, M.H., Esterling, B., Lutgendorf, S., Fletcher, M.A., & Schneiderman, N. (1995) Psychosocial stressors, herpesvirus reactivation and HIV-1 infection. In M. Stein & A. Baum (Eds.), *AIDS and Oncology: Perspectives in Behavioral Medicine*. Hillsdale, N.J.: Erlbaum.
- Carver, C.S. (1995) Stress and Coping. In A.S. Manstead & M. Hewstone (Eds), *Blackwell encyclopedia of social psychology*. Oxford and New York: Basil Blackwell.
- Schneiderman, N., Antoni, M.H., Ironson, G., Fletcher, M.A., Klimas, N., & LaPerriere, A. (1994) HIV-1, immunity and behavior. In Glaser, R. (Ed) *Handbook of Human Stress and Immunity*. N.Y.: Academic Press.
- Lutgendorf, S., Antoni, M.H., Schneiderman, N., Ironson, G., & Fletcher, M.A. (1994) Psychosocial interventions and quality of life changes across the HIV spectrum. In A. Baum & J. Dimsdale (Eds.), *Perspectives in Behavioral Medicine*. (pp. 205-239). N.J.: Erlbaum.

PUBLISHED ABSTRACTS

- Penedo, F., Antoni, M.H., Schneiderman, N., Malow, R., Ironson, G., Duran, R., Fletcher, M.A., Hurwitz, B., & LaPerriere, A. (1999) A general structural equation model assessing coping, psychological distress, alcohol use and NK cell function among symptomatic HIV-1+ gay men. *Psychosomatic Medicine*, 61, 112.
- Antoni, M.H., Carver, C.S., Boyers, A*, McGregor, B*, Arena, P*, Kilbourn, K., Lehman, J*, Harris, S., Price, A., Alferi, S*, Culver, J., & Cruess, D. (1999) Cognitive behavioral stress management intervention increases positive adaptation to breast cancer. *Psychosomatic Medicine*, 61, 94.
- Cruess, D., Antoni, M.H., McGregor, B*, Boyers, A*, Alferi, S*, Kilbourn, K., Schneiderman, N., Kumar, M., Fernandez, J. & Carver, C.S. (1999) Cognitive

behavioral stress management reduces serum cortisol levels and enhances feelings of positive personal growth in women with breast cancer. *Psychosomatic Medicine*, 61, 94.

Antoni, M.H., Kumar, M., Cruess, D., & Lovallo, W. (1999) Psychoneuroendocrinology of HIV infection. *Psychosomatic Medicine*, 61, 126.

Antoni, M.H., Wagner, S., Cruess, D., Kumar, M., Ironson, G., & Schneiderman, N. (1999) Cognitive behavioral stress management effects on distress and adrenal hormones in HIV-infected gay men. *Psychosomatic Medicine*, 61, 127.

Kumar, M., Antoni, M.H., Kumar, A., Cruess, D., Danielson, A., Fernandez, J., Eisdorfer, C., & Schneiderman, N. (1999) Neuroendocrine response to challenge in HIV-1 infection: Its possible role in stress adaptation and stress management interventions. *Psychosomatic Medicine*, 61, 127

Cruess, D., Antoni, M.H., Wagner, S., Kumar, M., Fernandez, J., & Schneiderman, N. (1999) Reductions in salivary cortisol and anxious mood during three different forms of relaxation training in symptomatic HIV+ men. *Psychosomatic Medicine*, 61, 127.

Alferi, S*, Culver, J., Carver, CS., Arena, P. & Antoni, M.H. (1999) Religious orientation, religious coping and distress among Hispanic early stage breast cancer patients: A prospective study. *Psychosomatic Medicine*, 61, 118.

Enos, T., Antoni, M.H., Ironson, G., Fletcher, M.A., Klimas, N., & Schneiderman, N. (1999). Hostility and measures of immune function in HIV+ gay men. *Psychosomatic Medicine*, 61, 119.

Penedo, F., Antoni, M.H., Ironson, G., Schneiderman, N., Fletcher, M., Hurwitz, B., & LaPerriere, A. (1998) Psychological distress, alcohol use, and immune function among symptomatic HIV+ gay men. *Psychosomatic Medicine*, 60, 129.

Antoni, M.H. (1998) Secondary prevention in HIV/AIDS. *Psychosomatic Medicine*, 60, 125. (Abstract).

Penedo, F., Malow, R., Jennings, T., McMahon, R., Antoni, M.H., & Schneiderman, N. (1998) Coping, stress, and substance abuse among HIV+ drug dependent women in treatment. *Psychosomatic Medicine*, 60, 129 (Abstract).

Costello, N., Antoni, M.H., Baldewicz, T., Lutgendorf, S., Klimas, N., Schneiderman, N., (1998) Coping and emotional expression effects on distress, illness burden and cytokines in CFS patients after Hurricane Andrew. *Psychosomatic Medicine*, 60, 121 (Abstract).

Boyers, A. *, Antoni, M.H., & Carver, C.S. (1998) How does optimism predict emotional growth in breast cancer patients? *Psychosomatic Medicine*, 60, 92 - 135.

Byrnes, D., Antoni, M.H., Goodkin, K., Efantis-Potter, J., Simon, T., Munajj, J., Ironson, G., Asthana, D., & Fletcher, M. (1998) Stressful life events are associated with higher levels of squamous intraepithelial neoplasia lesions in HIV+ Black women. *Psychosomatic Medicine*, 60, 94 (Abstract).

Perna, F., Spencer, S., Carver, C., Antoni, M.H., & LaPerriere, A. (1998) Barriers to exercise among stage I and II breast cancer patients at 3-months post-surgery. *Journal of Applied Sport Psychology*.

- Antoni, M., Lutgendorf, S., Ironson, G., Fletcher, M.A., & Schneiderman, N. (1997) CBSM intervention effects on mood and immunity in HIV+ gay men: The role of relaxation training, coping skills and social support. *Psychosomatic Medicine*, 59, 81.
- Perna, F., Antoni, M.H., Kumar, M., & Schneiderman, N. (1996) Psychological skills training decreases cortisol and improves mood and coping among competitive rowers. *Journal of Applied Sport Psychology*, 8, 517.
- van der Pompe, G., Antoni, M.H., Visser, A., Heijnen, C., & deVries, M. (1996) Psychological and immunological effects of psychotherapy for breast cancer patients: A reactivity study. *Psychosomatic Medicine*, 58, 97.
- Woods, T., Antoni, M.H., Ironson, G., & Kling, D. (1996) Religiosity and its relationship to affective distress, immune and health status in HIV-infected gay men.. *Psychosomatic Medicine*, 58, 84.
- Antoni, M.H., Lutgendorf, S., Ironson, G., Fletcher, M.A., & Schneiderman, N. (1996) CBSM intervention effects on social support, coping, depression and immune function in symptomatic HIV-infected men. *Psychosomatic Medicine*, 58, 86.
- Antoni, M.H. (1995) Emotional expression and immune function in people dealing with major stressors and traumas. *Psychosomatic Medicine*, 57, 60 (Abstract).
- Costello, N., Antoni, M.H., Ironson, G., Klimas, N., Fletcher, M.A., Klimas, N., Kumar, M., & Schneiderman, N. (1995) Emotional expression, HPA axis and immune functioning in victims of Hurricane Andrew. *Psychosomatic Medicine*, 57, 60 (Abstract)
- Esterling, B., Antoni, M.H., Fletcher, M.A., Schneiderman, N. (1995) Trauma disclosure, emotional expression and immunologic surveillance of latent herpesvirus infection. *Psychosomatic Medicine*, 57, 60 (Abstract)
- Lutgendorf, S., Antoni, M.H., Ironson, G., Kumar, M., Klimas, N., Schneiderman, N. & Fletcher, M.A. (1995) Cognitive processing of stressful emotional material predicts changes in mood and immune functioning. *Psychosomatic Medicine*, 57, 60 - 61 (Abstract)
- Mulder, C., de Vroome, E., van Griensven, G., Antoni, M.H., Sandfort, T. (1995) Distraction as a predictor of the virological course of HIV-1 infection over a 7-year period in gay men. *Psychosomatic Medicine*, 57, 67 (Abstract)
- Lutgendorf, S., Antoni, M.H., Ironson, G., Kumar, M., Starr, K., Klimas, N., Schneiderman, N., & Fletcher, M.A. (1995) Can relaxation modulate endocrine functioning even in progressed HIV disease? *Psychosomatic Medicine*, 57, 80 (Abstract)
- Starr, K., Antoni, M.H., Lutgendorf, S., Costello, N., Penedo, F., Zuckerman, M., Lehman, J.*, Ironson, G., Fletcher, M.A. & Schneiderman, N. (1995) Premorbid pessimism as related to style of cognitive processing, sexual behavior, and HHV-6 antibody titers among HIV-1 seropositive symptomatic gay men. *Psychosomatic Medicine*, 57, 81 (Abstract)
- McKinney C., Antoni, M.H., Kumar, M., Tims, F., McCabe, P., Boyle, D., & Goldstein, J. (1995) Effects of guided imagery and music therapy on mood and cortisol in healthy adults. *Psychosomatic Medicine*, 57, 85 (Abstract)

- Starr, K., Antoni, M.H., Costello, N., Lutgendorf, S., Penedo, F., Zuckerman, M., Lehman, J.*, Ironson, G., & Schneiderman, N. (1995) The effects of group cognitive behavioral stress management (CBSM) intervention on intrusive thoughts and high-risk sexual behavior in HIV+ symptomatic gay men. *Psychosomatic Medicine*, 57, 91 (Abstract)
- van der Pompe, G., Antoni, M.H., Heijnen, C., & deVries, M. (1995) The influence of laboratory stress on immunologic reactivity in breast cancer patients. *Psychosomatic Medicine*, 57, 93 (Abstract)
- Lutgendorf, S., Antoni, M. H., Ironson, G., Starr, K., Klimas, N., Kumar, M., Cleven, K., Penedo, F., Schneiderman, N., & Fletcher, M. A. (1994). Impact of avoidant thoughts on immune functioning in symptomatic HIV positive men. *Psychosomatic Medicine*, 56, 152 (Abstract).
- Kilbourn, K., Costello, N., Antoni, M. H., Ironson, G, Fletcher, M. A., Baum, A., Schneiderman, N. (1994). How are coping strategies that people use to handle major challenges related to their immune and neuroendocrine responses? *Psychosomatic Medicine*, 56, 156 (Abstract).
- Benight, C., Antoni, M. H., Kilbourn, K., Ironson, G., Costello, N., Fletcher, M. A., Schneiderman, N. (1994). The effect of perceived competence and responsiveness of the environment on psychological and physical health in HIV+ men following Hurricane Andrew. *Psychosomatic Medicine*, 56, 163 (Abstract).
- van der Pompe, G., Antoni, M. H., Garssen, B., Heijnen, C. (1994). Does psychosocial intervention modulate immunologic reactivity in breast cancer patients? *Psychosomatic Medicine*, 56, 148 (Abstract).

PAPER PRESENTATIONS

- Penedo, F., Antoni, M.H., Schneiderman, N., Malow, R., Ironson, G., Duran, R., Fletcher, M.A., Hurwitz, B., & LaPerriere, A. (1999) *A general structural equation model assessing coping, psychological distress, alcohol use and NK cell function among symptomatic HIV-1+ gay men*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Antoni, M.H., Carver, C.S., Boyers, A*, McGregor, B*, Arena, P., Kilbourn, K., Lehman, J*, Harris, S., Price, A., Alferi, S*, Culver, J., & Cruess, D. (1999) *Cognitive behavioral stress management intervention increases positive adaptation to breast cancer*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Cruess, D., Antoni, M.H., McGregor, B*, Boyers, A*, Alferi, S*, Kilbourn, K., Schneiderman, N., Kumar, M., Fernandez, J. & Carver, C.S. (1999) *Cognitive behavioral stress management reduces serum cortisol levels and enhances feelings of positive personal growth in women with breast cancer*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Antoni, M.H., Kumar, M., Cruess, D., & Lovallo, W. (1999) *Psychoneuroendocrinology of HIV infection*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.

- Antoni, M.H., Wagner, S., Cruess, D., Kumar, M., Ironson, G., & Schneiderman, N. (1999) *Cognitive behavioral stress management effects on distress and adrenal hormones in HIV-infected gay men*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C..
- Kumar, M., Antoni, M.H., Kumar, A., Cruess, D., Danielson, A., Fernandez, J., Eisdorfer, C., & Schneiderman, N. (1999) *Neuroendocrine response to challenge in HIV-1 infection: Its possible role in stress adaptation and stress management interventions*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Cruess, D., Antoni, M.H., Wagner, S., Kumar, M., Fernandez, J., & Schneiderman, N. (1999) *Reductions in salivary cortisol and anxious mood during three different forms of relaxation training in symptomatic HIV+ men*. Presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Alferi, S*, Culver, J., Carver, CS., Arena, P. & Antoni, M.H. (1999) *Religious orientation, religious coping and distress among Hispanic early stage breast cancer patients: A prospective study*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Enos, T., Antoni, M.H., Ironson, G., Fletcher, M.A., Klimas, N., & Schneiderman, N. (1999). *Hostility and measures of immune function in HIV+ gay men*. Paper presented at the American Psychosomatic Society meeting, Vancouver, B.C.
- Arena, P., Carver, C.S., Antoni, M.H. Alferi, S*, & Weiss, S. (March, 1999) *Coping and distress in Hispanic women with early stage breast cancer*. Presented at the Society of Behavioral Medicine, San Diego, CA.
- Stanley, H., LaPerriere, A., Jones, D., Devieux, J., Malow, R., Ishii, M., Trachter, A., Antoni, M., Wiesner, Y., Nasajon, R., Yeandle, V., & Weiss, S.(March, 1999). *Social support and religiosity among women with AIDS: The SMART/EST women's project*. Paper presented at the Society of Behavioral Medicine, San Diego, CA.
- Antoni, M.H., & Lutgendorf, S. (August, 1998) *Stress management in HIV infection: Behavioral, immunological and health effects*. Presented at the International Congress of Behavioral Medicine, Copenhagen, Denmark.
- Antoni, M.H. (August, 1998) *Stressors, cytokine regulation and CFS symptoms: A PNI model*. Paper presented at the International Congress of Behavioral Medicine, Copenhagen, Denmark.
- van der Pompe, G., Antoni, M.H., & Heijnen, C. (August, 1998) *Effects of group psychotherapy on cardiovascular, endocrine, and immune system reactivity in breast cancer patients*. Paper presented at the International Congress of Behavioral Medicine, Copenhagen, Denmark.
- Kilbourn, K., Antoni, M.H., Wagner, S., Carver, C.S., Kumar, M., & Schneiderman, N. (August, 1998). *Coping strategies and neuroendocrine changes in HIV+ gay men exposed to Hurricane Andrew*. Paper presented at the International Congress of Behavioral Medicine, Copenhagen, Denmark.
- Dixon, D., Antoni, M.H., Kilbourn, K., Wagner, S., Schneiderman, N., Klimas, N., Fletcher, M. (August, 1998) *Acute and sustained effects of social support on HHV-6*

antibody titers in HIV+ gay men following Hurricane Andrew. Paper presented at the International Congress of Behavioral Medicine, Copenhagen, Denmark

Antoni, M.H. (June, 1998) *Effect of cognitive behavioral stress management intervention in HIV infection: Facts vs. Fiction.* Paper presented at the Academy of Behavioral Medicine, Falmouth, MA.

Weiss, J., Antoni, M.H., Mulder, C., Garssen, B. (June, 1998) *Attitudes, age, education and length of use are related to adherence to combination therapy in HIV-1 positive gay men.* Paper presented at the 12th World AIDS Conference, Geneva, Switzerland.

Cruess, D., Antoni, M.H., Kumar, M., Ironson, G., McCabe, P., & Schneiderman, N. (March, 1998) *Changes in symptoms of distress and sex hormones in symptomatic HIV+ gay men during a cognitive-behavioral stress management (CBSM) intervention.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Penedo, F., Antoni, M.H., Duran, R., Ironson, G., Fletcher, M. & Schneiderman, N. (March, 1998) *Ethnic differences in intervention-associated changes in coping and dysphoria in HIV+ symptomatic gay men.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Byrnes, D., Antoni, M.H., Goodkin, K., Ironson, G., Asthana, D., Efantis-Potter, J., Simon, T., Munajj, J., & Fletcher, M. (March, 1998) *Stressful events, pessimism, and NKCC in HIV+ Black women at risk for cervical cancer.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Goldstein, A., LaPerriere, A., Klimas, N., Antoni, M.H., Ironson, G., Maik-Rachline, G., Talluto, C., Fletcher, M. & Schneiderman, N. (March, 1998) *Weekly adherence to exercise predicts changes in CD4+ counts, fitness and mood in early symptomatic HIV-1 infection.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Kilbourn, K., Antoni, M.H., Wagner, S., Ironson, G., Carver, C.S., Kumar, M., & Schneiderman, N. (March, 1998) *Behavioral disengagement mediates elevations in depression and 24-hour urinary epinephrine output in HIV+ gay men exposed to Hurricane Andrew.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Malow, R., Antoni, M.H., Schneiderman, N., Penedo, F., Ironson, G., Ziskind, D., Jennings, T., Greenwood, D., Klimas, N., & Page, B. (March, 1998) *Barriers to adherence with anti-retroviral agents : A pilot study with inner city HIV+ drug abusing men..* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Samuels, D., Greenwood, D., Antoni, M.H., Ironson, G., & Szapocznik, J. (March, 1998) *Effects of hassles and coping on change in CD4 count and CD4/CD8 ratio among African American HIV+ women.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Penedo, F., Antoni, M.H., Szapocznik, J., Ironson, G., Zuckerman, M., Fletcher, M. & Schneiderman, N. (March, 1998) *Acculturation and immune function in gay HIV+ Hispanic and non-Hispanic men.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Wagner, S., Antoni, M.H., Cruess, D., Kumar, M., & Schneiderman, N. (March, 1998) *Changes in depression and anxiety during CBSM are differentially related to urinary*

cortisol and norepinephrine in HIV+ gay men. Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Alferi, S.*, Antoni, M.H., Carver, C.S., Arena, P., Price, A., Weiss, S. (March, 1998) *Hispanic breast cancer patients living alone reveal greater delay in seeking treatment and single women report greater post-surgery anger.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

McGregor, B.*, Antoni, M.H., Carver, C.S. & Blomberg, B. (March, 1998) *Distress and immune function in early stage breast cancer patients within two months of surgery and immediately prior to a CBSM intervention.* Paper presented at the Society of Behavioral Medicine, New Orleans, La.

Penedo, F., Antoni, M.H., Ironson, G., Schneiderman, N., Fletcher, M., Hurwitz, B., & Laperriere, A. (March, 1998) *Psychological distress, alcohol use, and immune function among symptomatic HIV+ gay men.* Paper presented at the American Psychosomatic Society, Clearwater Beach, Fl.

Antoni, M.H. (March, 1998) *Secondary prevention in HIV/AIDS.* Paper presented at the American Psychosomatic Society, Clearwater Beach, Fl.

Penedo, F., Malow, R., Jennings, T., McMahon, R., Antoni, M.H., & Schneiderman, N. (March, 1998) *Coping, stress, and substance abuse among HIV+ drug dependent women in treatment.* Paper presented at the American Psychosomatic Society, Clearwater Beach, Fl.

Costello, N., Antoni, M.H., Baldewicz, T., Lutgendorf, S., Klimas, N., Schneiderman, N. (March, 1998) *Coping and emotional expression effects on distress, illness burden and cytokines in CFS patients after Hurricane Andrew.* Paper presented at the American Psychosomatic Society, Clearwater Beach, Fl.

Boyers, A.*, Antoni, M.H., & Carver, C.S. (March, 1998) *How does optimism predict emotional growth in breast cancer patients?* Paper presented at the American Psychosomatic Society, Clearwater Beach, Fl.

Byrnes, D., Antoni, M.H., Goodkin, K., Efantis-Potter, J., Simon, T., Munajj, J., Ironson, G., Asthana, D., & Fletcher, M. (March, 1998) *Stressful life events are associated with higher levels of squamous intraepithelial neoplasia lesions in HIV+ Black women.* Paper presented at the American Psychosomatic Society, Clearwater Beach, Fl.

McGregor, B.*, Antoni, M.H., Carver, C.S., & Weiss, S. (October, 1997) *Effects of CBSM intervention on stress and immunity in women with early-stage breast cancer.* Paper presented at the Department of Defense "Era of Hope" conference. Washington, D.C.

Antoni, M.H. (October, 1997) *Biopsychosocial research training in breast cancer.* Paper presented at the Department of Defense "Era of Hope" conference. Washington, D.C.

Perna, F., Spencer, S., Carver, C.S., Antoni, M.H., & LaPerriere, A. (September, 1997) *Barriers to exercise among stage I and II breast cancer patients at 3-months post-surgery.* Paper presented at annual meeting of the Association for the Advancement of Applied Sport Psychology, San Diego, CA.

- Meyer, B., & Carver, C. S. (August 1997) *Predicting affect via exposure to stressful events and self-reported sensitivities to threat and reward*. American Psychological Association, Chicago,.
- Byrnes, D., Antoni, M., Goodkin, K., Ironson, G., Asthana, D., Efantis-Potter, J., Simon, T., Munajj, J., & Fletcher, M.A. (June, 1997). *Stressful life events, repressive coping, pessimism, and natural killer cell cytotoxicity in women with Human Immunodeficiency Virus and Human Papillomavirus*. Paper presented at the National Conference on Women and HIV. Washington, D.C
- Spencer, S. M., Wynings, C*., Lehman, J*., Antoni, M. H., Love, N., & Carver, C. S. (April 1997) *Investigating the concerns of early stage breast cancer patients*. Society of Behavioral Medicine, San Francisco,.
- Eisenberg, A*., Lehman, J*., Antoni, M. H., & Carver, C. S. (April 1997) *Do breast cancer patients experiencing increased positive contributions to life after diagnosis report less mood disturbance?* Society of Behavioral Medicine, San Francisco.
- Kilbourn, K. M., Antoni, M. H., Wagner, S., Carver, C. S., Ironson, G., Fletcher, M. A., & Schneiderman, N. (April 1997) *Denial coping predicts increases in signs of disease progression in HIV+ gay men over the two years following Hurricane Andrew*. Society of Behavioral Medicine, San Francisco,.
- Lehman, J. M*., Antoni, M. H., Lutgendorf, S., Carver, C. S., & Klimas, N. (April 1997) *Coping responses following Hurricane Andrew and symptom exacerbations in chronic fatigue syndrome patients*. Society of Behavioral Medicine, San Francisco,.
- Antoni, M., Lutgendorf, S., Ironson, G., Fletcher, M.A., & Schneiderman, N. (March, 1997) *CBSM intervention effects on mood and immunity in HIV+ gay men: The role of relaxation training, coping skills and social support*. Paper presented at the American Psychosomatic Society. Santa Fe, NM.
- Baldewicz, T., Costello, N., Antoni, M., Lehman, J*., Klimas, N., Ironson, G., Fletcher, M.A., & Schneiderman, N. (April, 1997) *Emotional expression is related to greater psychological distress and IL-6 production in CFS patients*. Paper presented at the Society of Behavioral Medicine meeting, San Francisco, CA.
- McGregor, B*., Antoni, M., Meyer, B., & Blomberg, B. (April, 1997) *Psychological stress is associated with decreased B lymphocytes*. Paper presented at the Society of Behavioral Medicine meeting, San Francisco, CA.
- Kilbourn, K., Antoni, M., Wagner, S., Carver, C., Ironson, G., Fletcher, M.A., & Schneiderman, N. (April, 1997). *Denial coping and Hurricane-related distress predict increases in serum neopterin in HIV+ gay men over the two years following Hurricane Andrew*. Paper presented at the Society of Behavioral Medicine meeting, San Francisco, CA.
- Penedo, F., Antoni, M., Szapocznik, J., Ironson, G., Zuckerman, M., Fletcher, M.A., & Schneiderman, N. (April, 1997) *Acculturation and immune function in gay HIV+ Hispanic and non-Hispanic men*. Paper presented at the Society of Behavioral Medicine meeting, San Francisco, CA.
- Spencer, S., Wynings, C*., Lehman, J*., Antoni, M., Love, N., & Carver, C. (April, 1997) *Investigating the concerns of early stage breast cancer patients*. Paper presented at the

Society of Behavioral Medicine meeting, San Francisco, CA.

Goldstein, A., Laperriere, A., Klimas, N., Antoni, M., Ironson, G., Talluto, C., Maik, G., Fletcher, M.A., & Schneiderman, N. (April, 1997) *Exercise improves depressed mood in early symptomatic HIV-1 infection*. Paper presented at the Society of Behavioral Medicine meeting, San Francisco, CA.

Weiss, S. (March, 1997) *Alternative treatments in Breast Cancer*. Presented at the Joint Cancer Conference of the Florida Universities, Orlando.

Eisenberg*, A., Antoni*, M., Carver*, C., Lehman*, J. (August, 1997) *Positive contributions made by breast cancer*. Paper presented at the American Psychological Association. Chicago, IL.

McGregor*, B., Antoni*, M., Dettmer, E., Williams, J. (April, 1997) *Examination stress is associated with decrements in B-cells*. paper presented at the Society of Behavioral Medicine, San Francisco, CA.

1996

Perna, F., Antoni, M.H., Kumar, M., & Schneiderman, N. (October, 1996) *Psychological skills training decreases cortisol and improves mood and coping among competitive rowers*. Paper presented at the annual scientific meetings of the Society for the Advancement of Applied Sport Psychology, Williamsburg, VA.

Cruess, D., Reynolds, P., Pozo-Kaderman, C., Antoni, M.H., & Millon, T. (October, 1996) *Personality characteristics and affective status among cancer patients referred for pain management and psychological treatment*. Paper presented at the International Conference on Psycho-Oncology. Memorial Sloan-Kettering Cancer Center. N.Y.

Antoni, M.H. (August 1996) *Emotional expression and the promotion of cervical neoplasia*. Paper presented at the Conference on the Expression of Emotion in Health and Disease. Tilburg, NTH.

Weiss, J., Mulder, C., & Antoni, M.H. (July, 1996) *Active coping impacts the relationship between physical symptoms and psychological distress in HIV positive gay men*. Paper presented at the XI International Conference on AIDS. Vancouver, CA.

Weiss, J., Mulder, C., & Antoni, M.H. (June, 1996) *Active coping impacts the relationship between physical symptoms and psychological distress in HIV positive gay men*. Paper presented at the XI International Conference on AIDS, Vancouver, Canada.

van der Pompe, G., Antoni, M.H., Visser, A., Heijnen, C., & deVries, M. (March, 1996) *Psychological and immunological effects of psychotherapy for breast cancer patients: A reactivity study*. Paper presented at the American Psychosomatic Society. Williamsburg, VA.

Woods, T., Antoni, M.H., Ironson, G., & Kling, D. (March, 1996) *Religiosity and its relationship to affective distress, immune and health status in HIV-infected gay men*. Paper presented at the American Psychosomatic Society. Williamsburg, VA.

Antoni, M.H., Lutgendorf, S., Ironson, G., Fletcher, M.A., & Schneiderman, N. (March, 1996) *CBSM intervention effects on social support, coping, depression and immune*

function in symptomatic HIV-infected men. Paper presented at the American Psychosomatic Society. Williamsburg, VA.

Lehman, J*, Baldewicz, T., Antoni, M.H., Klimas, N., Fletcher, M.A. (March, 1996) *The relationship of coping strategies to the immunological and physical status of patients with chronic fatigue syndrome.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Antoni, M.H. (March, 1996) *Stress, psychoneuroimmunology and cervical neoplasia.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Wagner, S., Kilbourn, K., Antoni, M.H., Ironson, G., Baum, A., Fletcher, M.A., Schneiderman, N. (March, 1996) *Social support, optimism, immunity and psychological distress in HIV+ men in the face of a natural disaster.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Starr, K., Antoni, M.H., Penedo, F., Costello, N., Lutgendorf, S., Ironson, G., Schneiderman, N. (March, 1996) *Cognitive and affective correlates of emotional expression in symptomatic HIV-infected gay men.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Lutgendorf, S., Antoni, M.H., Ironson, G., Klimas, N., Starr, K., Schneiderman, N., & Fletcher, M.A. (March, 1996) *Coping and social support predict distress changes in symptomatic HIV-seropositive gay men following a cognitive behavioral stress management intervention.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Kumar, M., Antoni, M.H., Kumar, A., Cruess, D., Fletcher, M.A., Hurwitz, B., & Schneiderman, N. (March, 1996) *Circadian changes in cortisol and DHEA-S in HIV-1 infection.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Penedo, F., Antoni, M.H., Starr, K., Ironson, G., Alferi, S*, Fletcher, M.A., & Schneiderman, N. (March, 1996) *Associations among dysfunctional attitudes, coping, social support and immune function in HIV+ gay men.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Woods, T., Antoni, M.H., Ironson, G., & Kling, D. (March, 1996) *Religiosity is associated with affective and immune status in HIV-infected gay men.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Byrnes, D., Antoni, M.H., Goodkin, K., Efantis-Potter, J., Simon, T., & Munajj, J. (March, 1996) *Life stress, HPV infection, immunity, and cervical intraepithelial neoplasia in HIV-1 seropositive minority women.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Wyning, C., Ironson, G., Antoni, M.H., Burnett, K., Fletcher, M.A., Baum, A., & Schneiderman, N. (March, 1996) *Loss, social support and depression in recovery from Hurricane Andrew.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Samuels, D., Greenwood, D., Tejada, M., Ironson, G., Antoni, M.H., & Szapocznik, J. (March, 1996) *Influence of daily hassles and coping strategies on immune functioning in African American HIV + women.* Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Steffen, P., Ironson, G., Antoni, M.H., Fletcher, M.A., Cruess, D., Schneiderman, N. (March, 1996) *Hostility, psychological distress and immune function immediately following Hurricane Andrew and at 2-year follow-up*. Paper presented at the Society of Behavioral Medicine, Wash., D.C.

Zuckerman, M., Antoni, M.H., Ironson, G., Fletcher, M.A., & Schneiderman, N. (March, 1996) *Social support and its relationship to psychological and immune variables in HIV infection*. Paper presented at the Society of Behavioral Medicine, Wash., D.C.

1995

van der Pompe, G., Antoni, M.H., Visser, A., Heijnen, C., deVries, M. (November, 1995) *Effectiveness of group psychotherapy on psychological and immune function in breast cancer patients*. Paper presented at the First Dutch Conference on Psychology and Health. Kergarde, NTH.

Mulder, C., de Vroome, E., van Griensven, G., Antoni, M.H., & Sandfort, T. (November, 1995) *Distraction as a predictor of the biological course of HIV-1 infection over a seven-year period in gay men*. Paper presented at the First Dutch Conference on Psychology and Health, Kerkrafe, NTH.

Greenwood, D., Samuels, D., Sorhaindo, L., McIntosh, S., Ironson, G., Antoni, M.H., Blake, R., & Szapocznik, J. (August, 1995) *Social support networks of seropositive women with infants*. Paper presented at the American Psychological Association, N.Y., N.Y.

Greenwood, D., Szapocznik, J., McIntosh, S., Antoni, M.H., Ironson, G., Clarington, L., Samuels, D., & Sorhaindo, L. (August, 1995) *Mothers, families and HIV/AIDS*. Paper presented at the American Psychological Association, N.Y., N.Y.

Samuels, D., Greenwood, D., Blake, R., Sorhaindo, L., Clarington, L., McIntosh, S., Ironson, G., Antoni, M.H., & Szapocznik, J. (August, 1995) *Psychosocial adjustment in African American post-partum, HIV-1 seropositive women*. Paper presented at the American Psychological Association, N.Y., N.Y.

van der Pompe, G., Antoni, M.H., Visser, A., Heijnen, C. (October, 1995) *Immune and cardiovascular responsivity in breast cancer patients: a reactivity study*. Paper presented at the Second International Oncology Conference, Kobe, Japan.

Greenwood, D., Szapocznik, J., Antoni, M.H., Ironson, G., McIntosh, S., Tejada, M., Samuels, D., Sorhaindo, L., & Clarington, L. (July, 1995) *Stress, coping and family functioning in HIV+ African American women*. Paper presented at the NIMH Office of AIDS 3rd annual meeting: Role of families in preventing and adapting to HIV/AIDS. Chantilly, VA.

Lollis, C., Antoni, M.H., Chitwood, D., Johnson, E.H. (March, 1995) *Differences in the health beliefs of injection drug users and university women who vary in their practice of health preventative behaviors*. Paper presented at the annual meeting of the Society of Behavioral Medicine, San Diego, CA.

Quillian, R., Antoni, M.H., Brickman, A., Rey, G., Ironson, G., McCabe, P., Imia-Fins, A., Klimas, N. (March, 1995) *Neuropsychological deficits covary with lymphocyte activation markers in chronic fatigue syndrome*. Paper presented at the annual meeting of the Society of Behavioral Medicine, San Diego, CA.

Quillian, R., Brickman, A., Antoni, M.H., Rey, G., Ironson, G., McCabe, P., Imia-Fins, A., Klimas, N., & Mirsky, A. (March, 1995) *Neuropsychological functioning in chronic fatigue syndrome patients*. Citation paper presented at the annual meeting of the Society of Behavioral Medicine, San Diego, CA.

Wagner, S., Kilbourn, K., Antoni, M.H., Costello, N., Ironson, G., Baum, A., Fletcher, M.A., Schneiderman, N. (March, 1995) *Pushing on: Factors relating to the preservation of self-efficacy in the face of a life-threatening disease and a natural disaster*. Paper presented at the annual meeting of the Society of Behavioral Medicine, San Diego, CA.

Penedo, F., Costello, N., Ironson, G., Antoni, M., DiLillo, V., Starr, K., Fletcher, M.A., Baum, A., & Schneiderman, N. (March, 1995) *Emotional expression, psychosocial distress, and immune functioning following Hurricane Andrew*. Paper presented at the annual meeting of the Society of Behavioral Medicine, San Diego, CA.

Antoni, M.H. (March, 1995) *Emotional expression and immune function in people dealing with major stressors and traumas*. Symposium presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Costello, N., Antoni, M.H., Ironson, G., Klimas, N., Fletcher, M.A., Klimas, N., Kumar, M., & Schneiderman, N. (March, 1995) *Emotional expression, HPA axis and immune functioning in victims of Hurricane Andrew*. Paper presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Esterling, B., Antoni, M.H., Fletcher, M.A., Schneiderman, N. (March, 1995) *Trauma disclosure, emotional expression and immunologic surveillance of latent herpesvirus infection*. Paper presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Lutgendorf, S., Antoni, M.H., Ironson, G., Kumar, M., Klimas, N., Schneiderman, N. & Fletcher, M.A. (March, 1995) *Cognitive processing of stressful emotional material predicts changes in mood and immune functioning*. Paper presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Mulder, C., de Vroome, E., van Griensven, G., Antoni, M.H., Sandfort, T. (March, 1995) *Distraction as a predictor of the virological course of HIV-1 infection over a 7-year period in gay men*. Paper presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Lutgendorf, S., Antoni, M.H., Ironson, G., Kumar, M., Starr, K., Klimas, N., Schneiderman, N., & Fletcher, M.A. (March, 1995) *Can relaxation modulate endocrine functioning even in progressed HIV disease?* Presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Starr, K., Antoni, M.H., Lutgendorf, S., Costello, N., Penedo, F., Zuckerman, M., Lehman, J., Ironson, G., Fletcher, M.A. & Schneiderman, N. (March, 1995) *Premorbid pessimism as related to style of cognitive processing, sexual behavior, and HHV-6 antibody titers among HIV-1 seropositive symptomatic gay men*. Presented at the annual meeting of the

American Psychosomatic Society. New Orleans, LA.

McKinney C., Antoni, M.H., Kumar, M., Tims, F., McCabe, P., Boyle, D., & Goldstein, J. (March, 1995) *Effects of guided imagery and music therapy on mood and cortisol in healthy adults*. Presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

Starr, K., Antoni, M.H., Costello, N., Lutgendorf, S., Penedo, F., Zuckerman, M., Lehman, J.*, Ironson, G., & Schneiderman, N. (March, 1995) *The effects of group cognitive behavioral stress management (CBSM) intervention on intrusive thoughts and high-risk sexual behavior in HIV+ symptomatic gay men*. Presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

van der Pompe, G., Antoni, M.H., Heijnen, C., & deVries, M. (March, 1995) *The influence of laboratory stress on immunologic reactivity in breast cancer patients*. Presented at the annual meeting of the American Psychosomatic Society. New Orleans, LA.

1994

Antoni, M.H. (August, 1994) *Effects of group stress management on psychological adjustment in asymptomatic and symptomatic HIV-infected gay men*. Paper presented at the annual meeting of the American Psychological Association. Los Angeles, CA.

Antoni, M.H. (August, 1994) *A psychoneuroimmunologic model for chronic fatigue syndrome*. Paper presented at the annual meeting of the American Psychological Association. Los Angeles, CA.

van der Pompe, G., Antoni, M.H., Heijnen, C. (June, 1994) *Cellular immune changes following standardized laboratory stress in breast cancer patients compared to age-matched healthy controls*. Paper presented at Blood Transfusion in Cancer Surgery conference. Noordwijkerhout, NTH.

Lehman, J.*, Kilbourn, K., Antoni, M.H., Costello, N., Ironson, G. & Klimas, N. (August, 1994) *Coping with Hurricane Andrew and chronic fatigue--Illness burden effects*. Paper presented at the annual meeting of the American Psychological Association. Los Angeles, CA.

Antoni, M.H. (July, 1994) *Effects of cognitive behavioral stress management intervention in asymptomatic and symptomatic HIV+ gay men*. Paper presented at the III International Congress on Behavioral Medicine. Amsterdam, Netherlands.

van der Pompe, G., Antoni, M.H., & Heijnen, C. (July, 1994) *Immune reactivity in metastatic and non-metastatic breast cancer patients*. Paper presented at the III International Congress on Behavioral Medicine. Amsterdam, Netherlands.

Lutgendorf, S., Antoni, M. H., Ironson, G., Starr, K., Klimas, N., Kumar, M., Cleven, K., Penedo, F., Schneiderman, N., & Fletcher, M. A. (April, 1994). *Impact of avoidant thoughts on immune functioning in symptomatic HIV positive men*. Paper presented at the annual scientific meeting of the American Psychosomatic Society, Boston, MA.

Kilbourn, K., Costello, N., Antoni, M. H., Ironson, G, Fletcher, M. A., Baum, A., Schneiderman, N. (April, 1994). *How are coping strategies that people use to handle*

major challenges related to their immune and neuroendocrine responses? Paper presented at the annual scientific meeting of the American Psychosomatic Society, Boston, MA.

Benight, C., Antoni, M. H., Kilbourn, K., Ironson, G., Costello, N., Fletcher, M. A., Schneiderman, N. (April, 1994). *The effect of perceived competence and responsiveness of the environment on psychological and physical health in HIV+ men following Hurricane Andrew.* Paper presented at the annual scientific meeting of the American Psychosomatic Society, Boston, MA.

van der Pompe, G., Antoni, M. H., Garssen, B., Heijnen, C. (April, 1994). *Does psychosocial intervention modulate immunologic reactivity in breast cancer patients?* Paper presented at the annual scientific meeting of the American Psychosomatic Society, Boston, MA.

Mertz, T., Antoni, M. H., Ironson, G., & Brickman, A. (April, 1994). *Chronic fatigue syndrome and depression: Development of empirically-derived factors for differential diagnosis.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

Imia-Fins, A., Antoni, M. H., Brickman, A., Klimas, N., Lutgendorf, S., Ironson, G., Quillian, R., Fletcher, M. A. (April, 1994). *Stressful life events, cognitive appraisals, coping strategies and illness burden in chronic fatigue syndrome.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

Costello, N., Kilbourn, K., Antoni, M. H., Ironson, G., Fletcher, M. A., Schneiderman, N. (April, 1994). *Social provisions, optimism, and distress levels in HIV+ gay men dealing with the aftermath of Hurricane Andrew.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

Kilbourn, K., Antoni, M. H., Costello, N., Ironson, G., Schneiderman, N. (April, 1994). *Are coping strategies people use to handle major stressors consistent? Hurricanes and HIV.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

Hinkle, Y., Antoni, M. H., Schneiderman, N., Ironson, G., Schneiderman, N., & Efantis, J. (April, 1994). *Psychosocial correlates of stress and anxiety among African American women who are HIV-positive and HIV-negative.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

Ackerman, M., & Antoni, M. H. (April, 1994). *Unhappy wives do not corroborate details of their husband's erectile difficulties: Disparities in attributions of symptoms?* Citation paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

Kilbourn, K., Costello, N., Antoni, M. H., Ironson, G., Fletcher, M. A., & Schneiderman, N. (April, 1994). *The physiological and psychological impact of Hurricane Andrew on an HIV positive population as compared to other stressed populations.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

van der Pompe, G., Antoni, M. H., Garssen, B., & Heijnen, C. (April, 1994). *Immunologic reactivity in breast cancer patients.* Paper presented at the annual scientific meeting of the Society of Behavioral Medicine, Boston, MA.

van der Pompe, G., Antoni, M.H., & Heijnen, C. (September, 1994) *Effects of psychological stress on immunological reactivity in breast cancer patients*. Paper presented at the 8th Congress of the European Society of Psychosocial Oncology, Budapest, Hungary.

van der Pompe, G., Antoni, M.H., & Heijnen, C. (September, 1994) *Effectiveness of a group psychotherapy program on psychosocial adjustment and immunological reactivity in breast cancer patients*. Paper presented at the 8th Congress of the European Society of Psychosocial Oncology, Budapest, Hungary.

MANUSCRIPTS UNDER REVIEW

Antoni, M. H., Lehman, J*, Kilbourn, K., Boyers, A*, Yount, S., Culver, J., Alferi, S*, McGregor, B*, Arena, P., Harris, S., Price, A., Carver, C.S. (under review) Cognitive-behavioral stress management intervention enhances optimism and the sense of positive contributions among women under treatment for early-stage breast cancer.

Cruess, D. G., Antoni, M. H., McGregor, B*, Boyers, A*, Kumar, M., Kilbourn, K., & Carver, C.S. (under review). Cognitive-behavioral stress management reduces serum cortisol by enhancing positive contributions among women being treated for early stage breast cancer.

Alferi, S*, Antoni, M.H., Weiss, S., Duran, R., & Carver, C.S. (under review). Social support, distress, and disruption among low income Hispanic breast cancer patients: A prospective study of types, sources, and timing of support.

Alferi, S*, Antoni, M.H., Ironson, G., Kilbourn, K. & Carver, C.S.(under review) Use of alternative therapies in a multi-ethnic sample of women with early stage breast cancer.

van der Pompe, G., Antoni, M.H., Visser, A., & Heijnen, C.(under review) Immune and cardiovascular responsivity to a standardized laboratory challenge in breast cancer patients and healthy women.

van der Pompe, G., Antoni, M.H., Duivenvoorden, H., de Graeff, A., Simonis, A, van der Vegt, S., & Heijnen, C. (under review) Effect of group psychotherapy on cardiovascular and immunoreactivity to acute stress in breast cancer patients.

van der Pompe, G., Antoni, M.H., Vries-Kragt, K., Pelgrim, F., Visser, A., Vries, M. Prediction of psychological adjustment to breast cancer after participation in group psychotherapy: An empirical exploration.

KEY RESEARCH ACCOMPLISHMENTS

- **Five trainees completed the training program**
 - Three completed their dissertations, one is in final stages and one is at proposal stage
 - Four completed or have commenced APA-approved clinical internships
- **All trainees were involved in publication and presentation of research at scientific meetings**
 - All trainees were involved as authors or co-authors of peer-reviewed publications
 - Three trainees successfully obtained external research funding
- **Trainee research efforts contributed to large grant awards for psycho-oncology research**
 - an NCI-funded R01 project (1R01CA64710-01) entitled "Coping with Breast Cancer in Younger Women" (P.I. : C. Carver, co-P.I.: M. Antoni)
 - an NCI-supplemental project (1R01CA64710-01) entitled "Lifestyle and Breast Cancer in Cultural and Sexual Minorities" (P.I.: C. Carver)
 - an NCI-funded project entitled " PDQ/PIF Evaluation in Multiethnic Populations" (P.I.: S.Weiss)
 - a developmental grant funded by the Sylvester Cancer Center entitled " Stress Management Intervention for Women with Breast Cancer"(P.I. : G. Ironson)
 - an NCI-funded R01 project (R01CA97-018) entitled "Quality of Life in Adult Cancer Survivors" (P. I.: C. Carver)
 - an NCI funded R01 project (2R01CA/HD64710-05A1) entitled "Facilitating Positive Adaptation to Breast Cancer" (P.I.: M. Antoni)
 - an NIH-funded P50 Center (P50 CA84944-01) entitled "Center of Psycho-Oncology Research" (P.I: M. Antoni)

CONCLUSIONS

The training program was successful in accomplishing the general mission of providing multidisciplinary research training in biopsychosocial aspects of breast cancer in the context of predoctoral training in Clinical Health Psychology. Five trainees were enrolled in the training program in during its 4-year period. Training was closely coordinated with ongoing ACS-funded and NCI-funded biopsychosocial breast cancer research projects. All trainees were exposed through coursework to experimental design and statistics as well as psychosocial, biobehavioral and pathophysiologic

perspectives on breast carcinoma and other chronic diseases. The latter focus was extended through the program's weekly Psycho-Oncology Clinical Workshop, weekly Breast Cancer Team Research Meeting, monthly Psycho-Oncology Research Seminar and the monthly Psychoneuroimmunology Journal Club meeting. There was a significant amount of development and growth in the training program across the following areas: Symposia/Didactic Experiences; Active Biopsychosocial Breast Cancer Research Protocols; Cancer Center Programs, Facilities and Resources; Trainee Progress; and Publications and Presentations of Training Program Faculty and Trainees. All five trainees were judged to have made excellent to outstanding progress in coursework, research training and clinical training.

Two additional biopsychosocial projects designed by trainees and their preceptors that received funding from the SCCC during YR 3 continued across the YR 4 period. These projects deal with evaluating the effects of a psychosocial intervention on endocrine and immune functioning in an effort to identify the health-promoting mechanisms underlying these interventions. We made significant progress toward our ultimate goal of building a comprehensive program of training and research that addresses the major concerns of breast cancer patients from different ethnic groups, socioeconomic groups and age groups at multiple stages of disease through the use of prospective natural history studies whose results lead directly to the development of theoretically-driven and empirically-validated psychosocial interventions specifically tailored to the chief concerns of these patients. All of these activities are couched in the context of a joint collaboration between the Department of Psychology, the SCCC, the Miami VAMC, and the Departments of Medicine and Psychiatry at the University of Miami. This collaborative arrangement provides a state of the art training environment.

**STATEMENT OF WORK-Status Report
September 21, 1999**

Task 1: Pre-Recruitment for Year 1-Completed

MONTHS [-4 to - 2] - March - May, 1994: Pre-Recruitment. Because the proposed starting date for the Training Program comes significantly later in 1994 than our annual recruitment campaign for our graduate program it is necessary to pre-recruit potential candidates for the training program before we have received approval of the funding for the training grant. While the pre-selection of these individuals is planned for the period March - May, 1994, there is no guarantee that we can secure these candidates as we are unable to offer them any confirmed means of support. Immediately upon formal notice of an award from the DOD we will attempt to secure such candidates. In the event that this is impossible we will either seek out other candidates from the pool of first alternates to our Health Clinical Graduate Program or from the pool of candidates seeking admission to our Adult Clinical Program who have indicated a strong interest in psycho-oncology training

MONTH 1: Trainee Orientation

TASK 2: Initial Planning Meetings and Program Implementation-Completed

MONTHS 1 - 12: The *Executive Committee* meets at the commencement of the program and will subsequently meet at least monthly to consider training program issues and twice yearly to review formally the progress of the training program.

MONTHS 2-10: Program Implementation: Includes all aspects of academic coursework, psycho-oncology seminars and related grand rounds, research rotations and meetings, and clinical rotations

TASK 3: Conference Attendance and Presentation-Completed

All trainees attend the annual two-day Stress and Coping Symposium that is funded through our two existing training grant programs, in conjunction with the Department of Psychology and University of Miami School of Medicine. In addition we will furnish application materials, supervision and travel support for all trainees who wish to attend and present scientific reports at one national conference each year (SBM, APS, APA).

TASK 4: Recruitment of new trainees-Completed

Month 6-8: Recruitment of new trainees:

Dr. Antoni collects and ranks applicants from among respondents to our advertisements for positions, new individuals recommended by training grant faculty, and existing pre-doctoral graduate students. Executive Committee discusses, evaluates and re-appoints existing trainees and appoints new trainees.

Task 5 : Evaluation-Completed

Month 12 : Annual Program Evaluation: Executive committee evaluates progress of each trainee Executive and internal advisory committee members meet to discuss progress and proposed modifications to program

Task 6: Execution of Years 2, 3 and 4 of Program-Completed

- Implementation of Training Program as outlined for Year 1 including all aspects of recruitment; academic, research and clinical training seminars and weekly meetings; participation by trainees in local and national conferences
- Monthly meetings of Executive Committee
- Annual evaluation of trainees by executive committee
- Program evaluation meeting resulting in plans for modifying aspects of the program

Task 7: Final Report on Training Program for Department of Defense Office-Completed

APPENDIX: Journal articles, preprints and abstracts

Biopsychosocial Research Training in Breast Cancer

Principal Investigator: Michael H. Antoni, Ph.D.

Religiosity, Religious Coping, and Distress

A Prospective Study of Catholic and Evangelical Hispanic Women in Treatment for Early-stage Breast Cancer

SUSAN M. ALFERI, JENIFER L. CULVER,
CHARLES S. CARVER, PATRICIA L.
ARENA, & MICHAEL H. ANTONI
University of Miami, Florida, USA

SUSAN M. ALFERI, MS, is a doctoral student in clinical health psychology at the University of Miami.

JENIFER L. CULVER, MA, is a doctoral student in clinical psychology at the University of Miami.

CHARLES S. CARVER, PhD, is Professor of Psychology and Associate Director of the Program in Biopsychosocial Oncology at the Sylvester Comprehensive Cancer Center at the University of Miami.

PATRICIA L. ARENA is a doctoral student with the Department of Psychology at the University of Miami.

MICHAEL H. ANTONI, PhD, is a professor in the clinical health psychology division of the department of psychology at the University of Miami.

ACKNOWLEDGEMENTS. Data collection was supported by a grant from the American Cancer Society (PBR-82). Preparation of the manuscript was facilitated by support from the National Cancer Institute (CA-64710) and the Department of Defense (J4236-DAMD1794).

COMPETING INTERESTS: None declared.

ADDRESS. Correspondence should be directed to:
SUSAN M. ALFERI, Department of Psychology, University of
Miami, Coral Gables, FL 33124-2070, USA.
[Tel. (305) 284-2833; Fax (305) 284-3402;
email: Salferi@umiami.ir.miami.edu]

Journal of Health Psychology
Copyright © 1999 SAGE Publications
London, Thousand Oaks and New Delhi,
[1359-1053(199907)4:3]
Vol 4(3) 343-356; 008560

Abstract

Religious involvement was measured in a sample of 49 lower socio-economic status Hispanic women who were newly diagnosed with early-stage breast cancer. Religious coping and emotional distress were assessed at pre-surgery, post-surgery, and at 3-, 6-, and 12-month follow-ups. Among Catholic women, greater religiosity tended to be associated with more distress throughout the year; among Evangelical women, in contrast, greater religiosity tended to be associated with less distress throughout the year. These correlations were significantly different at two measurement points. Similarly, religious coping tended to have divergent effects in the two groups. Among Catholics, church attendance at 6 months predicted greater distress at 12 months; among Evangelical women, obtaining emotional support from church members at 6 months predicted less distress at 12 months. These various differences are interpreted in terms of differences in the ideologies of the two religious groups.

Keywords

religion, coping, cancer, women, Hispanic

THE DIAGNOSIS AND TREATMENT of a life-threatening illness such as cancer is a serious life stressor. When faced with such stressors, many people turn to religion to find comfort and support (Die Trill & Holland, 1993; Jenkins, 1995; Koenig, George, & Siegler, 1988; Tebbi, Mallon, Richards, & Bigler, 1987). Indeed, people who have been religious in the past but have drifted away from their religious connection tend to return to religion during such times (Die Trill & Holland, 1993). Even 5 years and more after diagnosis and treatment, survivors of breast cancer have a heightened concern with spiritual issues (Ferrell, Grant, Funk, Otis-Green, & Garcia, 1998; Fredette, 1995; Wyatt & Friedman, 1996).

Turning to religion during such times can have a variety of positive consequences. For instance, adolescent cancer patients reported that religion offered them comfort and security in the face of death and helped them to accept their experience with cancer (Tebbi et al., 1987). A considerable amount of research has demonstrated a positive relationship between religiosity and spirituality with both psychological well-being (Ell, Mantell, Hamovitch, & Nishimoto, 1989; Hill & Butler, 1995; Kaczorowski, 1989; Smith et al., 1993; Tebbi et al., 1987; Tix & Frazier, 1998) and physical well-being (Hill & Butter, 1995; see Levin & Vanderpool, 1991, for a review).

Despite the salience of religious awareness that occurs in response to illness and the overall relationship of religiosity to well-being, relatively little research has examined specific aspects of religious coping with illness. Pargament et al. (1990) examined coping processes in response to negative life events, some of which were physical illnesses. They found relationships between specific religious coping responses (e.g. turning to God for answers, participating in church groups, getting support from clergy) and positive outcomes that included mental health status, psychological sequelae of the event (e.g. how much the person reported learning from the event), and the religious outcome of the event (e.g. perceived spiritual growth). The contributions of religious coping activities to positive outcomes were significant beyond the effects of overall religiosity.

In a study that targeted coping among individuals with medical illnesses, Koenig et al. (1992)

found that higher levels of religious coping predicted lower levels of depression in elderly men 6 months later, after controlling for prior depression. Similarly, Tix and Frazier (1998) found that the use of religious coping predicted positive psychological adjustment among patients recently undergoing kidney transplant surgery. Religious coping has also been associated with better mental health status and psychological well-being in a cross-sectional study of cancer patients (Ell et al., 1989). Thus, existing evidence suggests that religious coping can be an important aspect of adjusting to physical illness for many people. Nonetheless, additional research is needed, as many questions in this area remain unanswered.

One such question concerns the differing role of religious coping in different ethnic groups. The role of religious coping is clearly important among African-Americans (for a review, see Taylor & Chatters, 1991). In a sample of older adults, religious coping was mentioned spontaneously as a response to life stressors by 51 percent of African-Americans compared to only 28 percent of Caucasians (Koenig et al., 1988). Another study found that among a group of cancer patients, African-Americans reported the greatest reliance on religion, and Caucasians reported the least (Ell et al., 1989). Additional research supports the position that African-Americans are more likely to use religious coping than are members of other groups (Jenkins, 1995; Koenig et al., 1992).

There is also indirect evidence concerning the importance of religion as a coping strategy in Hispanic populations. The vast majority of Hispanics in the United States identify strongly with the Catholic church. They typically see this religious faith as an important aspect of their self-identity (Lacayo, 1984). Although there is not a great deal of information available concerning religious coping among Hispanics, Ceballos-Capitaine et al. (1990) found that reports of turning to religion as a coping tactic were more common in a Cuban-American sample of HIV-positive men than in an otherwise comparable Anglo sample. Another study, examining Hispanic women with arthritis, found that 38 percent spontaneously reported using religion or prayer as a coping strategy (Abraido-Lanza, Guier, & Revenson, 1996).

As salient as religious identity is in the

Hispanic community, it is remarkable how little has been written about it from a psychological point of view. Our review of the literature revealed very little empirical research that examines religiosity and religious coping among Hispanics. The present study provided an opportunity to gain further information on some of these issues. In this study we examined religious coping in a Hispanic sample composed largely of Cuban-Americans.

Another focus of the current study was to examine religiosity and religious coping among individuals who differ in religious affiliation. The small amount of research that has examined differences among religious groups suggests that the effects of religiosity and religious coping on well-being may depend on one's religious affiliation. In some instances religion can even have an adverse effect on well-being. An obvious example is religions that prohibit the use of medication or medical treatment for physical ailments (Hill & Butter, 1995). However, religions also differ in more subtle ways. Religious denominations differ in the extent to which they focus on supporting and fostering the emotional well-being of their members, versus focusing on expiation of guilt and preparation for the hereafter.

One project provides initial information in this regard. Park, Cohen, and Herb (1990) examined religious coping among Catholics and Protestants. They found that after experiencing a controllable stressor, religious coping appeared to buffer distress for Catholics and exacerbate distress for Protestants. After experiencing an uncontrollable stressor, however, those Protestants with an intrinsic religious orientation (those who view religion as an end in itself—see Allport & Ross, 1967) experienced less distress than did Catholics. Thus, when negative life events were uncontrollable, religious coping appeared to buffer stress for Protestants, but not for Catholics.

One interpretation that Park et al. (1990) provided for these findings rests on differences in religious focus between Catholics and Protestants. They suggested that the emphasis on confession and absolution of guilt in the Catholic religion may better prepare Catholics for coping with controllable stressors. In contrast, they suggested, the emphasis on faith and acceptance in Protestant religions may better

prepare Protestants for coping with uncontrollable stressors.

These findings are interesting, but limited. The differences that emerged clearly indicate the need for additional research examining differences between religious groups.

Overview of present research

The study reported here provides further information bearing on several of the issues raised above. We examined the relationship of religiosity to religious coping and distress in a sample of Hispanic women who were newly diagnosed with early-stage breast cancer. As is true of most of the literature on adaptation to breast cancer, this study focuses on early-stage patients, in part because of their relatively good prognosis. Thus, the women in this study were dealing with a serious health threat, but one that most of them would survive. This meant that they would not be dealing with the additional distress and psychological and spiritual issues associated with the knowledge that their prognosis is poor.

The sample under study here was predominantly Catholic. However, there was also a substantial subsample of women who reported membership in other denominations, such as Jehovah's Witness, Baptist, Evangelist, and Pentecostal. For comparison purposes, we combined the latter women into a group of what we will refer to as non-Catholic Evangelical.

The women in this study completed a measure of the extent of their religious involvement at the time of their cancer diagnosis. They then reported on their coping responses and their emotional distress before and after surgery, and at 3-, 6-, and 12-month follow-ups. We focus here on overall religiosity, religious coping responses, and emotional distress at various time points.

Method

Participants

Participants were 49 Hispanic women referred from the Breast Health Center at Miami-Dade County's public hospital, between November 1993 and February 1996. Any woman with a previous cancer, another serious concurrent medical condition, or a positive psychiatric history was not referred for possible participa-

tion. The referral process is described more fully below.

The ethnic make-up of the sample was largely Cuban (55 percent), with 8 percent Nicaraguan, 10 percent Puerto Rican, 2 percent Dominican, and 25 percent self-reported to be of other Hispanic descents. Approximately 47 percent of the sample were married, 12 percent separated, 18 percent divorced, 16 percent widowed, and 6 percent single. The women's average age was 56.37 years ($SD = 9.42$, range 35–78).

At entry into the study, approximately 21 percent of the sample were employed, 14 percent were retired, and 65 percent reported being neither employed nor retired. As a group, the Hispanic women who participated were of very low socio-economic status (SES): 70 percent of the women reported a family income of less than \$8000 per year, and education levels were low to moderate ($M = 8.80$ years, $SD = 4.34$). The sample was mostly Catholic (72.5 percent, $n = 37$). The vast majority of the others (23.5 percent, $n = 12$) reported being members of one or another Evangelical group: Jehovah's Witness ($n = 5$), Evangelist ($n = 4$), Pentecostal ($n = 1$), Baptist ($n = 1$), and non-denominational ($n = 1$). Two additional participants, whose reported religious affiliation did not fit into either of these two categories, were omitted from these analyses.

Stage I breast cancer was diagnosed in approximately 35 percent ($n = 17$) of the sample. Women with stage II breast cancer accounted for approximately 55 percent ($n = 27$) of the sample, and 10 percent ($n = 5$) were diagnosed with stage 0 (in situ carcinoma). The majority of the women (82 percent) had no positive lymph nodes, with the number of positive nodes ranging from 0 to 17 ($M = .71$ nodes, $SD = 2.56$). Fifty-five percent ($n = 27$) of the sample received a mastectomy, while 45 percent ($n = 22$) received a lumpectomy. Over the course of the study, 43 percent of the sample received adjuvant radiation therapy, 37 percent received chemotherapy, and 35 percent received tamoxifen (a hormonal therapy).

Procedures

Shortly before this project was begun, the Breast Health Center was established to handle the needs of uninsured women in Miami-Dade County. Women referred to the center attend a multi-

disciplinary clinic for diagnosis and determination of treatment options. During this clinic, these women were routinely referred to a member of the project staff for recruitment. This staff member explained the nature and requirements of the study (participating in five interviews and authorizing access to certain parts of the patient's medical record). All of the women were explicitly informed that participation was voluntary and that declining to participate would have no adverse influence on their care. Most appeared to treat participation as a normal part of their experience at the center, however, and opted to participate. Thus our recruitment rate was quite high, over 85 percent of those who were approached.

After informed consent was obtained, a graduate student conducted the *initial* interview, which consisted of measures of demographics, religious involvement, coping strategies, and psychological functioning. The questionnaires were administered to the women verbally (in most cases in Spanish). A *post-surgery* interview was conducted approximately 7–10 days after surgery. This interview measured levels of psychological functioning and coping responses since surgery. *Follow-up* interviews were conducted 3, 6, and 12 months after the surgery and took place at the same time as medical follow-up appointments. Follow-ups also assessed recent coping responses and current levels of distress. Each woman was paid \$25.00 after each interview was completed.

Measures

Religious involvement We assessed several aspects of the women's religious involvement. The questionnaire was composed of items taken from the General Social Survey (Davis & Smith, 1989), a national yearly survey conducted since 1972. The items chosen focused on the importance of religion to the woman, her frequency of church attendance, her frequency of prayer, the extent to which she turned to religion for comfort in times of stress, and the extent to which she considered herself spiritual. Additional items also asked about the frequency with which the woman experienced doubts about her faith, and the degree to which her religious beliefs influenced her treatment decisions. Responses to specific items varied in content, but all used either 3-, 4-, or 5-point scales. The religious involvement

questions were administered at pre-surgery, and again at the 6- and 12-month follow-ups.

Factor analysis of the religiosity items yielded one factor on which five items loaded at greater than .53. These five items were summed to compose a general religiosity index score ($\alpha = .61$ at the initial assessment). The two items that did not load on this factor were the reported frequency with which the woman experienced doubts about her faith, and the degree to which religious beliefs influenced her treatment decisions. These items were further examined as separate predictors. However, the item pertaining to doubts about faith proved not to be analyzable, as all of the Evangelical women (and the majority of the Catholic women) endorsed 'never' at each assessment.

Coping Coping responses were measured at each assessment by an abbreviated version of the situational COPE (Carver, Scheier, & Weintraub, 1989). The COPE is a theoretically based inventory of coping measuring a wide variety of reactions. Response choices range from 'I haven't been doing this at all' (1) to 'I have been doing this a lot' (4). Responses assessed by the full COPE include aspects of problem-focused coping (e.g. active coping, planning), avoidance coping (e.g. behavioral and emotional disengagement, denial), seeking of social support, turning to religion as a coping strategy, and positive reframing of the experience.

Because of concerns about the willingness of this relatively uneducated sample to complete long interviews, and because the study incorporated several additional measures not discussed here, the COPE was abbreviated to a single item for each coping response. There is substantial

evidence that qualities that are familiar to respondents can be assessed adequately by single items (Burisch, 1984a, 1984b), and the coping responses assessed here are all familiar.

The religious coping portion of the COPE was modified expressly for this study, in the following way. Because we were interested in obtaining information about diverse aspects of religious coping, items were written to focus specifically on four distinct aspects of religion-related coping. The religious coping items used here are shown in Table 1. As one might expect, reports of getting emotional support from church members were correlated strongly with reports of attending church (average r over 5 assessments = .65). Correlations of getting church-related support and attending church also correlated strongly with consulting a minister or priest (average $r = .51$ and $.53$, respectively). Reports of taking comfort in religion were less related to any of these items (average $r = .28$, $.36$, and $.13$, respectively).

The other COPE items that are discussed in this article are the items reflecting denial and behavioral disengagement (a giving-up response). These items are also shown in Table 1.

Distress Mood disturbance was measured by the Profile of Mood States, or POMS (McNair, Lorr, & Droppelman, 1981). The POMS is a checklist of mood-descriptive adjectives. Participants indicate the degree to which they have experienced the emotion portrayed by the item within the past week, based on a 5-point scale ranging from 'not at all' to 'a lot'. This measure has been widely used to assess distress in research on a variety of samples, including cancer patients (cf. Trijsburg, van Knippenberg,

Table 1. Coping items (each was assessed at each measurement point)

Religious coping

I've been getting emotional support from the people in my church
I've been going to church or prayer meetings
I've been talking with my priest or minister
I've been trying to find comfort in my religion or spiritual beliefs

Behavioral disengagement

I've been giving up trying to deal with it

Denial

I've been saying to myself 'this isn't real'

Response options are: 1 = I haven't been doing this at all; 2 = I've been doing this a little bit; 3 = I've been doing this a medium amount; 4 = I've been doing this a lot

& Rijpma, 1992). Several abbreviated versions of this instrument have been developed (e.g. Blesch et al., 1991; Carver et al., 1993; Cella et al., 1987). The present study used the version used by Carver et al. (1993).

It was noted that the anxiety, depression, and anger subscales all focus on the cognitive aspects of distress, whereas the vigor, fatigue, and lack of concentration subscales focus more on the physical responses to distress. Since the physical aspects of distress could easily be confounded with the physical effects of surgery, we used a composite distress score that consisted of the average of the raw anxiety, depression, and anger subscale scores (this was the procedure used by Carver et al., 1993). Reliability analyses of the distress composite at all five time points revealed alpha coefficients between .66 and .85.

Results

The analyses reported here made use of all the data available to us. Because different numbers of women completed our measures at different time points, group sizes differ somewhat from analysis to analysis.¹ Effect sizes are also provided for for *t*-test comparisons as eta (Rosenthal & Rosnow, 1984).

Preliminary analyses for control variables

Preliminary analyses were conducted to assess the need to include control variables in the main analyses. These initial analyses consisted of tests of the associations of outcome variables (distress and coping) with various demographic and medi-

cal variables. Given the relatively small sample, control variables were included in various analyses on a case-by-case basis, as needed.

The preliminary analyses revealed that women undergoing mastectomy reported higher levels of distress at all measurement points than did women undergoing lumpectomy (all *ps* < .06). Women not receiving radiation also reported higher distress at all measurement points than women undergoing radiation as an adjuvant treatment (all *ps* < .01). Since radiation and surgical procedure were themselves related (*r* (49) = .80, *p* < .001) we tested their overlap in predicting outcome variables by multiple regression. These analyses indicated that radiation predicted significant unique variance in distress, but surgical procedure did not. Therefore, only radiation was controlled for in subsequent analyses predicting distress.

Coping was not consistently related to any one control variable. However, surgical procedure, radiation treatment, and years of education were significantly related to various individual coping items at various measurement points. These control variables therefore were included in analyses involving those coping items.

Religious groups and religiosity across time

We began by examining the degree of religiosity reported by the Catholic and Evangelical subsamples at intake, and at 6 and 12 months post-treatment. These analyses indicated that Evangelical women reported higher religiosity at all three measurement points than Catholic women (see Table 2). Religiosity in the sample as a

Table 2. Overall religious involvement and self-reported influence of religious beliefs on treatment decisions reported among Hispanic Catholic and Hispanic Evangelical Christians at pre-surgery, 6-month follow-up, and 12-month follow-up

Variable	Catholic			Evangelical			<i>t</i>	<i>p</i>	<i>eta</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>			
Religious involvement as a summed index									
Pre-surgery	34	15.8	2.5	12	17.9	1.2	2.73	.009	.38
6 months	31	13.1	2.1	10	15.8	2.4	3.39	.009	.48
12 months	31	13.0	2.0	11	16.3	1.6	4.84	.001	.61
Religious beliefs influenced treatment decisions									
Pre-surgery	36	2.0	1.4	12	2.8	1.5	1.66	.10	.24
6 months	31	1.3	0.9	10	2.6	1.5	2.55	.03	.38
12 months	31	1.4	0.9	11	3.0	1.3	4.22	.001	.56

Table 3. Means and standard deviations of distress ratings from abbreviated profile of mood states at all measurement points of the study among Hispanic Catholic and Hispanic Evangelical Christians

Time point	Catholic			Evangelical		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Pre-surgery	37	1.87	.70	12	1.70	.61
Post-surgery	37	1.60	.58	12	1.50	.66
3 months	32	1.69	.63	12	1.65	.73
6 months	31	1.72	.78	10	1.50	.73
12 months	31	1.73	.91	11	1.42	.46

The distress index is composed of the average of the Anger, Anxiety, and Depression items of the Profile of Mood States (range 1–5). Catholic and Evangelical groups did not differ at any measurement point

whole fell from the pre-surgery assessment to the 6-month assessment ($t(39) = 8.66, p < .001, \eta^2 = .81$) but did not change further from 6 to 12 months ($t(36) = .17, NS$). There was no interaction between repeated measurement and religious affiliation.

We also examined the degree to which participants reported that their religious beliefs influenced their treatment decisions. Ratings on this item did not change over time for the sample as a whole (Table 2). The initial tendency of Evangelical women to report more influence of religious beliefs on their treatment decisions than Catholic women only approached significance. However, the corresponding differences at the 6- and 12-month follow-ups were significant.

Distress

Distress levels and the use of various types of coping were also compared across measurement points and between groups. Analysis of distress (see Table 3) indicated that distress fell significantly overall from pre- to post-surgery ($t(48) = 2.62, p = .01, \eta^2 = .35$) but did not change significantly between any other adjacent pair of time points. Although the distress means of the Evangelical group tended to be lower than those of the Catholic group, this tendency did not approach significance at any measurement point.

Coping

Which particular sorts of religious coping were more common and less common? The most endorsed religious coping response was taking comfort in one's religion (means ranged from 3.78 to 3.90 across the various measurement

points). This response was significantly higher at each time point than the next highest response, which was the obtaining of emotional support from other church members (means ranged from 2.92 to 3.45), p s ranging from .02 to .001. Reports of getting emotional support from other church members did not differ significantly from reports of attending church or prayer meetings (means ranged from 2.06 to 2.72) at any measurement point other than post-surgery, $p = .005$. The least-reported response was talking with a priest or minister (means ranged from 1.49 to 1.79), which was significantly lower than the next lowest response at each measurement point, with p s ranging from .03 to .001.

Religious coping strategies differed between the two religious groups in several ways (Table 4). At pre-surgery, Evangelical women reported higher levels than did Catholics of all types of religious coping. At post-surgery, Evangelical women tended to report higher levels of talking to their ministers than did Catholics. At the 3-month follow-up, Evangelical women reported higher church attendance and tended to report getting greater support from people in their church than did Catholic women. They also tended to report higher church attendance at the 6-month follow-up. At the 12-month follow-up, Evangelical women again reported higher levels of all aspects of religious coping except talking to their minister.

Further analyses explored potential differences between groups on two non-religious types of coping. Catholic and Evangelical women differed relatively consistently on experiencing a giving-up response to the diagnosis and treatment: Catholics reported higher levels

Table 4. Differences between Hispanic Catholic and Hispanic Evangelical Christians in religious coping responses, behavioral disengagement, and denial, at pre-surgery, post-surgery, 3-month follow-up, 6-month follow-up, and 12-month follow-up

Variable	Catholic			Evangelical			t	p<	eta
	n	M	SD	n	M	SD			
Getting support from the people in my church									
Pre-surgery	11	2.00	1.34	8	4.00	.00	4.94	.001	.86
Post-surgery	21	2.71	1.52	11	3.45	1.21	1.50	NS	.29
3 months	12	3.00	1.21	10	3.80	.63	1.99	.06	.45
6 months	13	3.23	1.17	8	3.75	.46	1.43	NS	.34
12 months	15	2.53	1.30	10	3.40	.84	2.02	.06	.40
Going to church or prayer meetings									
Pre-surgery	35	1.91	1.27	12	3.25	1.36	3.09	.003	.42
3 months	29	2.45	1.35	12	3.33	1.07	2.22	.04	.41
6 months	29	2.45	1.35	10	3.30	1.25	1.75	.09	.28
12 months	30	2.30	1.29	11	3.36	1.03	2.46	.02	.37
Talking with my priest or minister									
Pre-surgery	35	1.17	.71	12	3.00	1.48	4.13	.001	.59
Post-surgery	31	1.45	1.06	12	2.25	1.42	1.76	.10	.41
Trying to find comfort in my religion or spiritual beliefs									
Pre-surgery	37	3.76	.76	12	4.00	.00	1.95	.06	.31
Post-surgery	36	3.81	.62	12	4.00	.00	1.07	NS	.30
12 months	30	3.83	.69	11	4.00	.00	2.11	.04	.37
Behavioral disengagement									
Post-surgery	36	1.39	.96	12	1.00	.00	2.42	.02	.38
3 months	31	1.45	.77	12	1.00	.00	3.28	.003	.51
6 months	30	1.37	.93	10	1.00	.00	2.16	.04	.37
Denial									
Post-surgery	36	2.31	1.31	12	1.58	.90	2.13	.04	.37

All differences that approached significance or had effect sizes greater than .28 are displayed. Response options are: 1 = I haven't been doing this at all; 2 = I've been doing this a little bit; 3 = I've been doing this a medium amount; 4 = I've been doing this a lot

of behavioral disengagement at post-surgery, and at the 3- and 6-month follow-ups. Catholics also reported significantly more denial (attempting to push away the reality of the situation) than Evangelical women at post-surgery.

How stable was participants' religious coping? There was no significant mean change in any aspect of religious coping over time, with one exception: church attendance increased from post-surgery (M = 2.15, SD = 1.46) to the 3-month follow-up (M = 2.77, SD = 1.33), $t(40) = 2.75, p = .009, \eta = .38$. Another aspect of stability concerns correlations of coping responses from one time to the next. Test-retest correlations of the four religious coping items revealed substantial instability early in the adjustment period, with respect to church

attendance and receiving of support from other church members. Correlations from pre- to post-surgery and post-surgery to 3-month follow-up for those items averaged .21 and .38, respectively. Comparable associations for talking to a priest or minister and taking comfort in religion averaged .59 and .92, respectively. By the later stage of the adaptation process, all religious coping had stabilized considerably. The test-retest correlations from 3- to 6-month and from 6- to 12-month follow-ups averaged .54 for getting support, .73 for church attendance, .55 for talking to ministers, and .81 for taking comfort in religion.

Religiosity, coping, and distress

The next set of analyses explored the extent to

Table 5. Correlations of general religious involvement index at pre-surgery among Hispanic Catholic and Hispanic Evangelical women, with distress at pre-surgery, 6-month follow-up, and 12-month follow-up

Religious affiliation	Pre-surgery	Post-surgery	3 months	6 months	12 months
Catholic	.27 (34)	.33† (34)	.21 (31)	.07 (29)	.33† (28)
Evangelical	-.16 (12)	-.35 (12)	-.35 (12)	-.89** (9)	-.18 (10)

† $p < .10$, ** $p < .01$

ns are in parentheses. The distress index is composed of the average of the Anger, Anxiety, and Depression items of the Profile of Mood States (range 1-5)

which initial religiosity related to distress. The two religious groups proved to exhibit very different patterns of associations between religiosity and distress (see Table 5). Among Catholic women, religiosity related positively to distress (r s ranged from .07 to .33 across measurement points), although these associations were not significant. In contrast, among Evangelical women, religiosity related negatively to distress (r s ranged from $-.16$ to $-.89$ across measurement points), significantly so at 6-month follow-up ($p = .003$). Comparisons between these pairs of associations determined that the correlations among Catholic women differed significantly from those of Evangelical women at post-surgery ($Z = 1.95$, $p = .05$) and 6-month follow-up ($Z = 3.61$, $p = .001$).

Partial correlations were also computed to determine whether initial religiosity would influence the development of distress. That is, would religiosity predict levels of future distress, controlling for distress at the preceding measure-

ment point? This proved to be the case in two instances, again in opposite directions in the two groups. Among Evangelical women, religiosity predicted lower distress at the 6-month follow-up, controlling for 3-month distress ($r(6) = -.86$, $p = .006$). Among Catholic women, in contrast, religiosity predicted higher distress at the 12-month follow-up, controlling for 6-month distress ($r(23) = .46$, $p = .02$).

Inspection of associations between initial religiosity and level of religious coping suggested a considerable similarity in patterns between Catholic and Evangelical women. Accordingly, we present the relations that emerged from the combined sample (see Table 6). Initial religiosity correlated significantly with obtaining emotional support from the church at pre-surgery, post-surgery, and the 12-month follow-up. However, this relationship dropped to near zero at the 3- and 6-month follow-ups. Higher initial religiosity was significantly related to attending church or prayer meetings at

Table 6. Correlations of general religious involvement index *t* pre-surgery with specific religious coping responses at each measurement point, controlling for income, surgical procedure, and religious affiliation

Religious coping response	Pre-surgery	Post-surgery	3 months	6 months	12 months
Social support from other church members	.55* (19)	.40* (30)	-.15 (23)	.03 (21)	.51* (24)
Attending church/prayer meetings	.55** (43)	.40* (42)	.29† (40)	.64** (35)	.38* (36)
Talking to priest/minister	.26 (42)	.37* (41)	.40* (39)	.32† (34)	.28 (33)
Taking comfort in religion	.33* (45)	.33* (45)	.29† (40)	.23 (36)	.33† (36)

† $p < .10$, * $p < .05$, ** $p < .01$

ns are in parentheses

all measurement points except 3 months post-surgery. Religiosity was positively related to talking to a priest/minister from post-surgery to 3-month post-surgery, and taking comfort in religion at pre- and post-surgery, but neither coping strategy was related to religiosity at the 6- and 12-month follow-ups.

Coping and distress

Recall that religiosity was related in different directions to distress across the two religious groups. For this reason, we computed correlations between coping and concurrent distress separately for the two groups. Distress proved to be correlated in opposite directions among Catholic and Evangelical women with talking to a priest or minister as a coping strategy. Among Catholic women, talking to a priest at the 3-month follow-up related to higher concurrent distress ($r(25) = .42, p = .03$). However, among Evangelical women, talking to a minister was related inversely to distress at pre-surgery ($r(10) = -.59, p = .04$) and 3-month follow-up ($r(11) = -.59, p = .04$).

There were two other significant associations between religious coping and distress. Among Catholic women, taking comfort in religion at pre-surgery related to higher concurrent distress ($r(34) = .35, p = .04$). Among Evangelical women, attending prayer or church groups at the 6-month follow-up was related inversely to concurrent distress ($r(8) = -.88, p = .001$).²

Prospective prediction between coping and distress

The preceding analyses provide a picture of the experiences of the group of women at various points in time. Because the associations are concurrent, however, they provide no information about temporal precedence or causal influence. Further tests were conducted to examine temporal precedence. Specifically, partial correlations were computed, for each group separately, to determine whether religious coping would predict future distress, controlling for distress at the previous measurement point (with a further control for radiation).

These analyses revealed that among Catholic women, getting support from church members at pre-surgery predicted higher levels of distress at post-surgery ($r(7) = .86, p = .003$). Among Catholic women, attending church or prayer

groups at the 6-month follow-up also predicted higher distress at the 12-month follow-up ($r(21) = .48, p = .02$). Among Evangelical women, getting emotional support from church members at the 6-month follow-up was related to lower distress at the 12-month follow-up ($r(4) = -.99, p < .001$).

Partial correlations were also computed (for each group separately) to determine whether differences in distress would predict future religious coping responses (controlling for coping at the previous measurement point). Among Evangelical women, pre-surgical distress predicted lower attendance of church or prayer meetings at post-surgery ($r(9) = -.64, p = .03$) and distress at 3 months predicted lower church attendance at the 6-month follow-up ($r(7) = -.67, p = .05$). Among Catholic women, distress at the 3-month follow-up predicted lower levels of talking to a priest/minister ($r(18) = -.51, p = .02$), and less taking comfort in religion ($r(22) = -1.00, p < .001$) at the 6-month follow-up. Thus, there was at least limited evidence that distress at one point dampened religious coping at the subsequent point.

Discussion

In this study we examined associations among religiosity, religious coping, and distress in a sample of low-SES Hispanic women who had been diagnosed with early-stage breast cancer at the point of their recruitment. The findings of this study suggest several distinct points.

Varieties of religious coping

First, the data indicated that some kinds of religious coping are more common than others. The most commonly used path of religious coping in this sample was internal—taking comfort in one's religious faith. Responses that involved obtaining emotional support from others and attending religious services were engaged in significantly less often. Least common of all were reports of talking with a priest or minister.

This pattern of results is similar to that reported by Pargament et al. (1990). Although they measured a larger number of religious coping items (grouped into factors), the highest means they reported were on items such as

'experienced God's love and care', 'accepted that the situation was in the hands of God', and 'trusted that God would not let anything terrible happen to me'. These items most resemble our coping response of taking comfort in religion. Among the lowest means reported by Pargament et al. (1990) were 'receiving support from clergy', also consistent with our data. Receiving support from other church members and attending religious services fell in between these other categories.

In general, then, our results suggest that Hispanic women with breast cancer showed religious coping responses that were similar to those of a sample of men and women experiencing a variety of negative life events. It seems that when faced with a variety of stressors, people tend to most commonly seek comfort in their religion, followed by engaging in church activities and seeking social support from church members, and finally, speaking with clergy.

Religiosity and religious coping

A second point to be drawn from this study concerns the relationship of religiosity to religious coping responses. In general, these relationships were not terribly strong. Religiosity correlated significantly with religious coping at only a few time points (with talking to a priest or minister at 3 months, with taking comfort in religion at pre- and post-surgery, and with obtaining emotional support from the church at pre-surgery, post-surgery, and 12 months). This may be a product of our low sample size, and consequent low power. However, it should be clear that 'having a strong religious identification' and 'engaging in religious types of coping' are by no means identical to each other.

The finding that religiosity was correlated with obtaining emotional support from other church members at pre-surgery, post-surgery, and 12 months (but not at 3 and 6 months) was of particular interest. One interpretation for this finding that we regard as plausible is that adjuvant treatments occurred primarily during the periods covered by the 3- and 6-month follow-ups. Side effects from these adjuvant treatments may have prevented active church involvement (and thus the utilization of emotional support from church members) during this period. Indeed, this interpretation is further

supported by the fact that the only time religiosity was not related to church attendance was at the 3-month follow-up.

Comparison of Catholic and Evangelical women

Another important conclusion to be drawn from this study is that the impact of religiosity can be very different as a function of the nature of a person's religious affiliation. Higher levels of religious involvement or commitment tended to be related to lower distress among Evangelical women, but to higher distress in Catholic women, throughout the year after diagnosis and treatment. Although the correlations within each group were mostly non-significant, the correlations differed significantly from each other at post-surgery and 6-month follow-up.

A further reflection of this difference between religious classifications came in analyses predicting distress at one time point controlling for prior distress (thus, in effect, predicting change in distress). In one of these tests, religiosity among Evangelical women predicted lower distress at the 6-month point, even when controlling for distress at 3 months. In another test, an opposite effect was obtained for Catholics: controlling for 6-month distress, religiosity predicted higher 12-month distress.

Clearly, religiosity has different predictive associations with distress in these two groups. Whereas religiosity appeared to protect against distress for Evangelical women, it tended to be a risk factor for distress among Catholic women. These results suggest a potentially important qualification on findings indicating that religiosity is related to positive well-being (Ell et al., 1989; Kaczorowski, 1989; Tix & Frazier, 1998). Evidently, the effect of religiosity on subjective well-being depends on one's religious affiliation.

A related pattern was found for the prospective effects of certain kinds of religious coping on distress. Among Evangelical women, obtaining emotional support from church members at the 6-month follow-up predicted lower distress at the 12-month follow-up. Among Catholic women, in contrast, getting emotional support from church members at pre-surgery predicted greater distress at post-surgery, and higher church attendance at the 6-month follow-up predicted greater distress at the 12-month follow-up.

The pattern of these results can be seen as being consistent with findings reported by Park et al. (1990). They found that, following an uncontrollable stressor, religious coping buffered distress for Protestants but exacerbated distress for Catholics. Breast cancer is an uncontrollable stressor. In this context we similarly found that engaging in religious coping (or being invested in religious identification) created problems for Catholics, while buffering distress for others.

Why do these differences between religious classifications exist? One interpretation would be that Catholics may simply engage in religious coping more than Evangelicals when they are experiencing an increase in distress. However, other aspects of the results cast doubt on this interpretation. Among Catholics, distress at 3 months predicted a *reduction* rather than an increase in religious coping at 6 months, in the form of less talking with a priest and less taking of comfort in religion.

Another interpretation rests on the idea that the ideologies of the different religious groups have different emphases. Catholicism places an emphasis on confession, judgment, and obtaining absolution from guilt (Park et al., 1990), which may imply that the Catholic image of God's nature is a relatively judgmental and punitive one. In contrast, Protestant sects tend to emphasize faith and acceptance. Many Evangelical Christians believe that they are already saved for eternity.

Perhaps, then, being more invested in their religion simply made the Catholic women in this sample more aware of a need to settle their earthly affairs and prepare for a hereafter in which they will experience God's judgment. This interpretation would also be consistent with the fact that Catholic women in this sample reported a greater tendency to experience a 'giving up' response than did the Evangelical women at post-surgery, at 3-month follow-up, and 6-month follow-up. Although this interpretation of the differences between groups appears plausible, it clearly goes beyond the evidence available to us, and should be viewed with suitable caution.

Limitations and concluding comment

The findings of this study, although interesting,

are subject to important limitations. First, participants were all early-stage breast cancer patients. They were confronting a specific life-threatening illness, but their prognosis was good. We cannot be sure that the findings would generalize to other patient groups, or to women with more advanced cancers, or to men.

Another important limitation is that the participants examined here were all recruited from a county hospital that caters to the indigent. We cannot be sure that the pattern of findings would generalize to Hispanic women who are more educated and affluent than those studied here. This recruitment site also attracts far more Hispanic women than African-American or non-Hispanic whites. Thus, we did not have another ethnic group of comparable SES to study. Our conclusions can be applied only to this low-SES Hispanic sample.

Indeed, it is worth noting explicitly that this sample is not at all representative of samples in the existing psycho-oncology literature. Most prior studies have reported on the experiences of predominantly non-Hispanic white women who are from middle to upper middle class SES. The extent to which various aspects of the experience of dealing with breast cancer generalize across ethnicities and social strata needs much more investigation.

A further limitation on the data set concerns the diversity among religious groups. The majority of the sample was Catholic, with the remainder falling into several different subgroups. It was our inference from the denominations that the women endorsed were Evangelical groups. This lumping together of these groups requires the tentative acceptance of the assumption that the specific denominations share important characteristics with one another. Although that assumption led us to an intelligible set of associations, the assumption remains tentative. Future research should make every effort to obtain larger samples, in order to obtain greater differentiation among non-Catholics.

Despite these cautions, the findings of this study have important implications. Religiosity and religious coping are not the same. Further, the impact of both of these variables depends in part on the nature of the person's religious affiliation. Future research should examine more closely the psychological characteristics associated with varying religious classifications, to

determine why religious commitment and religious coping have different consequences among various religious groups.

Notes

1. All participants retained for analysis endorsed a religious affiliation. However, on a measure not included in this report, a substantial number of participants indicated that social support from church members was 'not applicable'. For that reason, in analyzing responses to this particular coping item, we treated those participants as missing data, rather than recoding the response to 'not at all'.
2. Multiple regression analyses assessed whether these predictions of coping were above and beyond any prediction by religiosity per se. With one exception, the coping response remained a significant predictor of distress when religiosity was entered. The exception was that among Evangelical women, the negative association between talking to a minister and distress at the 6-month follow-up failed to remain a significant predictor of distress when religiosity was also entered as a predictor.

References

- Abraido-Lanza, A. F., Guier, C., & Revenson, T. A. (1996). Coping and social support resources among Latinas with arthritis. *Arthritis Care and Research, 9*, 501-508.
- Allport, G. W., & Ross, J. M. (1967). Personal religious orientation and prejudice. *Journal of Personality and Social Psychology, 5*, 432-443.
- Blesch, K. S., Paice, J. A., Wickham, R., Harte, N., Schnoor, D. K., Purl, S., Rehwalt, M., Kopp, P. L., Manson, S., Coveny, S. B., McHale, M., & Cahill, M. (1991). Correlates of fatigue in people with breast or lung cancer. *Oncology Nursing Forum, 18*, 81-87.
- Burisch, M. (1984a). Approaches to personality inventory construction: A comparison of merits. *American Psychologist, 39*, 214-227.
- Burisch, M. (1984b). You don't always get what you pay for: Measuring depression with short and simple versus long and sophisticated scales. *Journal of Research in Personality, 18*, 81-98.
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology, 65*, 375-390.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*, 267-283.
- Ceballos-Capitaine, A., Szapocznik, J., Blaney, N. T., Morgan, R. O., Millon, C., & Eisdorfer, C. (1990). Ethnicity, emotional distress, stress-related disruption, and coping among HIV seropositive gay males. *Hispanic Journal of Behavioral Sciences, 12*, 135-152.
- Cella, D. F., Jacobsen, P. B., Orav, E. J., Holland, J. C., Silberfarb, P. M., & Rafta, S. (1987). A brief POMS measure of distress for cancer patients. *Journal of Chronic Disease, 40*, 939-942.
- Davis, J. A., & Smith, T. W. (1989). *General social surveys, 1972-1989: Cumulative codebook*. Chicago: National Opinion Research Center.
- Die Trill, M., & Holland, J. (1993). Cross-cultural differences in the care of patients with cancer: A review. *General Hospital Psychiatry, 15*, 21-30.
- Ell, K. O., Mantell, J. E., & Hamovitch, M. B. (1988). Socioculturally sensitive intervention for patients with cancer. *Journal of Psychosocial Oncology, 6*, 141-154.
- Ell, K. O., Mantell, J. E., Hamovitch, M. B., & Nishimoto, R. H. (1989). Social support, sense of control, and coping among patients with breast, lung, or colorectal cancer. *Journal of Psychosocial Oncology, 7*, 63-89.
- Ferrell, B. R., Grant, M., Funk, B., Otis-Green, S., & Garcia, N. (1998). Quality of life in breast cancer—part II: Psychological and spiritual well-being. *Cancer Nursing, 21*, 1-9.
- Fredette, S. L. (1995). Breast cancer survivors: Concerns and coping. *Cancer Nursing, 18*, 35-46.
- Hill, P. C., & Butter, E. M. (1995). The role of religion in promoting physical health. *Journal of Psychology and Christianity, 14*, 141-155.
- Jenkins, R. A. (1995). Religion and HIV: Implications for research and intervention. *Journal of Social Issues, 51*, 131-144.
- Kaczorowski, J. M. (1989). Spiritual well-being and anxiety in adults diagnosed with cancer. *The Hospice Journal, 5*, 105-116.
- Koenig, H. G., Cohen, H. J., Blazer, D. G., Pieper, C., Meador, K. G., Shelp, F., Goli, V., & DiPasquale, B. (1992). Religious coping and depression among elderly, hospitalized medically ill men. *American Journal of Psychiatry, 149*, 1693-1700.
- Koenig, H. G., George, L. K., & Siegler, I. C. (1988). The use of religion and other emotion-regulating coping strategies among older adults. *Gerontological Society of America, 28*, 303-310.
- Lacayo, C. G. (1984). Hispanics. In E. B. Palmore (Ed.), *Handbook of the aged in the United States*. Westport, CT: Greenwood.

- Levin, J. S., & Vanderpool, H. Y. (1991). Religious factors in physical health and the prevention of illness. *Prevention in Human Services, 9*, 41-64.
- McNair, D., Lorr, M., & Droppelman, L. (1981). *Profile of Mood States manual*. San Diego, CA: EDITS.
- Pargament, K. I., Ensing, D. S., Falgout, K., Olsen, H., Reilly, B., Van Haitsma, K., & Warren, R. (1990). God help me: (I): Religious coping efforts as predictors of the outcomes to significant negative life events. *American Journal of Community Psychology, 18*, 793-824.
- Park, C., Cohen, L. H., & Herb, L. (1990). Intrinsic religiousness and religious coping as life stress moderators for Catholics versus Protestants. *Journal of Personality and Social Psychology, 59*, 562-574.
- Rosenthal, R., & Rosnow, R. L. (1984). *Essentials of behavioral research: Methods and data analysis*. New York: McGraw-Hill.
- Smith, E. D., Stefanek, M. E., Joseph, M. V., Verdieck, M. J., Zabora, J. R., & Fetting, J. H. (1993). Spiritual awareness, personal perspective on death, and psychosocial distress among cancer patients: An initial investigation. *Journal of Psychosocial Oncology, 11*, 89-103.
- Taylor, S. E., & Chatters, L. M. (1991). Religious life. In J. S. Jackson (Ed.), *Life in Black America* (pp. 105-123). Newbury Park, CA: Sage.
- Tebbi, C. K., Mallon, J. C., Richards, M. E., & Bigler, L. R. (1987). Religiosity and locus of control of adolescent cancer patients. *Psychological Reports, 61*, 683-696.
- Tix, A. P., & Frazier, P. A. (1998). The use of religious coping during stressful life events: Main effects, moderation, and mediation. *Journal of Consulting and Clinical Psychology, 66*, 411-422.
- Trijsburg, R. W., van Knippenberg, F. C., & Rijpma, S. E. (1992). Effects of psychological treatment on cancer patients: a critical review. *Psychosomatic Medicine, 54*, 489-517.
- Wyatt, G., & Friedman, L. L. (1996). Long-term female cancer survivors: Quality of life issues and clinical implications. *Cancer Nursing, 19*, 1-7.

Concerns About Breast Cancer and Relations to Psychosocial Well-Being in a Multiethnic Sample of Early-Stage Patients

Stacie M. Spencer
University of Pittsburgh

Jessica M. Lehman, Christina Wynings,
Patricia Arena, Charles S. Carver,
Michael H. Antoni, Robert P. Derhagopian,
and Gail Ironson
University of Miami

Neil Love
Jackson Memorial Hospital

Much work on psychosocial sequelae of breast cancer has been guided by the assumption that body image and partner reaction issues are focal. In a tri-ethnic sample of 223 women treated for early-stage breast cancer within the prior year, the authors assessed a wider range of concerns and relations to well-being. Strongest concerns were recurrence, pain, death, harm from adjuvant treatment, and bills. Body-image concerns were moderate; concern about rejection was minimal. Younger women had stronger sexual and partner-related concerns than older women. Hispanic women had many stronger concerns and more disruption than other women. Life and pain concerns and sexuality concerns contributed uniquely to predicting emotional and psychosexual disruption; life and pain concerns and rejection concerns contributed to predicting social disruption. In sum, adaptation to breast cancer is a process bearing on several aspects of the patient's life space.

Key words: breast cancer, quality of life, psychosocial sequelae, psychological well-being, ethnicity

The experience of breast cancer is unquestionably the source of substantial distress. However, among early-stage patients with no prior history of psychiatric disturbance, severe psychiatric symptoms are less common than was once believed and far less common than among patients with more advanced cancers (Bloom et al., 1987; Gordon et al., 1980; Lansky et al., 1985; Penman et al., 1987; for reviews see Glanz & Lerman, 1992; Irvine, Brown, Crooks, Roberts, & Browne, 1991; Moyer & Salovey, 1996). The experience of early-stage breast cancer is now widely viewed as a crisis, which is weathered during the period of about a year postsurgery by the majority of patients.

Women's psychological responses to early-stage breast cancer are influenced by many factors, including surgical procedure. Mastectomy patients typically report poorer psychosexual adjustment (assessed as sense of attractive-

ness, femininity, and sexual desirability) than lumpectomy patients, though the groups do not differ in mood disturbance (e.g., Bartelink, van Dam, & van Dongen, 1985; de Haes & Welvaart, 1985; Fallowfield, Baum, & Maguire, 1986; Kemeny, Wellisch, & Schain, 1988; Morris & Royle, 1988; Pozo et al., 1992; Sanger & Reznikoff, 1981; Schain et al., 1983; Steinberg, Juliano, & Wise, 1985; Taylor, Lichtman, Wood, Bluming, Dosik, & Leibowitz, 1985; Wellisch et al., 1989). This pattern of findings illustrates both the diversity among psychological sequelae of breast cancer and the fact that the sequelae do not necessarily have the same determinants.

This work also reflects an orienting assumption that seems implicit in much research on psychosocial responses to breast cancer. Specifically, it often seems to be assumed that the major concern of the early-stage breast-cancer patient is the impact of the disease and its treatment on her body image (Carver et al., 1998; Mastrovito, 1974; Meyerowitz, 1980; Polivy, 1977; Schain, 1988; Sinsheimer & Holland, 1987; Sutherland, 1967; Wolberg, Tanner, Romsaas, Trump, & Malec, 1987). Thus, prime targets for study have been questions such as the extent to which the breast-cancer patient continues to feel attractive, feminine, and sexually desirable after treatment.

The focus on body image reflects an evolution in the thinking of researchers on psychological sequelae of breast cancer. In earlier years, a psychoanalytic approach dominated thinking about the psychological impact of breast cancer (though it should also be kept in mind that the

Stacie M. Spencer, Department of Psychology, University of Pittsburgh; Jessica M. Lehman, Christina Wynings, Patricia Arena, Charles S. Carver, Michael H. Antoni, Robert P. Derhagopian, and Gail Ironson, Department of Psychology, University of Miami; Neil Love, Jackson Memorial Hospital, Miami, Florida.

This research was supported by Research Grant CA-64710 from the National Cancer Institute and Training Grant J4236-DAMD1794 from the Department of Defense.

Correspondence concerning this article should be addressed to Charles S. Carver, Department of Psychology, University of Miami, Coral Gables, Florida 33124-2070. Electronic mail may be sent to ccarver@miami.edu.

surgical treatment itself was far more severe than it is now—cf. Holland & Rowland, 1987). The assumption at that time was that a woman with breast cancer confronted a challenge to her identity as a feminine being (Polivy, 1977). Today, discussions of the impact of body image focus more on perceptions of physical disfigurement per se and a consequent loss of confidence about relations with significant others.

The assumption that women with breast cancer have special concerns about body image is certainly a reasonable one. However, there is surprisingly little systematic evidence about how such concerns rank among the many concerns possible. *Is* body image the key concern among early-stage breast-cancer patients? If not, what concerns *are* focal? Several sources of indirect evidence exist. Studies have assessed problems cancer patients experience at various phases of their treatment (e.g., Freidenbergs, Gordon, Hibbard, & Diller, 1980; Ganz, Polinsky, Schag, & Heinrich, 1989; Meyerowitz, Sparks, & Spears, 1979; Mor, Malin, & Allen, 1994). However, these studies tend to focus on current impact of the treatment on practical domains of life—for example, dissatisfactions with medical services, problems doing housework, financial problems, and disruption of daily routine and family activities. They provide little information on concerns outside those realms.

One study that does provide such information was conducted some time ago by Gotay (1984). She interviewed early-stage gynecological patients (within 2 weeks after diagnosis) and later-stage gynecological and (mostly) breast-cancer patients. Participants were asked to specify their concerns and to describe what they were doing about the concerns. Gotay found that the greatest concern expressed was the possibility of progression or recurrence of the cancer. Among the early-stage gynecological patients, the ability to bear children in the future was the second most common, followed by concerns about effects of the illness on their jobs. Among more advanced patients, fear of progression was matched by concerns about restrictions on activities and about side effects of treatments. In both groups, concern about being able to handle the emotional distress was also commonly mentioned.

These findings are valuable, but they have important limitations. First, the breast-cancer patients in this sample were Stage III and IV patients, in whom concern about progression, physical debilitation, and side effects of treatment would be expected to be especially high. The early-stage patients were gynecological patients, whose concerns may differ from those of breast-cancer patients. Second, the assessment of these early-stage gynecological patients took place very shortly after diagnosis, when the shock of having been diagnosed with cancer was at its peak. It is unclear whether the concerns of these patients may have shifted across the months after diagnosis, as they adapted to the knowledge of their diagnosis, treatment, and favorable prognosis. Third, ethnic minority groups were not well represented in this study, or for that matter in other research relevant to the concerns of breast-cancer patients.

The study reported here was undertaken, in part, to provide further information about what concerns are stron-

gest in the minds of early-stage breast-cancer patients during the first year posttreatment. To do this, we surveyed a tri-ethnic sample of patients, all of whom had had surgery within the prior year. They rated the extent to which they were concerned about each of a series of issues that were presented to them, permitting us to compare the degree of concern across domains. We report here the overall profile of concerns and differences between ethnic subgroups.

Knowing what concerns are salient is important, but it is also important to know which concerns relate most to distress. That is, a given concern may be salient but fail to have an impact on feelings of well-being. A relatively low-level concern may have a strong link to well-being. Accordingly, we also report associations between the concerns reported and several indicators of subjective well-being.

Method

Participants

Participants were 223 women with early-stage breast cancer, recruited through several Miami-area hospitals and practices. In most cases, recruitment began with a letter from the woman's physician to her, which introduced the study and asked her to consider participating in it (in some cases the study was introduced during an office visit). Letters were sent to all early-stage breast-cancer patients these physicians had treated within the past year. The letter was accompanied by a more concrete description of what would be involved in participating. Those interested returned the bottom of that page by mail to indicate when and where they might be reached by phone. Female graduate students called them, explained the study in more detail, and (for all who wished to participate) mailed the women informed consent forms and questionnaire packets. Each participant was paid \$40 upon return of the packet. The final participation rate of women initially contacted by letter was approximately 80%.

The patients under study were diagnosed with either Stage 0 ($n = 10$), Stage I ($n = 128$), or Stage II ($n = 85$) breast cancer. Approximately a third of the women (74) reported a positive family history for breast cancer. Nodal involvement ranged from 0 to 21 ($M = 0.86$, $SD = 2.67$). Most were English speakers, though a few of the participants completed the questionnaires in Spanish ($n = 13$; preliminary analyses revealed that outcome variables did not differ by language of administration). No participant had a positive psychiatric history, prior cancer, or major concurrent disease.

Most of the women were married or in an equivalent relationship (157); 29 were separated or divorced, 24 were widowed, and 13 were single. The majority of the women were non-Hispanic White (151), 48 were Hispanic, and 24 were African Americans. The women had completed an average of 14.39 years of education ($SD = 2.80$). Ninety-eight were currently employed full time, 20 were employed part time, and 105 were not currently working outside the home. Because the data collection had been funded by a project with a focus on the special concerns of younger breast-cancer patients, the sample was heavily weighted with younger patients, ranging in age from 27 to 87 ($M = 53.75$, $SD = 12.62$).

Seventy-eight of the women had modified radical mastectomies, 9 had bilateral mastectomies, and 136 had lumpectomies (tumor excision). Fifty of the women had undergone reconstruction. Three coding options were used for each adjuvant treatment assessed: "no," "yes but not in the past 4 weeks," and "yes in the past 4 weeks." On these items, 137 reported radiation therapy (46 in the

past 4 weeks), 84 reported chemotherapy (29 in the past 4 weeks), and 83 were receiving tamoxifen.

An attempt was made to recruit women who varied in the amount of time that had passed since their surgery, to ascertain whether the passage of time (and involvement in, vs. completion of, adjuvant therapy) would have an influence on the profile of concerns women reported. For this purpose, we established selection windows at 3, 6, and 12 months postsurgery. Time since surgery varied as much as a month in either direction from the target date except for the 3-month window, for which the lower bound was only 2 weeks prior to the 3-month mark. Women in the 3-month window numbered 69, 72 were in the 6-month window, and 82 were in the 12-month window.

Psychosocial Measures

Profile of concerns. The measure of participants' concerns was the Profile of Concerns about Breast Cancer (PCBC), created for this study. It consists of 28 items, each naming a specific potential concern stemming from the diagnosis or medical treatment. The items were written by members of the research team, partly on the basis of the existing psychooncology literature and partly on the basis of years of first-hand experience with breast-cancer patients. An attempt was made to cover a diverse range of potential concerns. The items are listed in Table 1.

The introduction to the PCBC said that many sorts of things go through people's minds when they confront any illness, including breast cancer. The respondent was to indicate how concerned she was about each of this list of issues. She was asked not to respond according to how she had felt at the moment she found out she had

breast cancer but according to how she has felt for the last few days, including today. Response options ranged from 1 (*not at all concerned*) to 5 (*extremely concerned*). Another option indicated the concern was not applicable (e.g., a concern about not seeing children grow up would not apply to someone whose children were already grown).

Women were also given the opportunity to enter specific concerns not named in the list and to rate those concerns along with the ones that had been provided. Of the 223 women in the sample, 45 (20%) added at least one concern. The concerns that the women added were of real importance to them: The majority were rated as "extremely concerned." Although many of the concerns added by participants could be viewed as more focused restatements of concerns already on the list, some were new. Concerns expressed with some frequency in this way were concerns about hair loss, difficulty of obtaining health insurance in the future, the possibility of an error in diagnosis, and financial issues such as loss of a business because of time spent away from work.

Emotional adjustment. Emotional distress was assessed by three measures. The first was the abbreviated version of the Profile of Mood States (POMS; McNair, Lorr, & Droppelman, 1981) used in our earlier research (Carver et al., 1993). The POMS assesses several emotions. It consists of a series of adjectives, each a mood descriptor. Respondents in this study indicated the extent to which they had had the feeling described for the past week including today, using response choices that ranged from 1 (*not at all*) to 5 (*extremely*). An index of the responses made to items reflecting anxiety, anger, and depression ($\alpha = .90$) was one measure of emotional adjustment.

A second measure of emotional adjustment was the Center for

Table 1
Items of Profile of Concerns About Breast Cancer in Order Administered and Overall Sample Means (Response Options Range From 1 [not at all] to 5 [extremely])

As you think about your illness, how much are you concerned . . .	M	SD	
1. that you won't be able to get a better job (or be promoted) if they know you had cancer.	1.98	1.43	
2. that you won't be given the raises you deserve because of your illness.	1.65	1.21	
3. that the bills from the treatment will be overwhelming.	2.38	1.43	M
4. that you won't be able to have children.	1.79	1.42	
5. that you won't see your children grow up.	2.52	1.51	M
6. that your partner (or a potential new partner) will reject you because of the tumor or your treatment.	1.57	1.13	L
7. that your children will become less affectionate or less loving with you.	1.14	0.59	L
8. that your family will become angry with you.	1.12	0.51	L
9. that you will argue more with your partner.	1.39	0.88	L
10. that the treatment will make you feel less feminine, less like a woman.	1.71	1.21	
11. that the treatment will make you less desirable sexually.	1.86	1.30	
12. that the various treatments will make you less likely to have sexual feelings.	1.92	1.27	
13. that people won't think you look as good as you did.	1.62	1.06	L
14. that your friends will avoid you.	1.21	0.68	L
15. that people at work won't want to interact with you.	1.26	0.78	L
16. that your friends will act as though your disease is contagious.	1.12	0.59	L
17. that chemotherapy or radiation therapy will make you sick.	2.79	1.46	M
18. that chemotherapy or radiation therapy will damage your body in some way.	2.87	1.40	M
19. that you'll undergo an early menopause.	2.08	1.43	
20. that you may die soon.	2.22	1.24	M
21. that you won't be able to go places you want to go and do things you want to do.	1.94	1.28	
22. that you will always feel physically damaged from this disease.	2.02	1.24	
23. that your life with your partner will be cut short.	2.11	1.22	M
24. that the cancer may come back.	3.14	1.35	M
25. that you will lose your sense of independence/self-sufficiency.	2.31	1.39	M
26. that others perceive you as less strong, fit, and healthy than before you were diagnosed with breast cancer.	1.82	1.18	
27. that physical pain might come from your illness or its treatment.	2.32	1.31	M
28. that you might become dependent on or addicted to drugs or medications.	1.53	1.05	L

Note. N differs from item to item, as some items were not applicable to all participants; M = most-endorsed items; L = least-endorsed items.

Epidemiologic Studies Depression scale (CES-D; Radloff, 1977). The CES-D measures a range of cognitive, affective, motivational, and somatic symptoms (for data on validity, see Myers & Weissman, 1980; Schulberg et al., 1985). Instructions to the respondent are to indicate the extent to which she has had a variety of experiences (framed as "I" sentences), in this case within the past week. Options for responding range from 0 (*rarely or none of the time*) to 3 (*most or all of the time*).

Our third measure of emotional adjustment was the extent to which the woman reported feeling a positive quality of life in her day-to-day experiences. Because our focus was on patients who have few physical symptoms, we did not assess cancer-specific aspects of quality of life but aspects of general quality of life. We selected 11 items from Andrews and Withey (1976) that address a reasonable range of the life activities. Respondents considered each item's content and indicated how they felt about that domain of life, on a scale ranging from 1 (*terrible*) to 7 (*delighted*). This brief measure (which has high internal reliability, $\alpha = .89$) was used in our earlier breast-cancer research (Carver et al., 1994).

Preliminary analysis indicated that the three measures just described were fairly strongly correlated with one another (inter-scale r s ranged from .62 to .75, standardized α after reversing the coding for quality of life = .87). For this reason, the three measures were merged into an index of emotional distress, by standardizing responses to each of the measures and averaging the z scores.

Psychosexual adjustment. Psychosexual well-being was assessed by two measures. The first was the Sexual Relations subscale from the Psychosocial Adjustment to Illness Scale (PAIS), a self-report measure of how illness is influencing well-being (Derogatis, 1975). The Sexual Relations items assess changes in sexual interests, activities, and abilities. Each item has its own response options. This scale was scored such that high values imply greater adverse impact on sexual relations.

Another measure of psychosexual well-being consisted of a series of individual items culled from previous studies of the impact of mastectomy versus lumpectomy (Carver et al., 1998). The items on which we focus here are self-ratings of physical attractiveness ("How physically attractive do you feel you are?"), sexual desirability ("How sexually desirable do you feel you are?"), and femininity ("How feminine, or how much like a woman, do you feel you are?"). All were self-rated on scales ranging from 1 (*not at all*) to 5 (*extremely*). Responses to these 3 items were highly intercorrelated (r s ranged from .64 to .79, $\alpha = .87$). For this reason, the items were merged into an index of femininity by standardizing responses to each item and averaging the z scores. This is the only outcome variable for which a high value is a sign of positive well-being. Because the PAIS Sexual Relations scale and this index were only moderately related to each other ($r = .48$), they were examined separately.

Disruption of social and recreational activities. An important aspect of psychosocial adjustment to an illness is remaining engaged in life's normal activities after medical treatment. If the illness or its treatment disrupts social activities, either for psychological reasons or because of physical symptoms from adjuvant treatment, the patient may become more isolated from her social network, which can lead to further adverse effects on well-being (Bloom & Spiegel, 1984). To assess illness-related disruptions, we used two subscales of the Sickness Impact Profile (SIP; Bergner, Bobbitt, Carter, & Gilson, 1981). These were subscales measuring adverse impact of the illness or its treatment on Social Activities and Recreational Pastimes. As scores on these scales were strongly correlated ($r = .70$), we combined them into an index of disruption, by computing z scores and averaging them.

Association among facets of well-being. The various outcome measures used here had different focuses, but they obviously were

not independent of one another. The associations ranged in strength from a correlation of .58 between distress and disruption of social activities and $-.43$ between social disruption and the sense of femininity. Although the indexes were analyzed separately, these associations should also be kept in mind in interpreting the results.

Results

Preliminary Analyses for Control Variables

The outcome variables in this study were the concerns patients expressed about breast cancer, emotional distress, sexual disruption, the sense of femininity, and disruption of social activities. Of interest to us as potential predictors of these outcomes were age, ethnic group, and time since surgery. Before examining the role of these variables, however, we conducted preliminary analyses to assess the need to include other variables as controls. Variables tested in this way were surgical procedure, stage of disease, chemotherapy status, radiation status, reconstruction status, employment status, education level, and family history of breast cancer.

None of these variables related significantly to any measure of well-being, but two variables related significantly to concerns. Surgical procedure related to concern about overwhelming bills ($p < .01$), that the treatment would result in lowered sexual desirability ($p < .01$), and that adjuvant therapy would produce sickness as a side effect ($p < .02$). In each case, lumpectomy patients reported less concern than mastectomy patients (single and double mastectomy patients did not differ).

Chemotherapy status related significantly to a relatively large number of concerns: possibly not being able to have children ($p < .02$); that the treatment would make them feel less feminine ($p < .001$), less sexually desirable ($p < .001$), and less likely to have sexual feelings ($p < .002$); that people wouldn't think they look as good as they had ($p < .002$) and that friends would avoid them ($p < .03$); that the therapy would make them sick ($p < .02$) and damage their body ($p < .03$); that they would always feel physically damaged ($p < .04$); that they might undergo early menopause ($p < .04$); that they wouldn't be able to go places and do things as they wished ($p < .04$); that their life with their partner would be cut short ($p < .01$); and that they might die soon ($p < .03$). In all cases, patients receiving chemotherapy reported more concern than those without chemotherapy (on most of these items those whose chemotherapy was in the past did not differ from those with current chemotherapy).

Given these associations, when analyzing predictors of the concerns as outcomes, surgical procedure and chemotherapy status were included as controls. Time since surgery was included in all analyses but proved not to relate to any outcome variable and is not discussed further.

Overall Profile of Greater and Lesser Concerns

Table 1 (earlier) included means for the full sample on each item of the PCBC. Recall that women were permitted to indicate that a given item was not applicable (particularly

common for items dealing with work, partners, and children), which means that the sample size varies across the items. The nine items for which responses indicated the greatest degree of concern are marked with the letter M; the nine items for which responses indicated the lowest degree of concern are marked with the letter L.

The single largest concern reported was the possible recurrence of the cancer. This concern was significantly higher than the next highest item (by paired *t* test), bearing on potential damage from the adjuvant therapies ($p < .001$). Concern about damage from adjuvant therapy, in turn, was higher than concern about not seeing children grow up ($p < .02$), which was significantly higher than concern about bills ($p < .02$). As a group, then, the highest-rated concerns blend existential and practical issues: premature death, pain, and overwhelming bills. To the extent that relationships are mentioned in these high-level concerns, it is in the form of concern about not being able to live out the relationships, rather than concern about adverse reactions from significant others.

Adverse reactions from others, in fact, were among the least intense of the concerns reported. With the exception of an item dealing with dependency on drugs and medications, the least endorsed items all deal with rejection, avoidance, or friction from family, partners, and friends. Items falling in the middle range of endorsement included several dealing with sexuality and femininity and others dealing with self-perceptions and other-perceptions of strength and self-sufficiency.

Data Reduction Among Concerns

To explore the possibility that the PCBC items reflect a more limited number of latent variables, we conducted a factor analysis, limited to items for which at least 200 of the 233 participants provided responses. A "not applicable" response was fairly common for items regarding work (many women did not work), partner reactions (some had no partners), children (some had no children), and adjuvant therapy (some did not undergo adjuvant therapy). Because of the lower response rates on these items, they were omitted from this analysis and considered separately.

The factor analysis, with an oblique rotation to permit correlations among factors, yielded 3 factors, accounting for 67% of the variance. Factor 1 (Life and Pain Issues) combined existential and practical issues—loss of self-sufficiency, pain, recurrence, dependency on medication, premature death, the loss of ability to go places and do things, the sense of always feeling damaged from the disease, and overwhelming bills (Items 3, 20, 21, 22, 24, 25, 26, 27, and 28). Factor 2 (Rejection Issues) loaded 3 items bearing on possible adverse reactions from family and friends (items 8, 14, and 16). Factor 3 (a Sexuality Issues factor) was made up of 4 items dealing with perceptions of being less feminine, less attractive, and less sexual (Items 10, 11, 12, and 13). Factor 1 correlated .43 with Factor 2 and .56 with Factor 3; the latter two correlated .44.

Factor scores for each participant were generated from this analysis, and the factor scores were used in subsequent

analyses. The items not entered into the factor analysis were also examined for possible data reduction. The items pertaining to work (1 and 2) were highly correlated ($r = .82$) and were averaged, as were the items pertaining to adjuvant treatment (17 and 18, $r = .75$). The items pertaining to partners (6, 9, & 23) correlated an average of .53 ($\alpha = .75$) and were also averaged. The items pertaining to children were answered by sufficiently divergent subsamples that it was impractical to merge them, but we continued to examine Item 5, the most frequently answered ($n = 112$).

Age and Ethnicity Differences in Concerns and Subjective Well-Being

The data then were examined for age differences and differences among ethnic groups. Age effects were tested by partial correlations, controlling for chemotherapy status and procedure. Age was inversely related to partner concerns ($r = -.22$, $p < .005$), concerns about impact of adjuvant treatment ($r = -.27$, $p < .001$), concerns about not seeing children grow up ($r = -.41$, $p < .005$), and the Sexuality Issues factor ($r = -.17$, $p < .04$). Age was not related to work concerns or the factors for Life and Pain Issues or Rejection Issues. Age also was inversely associated with emotional distress ($r = -.15$, $p < .05$) but not to the other indexes of subjective well-being.

The three ethnic groups were compared by analysis of covariance, controlling for chemotherapy status, surgical procedure, and age. Results on ethnicity are summarized in Table 2 (omitting mention of control variables). Ethnic differences emerged on all concerns tested except for Rejection Issues and concerns about adverse effects of adjuvant treatment. With regard to concerns about Life and Pain Issues and Sexuality Issues, the Hispanic mean was significantly higher than that of non-Hispanic Whites, which was higher than that of African Americans. With regard to work concerns, the mean among Hispanic women was higher than those of the other two groups, which did not differ from each other. With regard to partner concerns, the non-Hispanic White mean was roughly midway between those of the Hispanics and African Americans and did not differ from either of them. With regard to concern about not seeing children grow up, the African American mean was lowest but differed significantly only from the mean for Hispanics.

Similar analyses of the indices of subjective well-being also yielded ethnicity effects (Table 2). Hispanic women reported more distress, social disruption, and sexual disruption than the other two groups, which did not differ from each other. With respect to the sense of femininity, African Americans reported more positive values than the other groups, which did not differ from each other.

Relating Concerns to Psychosocial Well-Being

Next, we considered the relation between concerns and subjective well-being. All three PCBC factors were significantly correlated with all outcome variables at the bivariate level. However, recall that the concern factors were moder-

Table 2
Summary of Analyses of Covariance Comparing African Americans, Non-Hispanic Whites, and Hispanics on Life and Pain Concerns, Rejection Concerns, and Sexual Concerns (All as Factor Scores); Work Concerns, Partner Concerns, Not Seeing Children Grow Up Concern, and Adverse Impact of Adjuvant Therapy Concerns (as Mean Item Responses); Emotional Distress (as z Scores); Disruption of Social Activities (as z Scores); Disruption of Sexual Relations (as Scale Totals); and Self-Perceived Femininity (as z Scores)

Dependent variable	Ethnic group			F	df
	African American	Non-Hispanic White	Hispanic		
Concerns					
Life and Pain Issues factor	-0.58 _a	-0.10 _c	0.77 _b	15.10***	2, 160
Rejection Issues factor	-0.25	0.03	0.15	ns	
Sexuality Issues factor	-0.52 _a	0.04 _c	0.39 _b	5.22**	2, 160
Work concerns	1.58 _a	1.62 _a	2.43 _b	4.83*	2, 123
Partner concerns	1.37 _a	1.65 _{a,b}	2.03 _b	4.18*	2, 150
Not see child grow concern	1.86 _a	2.62 _{a,b}	2.97 _b	3.30*	2, 106
Adjuvant impact concerns	2.96	2.79	3.37	ns	
Subjective well-being					
Emotional distress	-0.38 _a	-0.05 _a	0.44 _b	8.09***	2, 217
Social disruption	-0.13 _a	-0.15 _a	0.54 _b	10.82***	2, 216
Sexual disruption	1.54 _a	1.66 _a	2.16 _b	6.47**	2, 213
Femininity	0.51 _a	-0.02 _b	-0.25 _b	5.93**	2, 217

Note. Each line represents a separate analysis; on each line, groups sharing a subscript do not differ by Duncan Multiple Range test. All analyses incorporate controls for chemotherapy status, surgical procedure, and age; means are adjusted.

* $p < .05$. ** $p < .01$. *** $p < .001$.

ately correlated with one another. For this reason, the factor scores were entered simultaneously into multiple regression analyses, predicting each measure of subjective well-being. Surgical procedure and chemotherapy status again were included as control variables in these analyses. The results are summarized in Table 3.

These analyses accounted for considerable variance in each measure of well-being. The analysis for emotional distress yielded unique contributions from the PCBC's Life and Pain Issues factor and Sexuality Issues factor, but the Rejection Issues factor did not play a unique predictive role. The same pattern emerged for sexual disruption and perceptions of femininity as outcomes. In contrast, when predicting social disruption as an outcome, the Life and Pain Issues factor

and the Rejection Issues factor made unique contributions, and the Sexuality Issues factor fell short of significance.

Follow-up analyses explored whether concerns omitted from the factor analysis would add to prediction among subsets of participants who provided information about those concerns. Concerns pertaining to the partner related strongly to the Sexuality Issues factor ($r = .69$). When entered as a predictor of distress, it preempted the role of the Sexuality Issues factor. When entered as predictors of sexual disruption the two variables had more overlap, such that neither made a unique contribution. Concerns pertaining to adjuvant treatment related strongly to both the Life and Pain Issues factor ($r = .65$) and the Sexuality Issues factor ($r = .64$) and added no unique variance for any outcome.

Table 3
Summary of Multiple Regression Analyses Predicting Emotional Distress, Disruption of Social Activities, Disruption of Sexual Relations, and Self-Perceived Femininity From Three Factors From the Profile of Concerns About Breast Cancer: (1) Life and Pain Issues, (2) Rejection Issues, and (3) Sexuality Issues

Dependent variable	N	Beta for Life and Pain Issues	Beta for Rejection Issues	Beta for Sexuality Issues	Overall adjusted R ²	Equation F value
Emotional distress	166	.41***	.06	.29***	.39	21.83
Social disruption	165	.30***	.16*	.15	.24	11.57
Sexual disruption	162	.27**	.11	.22*	.22	9.97
Femininity	166	-.19*	-.08	-.36***	.26	12.71

Note. All analyses incorporate controls for surgical procedure and chemotherapy status.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Concern about not seeing children grow also related both to the Life and Pain Issues factor ($r = .68$) and the Sexuality Issues factor ($r = .57$) and also failed to increase prediction.

Supplemental analyses also were conducted to test the generality of the relations shown in Table 3 across age and ethnicity, by creating dummy codes for ethnicity and appropriate interaction terms. These analyses indicated that the associations generalized across ethnicities and across age (no significant interaction emerged between age or ethnicity and any PCBC factor for any outcome).

Finally, we conducted an analysis to determine whether the concerns reported in the PCBC could predict emotional well-being above and beyond contributions made by indicators of social and sexual well-being. To test this, we conducted a regression analysis entering social disruption, sexual disruption, and the femininity index as predictors of distress, followed by the PCBC factors. The final equation accounted for 57% of the variance in distress, with three significant unique effects. Distress was inversely related to perceived femininity ($\beta = -.26, p < .001$) and positively related both to social disruption ($\beta = .34, p < .001$) and to the Life and Pain Issues factor of the PCBC ($\beta = .26, p < .001$).

Discussion

We created a profile of concerns reported by early-stage breast-cancer patients and related that profile of concerns to several measures of psychological, social, and sexual well-being. A number of limitations on the study should be acknowledged, including its cross-sectional and descriptive nature. We are unable, for example, to assert that the concerns have a causal influence on subjective well-being. What we have here is a snapshot of the experiences of women who are in treatment for early-stage breast cancer—the concerns that occupy their minds and the associations between those concerns and facets of their well-being. Within that framework, however, the findings make several points.

Overall Profile

First, it is clear that some concerns stand out in these women's minds more than others. The strongest concerns expressed were those that related directly to cancer as a health and life threat. The single focal concern was the possibility of recurrence, a finding that replicated Gotay's (1984) finding among patients treated for more advanced cancers. The other high-rated concerns combined overtones of the existential and the practical: sickness and potential damage from undergoing adjuvant therapies, premature death, pain, and overwhelming bills.

To the extent that personal relationships appeared at all among the high-level concerns, they did so as concerns about not being able to live out important relationships—not seeing children grow up and having life with a partner cut short. Concerns about adverse reactions from significant others, in contrast, were among the least intense reported. All but one of the least-endorsed items dealt with rejection,

avoidance, or friction from family, partners, and friends. Items pertaining to body-image issues (femininity, sexuality, attractiveness) fell in the middle range. They were not as salient as existential concerns about recurrence, survival, and pain, but they pressed on these women's minds more than did concerns about adverse reactions from significant others.

Several forces might be invoked to account for this pattern. For instance, cancer in general and breast cancer in particular have been discussed openly in the past two decades. This probably has desensitized many people to some of its adverse implications. Further, treatment for breast cancer is less disfiguring than it was, and reconstructive procedures are more advanced. This might serve to dampen body-image-related concerns. Apart from such changes in treatment and social context, it may simply be the case that existential issues naturally come to the fore when people confront threats to their life and physical well-being.

An implication of this pattern is to remind researchers that the experience of breast cancer is not solely about threats to body image. Although such threats are certainly a part of the experience, there is much more going on in the patient that may be more salient to her. Such issues should be considered in planning assessments. Clinically, the pattern serves as a reminder that what may be easiest to discuss with a patient (e.g., how physical changes can influence a relationship) may not be what the patient is most worried about. The pattern also suggests an important criterion for an intervention in this group: that it provide patients an avenue for confronting issues of mortality. A part of this confrontation may be accepting what cannot be changed (the reality of the cancer diagnosis and the treatment) and directing energies to concerns that are strong yet controllable (e.g., increasing health-enhancing behavior, planning for children's future, developing a plan for dealing with medical bills—cf. Scheier & Carver, in press). Addressing existential issues directly may be more valuable than focusing closely on issues of body image and potential social rejection. The latter issues do matter—just not enough to be the primary focus of an intervention for the majority of patients.

Impact of Adjuvant Therapy and Age

A second important aspect of the findings is the impact of adjuvant chemotherapy on the concerns reported. If we had looked only at the measures of subjective well-being, we would have concluded that the women of this sample were not bothered by the experience of adjuvant therapy, because its presence did not significantly relate to subjective well-being per se. In contrast, however, chemotherapy did relate to the rated intensity of several concerns (see also Meyero-witz et al., 1979).

Having had chemotherapy—whether recently or not—related to social, sexual, and existential concerns. It related to concerns about an early menopause and not being able to have children, that people wouldn't think the women look as good as they did, and that friends would avoid them. It related to concerns about sickness and damage as side effects of treatment, about abridgement of the ability to go

places and do things, and about dying. Having had chemotherapy also related to concerns that the treatment would have an adverse impact on the sense of femininity and sexual desirability—indeed, on the capacity for sexual feelings. These concerns occupied the minds of the women who underwent chemotherapy in this sample more than those who did not, despite the fact that the more general measures of subjective well-being did not relate to chemotherapy status.

A third aspect of the findings worth brief comment is age differences. Older patients reported less partner-related concerns and concerns about sexual issues than did younger patients, along with lower levels of emotional distress (about which previous evidence has been mixed—Given, Given, & Stommel, 1994; Mor, Allen, & Malin, 1994; Vinokur, Threatt, Vinokur-Kaplan, & Satariano, 1990). These differences in levels of concern did not extend the existential qualities assessed in the Life and Pain factor or to concerns about the reactions of friends.

Ethnic Differences

Another finding of interest is the pattern of ethnic differences. Hispanic women reported higher levels of concern than did the other groups on all indexes other than the Rejection Issues factor (which includes items dealing with friends and family without reference to partners). They expressed higher concerns about existential issues, sexuality issues, work issues, and partner issues. These elevated concerns among Hispanic women were paralleled by elevations in measures of emotional distress and both sexual and social disruption.

A second notable ethnic difference was that some concerns reported by African American women were notably lower than those reported by the other two groups. The relatively smaller number of African American participants than other groups means that these effects should be interpreted with caution. However, African American women reported significantly less concern than did the other women about Life and Pain Issues and Sexuality Issues. They also reported higher perceptions of their own sense of femininity than the other groups.

What accounts for these ethnic differences? Might the pattern of lower concerns among African Americans reflect a stronger religious commitment (Jackson & Sellers, 1996; Levin, 1991; Mattis, 1997) or a greater sense of fatalism (Ho, 1987, p. 183)? We cannot address these possibilities with great confidence. On a measure of coping in the data set but not involved in this article, African Americans reported the highest absolute level of religious-oriented coping. They did not, however, differ significantly from Hispanic women in that regard (though both differed substantially from non-Hispanic Whites), which tends to contradict an interpretation of the concerns data based on religiosity. On the other hand, the religious affiliations of these two groups are quite different. Whether religious investment and religious activity might function differently for African Americans and Hispanics is a matter that will have to be examined in future research.

Another issue that should be raised at least briefly is the possibility that these ethnic differences in reports of concerns and well-being reflect cultural differences in communication style and impression management rather than actual concerns and well-being. Perhaps Hispanic women reported stronger concerns and greater distress than other women because such responses are culturally appropriate—or because acknowledgment of feelings is culturally appropriate. Perhaps African American women reported lower concerns and less distress because it is culturally appropriate for them to present a strong image to others (cf. Pinderhughes, 1979). Most of the women returned the measures by mail rather than having in-person interviews; this should have diminished any impact of ethnic differences between researchers and participants. Although we believe that the responses made by our participants represent their true subjective experiences, we cannot entirely discount the possibility that such influences contributed either to the experiences themselves or to the reports of them.

Relations of Concerns to Distress and Disruption

A final issue addressed by the findings is the relation between the concerns and our indexes of psychosocial and sexual well-being. We tested the three PCBC factors in multiple regression analyses as predictors of the indexes of subjective well-being. Each factor related significantly to each index of well-being at the bivariate level, but the regression analyses yielded slightly different patterns. In each case, the Life and Pain Issues factor made a unique contribution to prediction. Indeed, concern about Life and Pain Issues proved to contribute to prediction of emotional distress above and beyond the contribution made by the other aspects of subjective well-being that were assessed.

The Sexuality Issues factor also made unique contributions to prediction in three of the four aspects of well-being (emotional distress, sexual disruption, and perceptions of femininity). The latter two are the most straightforward. The failure of this factor to contribute was in the analysis of social disruption, where its contribution only approached significance. The analysis of social disruption also saw the emergence of unique prediction from the Rejection Issues factor, the only case in which it did so. The emergence of this factor here is not surprising. The Rejection Issues factor revolves around concern about adverse reactions among family and friends. It seems natural that such concerns would be associated with restriction of social and recreational activities.

The pattern of findings from these analyses makes clear that psychological, social, and sexual well-being relate to concerns that weigh heavily on people's minds but also relate to concerns that are less salient. Despite the fact that the Rejection and Sexuality factors were based on items that were not endorsed strongly overall, these qualities played unique roles in predicting various aspects of well-being, including emotional distress. Despite their low incidence, they should not be ignored.

Finally, it is noteworthy that the relations among concerns and the indexes of well-being generalized across age and

ethnic groups. Although differences emerged between age and ethnic groups in profiles of concerns felt and distress levels experienced, associations among the variables did not vary significantly by subgroup. This provides reason for confidence in the conclusion that the women in the study shared a common core of psychological experiences as a function of their diagnosis and treatment for early-stage breast cancer.

References

- Andrews, F. M., & Withey, S. B. (1976). *Social indicators of well being: Americans' perceptions of life quality*. New York: Plenum.
- Bartelink, H., van Dam, F., & van Dongen, J. (1985). Psychological effects of breast conserving therapy in comparison with radical mastectomy. *International Journal of Radiation Oncology, Biology, & Physics*, *11*, 381-385.
- Bergner, M., Bobbitt, R. A., Carter, W. B., & Gilson, B. S. (1981). The Sickness Impact Profile: Development and final revision of a health status measure. *Medical Care*, *19*, 787-806.
- Bloom, J. R., Cook, M., Fotopoulos, S., Flamer, D., Gates, C., Holland, J. C., Muenz, L. R., Murawski, B., Penman, D., & Ross, R. D. (1987). Psychological response to mastectomy: A prospective comparison study. *Cancer*, *59*, 189-196.
- Bloom, J. R., & Spiegel, D. (1984). The relationship of two dimensions of social support to the psychological well-being and social functioning of women with advanced breast cancer. *Social Science & Medicine*, *19*, 831-837.
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, *65*, 375-390.
- Carver, C. S., Pozo-Kaderman, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1994). Optimism vs. pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer*, *73*, 1213-1220.
- Carver, C. S., Pozo-Kaderman, C., Price, A. A., Noriega, V., Harris, S. D., Derhagopian, R. P., Robinson, D. S., & Moffat, F. L., Jr. (1998). Concern about aspects of body image and adjustment to early stage breast cancer. *Psychosomatic Medicine*, *60*, 168-174.
- de Haes, J. C. J. M., & Welvaart, K. (1985). Quality of life after breast cancer surgery. *Journal of Surgical Oncology*, *28*, 123-125.
- Derogatis, L. R. (1975). *The Psychosocial Adjustment to Illness Scale: Administration, scoring and procedures manual*. Baltimore, MD: Johns Hopkins University Press.
- Fallowfield, L. J., Baum, M., & Maguire, G. P. (1986). Effects of breast conservation on psychological morbidity associated with diagnosis and treatment of early breast cancer. *British Medical Journal*, *293*, 1331-1334.
- Freidenbergs, I., Gordon, W., Hibbard, M. R., & Diller, L. (1980). Assessment and treatment of psychosocial problems of the cancer patient: A case study. *Cancer Nursing*, *3*, 111-119.
- Ganz, P. A., Polinsky, M. L., Schag, C. C., & Heinrich, R. L. (1989). Rehabilitation of patients with primary breast cancer: Assessing the impact of adjuvant therapy. *Recent Results in Cancer Research*, *115*, 244-254.
- Given, C. W., Given, B. A., & Stommel, M. (1994). The impact of age, treatment, and symptoms on the physical and mental health of cancer patients. *Cancer*, *74*, 2128-2138.
- Glanz, K., & Lerman, C. (1992). Psychosocial impact of breast cancer: A critical review. *Annals of Behavioral Medicine*, *14*, 204-212.
- Gordon, W. A., Freidenbergs, I., Diller, L., Hibbard, M., Wolf, C., Levine, L., Lipkins, R., Ezrachi, O., & Lucido, D. (1980). Efficacy of psychosocial intervention with cancer patients. *Journal of Consulting and Clinical Psychology*, *48*, 743-759.
- Gotay, C. C. (1984). The experience of cancer during early and advanced stages: The views of patients and their mates. *Social Science & Medicine*, *18*, 605-613.
- Ho, M. K. (1987). *Family therapy with ethnic minorities*. Newbury Park, CA: Sage.
- Holland, J. C., & Rowland, J. H. (1987). Psychological reactions to breast cancer and its treatment. In J. R. Harris & S. Hellman (Eds.), *Breast disease* (pp. 632-647). Philadelphia: Lippincott.
- Irvine, D., Brown, B., Crooks, D., Roberts, J., & Browne, G. (1991). Psychosocial adjustment in women with breast cancer. *Cancer*, *67*, 1097-1117.
- Jackson, J. S., & Sellers, S. L. (1996). African-American health over the life course: A multidimensional framework. In P. M. Kato & T. Mann (Eds.), *Handbook of diversity issues in health psychology* (pp. 301-317). New York: Plenum.
- Kemeny, M. M., Wellisch, D. K., & Schain, W. S. (1983). Psychosocial outcome in a randomized surgical trial for treatment of primary breast cancer. *Cancer*, *62*, 1231-1237.
- Lansky, S. B., List, M. A., Herrmann, C. A., Ets-Hokin, E. G., Das-Gupta, T. K., Wilbanks, G. D., & Hendrickson, F. R. (1985). Absence of major depressive disorder in female cancer patients. *Journal of Clinical Oncology*, *3*, 1553-1559.
- Levin, J. S. (1991). Religious involvement among Hispanic and Black mothers of newborns. *Hispanic Journal of Behavioral Sciences*, *13*, 436-447.
- Mastrovito, R. C. (1974). Cancer: Awareness and denial. *Clinical Bulletin*, *4*, 142-146.
- Mattis, J. S. (1997). Spirituality and religiosity in the lives of Black women. *African American Research Perspectives*, *3*, 56-60.
- McNair, D., Lorr, M., & Droppelman, L. (1981). *Manual for the Profile of Mood States*. San Diego: Educational and Industrial Testing Service.
- Meyerowitz, B. E. (1980). Psychosocial correlates of breast cancer and its treatments. *Psychological Bulletin*, *87*, 108-131.
- Meyerowitz, B. E., Sparks, F. C., & Spears, I. K. (1979). Adjuvant chemotherapy for breast carcinoma: Psychosocial implications. *Cancer*, *43*, 1613-1618.
- Mor, V., Allen, S., & Malin, M. (1994). The psychosocial impact of cancer on older versus younger patients and their families. *Cancer*, *74*, 2118-2127.
- Mor, V., Malin, M., & Allen, S. (1994). Age differences in the psychosocial problems encountered by breast cancer patients [Monograph]. *Journal of the National Cancer Institute*, *16*, 191-197.
- Morris, J., & Royle, G. T. (1988). Offering patients a choice of surgery for early breast cancer: A reduction in anxiety and depression in patients and their husbands. *Social Science & Medicine*, *26*, 583-585.
- Moyer, A., & Salovey, P. (1996). Psychosocial sequelae of breast cancer and its treatment. *Annals of Behavioral Medicine*, *18*, 110-125.
- Myers, J. K., & Weissman, M. M. (1980). Use of a self-report symptom scale to detect depression in a community sample. *American Journal of Psychiatry*, *137*, 1081-1084.

- Penman, D. T., Bloom, J. R., Fotopoulos, S., Cook, M. R., Holland, J. C., Gates, C., Flamer, D., Murawski, B., Ross, R., Brandt, U., Muenz, L. R., & Pee, D. (1987). The impact of mastectomy on self-concept and social function: A combined cross-sectional and longitudinal study with comparison groups. *Women and Health, 11*, 101-130.
- Pinderhughes, C. A. (1979). Differential bonding: Toward a psychophysiological theory of stereotyping. *American Journal of Psychiatry, 136*, 33-37.
- Polivy, J. (1977). Psychological effects of mastectomy on a woman's feminine self-concept. *Journal of Nervous and Mental Disease, 164*, 77-87.
- Pozo, C., Carver, C. S., Noriega, V., Harris, S. D., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1992). Effects of mastectomy versus lumpectomy on emotional adjustment to breast cancer: A prospective study of the first year postsurgery. *Journal of Clinical Oncology, 10*, 1292-1298.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.
- Sanger, C. K., & Reznikoff, M. (1981). A comparison of the psychological effects of breast-saving procedures with the modified radical mastectomy. *Cancer, 48*, 2341-2346.
- Schain, W. S. (1988). The sexual and intimate consequences of breast cancer treatment. *CA-A Cancer Journal for Clinicians, 38*, 154-161.
- Schain, W. S., Edwards, B. K., Gorrell, C. R., de Moss, E. V., Lippman, M. E., Gerber, L. H., & Lichter, A. S. (1983). Psychosocial and physical outcomes of primary breast cancer therapy: Mastectomy vs. excisional biopsy and irradiation. *Breast Cancer Research and Treatment, 3*, 377-382.
- Scheier, M. F., & Carver, C. S. (in press). Adapting to cancer: The importance of hope and purpose. In A. Baum & B. L. Andersen (Eds.), *Psychosocial interventions for cancer*. Washington, DC: American Psychological Association.
- Schulberg, H. C., Saul, M., McClelland, M., Ganguli, M., Christy, W., & Frank, R. (1985). Assessing depression in primary medical and psychiatric practices. *Archives of General Psychiatry, 42*, 1164-1170.
- Sinsheimer, L. M., & Holland, J. C. (1987). Psychological issues in breast cancer. *Seminars in Oncology, 14*, 75-82.
- Steinberg, M. D., Juliano, M. A., & Wise, L. (1985). Psychological outcome of lumpectomy versus mastectomy in the treatment of breast cancer. *American Journal of Psychiatry, 142*, 34-39.
- Sutherland, A. M. (1967). Psychological observations in cancer patients. *International Psychiatry Clinics, 4*, 75-92.
- Taylor, S. E., Lichtman, R. R., Wood, J. V., Bluming, A. Z., Dosik, G. M., & Leibowitz, R. L. (1985). Illness-related and treatment-related factors in psychological adjustment to breast cancer. *Cancer, 55*, 2506-2513.
- Vinokur, A. D., Threatt, B. A., Vinokur-Kaplan, D., & Satariano, W. A. (1990). The process of recovery from breast cancer for younger and older patients. *Cancer, 65*, 1242-1254.
- Wellisch, D. K., DiMatteo, R., Silverstein, M., Landsverk, J., Hoffman, R., Waisman, J., Handel, N., Waisman-Smith, E., & Schain, W. (1989). Psychosocial outcomes of breast cancer therapies: Lumpectomy versus mastectomy. *Psychosomatics, 30*, 365-373.
- Wolberg, W. H., Tanner, M. A., Romsaas, E. P., Trump, D. L., & Malec, J. F. (1987). Factors influencing options in primary breast cancer treatment. *Journal of Clinical Oncology, 5*, 68-74.

Concern About Aspects of Body Image and Adjustment to Early Stage Breast Cancer

CHARLES S. CARVER, PHD, CHRISTINA POZO-KADERMAN, PHD, ALICIA A. PRICE, PHD, VICTORIA NORIEGA, PHD, SUZANNE D. HARRIS, PHD, ROBERT P. DERHAGOPIAN, MD, DAVID S. ROBINSON, MD, AND FREDERICK L. MOFFATT, JR., MD

Objective: Several authors have suggested that patients adjust more poorly to breast cancer if they are heavily invested in body image as a source of their sense of self-worth. This prospective study examined this possibility, looking at two aspects of concern about body image as predictors of several indices of adjustment over the first postoperative year. *Methods:* At diagnosis (and again a year later) 66 women with early stage breast cancer reported how much they valued a) a sense of body integrity (or intactness) and b) a good physical appearance. The day before surgery, a week afterward, and at 3-month, 6-month, and 12-month follow-ups, they reported on their mood. At presurgery and at follow-ups they also rated their attractiveness and sexual desirability and reported on frequency of sexual interaction. At follow-ups they also indicated how much their illness and treatment were interfering with social and recreational activities. *Results:* Initial investment in appearance was related to distress across the postsurgical year. In contrast, investment in appearance made women more resilient against deterioration in their perceptions of attractiveness. Concern about body integrity did not strongly predict emotional distress, but it related to adverse impact on social and recreational activities in the follow-up period, to deterioration in feelings of sexual desirability, and to feelings of alienation from the self (feeling "not like yourself anymore"). *Conclusions:* Body image is often thought of in terms of physical appearance, but there is also a body image pertaining to integrity, wholeness, and normal functioning. People who are greatly concerned about either aspect of their body image are vulnerable to poorer psychosocial adjustment when confronting treatment for breast cancer. The poorer adjustment takes a different form, however, depending on the nature of the patient's body-image concern. **Key words:** breast cancer, psychosocial sequelae, psychological well being, adjustment, personality, body image.

MBA = Measure of Body Apperception; ABS = Affects Balance Scale; SIP = Sickness Impact Profile.

INTRODUCTION

Diagnosis and treatment of breast cancer are the source of substantial distress (1, 2), although in the absence of a previous psychiatric history severe symptoms are less common than was once the case, especially in cases of early-stage disease (3-7). Today the prevalent view of the psychosocial repercussions of a diagnosis of early-stage breast cancer is that it creates a crisis for women who experience it, but the crisis is weathered successfully by most patients over the period of a year postsurgery.

Psychosocial research on this topic began by establishing an overall profile of distress among patients. A later goal was to explore differences among patients. A main focus of the latter has been differences between mastectomy and lumpectomy patients (8-18). The studies consistently made two points: First, mastectomy and lumpectomy patients do not differ from each other in general emotional adjustment (assessed as mood disturbance). Second, mastectomy patients often do have poorer psychosexual adjustment (assessed as sense of attractiveness, femininity, and sexual desirability). This pattern of findings illustrates both the diversity among psychological sequelae of breast cancer, and the fact that these sequelae do not necessarily have the same determinants.

Investment in, or Concern About, Body Image

This pattern of findings suggests additional hypotheses. The greater disruption of the sense of femininity and sexual

desirability among mastectomy patients is commonly seen as a reaction to the greater disfigurement of the more extensive surgery. It seems to follow from this that the impact of breast cancer surgery should be greater for a woman whose sense of self-esteem depends heavily on her appearance, and less for a woman whose sense of self-esteem is less closely tied to that aspect of herself. The role of this variable—reliance for self-esteem on body image—has been suggested several times in the literature (19-24), but apparently it has not been studied directly.

Indirect evidence that this variable is important comes from studies of the decision to undergo lumpectomy rather than mastectomy. Wolberg et al. (25) found that, before surgery, women who chose lumpectomy valued their physical appearance more highly, were more narcissistic, and had fewer problems with sexual relationships than those who chose mastectomy (see also Ref. 14). Because lumpectomy has less impact on the body (and thus body image) than mastectomy, these data hint that women whose sense of self is most invested in physical appearance may have the most distress after treatment for breast cancer.

The research reported here was undertaken to explore this hypothesis more directly. Before describing the study, we note explicitly a subtle distinction between body image and concern over body image. The term "body image" pertains to the patient's perception of what her body is like (26). In contrast, the phrase "concern over body image" (or investment in body image) pertains to how much the body image matters to the patient. It is the latter that we examined here, as a predictor of subjective well being among breast cancer patients. We expected that having high levels of such concerns would render patients more vulnerable to various sorts of psychosocial difficulties after surgery.

Because no measure of this variable currently exists, we began by developing a measure of personal investment in one's body image. We chose to assess two distinct qualities: a concern over physical appearance, and a concern over the sense of body integrity. There is some disagreement in the literature as to which of these should be most important as an

From the Department of Psychology (C.S.C., A.A.P., V.N., S.D.H.), and Division of Surgical Oncology, Department of Surgery (R.P.D., D.S.R., F.L.M.), University of Miami, Coral Gables, Florida, and Mt. Sinai Comprehensive Cancer Center (C.P.-K.), Miami Beach, Florida.

Address reprint requests to: Charles S. Carver, PhD, Department of Psychology, P. O. Box 248185, University of Miami, Coral Gables, FL 33124-2070. E-mail: ccarver@umiami.ir.miami.edu.

Received for publication January 10, 1997; revision received May 9, 1997.

CONCERN ABOUT BODY IMAGE

influence on breast cancer patients (27), and we decided it was advisable to examine each separately. We reiterate that this is not a measure of good or poor body image per se. It is a measure of the extent to which the woman is invested in this aspect of self as a source of self-acceptance.

We also assessed multiple aspects of psychological adjustment to the diagnosis and treatment of breast cancer to study their relations to the two kinds of concern about body image. Emotional adjustment was measured as mood disturbance. Social adjustment was assessed by subscales from the Sickness Impact Profile (28), measuring adverse impact of illness on social and recreational activities. What we will refer to as psychosexual adjustment was measured by items dealing with self-perceived attractiveness and sexual desirability, taken verbatim from previous research.

METHOD

Subjects

Patients were recruited from the University of Miami Oncology Clinic and from a private practice in South Miami. Approximately 85% of the women contacted who met eligibility criteria (English fluency, no prior psychiatric history, prior cancer, or major concurrent disease) agreed to participate. Because we were interested, in part, in stability of effects over time, the sample discussed here was restricted to only those 66 patients who completed at least five of the six interviews of the protocol (including in all cases the initial, presurgery, and postsurgery interviews). Eleven other patients missed either two or all three of the follow-up interviews and were therefore omitted from these analyses (the sample reported here thus constitutes 73% of those approached). The omitted subjects did not differ systematically from those retained for analysis.

The patients under study were diagnosed with either Stage I ($N = 49$) or Stage II ($N = 17$) breast cancer. Nodal involvement ranged from 0 to 9 (mean = .67, $SD = 1.87$). The women ranged in age from 28 to 76 years (mean = 52.96, $SD = 11.16$). Most were married or in an equivalent relationship (47), six were divorced, eight widowed, and five single. Most of the women were non-Hispanic white (61), one black, and four Hispanic. The women had completed an average of 14.8 years of education ($SD = 2.26$); 43 were currently employed and 26 were retired or were not currently working outside the home.

Of the women, 34 underwent single modified radical mastectomies, 6 had bilateral mastectomies, and 26 had lumpectomies (tumor excision). Subsequently, 21 underwent radiation therapy, 15 had chemotherapy, and 34 received tamoxifen. There were 20 mastectomy patients who underwent reconstructive surgery: 19 within the first 3 months, 1 after a delay of 5 months.

Procedure

This project was conducted as a series of interviews, as was true of our earlier work in this area (13, 29, 30). Subjects were referred to the project by their surgeon. They were recruited during their diagnostic office visit or within a few days afterward. After informed consent was obtained, an initial interview was conducted. A presurgery interview was conducted on the day before surgery, a postsurgery interview 7 to 10 days after the surgery date, and follow-up interviews 3, 6, and 12 months later.

The initial interview included assessment of demographic variables and the measure of investment in body image. This measure (described below) was intended to reflect a trait-like concern about physical appearance and about body integrity. This measure was reassessed at the 12-month follow-up to determine the stability of these qualities in a sample of breast cancer patients who had by then assimilated the various experiences of the first postoperative year.

All interviews other than the initial one included a measure of emotional adjustment. The presurgery interview and the 3-, 6-, and 12-month follow-ups also included a very brief measure of psycho-

sexual adjustment. The follow-up interviews also included a measure of the extent to which the treatment for the illness was perceived to be interfering with social and recreational activities. The measures are described in the next section.

Psychosocial Measures

Investment in Body Image. MBA was created especially for this research. It consists of eight first-person statements (plus fillers) that respondents rate on a scale of 1 to 4. Response options range from "strongly agree" to "strongly disagree" (see Table 1).

The MBA was designed to assess two aspects of investment in, or concern about, body image. These were assumed to represent trait-like attitudes about one's body image. Before its use in this study the MBA went through two iterations of item testing and revision on college-student samples. The final item set yielded two clearly distinct factors (in a sample of 298), which together accounted for 52.2% of the variance in responding. The factors correlated but not highly ($r = .28$). One factor reflects the theme that feeling good about oneself depends on one's sense of body integrity; the other factor reflects the theme that feeling good about oneself depends on one's physical appearance. Two scales were formed by the two sets of items reflecting these concerns. They are referred to here as Concern About Body Integrity and Concern About Appearance. A student sample yielded test-retest correlations of better than .75 for each subscale over a period of 4 weeks.

As preliminary information pertaining to construct validity, data were collected from the final student sample on several items describing behaviors that should reflect appearance-related concern. The Concern About Appearance scale correlated .31 with an item reflecting a tendency to shop for clothes that would keep the respondent in fashion, and .33 with extent of self-reported makeup use. Neither of these behaviors related to the Concern About Body Integrity scale.

Because this is the first application of this instrument to a patient sample, this work should be viewed as an exploratory test of its applicability to such samples. Among these patients the Concern About Appearance scale had a mean of 9.30 ($SD = 3.03$), and the Concern About Body Integrity scale had a mean of 7.71 ($SD = 2.68$). In this sample the two scales correlated somewhat more than among the students. Correlations between scales were .41 at the initial

TABLE 1. Content Items of the Measure of Body Apperception (MBA), Along with Factor Loadings^a

	Factor 1	Factor 2
Concern About Appearance		
It's important to me to look my best all the time.	.68	
If a woman doesn't look good to others, she can't possibly feel good about herself.	.69	.34
I feel good about myself only if I know I look good to other people.	.84	
I have to look as good as I can to others, in order to feel right about myself.	.84	
Concern About Body Integrity		
When something goes wrong inside your body, you're never really the same person again.		.68
The idea of having surgery bothers me because of the fact it means altering my body.	.37	.64
A scar from an operation, even one that doesn't show, is a constant reminder to yourself that something was wrong with you.		.67
Completely apart from the pain, I'd have trouble giving myself an injection because it would mean forcing a needle into an undamaged part of my body.		.65

^a Responses are on a scale of 1 to 4 ranging from "strongly agree" to "strongly disagree." Factor loadings below .30 are omitted.

assessment and .36 in a follow-up assessment. Internal reliability for Concern About Appearance was .78 and for Concern About Body Integrity was .53. The follow-up provided an opportunity to assess the stability of the scales among patients over a 1-year period. The test-retest reliability for Concern About Appearance was reasonably high (ie. .67), but for Concern About Body Integrity was only .39.

The low retest reliability of the scale measuring Concern About Body Integrity is one of several sources of information suggesting that many of the women of this sample experienced changes in their views of the importance of body integrity after starting their treatment. The sample mean did not change significantly over the year, indicating that some women devalued this quality, whereas others became more concerned about it. Because this quality shifted over the course of the year, we undertook exploratory analyses to try to isolate factors that might have prompted the shifting.

Emotional Adjustment. Emotional distress was assessed by the ABS (31). The ABS, a widely used instrument, is designed to assess several qualities of emotion, both positive and negative. The ABS is a series of adjectives, each a mood descriptor. Respondents indicate the extent to which they have had the feeling described for a specified time period, using response choices that range from 1 ("never") to 5 ("always"). In this study, subjects responded according to how they had been feeling "during the past week including today."

Because of time constraints and the large number of instruments in the full research protocol, we did not use the entire ABS. At each measurement the subjects responded to the scales measuring anxiety, depression, hostility, joy, and affection. Reliability analyses indicated that the anxiety, depression, and hostility scales could be combined into a measure of distress (average $\alpha = .83$), and that the joy and affection scales could be combined into a measure of positive emotion (average $\alpha = .83$). Distress and positive emotion correlated only moderately in this sample (average $r = .44$). Accordingly, the measures were examined separately.

Psychosexual Adjustment. We did not collect a full measure of sexual adjustment in this project (cf. Refs. 32-34). However, we did collect two kinds of measures that seem relevant to psychosexual well being. One measure came from the literature comparing mastectomy to lumpectomy patients (8-18). This literature contains several items used to assess feelings of attractiveness, sexual desirability, and so on. The items in these studies were generally single-item ratings developed for the study in which they were used (8, 11, 16). These items do seem to have reflected the aspects of experience they were intended to reflect, however. That is, they successfully discriminated lumpectomy patients (who had less negative responses) from mastectomy patients (who had more negative responses).

We collected self-reports on items taken from the studies just cited. Two items were self-ratings of attractiveness and of sexual desirability ("How physically attractive do you feel you are?" and "How sexually desirable do you feel you are?"), both rated on 5-point scales. Because these items were strongly related at each measurement point (r 's averaged .75), they were averaged to form an index of self-perceived attractiveness.

In addition to these ratings, subjects who reported in the initial assessment having an active sex life also reported frequency of sexual activity ("How frequently do you have sex with your partner?" assessed as times per month). These reports, as well as the self-assessments of attractiveness, were made before treatment (to provide baseline values) and at each follow-up.

Disruption of Activities. An important aspect of psychosocial adjustment is remaining engaged in life's normal activities after being treated for an illness. If the illness or its treatment disrupts such social activities, the patient may become more isolated from her social network, which can lead to additional adverse effects on well being (35). To assess the extent to which subjects experienced illness-related disruptions, we used two subscales of the SIP (28). These were subscales measuring adverse impact of the illness or its treatment on social activities and recreational activities. Our reason-

ing here was that the illness of these women was not so debilitating that disease-related physical impairment would disrupt these activities. Rather, disruption of social or recreational activities would reflect psychological withdrawal from the activities, as offshoots of the illness and its treatment and potentially in combination with the personal dispositions measured by the MBA.

Alienation From Self. Another item we collected was a measure of alienation or estrangement from the self ("To what extent do you feel 'not like yourself anymore'"). This item was rated on a 5-point scale. This rating was not closely related either to the attractiveness index (average $r = .24$) or to distress (average $r = .37$). Thus, it was analyzed separately.

RESULTS

Potential Control Variables

Preliminary analyses tested for potentially confounding relationships between demographic characteristics (eg, age, marital status, education, employment status) or treatment characteristics (eg, stage of cancer, number of positive nodes, adjuvant therapies, type of surgery) and MBA scales. These analyses revealed that initial reports of Concern Over Body Integrity were inversely related to age, $r = -.40$, $p < .01$. Thus, age was controlled in all analyses. No other potential control variable related significantly to either MBA scale. However, several did relate to outcome variables. Removing the variance they accounted for would potentially permit effects to emerge that would otherwise be obscured, by reducing error variance. For this reason, analyses also incorporated these additional controls, on an analysis-by-analysis basis. These additional controls were as follow: a rating of other concurrent problematic life events, in the analyses of SIP scores; the same life-event rating plus the presence or absence of radiation treatment, in the analyses of alienation from self at 6 months; and employment status, in the analyses of alienation from self at 12 months.

The data examined here bear on several aspects of adjustment and two potential vulnerabilities. We present the results for each aspect of adjustment separately. The form of the analyses is multiple regression, using age and the two MBA scales as predictors (simultaneous entry) of each outcome variable, with additional controls as indicated above for specific outcome variables.

Emotional Adjustment

Emotional adjustment, as reflected in the ABS distress index, was analyzed separately at each measurement point. Table 2 shows β weights (standardized regression coefficients) for the MBA scales from these analyses (each column represents a separate analysis). Except for the immediately postsurgical measurement, Concern About Appearance was consistently related to distress at a low-moderate level, with significant relations emerging at 3- and 6-month follow-ups, and near-significant relations at presurgery and 12-month follow-up. Concern About Body Integrity was not related to emotional distress at any measurement except presurgery, when it related to distress marginally.

Although Concern About Appearance predicted emotional distress during the follow-up period, it was not a good predictor of change in distress, that is, later distress after controlling for distress at a preceding measurement. Instead, women who were high in Concern About Appearance expressed a fairly consistent and stable sense of distress throughout the follow-up period.

CONCERN ABOUT BODY IMAGE

TABLE 2. Standardized Regression Coefficients (β Weights) for Measure of Body Apperception (MBA) Scales in Prediction of Emotional Distress at Each Measurement Point

MBA Scale	Presurgery (66) ^a	Postsurgery (66)	Follow-Up		
			3-mo (64)	6-mo (62)	12-mo (61)
Concern about appearance	.22 [†]	.09	.27*	.30*	.26 [†]
Concern about body integrity	.17	.09	-.11	.01	.10

* $p < .05$; [†] $p < .08$.

^a Each column reflects a separate regression analysis, including age as a control variable (group sizes in parentheses). Different group sizes for different analyses reflect occasional missing interviews.

Analysis of positive emotions yielded no association with either MBA scale.

Psychosexual Adjustment

We turn now to psychosexual adjustment. The felt-attractiveness index was relatively distinct from emotional distress at presurgery ($r = .08$). It related inversely to distress at 3-month follow-up, although only weakly ($r = -.23$ NS), and the relation became stronger over time: $-.32$ at 6 months, $-.48$ at 12 months. Despite the emerging association between these two sets of outcomes, they related quite differently to the MBA scales.

Neither Concern About Appearance nor Concern About Body Integrity related significantly to presurgical self-reports of attractiveness-desirability, although the tendency was for higher Concern About Appearance to relate to a perception of less attractiveness and desirability. Presurgical reports were used, as baseline controls for analysis of the comparable reports at follow-ups. Results of these analyses are shown in Table 3. Concern About Body Integrity was unrelated to this index except at the 12-month follow-up, where a significant inverse association emerged.¹ Contrary to expectation, Concern About Appearance consistently predicted lower disruption in this sense of attractiveness and desirability after controlling initial levels. Thus, greater investment in appearance as a source of self-esteem seems not to have acted as a vulnerability in this respect. Rather, it seemed to act as a buffer against the development of feelings of lower attractiveness and desirability at follow-ups.

How are these effects of Concern About Appearance to be interpreted? Inspection of means among subgroups divided at the median on Appearance-Concern indicated that attractiveness ratings tended to decrease overall from presurgery to follow-ups. This downward tendency was greater, however, among women with low Appearance-Concern (whose feelings of attractiveness had tended to be higher initially). Thus, the pattern of relations just described reflects a tendency among women with low Concern About Appearance to drift downward in their perceptions of attractiveness so that their later ratings were similar to those of the women who had higher

Concerns About Appearance. This pattern raises a question about whether these relations are conceptually meaningful or simply represent a regression to the mean among scores that were initially somewhat disparate.

Feelings of attractiveness and sexual desirability are one marker of psychosexual adjustment. Another is sexual interaction per se. Multivariate analyses of reports of sexual activity among patients who were sexually active at the time of surgery yielded no effect attributable to either MBA scale. The tendency, however, was for Concern About Appearance to relate to higher levels of sexual activity. Thus, the data again failed to indicate that this concern interfered with psychosexual well being after diagnosis and surgery.

Social Adjustment

The SIP social interaction and recreation scales reflect the extent to which an illness has a disruptive impact on daily activities of these two types. These scales were related to emotional distress, although not strongly (concurrent correlations averaged .28 for each scale). Analyses of the SIP Social Interaction scale yielded no significant effect for Concern About Appearance, but Concern About Body Integrity related positively to disruption of social interaction at the 6-month follow-up ($\beta = .31$, $p < .04$) and the 12-month follow-up ($\beta = .36$, $p < .02$). These relations were independent of emotional distress: they remained significant even when an additional control was instituted for concurrent distress (β values = .31 and .35, p values $< .04$).

Alienation From Self

Reports of estrangement or alienation from the self ("To what extent do you feel 'not like yourself any more'?") were moderately related to emotional distress through the 6-month follow-up (r values = .36 to .44), with the correlation

TABLE 3. Standardized Regression Coefficients (β Weights) for Measure of Body Apperception (MBA) Scales in Prediction of Attractiveness Index at Each Follow-Up, Controlling for Index Baselines

MBA Scale	Follow-Up		
	3-mo (64) ^a	6-mo (62)	12-mo (61)
Concern about appearance	.36**	.27**	.30*
Concern about body integrity	-.17	-.16	-.25*

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

^a Each column reflects a separate regression analysis, also including age as a control variable (group sizes in parentheses). Different group sizes for different analyses reflect occasional missing interviews.

¹ Exploratory analyses suggested that Concern About Body Integrity did relate to lower ratings on the index of psychosexual adjustment—but only among women who had reconstructive surgery after mastectomy. Among these women, Concern About Body Integrity related inversely to attractiveness-desirability at all follow-ups, even when controlling both for presurgical levels of the index and for age (partial r values = $-.42$ at 3 months, $N = 18$, $p < .06$; $-.67$ at 6 months, $N = 16$, $p < .005$; and $-.60$ at 12 months, $N = 19$, $p < .02$). In contrast, correlations between these measures among lumpectomy patients and mastectomy patients who had not undergone reconstruction were uniformly low.

TABLE 4. Standardized Regression Coefficients (β Weights) for Measure of Body Apperception (MBA) Scales in Prediction of Alienation From the Self At Each Follow-Up

MBA Scale	Follow-Up		
	3-mo (64)	6-mo (62)	12-mo (61)
Panel A^a			
Concern about appearance	-.07	-.14	-.24
Concern about body integrity	.31*	.40**	.23
Panel B			
Concern about appearance	-.11	-.15	-.24
Concern about body integrity	.28†	.39**	.20
Panel C			
Concern about appearance	-.26*	-.26*	-.28*
Concern about body integrity	.34*	.38**	.19

** $p < .01$; * $p < .05$; † $p < .07$.

^a Panel A represents analysis including only MBA, age, and other controls (see text); Panel B includes additional control for alienation baselines; Panel C includes yet additional control for concurrent distress. Each column of each panel reflects a separate regression analysis (group sizes in parentheses). Different group sizes for different analyses reflect occasional missing interviews.

decreasing to .19 at the 12-month follow-up. Alienation was positively related to Concern About Body Integrity at each follow-up except the 12-month, where the association slipped to a nonsignificant level (Table 4). The associations at 3- and 6-month follow-ups remained significant even when controlling for presurgery levels of alienation from the self. Indeed, adding concurrent distress to the equation (at each follow-up) did not hamper the effect of Concern About Body Integrity, but simply added a significant effect of distress. Addition of distress into the equation also reduced error sufficiently to permit an association for Concern About Appearance to emerge. This association was such that higher Concern About Appearance was related to lower alienation from the self.

Influences on Follow-up Concern About Body Integrity

Recall that Concern About Body Integrity did not exhibit good test-retest reliability across the 1-year period. For this reason we explored whether Concern About Body Integrity at the 1-year point would be predicted by measures collected at various points earlier in the year. Although these analyses are clearly exploratory, they seem to provide some hints about what went on in the minds of the patients. The strategy was hierarchical regression analysis, with presurgical Concern About Body Integrity entered on the first step and other variables added in a subsequent step to determine their incremental value in predicting retest Concern About Body Integrity.

Initial Concern About Body Integrity accounted for 17% of the variance in final Body Integrity scores (adjusted R^2), $\beta = .30$, $p < .02$. Reports of feeling "not like yourself anymore" at 3 months contributed an additional 12%, $\beta = .38$, $p < .003$. Adding 3-month distress to the equation raised the overall adjusted R^2 to .33, with significant β values for initial Concern About Body Integrity (ie, .31), 3-month distress (ie, .26), and 3-month alienation (ie, .26). Although the pattern is suggestive rather than conclusive, it is consistent with the notion that distress and a sense of alienation that occurred for some

patients early in the posttreatment period induced a change in Concern About Body Integrity.

DISCUSSION

In this study we tested a measure of investment in, or concern over, two aspects of body image as predictors of subjective well being among early stage breast cancer patients. We tested prediction of emotional, social, and psychosexual outcome variables, at several different points after treatment. We should note some cautions about the study before proceeding. First, the relatively large number of tests raises the issue of whether some of the relations uncovered are a reflection of chance. To the extent that the same relationship emerged at multiple time points (which was, in fact, commonly the case), we are relatively confident that the findings did not capitalize on chance. Another caution is that the sample is not as large as one might prefer, and it is unclear how representative these women are of the broader population of breast cancer patients. Despite these cautions, however, the data make several points.

Concern About Appearance

Women who saw themselves as highly invested in their appearance reported higher distress at presurgery and through the first year after surgery than women who described themselves as less invested in this aspect of themselves. In the sense of emotional well being, then, the experience of being diagnosed with and treated for breast cancer was hardest on women who reported caring about how they looked. This partially confirms expectations expressed previously (19–25). Although the effect emerged on the measure of distress, there was no comparable difference in positive feelings.

In contrast to this adverse impact on emotional distress, there were two respects in which concern about appearance seemed to act as a psychological resource. First, it buffered the adverse impact on women's sense of attractiveness and sexual desirability. Those concerned about their appearance tended to be more self-critical on these self-ratings before surgery, but their later ratings changed less. That is, women with lower Concern About Appearance scores became more negative about their attractiveness and desirability after treatment, but women with higher Concern About Appearance were more stable. This finding was opposite to prediction. It is unclear whether it is an artifact deriving from the tendency toward an initial difference and regression to the mean, or whether an investment in appearance actually confers a greater resilience in this respect.

The possibility that it does represent resilience is suggested by the emergence of a second pattern of associations in which concern about appearance acted positively. Specifically, in analyses predicting alienation from the self, when baseline alienation reports and concurrent distress were both included in the regression equations, Concern About Appearance was a significant inverse predictor of alienation (Table 4, panel C). That is, women with a high investment in looking good were less likely to report a sense of self-estrangement at follow-ups.

In contrast to the foregoing, Concern About Appearance was not related to disruption in social or recreational activities, either as a vulnerability factor or as a resilience factor.

In summary, women who before surgery reported being invested in their appearance reported (compared to the other women) more distress during the subsequent year, but less

CONCERN ABOUT BODY IMAGE

disruption of their sense of femininity and sexual desirability. They also reported less alienation from the self. From this pattern it seems that this presumed vulnerability factor is not as distinctly a vulnerability as has been presumed.

Concern About Body Integrity

The second aspect of investment in body image we studied was investment in the sense of body integrity. Women with high Concern About Body Integrity showed several indications of poor adjustment, although not emotional distress *per se* (or diminished positive feelings). They reported greater illness-related disruption of social activities at 6- and 12-month follow-ups, and a greater sense of estrangement or alienation from the self at 3- and 6-month follow-ups. Exploratory analyses suggested that concern about body integrity also related to lower self-ratings of attractiveness and desirability at follow-ups, but only among women who had reconstruction after mastectomy.

The measure of concern about body integrity was not very reliable across the 1-year retest period. The women in this sample seem to have reevaluated the importance of this aspect of the self over the year of the study, with some concluding that it mattered more than they had thought earlier, others concluding that it mattered less. The data suggested that variations in distress and alienation by the 3-month point may have helped induce shifts in concern about body integrity.

In summary, women who before surgery reported being invested in the sense of body integrity reported (compared with the other women) no greater emotional distress, but they experienced more disruption in social activities and a stronger sense of "not being [themselves] any more."

CONCLUSIONS

Clinicians and researchers have long held that issues of body image are important to cancer patients (19-25). There has often been an implicit tendency to equate body image with the patient's perception of her appearance (18, 26). It is clear from the data reported here, however, that this view is too narrow. Body image is only partly about appearance, as Margolis and Goodman (27) noted. Body image is partly about the perception of one's body as an intact, properly functioning entity.

These two aspects of the body image have their counterparts in personal investment or concern. Both sorts of investment proved to have relevance for understanding the breast cancer experience, although the effects were not all as anticipated. Not every effect of psychological investment in the self-image was adverse. Caring about appearance seemed to confer a resilience against erosion of the sense of attractiveness and sexual desirability, perhaps because women who report this concern also have a stable sense of their ability to control their appearance. Women who said they cared about how they looked seemed to know that they were just as capable of looking good after their treatment as they were beforehand, and they seemed determined to do so. They also were least likely to feel as though they had lost contact with the women they had been before the treatment.

One respect in which these findings supplement previous work concerns the consequences of reconstruction. It is known that reconstruction has a positive impact on adjustment among many patients (18), but it does not inevitably have that effect. Some women who undertake reconstruction to improve sexual

or social relations find themselves disappointed (36). Ancillary findings from our study add support to the idea that reconstruction is not for everyone. One important influence on whether reconstruction has a positive effect may be the extent to which the woman is concerned about the integrity of her body.

We close this article by standing back from the findings to briefly consider clinical implications. In recent years, researchers have investigated a variety of differences among breast cancer patients in an effort to understand better which patients are at risk for poor adjustment to the experience. Our findings make two broad points in that regard. First, concern about either aspect of body image studied here can create a vulnerability to problems in adjustment. Both concerns matter, although they matter in different ways. Second, adverse effects on adjustment can occur in several ways, not just one. Women can respond to the experience of breast cancer with emotional distress, with withdrawal from social activities, with a loss of the sense of attractiveness and sexual desirability, or with the subjective experience of alienation. These diverse experiences all reflect adjustment problems. But the experiences do not all present in a single uniform package, nor are they all influenced by the same vulnerability factors. To have a complete picture of the patient at psychosocial risk, multiple vulnerabilities and multiple expressions of risk must be considered.

Data collection was made possible by American Cancer Society Grant PBR-56.

REFERENCES

1. Harrison J, Maguire P: Predictors of psychiatric morbidity in cancer patients. *Br J Psychiatry* 165:593-598, 1994
2. Parle M, Jones B, Maguire P: Maladaptive coping and affective disorders among cancer patients. *Psychol Med* 26:735-744, 1996
3. Bloom JR, Cook M, Fotopoulos S, et al.: Psychological response to mastectomy: A prospective comparison study. *Cancer* 59:189-196, 1987
4. Penman DT, Bloom JR, Fotopoulos S, et al: The impact of mastectomy on self-concept and social function: A combined cross-sectional and longitudinal study with comparison groups. *Women Health* 11:101-130, 1987
5. Gordon WA, Freidenbergs I, Diller L, et al: Efficacy of psychosocial intervention with cancer patients. *J Consult Clin Psychol* 48:743-759, 1980
6. Lansky SB, List MA, Hermann CA, et al: Absence of major depressive disorder in female cancer patients. *J Clin Oncol* 3:1553-1559, 1985
7. Irvine D, Brown B, Crooks D, et al: Psychosocial adjustment in women with breast cancer. *Cancer* 67:1097-1117, 1991
8. Bartelink H, van Dam F, van Dongen J: Psychological effects of breast conserving therapy in comparison with radical mastectomy. *Int J Radiat Oncol Biol Phys* 11:381-385, 1985
9. de Haes JCJM, Welvaart K: Quality of life after breast cancer surgery. *J Surg Oncol* 28:123-125, 1985
10. Fallowfield LJ, Baum M, Maguire GP: Effects of breast conservation on psychological morbidity associated with diagnosis and treatment of early breast cancer. *Br Med J* 293:1331-1334, 1986
11. Kemeny MM, Wellisch DK, Schain WS: Psychosocial outcome in a randomized surgical trial for treatment of primary breast cancer. *Cancer* 62:1231-1237, 1988
12. Morris J, Royle GT: Offering patients a choice of surgery for

- early breast cancer: A reduction in anxiety and depression in patients and their husbands. *Soc Sci Med* 26:583-585, 1988
13. Pozo C, Carver CS, Noriega V, et al: Effects of mastectomy versus lumpectomy on emotional adjustment to breast cancer: A prospective study of the first year postsurgery. *J Clin Oncol* 10:1292-1298, 1992
 14. Sanger CK, Reznikoff M: A comparison of the psychological effects of breast-saving procedures with the modified radical mastectomy. *Cancer* 48:2341-2346, 1981
 15. Schain WS, Edwards BK, Gorrell CR, et al: Psychosocial and physical outcomes of primary breast cancer therapy: Mastectomy vs excisional biopsy and irradiation. *Breast Cancer Res Treat* 3:377-382, 1983
 16. Steinberg MD, Juliano MA, Wise L: Psychological outcome of lumpectomy versus mastectomy in the treatment of breast cancer. *Am J Psychiatry* 142:34-39, 1985
 17. Taylor SE, Lichtman RR, Wood JV, et al: Illness-related and treatment-related factors in psychological adjustment to breast cancer. *Cancer* 55:2506-2513, 1985
 18. Wellisch DK, DiMatteo R, Silverstein M, et al: Psychosocial outcomes of breast cancer therapies: Lumpectomy versus mastectomy. *Psychosomatics* 30:365-373, 1989
 19. Ashcroft JJ, Leinster, SJ, Slade PD: Breast cancer-patient choice of treatment: Preliminary communication. *J R Soc Med* 78:43-46, 1985
 20. Mastrovito RC. Cancer: Awareness and denial. *Clin Bull* 4:142-146, 1974
 21. Meyerowitz BE: Psychosocial correlates of breast cancer and its treatments. *Psychol Bull* 87:108-131, 1980
 22. Schain, WS: The sexual and intimate consequences of breast cancer treatment. *CA Cancer J Clin* 38:154-161, 1988
 23. Sinsheimer LM, Holland JC: Psychological issues in breast cancer. *Semin Oncol* 14:75-82, 1987
 24. Sutherland AM: Psychological observations in cancer patients. *Int Psychiatry Clin* 4:75-92, 1967
 25. Wolberg WH, Tanner MA, Romsaas EP, et al: Factors influencing options in primary breast cancer treatment. *J Clin Oncol* 5:68-74, 1987
 26. Polivy J: Psychological effects of mastectomy on a woman's feminine self-concept. *J Nerv Ment Dis* 164:77-87, 1977
 27. Margolis GJ, Goodman RL: Psychological factors in women choosing radiation therapy for breast cancer. *Psychosomatics* 25:464-469, 1984
 28. Bergner M, Bobbitt RA, Carter WB, et al: The Sickness Impact Profile: Development and final revision of a health status measure. *Med Care* 19:787-806, 1981
 29. Carver CS, Pozo C, Harris SD, et al: How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *J Pers Soc Psychol* 65:375-390, 1993
 30. Carver CS, Pozo-Kaderman C, Harris SD, et al: Optimism vs pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer* 73:1213-1220, 1994
 31. Derogatis LR: The affects balance scale. Baltimore, MD, Clinical Psychometric Research, 1975
 32. Derogatis LR, Melisaratos N: The DSFI: A multidimensional measure of sexual functioning. *J Sex Marital Ther* 5:244-281, 1975
 33. Andersen BL, Broffitt B: Is there a reliable and valid self-report measure of sexual behavior? *Arch Sex Behav* 17:509-525, 1988
 34. Andersen BL, Anderson B, deProsse C: Controlled prospective longitudinal study of women with cancer: Sexual functioning outcomes. *J Consult Clin Psychol* 57:683-691, 1989
 35. Bloom JR, Spiegel D: The relationship of two dimensions of social support to the psychological well-being and social functioning of women with advanced breast cancer. *Soc Sci Med* 19:831-837, 1984
 36. Holland JC, Rowland JH: Psychological reactions to breast cancer and its treatment. In: Harris JR, Hellman S (eds), *Breast Disease*. Philadelphia, Lippincott, 1987, 632-647

European Conference on Psychosomatic Research

The 22nd European Conference on Psychosomatic Research will be held at the University of Medicine, Institute of Science & Technology, Munich, Germany, from September 25-29, 1994. The conference will include plenary meetings, The European Association of Psychosomatic Medicine, and the European Association of Psychosomatic Medicine International Collaborative Meeting on Somatic Symptoms. For information, please contact: Prof. Dr. G. R. V. van der Pijl, Department of Psychosomatic Medicine, University of Medicine, 276 5331, Leiden, The Netherlands. Tel: +31 (0) 71 526 1111. Fax: +31 (0) 71 526 1112. E-mail: G.R.VanDerPijl@Psychosom.umc.leiden.nl

In Press: Personality and Social Psychology Bulletin

How Important Is the Perception of Personal Control?

Studies of Early Stage Breast Cancer Patients

Charles S. Carver Suzanne D. Harris

Jessica M. Lehman Lynn A. Durel Michael H. Antoni

University of Miami

Stacie M. Spencer

University of Pittsburgh

Christina Pozo-Kaderman

Mt. Sinai Comprehensive Cancer Center

Running head: Control versus Confidence

Correspondence address: Charles S. Carver
 Department of Psychology
 P.O. Box 248185
 University of Miami
 Coral Gables, Florida 33124-2070

Phone: (305) 284-2817

Fax: (305) 284-3402

Internet: Ccarver@umiami.ir.miami.edu

Abstract

Two models of cognitive determinants of distress under adversity were tested in the experiences of two samples of newly treated breast cancer patients (ns = 144 and 202). One model emphasizes the role of the sense of personal control in subjective well being. The other model emphasizes confidence of the occurrence of desired outcomes. In this research the outcome addressed was remaining free of cancer in the future. In these two samples, beliefs about control over remaining free of cancer played no role in predicting distress, though expectancy of remaining cancer-free did. Discussion focuses on conceptual boundaries on the concept of control, how difficult it is to assess control separately from expectancy regarding the desired outcome, and how conceptual clarity requires such a separation.

The psychology of stress and coping is home to a number of theories about what variables render people more vulnerable or less vulnerable to adverse effects of stressful events. These theories share a good deal of conceptual ground, but they differ in certain respects because theorists emphasize or deemphasize various elements. An example is the role of perceptions of control. Some argue that perceptions of personal control are important in times of adversity. Others argue that the nature of the anticipated outcome (good versus bad) often matters more than how the outcome is expected to come to pass. This article addresses this theoretical difference.

Perceptions of Personal Control

Many people believe that the sense of personal control is an important determinant of successful adjustment to stressful events (Bandura, 1977, 1986; Weiner & Kukla, 1970; Peterson & Seligman, 1984; Schulz & Heckhausen, 1996; Shapiro, Schwartz, & Astin, 1996; Taylor, 1983; Taylor & Brown, 1988; Thompson & Spacapan, 1991; Weiner, 1985). Indeed, the idea that people deal better with stressors when they have the perception of control is a recurring theme in the stress literature. As Taylor (1990) put it, "the importance of feelings of personal control emerges in whether people practice particular health behaviors, whether they experience stress, whether their pain control efforts are successful, and how they adapt to chronic disease and disability" (p. 46).¹

Concepts of personal control over outcomes are also embedded within broad theories of behavior such as self-efficacy theory (Bandura, 1977; 1982, 1986). Self-efficacy is the person's level of confidence about being able to execute actions that are required to deal with particular classes of situations. The theoretical emphasis is on the person's confidence that a desired outcome can be attained through personal agency. Effort is undermined in situations where people lack confidence in their ability to exercise control over their actions. As a result, persons with low efficacy expectancies often fare worse than do those with more favorable expectancies (see Bandura, 1986, for a review of the literature deriving from this theory).

Does the sense of control really confer benefits? The answer is not as simple as it appears at first glance. We will not try to review here the extensive literature that bears on the consequences of control (for broader statements see, e.g., Aldwin, 1994; Averill, 1973; Skinner, 1996; Thompson, 1981; Thompson & Spacapan, 1991). Instead, we note several representative studies, chosen

because of their relevance to the conceptual themes of this article.

Beneficial Effects of Personal Control

Many studies support the idea that having a sense of personal control goes along with better emotional well being. For example, Burgess, Morris, and Pettingale (1988) studied patients who were newly diagnosed with breast cancer or lymphoma. Patients with an internal locus of control (i.e., the broad belief that they had control over important outcomes in their lives) also had less depression and anxiety and a more positive and confronting coping style than those with a more external locus of control (i.e., the belief that control over important outcomes in their lives rested outside themselves). Langer and Rodin (1976) found that nursing home patients who had personal control in choosing daily responsibilities and activities were rated by both self-report and observer report as happier, more active, and more mentally alert than other patients. A follow-up one year later (Rodin & Langer, 1977) found continued benefits among subjects given more control.

Laboratory findings also support this position. For example, Geer, Davison, and Gatchel (1970) shocked subjects occasionally while they performed a reaction time task. Subjects given a sense of control were told they could reduce the duration of their shocks from 6 to 3 seconds if they responded quickly. Subjects in the no-control condition simply had their shocks reduced to 3 seconds. Physiological measures showed less anticipatory arousal for the group who felt they were exercising control, though there was no difference in reported pain levels. A similar study by Glass, Singer, Leonard, Krantz, Cohen, and Cummings (1973) found no difference in anticipatory arousal but did find that the group with control reported less pain and did better on a behavioral posttest.

Another project relevant to this theme (and to the research we report here) was conducted by Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, and Cruzen (1993). This cross-sectional study examined the experiences of cancer patients. Patients with a stronger sense of control reported less distress than those whose control perceptions were lower. Particularly related to lower distress in this sample was the sense of control over symptoms and emotional reactions.

Detrimental Effects of Personal Control

Although personal control often relates to less distress, this is not always the case. Indeed, some theorists have even argued that situations exist in which perceptions of personal control are

actually detrimental to well being (Affleck, Tennen, Pfeiffer, & Fifield, 1987; Burger, 1989; Folkman, 1984; Thompson, 1981; Thompson, Cheek, & Graham, 1988).

There is also evidence to support this view. For example, Burger, McWard, and LaTorre (1989) found that most subjects who were asked to give a blood sample relinquished control over this procedure to the experimenters, who were viewed as more experienced. Apparently this giving up of control occurred in an effort to avoid pain (an undesired outcome). A similar principle seems to underlie results reported by Miller (1979). Students in that study thought they were being tested for reaction speed. Each subject was paired with a partner, and only one of the pair could respond on a given trial. Subjects were told they would be shocked each time they (or the partner) failed to react within a specified time. Students who believed their partners had faster reactions than they did relinquished control, presumably to avoid a painful outcome.

Work in health psychology has also led some to conclude that perceptions of personal control can in some cases have adverse consequences. Rodin (1986) argued that as people age and their physical problems become more severe and chronic, greater perceived control over these problems can result in more stress, worry, and self-blame. Affleck et al. (1987) found control was associated with poorer outcomes among patients with rheumatoid arthritis. They argued that having a sense of personal control in situations that offer few opportunities for actual control may lead to difficulties. Similarly, Eitel et al. (1995) recently found that control over treatment among patients with end-stage renal disease was associated (cross-sectionally) with poorer adjustment.

Findings such as these argue that the effects of control are not as simple and straightforward as has been widely assumed. After reviewing research on the sense of control, Burger (1989) identified several conditions that he believed cause people to relinquish control, or to experience distress under conditions of perceived control. Of special relevance at present is his conclusion that personal control is undesirable *when control reduces the likelihood of attaining a desired outcome* (or when it increases the likelihood of an undesired outcome).

An Alternative Theoretical View

Although many theorists view the sense of personal control as critically important, not all place such an emphasis on this variable. For example, Carver and Scheier (1981, 1990, 1994, 1998) argue

that expectancies about the occurrence of an outcome are what matter. They argue that people consider both external circumstances and sensed personal control in forming their expectancy about outcome likelihood. This expectancy predicts emotional reactions and subsequent behavioral effort. Indeed, in this model confidence about outcomes and affect are viewed as two different subjective readouts of the same psychological mechanism (Carver & Scheier, 1998, pp. 122, 172). The critical element in this model is *whether* the desired outcome seems likely to occur, not *how* it is to occur.

The studies of control that were reviewed in the preceding sections were not devised to compare these theoretical views. Yet consideration of their procedures and outcomes suggests that their results are generally consistent with this theoretical position. As a group, the studies suggest that control is desirable (and may diminish distress) when having control is seen as making a desired outcome more likely, but that having control is undesirable (and may exacerbate distress) when it is seen as making a desired outcome less likely (see also Law, Logan, & Baron, 1994). Presumably there are also cases in which personal control is irrelevant—cases in which having versus not having personal control has no bearing on the perceived likelihood of the desired outcome (see Fitzgerald, Tennen, Affleck, & Pransky, 1993).²

Indeed, Burger's (1989) view of the control literature as a whole has much in common with Carver and Scheier's conceptual position, in holding that what matters most may be the anticipated outcome, rather than the path by which it is expected to occur. It appears, however, that Burger's point regarding the control literature (see also Thompson et al., 1988, for related points) has been widely disregarded.

A Methodological Problem

There is also a methodological problem that contributes to confusion about the effects of control perceptions. Although perceived control has been studied a great deal over the years, much of this work confounds the perception that an outcome *depends on what you do* (personal control) with the anticipation that a desired outcome *will occur* (for a discussion of issues in conceptualizing control, including this one, see Thompson & Spacapan, 1991). Testing the effect of perceived control apart from the effect of expected outcome requires that the qualities be kept separate (Figure 1). This is done only rarely in research on the control construct.

---- Insert Figure 1 about here ----

Consider, for example, a study by Thompson et al. (1993) mentioned earlier, which appeared to indicate the value of perceived control. Thompson et al. combined subjects' ratings of the amount of *control* they perceived in a given domain with their ratings of the *effectiveness* of their control efforts in that domain (i.e., perception of successful outcome). This makes it impossible to know whether it was the control perception that mattered or the perception of a successful outcome. To disentangle the functional role of control from the functional role of expecting (or experiencing) good outcomes, these qualities have to be kept separate from each other empirically.

How can the qualities be kept separate? One strategy is to assess the mixture of control plus confidence with one measure (e.g., a measure of mastery), assess confidence per se with a second measure, and see whether the first measure retains predictive ability when controlling for the second (e.g., Marshall, 1991). An alternative strategy is to assess confidence about the occurrence of an outcome with one measure, and assess separately whether the outcome is perceived as being under personal control or being outside one's control (e.g., Fitzgerald et al., 1993).

The work reported here employed the latter strategy. We asked participants for their expectancies regarding an important outcome; we then asked whether the person believed the determination of the outcome was primarily under her control or primarily outside her control.

Present Research

The data reported here came from women who were undergoing a health crisis: treatment for early stage breast cancer. Breast cancer poses a threat to life and well being. However, early stage breast cancer has a relatively good prognosis. The combination of life threat and positive prognosis creates a situation of great ambiguity. No one knows what variables determine who will experience a recurrence of the disease and who will not. This ambiguity provides an opportunity for patients to interpret their situation in diverse ways. That is, it leaves considerable room for generating diverse expectations regarding the outcome (remaining free of cancer in the future) and diverse perceptions of the source of control over that outcome.

Study 1 reports data collected during a period shortly after surgery. In this assessment we measured the patient's expectancy regarding future freedom from cancer, the patient's sense of

personal control over this possible outcome, and distress, both concurrent and subsequent. If the sense of personal control always promotes well being, there should be a main effect relating control to lower distress. If personal control promotes subjective well being only among people who expect good outcomes, there should be an interaction between control and level of confidence of remaining cancer free, such that control is associated with less distress only among the more confident women. If the perception of personal control is irrelevant in this circumstance, only the expectation of remaining cancer free should relate to distress levels.

STUDY 1

Method

Subjects and Procedure

The analyses reported here made use of subjects from two samples of breast cancer patients. One sample was collected by Pozo et al. (1992); analyses of data from that sample have been reported both in that article and elsewhere (Carver et al., 1993, 1994). The variables under study here, however, have not been addressed in any previous report.

This sample began as 69 private patients from the University of Miami Oncology Clinic, diagnosed with either Stage I ($n = 49$) or Stage II ($n = 20$) breast cancer.³ Stage I and II breast cancers are early-stage cancers, which have a good prognosis. All these patients were English speakers. Exclusion criteria (typical of studies on breast cancer patients) were previous psychiatric history, a prior cancer, or a major concurrent disease. The participation rate of women contacted was approximately 85%. The women ranged in age from 33 to 72 ($M = 58.23$, $SD = 11.23$). Fifty-one were married or in an equivalent relationship, 7 were divorced, 7 widowed, and 4 single. Sixty-one of the women were White, 4 Black, and 4 Hispanic. The women had completed an average of 14.04 ($SD = 2.38$) years of education.

Of the starting sample, 3 failed to provide information concerning the sense of personal control over their outcomes and were omitted. The subsample contributing to the analyses reported here thus was 66 subjects. Forty-six of these women underwent modified radical mastectomies, 7 had bilateral mastectomies, and 13 had lumpectomies (tumor excision). Fourteen subsequently underwent radiation therapy, 14 had chemotherapy, and 21 had tamoxifen therapy.

The second sample was 78 private patients from the University of Miami Oncology Clinic or from a private practice in South Miami (as in the first sample, several issues concerning adjustment to breast cancer were being studied at once). The participation rate was comparable to that of the first sample. The patients again had either Stage I ($n = 56$) or Stage II ($n = 21$) breast cancer, all were English speakers, none had a prior psychiatric history, a prior cancer, or a major concurrent disease. They ranged in age from 28 to 76 ($M = 53.40$, $SD = 11.12$). Most were married or in an equivalent relationship (56), 8 were divorced, 9 widowed, and 5 single. Most were non-Hispanic White (72), 1 was Black, and 5 Hispanic. The women had completed an average of 14.67 years of education ($SD = 2.18$). Forty-two of the women underwent single modified radical mastectomies, 6 had bilateral mastectomies, and 29 had lumpectomies (tumor excision). Twenty-four subsequently underwent radiation therapy, 18 had chemotherapy, and 40 received tamoxifen.

In both of these samples, data collection was conducted as a series of interviews. Subjects were recruited during their diagnostic office visit. After informed consent was obtained, an initial interview was conducted; a presurgery interview took place the day before surgery and a postsurgery interview took place 7-10 days after surgery. Expectancies for recurrence were assessed at postsurgery, along with perceptions of the source of control (personal or external) over recurrence. Also assessed at that time was distress level. Followup interviews were conducted 3, 6, and 12 months after surgery. Distress levels were reassessed at those times.

Psychosocial Measures

Cancer expectancy. The postsurgery interview included this question: "To what extent do you believe that you will remain free of cancer in the future?" The rating was made on a 9-point scale, where 9 was labeled "absolutely sure I won't get cancer again," 5 was labeled "I don't know," and 1 was labeled "not at all confident—I expect to get cancer again." We used only a single item to assess the expectancy of remaining cancer-free because of evidence that single-item reports of psychological qualities are fully as informative as multi-item scales when the qualities being assessed are relatively intuitive to people (Burisch, 1984a, 1984b; see also Helgeson, 1992). We regarded the concept of confidence of remaining free of cancer as relatively easy for subjects to understand.

Personal control over recurrence. After the assessment of expectancy of recurrence, subjects

received the following statement: "There are a lot of factors that influence any outcome in a person's life, and that includes whether or not a person remains free of cancer. Some of the factors are related to the person, for example the way you take care of yourself, the kinds of foods you choose to eat, and so on. Some of the factors are outside the person, for example having good quality health care, and being in an environment that protects you from things that cause cancer. Which of these categories will be more important in determining whether you remain free from cancer in the future?: [response choices being] 'Mostly things that are in my personal control' or 'Mostly things that are outside my personal control'." Again we used only a single item because the psychological quality we were measuring was quite straightforward. Given the forced-choice procedure, the sense of control over the outcome had two levels: low (coded as 1) and high (coded as 2).⁴

Distress. Distress was assessed in the first sample by the Profile of Mood States, or POMS (McNair, Lorr, & Droppelman, 1971). The POMS, a widely used instrument, is designed to assess several sorts of moods (e.g., depression, anger, anxiety). It consists of a series of adjectives, each of which is a mood descriptor. Respondents indicate the extent to which they have had that feeling for a specified time period, using response choices that range from 1 ("not at all") to 5 ("a lot"). At post-surgery the women were asked to indicate how they had felt since the operation. At each followup they were asked to indicate how they had felt during the preceding month.

Abbreviated scales were used, in an effort to minimize respondent burden, as many measures other than those described here were assessed at each time. The scales relevant here are anxiety (with the items tense, nervous, anxious), depression (helpless, unhappy, worthless, hopeless), and anger (angry, resentful, grouchy). These scales were all highly reliable (average α at postsurgery = .80). Preliminary analyses determined that depression, anger, and anxiety were highly interrelated (average $r = .71$ at postsurgery). Thus, these three scales were averaged into an index of distress ($\alpha = .91$). Distress levels were not high during the periods assessed (consistent with the idea that this is a crisis that is being resolved adaptively by most patients), with means at various points ranging around 2.

Distress was assessed in the second sample by the Affects Balance Scales (ABS, Derogatis, 1975). The ABS, also a widely used instrument, is designed to assess several qualities of emotion, both positive and negative. The ABS also is a series of mood-descriptive adjectives. Respondents

indicate the extent to which they have had that feeling for a specified time period, using response choices that range from 1 ("never") to 5 ("always"). In this rating subjects responded according to how they had been feeling since the operation. The scales relevant at present are those measuring anxiety, depression, hostility. As in the first sample, reliability analyses indicated that the anxiety, depression, hostility scales could be combined into a measure of distress (average α across measurements = .83).

The two samples thus were assessed on the same qualities of mood, but using different instruments. In order to render the samples comparable with respect to distress indices, z scores were computed on distress at each time point within each sample. These z-scores then were used as the outcome measure for the combined sample. This procedure seems quite reasonable, given that the samples were similar on all descriptive variables and had been recruited from the same sources.

Results and Discussion

Preliminary analyses tested for any potentially confounding relationships between either demographic characteristics (e.g., age, marital status) or medical treatment characteristics (e.g., stage of cancer, adjuvant therapies) and the predictor variables. No such association was found; thus no demographic or medical variable was controlled in the the analyses reported here.

Cancer expectancy self-reports tended toward the optimistic ($M = 6.31$, $SD = 1.95$), consistent with the patient's good prognosis, though the modal response was 5 (the middle of the scale). Self-reports on the perceived control variable were fairly evenly divided, with 65 reporting the belief that influences under their personal control would determine whether they remained cancer-free and 79 reporting that their outcome would be determined mostly by variables outside their control. The cancer expectancy and perceived control variables were not strongly related to one another, though those perceiving personal control tended to be more optimistic than those perceiving the outcome as outside their control ($r = .15$, $p < .07$).

The relationship between the cancer-expectancy and perceived-control variables and distress was tested by hierarchical regression analysis, in which the main effects of the two predictors were entered on the first step and the interaction on the second (variables were centered before computing the interaction to reduce multi-collinearity). The final equation for presurgical distress yielded one

significant effect: The expectancy of remaining cancer free was inversely related to distress, $\beta = -.25$, $SE = .08$, $p < .004$. Neither control nor the interaction had an effect approaching significance (β s = .00 and -.02).⁵ *SEs .08 and .08*

The same set of postsurgical predictor variables was then used to predict followup distress. At the 3-month followup (with an N of 126 having data at both measurement points), there again was a significant effect for the postsurgical expectancy of remaining cancer free, $\beta = -.21$, $p < .02$, with *SE .09*, neither control nor the interaction having an effect approaching significance (β s = -.01 and .15). *SEs .09 and .09*. At the 6-month follow (N = 118), no predictor approached significance. At the 12-month followup (N = 114), presurgical confidence again predicted distress, $\beta = -.21$, $p < .03$, with *SE .09*, neither control nor the interaction approaching significance (β s = -.02 and .15). *SEs .09*. Although postsurgical confidence of remaining free of cancer was fairly consistent as a predictor of relative distress across this period of time, it did not predict *changes* in distress across time. That is, tests of followup associations in which previous associations were controlled yielded no significant effect.

STUDY 2

Study 1 found evidence that expecting to remain free of cancer related to better emotional adjustment, and that this association was independent of the perceived causal agency underlying that good outcome. It might be argued, however, that testing the effect of perceptions of personal control so soon after surgery did not allow enough time for the effect of perceived control to develop. Study 2 assessed whether of the pattern of associations would replicate in a sample of women who had had a somewhat longer period to adjust to their diagnosis and treatment before reporting on their expectancies and control beliefs.

Method

Subjects and Procedure

Participants were 202 patients from several practices in the Miami area, diagnosed with either Stage 0 (n = 10), Stage I (n = 118), or Stage II (n = 74) breast cancer. All were English speakers. None had a previous psychiatric history, a prior cancer, or a major concurrent disease. The women ranged in age from 27 to 87 (M = 53.83, SD = 12.80). One hundred forty-three were married or in

an equivalent relationship, 25 were divorced or separated, 22 widowed, and 12 single. One hundred thirty-nine of the women were White, 21 Black, and 42 Hispanic. The women had completed an average of 14.41 (SD = 2.80) years of education. Sixty-seven of these women underwent modified radical mastectomies, 8 had bilateral mastectomies, and 127 had lumpectomies (tumor excision). One hundred twenty-eight subsequently underwent radiation therapy, 74 had chemotherapy, and 76 had tamoxifen therapy.

These women all completed a single assessment, conducted (in most cases) in questionnaire form (a few opted to be interviewed). Potential participants were contacted by a letter from their physician's office, which had a description of the research project (which, as in Study 1, extended substantially beyond the issue under discussion here). This letter contained a form that could be returned if the woman was interested in learning more about the study. All women who returned that form were contacted by phone and given a more complete description of the project's aims. Women still interested in participation were then sent an informed consent form and the questionnaire. The final participation rate of women initially contacted by mail was approximately 80%.

This project focused on issues that differed from those of the projects contributing to Study 1, entailing only one assessment from each participant. One purpose of the study, however, was to examine for differences as a function of the amount of time since surgery (through the first year). For this purpose we had selection windows at 3, 6, and 12 months post-surgery. Time since surgery varied as much as a month in either direction from the target date except for the 3-month window, for which the lower bound was only 2 weeks prior to the 3-month mark. Women in the 3-month window numbered 61, 68 were in the 6-month window, and 73 in the 12-month window.

Psychosocial Measures

Cancer expectancy and personal control over recurrence. Participants' perceptions of their likelihood of remaining free of cancer were measured by the same item as was used in Study 1. Similarly, their sense of whether their future freedom from cancer would be influenced more by factors within their personal control or more by factors outside their personal control was assessed by the same item as in Study 1.

Emotional adjustment. Emotional distress was assessed in this study by three measures.

The first was the abbreviated version of the Profile of Mood States (POMS) used in the first sample of Study 1. A second measure of emotional adjustment was the Center for Epidemiologic Studies depression scale (CES-D; Radloff, 1977). The CES-D is a widely used 20 item scale that measures a range of cognitive, affective, motivational, and somatic symptoms (see Myers & Weissman, 1980; Schulberg et al., 1985, for evidence on its validity). Respondents indicate the extent to which they have recently had a set of experiences (framed as "I" sentences). Options for responding range from 0 ("rarely or none of the time") to 3 ("most or all of the time").

Our third measure of emotional adjustment was the extent to which the woman reported a positive quality of life in her day to day experiences. Because our focus was on patients who have few physical symptoms, we did not assess cancer-specific aspects of quality of life, but aspects of general quality of life. Although time constraints prevented use of the full measure of perceived quality of life of Andrews and Withey (1976), we selected 11 items from it that we felt address a reasonable range of life activities. Respondents considered each item's content and indicated how they felt about that domain of life, on a scale ranging from 1 ("terrible") to 7 ("delighted"). This measure had a high internal reliability in this sample ($\alpha = .89$).

Preliminary analysis indicated that the three measures of emotional adjustment were relatively strongly correlated with one another (interscale r s ranged from .62 to .75, standardized α after reversing the coding for quality of life = .87). Thus, the three measures were merged into an index of distress, by standardizing responses to each measure and averaging the z-scores.

Results and Discussion

As in Study 1, preliminary analyses tested for potentially confounding relationships between demographic or medical treatment characteristics and the predictor variables. Again no such association was found (including none for time elapsed since surgery). Cancer expectancy self-reports once again tended toward the optimistic ($M = 5.71$, $SD = 1.93$), though less so than in Study 1. Self-reports on the perceived-control variable again were fairly evenly divided, with 111 reporting the belief that influences under their personal control would determine whether they remained cancer-free and 91 reporting that their outcome would be determined mostly by variables outside their control. Cancer expectancy and control were virtually unrelated in this sample ($r = -.03$).

The relationship of greatest interest was once again tested by hierarchical regression analysis, in which the main effects of the two predictors were entered on the first step and the interaction on the second. As in Study 1, the final equation yielded one significant effect: The expectancy of remaining cancer free was inversely related to distress, $\beta = -.35, p < .0001$. Neither the perceived-control variable nor the interaction had an effect approaching significance (β s = .03 and .01). As in Study 1, then, confidence of remaining free of cancer related to greater subjective well being, and this was independent of the causal locus from which that good outcome was expected to be produced.

General Discussion

We reported here analysis of two data sets bearing on an issue that differentiates among theories about how people deal with adversity. The issue is the role played by perceptions of personal *control* over outcomes, versus the role of expectancies about the *occurrence* of the outcomes. We examined this issue in the context of a serious health threat: breast cancer. The studies thus examined this issue in a context that had considerable personal meaning to the research participants.

It is apparent from the pattern of the data that the situation facing patients was ambiguous, both with respect to the likelihood of remaining free of cancer in the future, and with respect to perceptions about what variables would determine whether they would remain cancer-free. As a result, responses made by participants varied substantially on both expectancy of recurrence and perceptions of control. Indeed, it is noteworthy that as many women reported believing that recurrence would depend mostly on things that were in their personal control (overall $n = 176$) as reported believing that recurrence would depend mostly on things that were outside their personal control (overall $n = 170$).

Cancer-related outcome expectancies related to emotional distress in both studies. Women who said they expected to remain free of cancer reported less distress than those who reported being uncertain or doubtful about their future. This effect was independent of the sense of personal control over whether they would remain cancer-free. To put it differently, women who anticipated being free from cancer and who believed that this would result primarily from causal forces under their control were no better off emotionally than those who anticipated freedom from cancer and believed this good outcome would be determined primarily by forces outside their control. This pattern replicates that found by Fitzgerald et al. (1993) for life satisfaction among coronary bypass patients, and extends it

forward in time (Study 1). That is, the same pattern held when predicting distress levels at 3 months and 12 months (though not at 6 months) postsurgery.

Limitations

Several limitations on the studies should be noted, and appropriate caution urged in interpreting the findings. One issue is that the data are correlational. We did not give participants an experimental manipulation to induce or diminish a sense of personal control or a sense of confidence or doubt for the future. The women arrived at both types of perceptions (confidence and control) on their own. The correlational nature of the data thus makes it hard to draw causal inferences. However, this limitation does not bear on the central theme of the analyses: the associations of distress with confidence about freedom from cancer and with agency of control over freedom from cancer.

A second limitation is one of generality: The patients under study here were predominantly white, relatively well off financially (all were private patients), and all had early-stage cancers, thus a relatively good prognosis. These characteristics (which are typical of breast cancers samples in the literature of psycho-oncology) limit our ability to generalize from the results. We cannot be sure the findings reported here would generalize to other cultural groups, to people with advanced cancers, or to people experiencing other stressors.

A third issue concerns the fact that both predictor variables were measured by single items. Although we believe this strategy was eminently reasonable for the psychological qualities we were measuring (see Burisch, 1984a, 1984b; Helgeson, 1992), it remains possible that control failed to predict distress because it was not well measured. This interpretation is weakened by the fact that expectancy of recurrence (also measured with a single item) did predict distress. The possibility, however, can not be entirely discounted.

A fourth issue is that we assessed expectancies and control perceptions only with regard to freedom from disease. Clearly this is not the only outcome that is relevant to the experiences of cancer patients. It may be that other areas of perceived control are better predictors of well being. There is some evidence on this issue, but it is very difficult to interpret. Thompson et al. (1993) collected data regarding recurrence, and also data regarding control over three other areas of life. Adjustment was predicted only by perceived control over emotions/symptoms. Recall, however, that

Thompson et al. blended perceptions of control with perceived efficacy of coping efforts, thereby rendering their finding ambiguous regarding the role of perceived control. Nonetheless, it may be that perceived control over another outcome (such as emotions and physical symptoms, or treatment options) is more relevant to subjective well being than is perceived control over recurrence.

Despite these cautions and limitations on generalization, the pattern of the data is clear. In the context studied here, a perception of personal control over freedom from recurrence was unrelated to subjective well being. Recurrence is an important outcome, and over half the participants saw it as mostly under their control. Although the expectation of a good outcome related to subjective well being, beliefs about how the outcome would come to pass did not.

Is Control Irrelevant?

We should be explicit about what we are *not* saying about perceived control, as well as what we *are* saying. We would not argue that personal control never matters. Sometimes personal control is critical. For example, sometime the goal (the desired outcome) is explicitly *to do something oneself*. Without perceptions of personal control in that situation, the person will experience distress. There are also cases in which exercising personal agency is the *only* way to obtain the desired outcome, because no other causal force is in play. In such a case, unless the person exercises control, the outcome will not occur. In both of these cases, however, it should also be noted that control is confounded with the occurrence of the desired outcome.

In other cases, control apparently matters much less. What matters in those cases is whether or not the desired outcome is expected. This conclusion will be counterintuitive to some. It has been noted that patients who find they can not control the course of their disease turn their attention to aspects of their situation over which they can have a sense of control, such as their daily activities or their emotions (e.g., Taylor, 1983; Thompson et al., 1993). This has been interpreted as suggesting that patients engage in a continuing search for control, which is shunted in new directions when the sense of control in one domain fades (indeed, it might be argued that this is why control over issues other than recurrence is more relevant to well being than control over recurrence).

Does this pattern imply that control—per se—is more important than confidence of desired outcomes? We think it does not. We believe that people shift their focus to other domains precisely

because these are domains in which *positive outcomes* are still possible (Carver & Scheier, 1998). That is, instead of struggling with a domain of life in which desired outcomes seem unlikely (e.g., a person with a terminal cancer making that cancer go into remission), people turn to domains where good outcomes are more likely (e.g., continuing to have enjoyable interactions with friends). Thus, this illustration of the possible importance of a sense of control again confounds the sense of control with anticipations of good outcomes.

Something else we are not saying is that it's a bad idea for people to feel a sense of control in their lives. After all, taking control often is an effective way to promote good outcomes. Many people, in many life contexts, fail to attain good outcomes precisely because they are failing to engage in acts of causal agency that are open to them. These people should certainly be encouraged to engage in such acts. Provided that the sense of control does not diminish the perceived likelihood of the desired outcome, a sense of control is good.

We believe, however, that it's important to understand the core processes in human functioning. The stance we are taking here is that when perceived control benefits people, it does so because it is fostering confidence about desired outcomes. Indeed, we might advance a similar speculation about the beneficial effects of other well known resources in the literature of stress and well being, such as social support (e.g., Cohen & Wills, 1985; Helgeson & Cohen, 1996; House, House, & Umberson, 1988; Thoits, 1986) and even socio-economic status (Adler et al., 1994). Confidence that desired outcomes will come to pass may well be the final common pathway to emotional well being.

Evidence on this issue is sparse. The studies reported here obviously don't settle the question. They simply represent two more sets of information bearing on it. However, if this issue is to be resolved—if it is even to be *addressed*—researchers have to be more careful than they have been about separating the two qualities. As we noted earlier, despite important exceptions (e.g., Affleck et al., 1987; Fitzgerald et al., 1993), a great deal of previous writing in which the concept of control is invoked has failed to distinguish perceptions of personal control from confidence of a good outcome (e.g., Thompson et al., 1993; see also Newsom, Knapp, & Schulz, 1996; Thompson, Collins, Newcomb, & Hunt, 1996). Indeed, this problem of confounding also extends to locus of control as a personality quality. That is, Rotter's (1966) measure of a generalized internal locus of control has

been shown to confound internal control with anticipation of a good outcome (Carver, 1997).

It will not be easy to sort out the difference between control and confidence. The measurement problem in itself is daunting. Of further concern, however, is that today's research climate does not seem open to considering evidence on the question. Skinner (1996, p. 558), presenting "a guide to constructs of control," wrote that the prototypic control construct in the psychological literature treats the self as agent, the self's actions as means, and assumes that a positive change is effected on the environment." In making this statement, she seemed to argue (a) that prevalence in the literature should be the primary criterion for judging the adequacy of a construct's definition ("it is no longer the case that all definitions are created equal") and (b) that it is appropriate for these qualities to remain confounded in the future.

We reject the idea that a positive outcome should be incorporated in a definition of control. Indeed, our main point is the need to separate the anticipation of positive outcomes from other conceptual elements, because of the obvious—but widely ignored—fact that influences other than personal agency can promote positive outcomes. Suppose, just for the sake of argument, that what really matters in most cases is the expectation that a desired outcome will occur, independent of agency or means. If this were so, confidence rather than control would be the critical parameter. But if researchers continue to study only cells A and D of Figure 1—if confounding of control with anticipated outcome is accepted as standard practice—the question of which quality mattered could not even be investigated. This, we think, would be a mistake.

References

- Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist, 49*, 15-24.
- Affleck, G., Tennen, H., Pfeiffer, C., & Fifield, J. (1987). Appraisals of control and predictability in adapting to a chronic disease. *Journal of Personality and Social Psychology, 53*, 273-279.
- Aldwin, C. M. (1994). *Stress, coping, and development: An integrative perspective*. New York: Guilford.
- Andrews, F. M., & Withey, S. B. (1976). *Social indicators of well being: Americans' perceptions of life quality*. New York: Plenum.
- Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological Bulletin, 80*, 286-303.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*, 122-147.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology, 56*, 246-256.
- Burger, J. M., McWard, J., & LaTorre, D. (1989). Boundaries of self-control: Relinquishing control over aversive events. *Journal of Social and Clinical Psychology, 8*, 209-221.
- Burgess, C., Morris, T., & Pettingale, K. W. (1988). Psychological response to cancer diagnosis - II. Evidence for coping styles (coping styles and cancer diagnosis). *Journal of Psychosomatic Research, 32*, 263-272.
- Burisch, M. (1984a). Approaches to personality inventory construction: A comparison of merits. *American Psychologist, 39*, 214-227.
- Burisch, M. (1984b). You don't always get what you pay for: Measuring depression with short and

- simple versus long and sophisticated scales. *Journal of Research in Personality*, 18, 81-98.
- Carver, C. S. (1997). The Internal-External scale confounds internal locus of control with expectancies of positive outcomes. *Personality and Social Psychology Bulletin*, 23, 580-585.
- Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior*. New York: Springer-Verlag.
- Carver, C. S., & Scheier, M. F. (1990). Principles of self-regulation: Action and emotion. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 3-52). New York: Guilford.
- Carver, C. S., & Scheier, M. F. (1994). Optimism and health-related cognition: What variables actually matter? *Psychology and Health*, 9, 191-195.
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., & Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, 65, 375-390.
- Carver, C. S., Pozo-Kaderman, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1994). Optimism vs pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer*, 73, 1213-1220.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310-357.
- Derogatis, L. R. (1975). *The affects balance scale*. Baltimore, MD: Clinical Psychometric Research.
- Eitel, P., Hatchett, L., Friend, R., Griffin, K. W., & Wadhwa, N. K. (1995). Burden of self-care in seriously ill patients: Impact on adjustment. *Health Psychology*, 14, 457-463.
- Fitzgerald, T. E., Tennen, H., Affleck, G., & Pransky, G. S. (1993). The relative importance of dispositional optimism and control appraisals in quality of life after coronary artery bypass

- surgery. *Journal of Behavioral Medicine*, 16, 25-43.
- Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology*, 46, 839-852.
- Geer, J. H., Davison, G. C., & Gatchel, R. I. (1970). Reduction of stress in humans through nonveridical perceived control of aversive stimulation. *Journal of Personality and Social Psychology*, 16, 731-738.
- Glass, D. C., Singer, J. E., Leonard, H. S., Krantz, D., Cohen, S., & Cummings, H. (1973). Perceived control of aversive stimulation and the reduction of stress responses. *Journal of Personality*, 41, 577-595.
- Helgeson, V. S. (1992). Moderators of the relation between perceived control and adjustment to chronic illness. *Journal of Personality and Social Psychology*, 63, 656-666.
- Helgeson, V. S., & Cohen, S. (1996). Social support and adjustment to cancer: Reconciling descriptive, correlational, and intervention research. *Health Psychology*, 15, 135-148.
- House, J. S., House, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, 241, 540-544.
- Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology*, 34, 191-198.
- Law, A., Logan, H., & Baron, R. S. (1994). Desire for control, felt control, and stress inoculation training during dental treatment. *Journal of Personality and Social Psychology*, 67, 926-936.
- Marshall, G. N. (1991). A multidimensional analysis of internal health locus of control beliefs: Separating the wheat from the chaff? *Journal of Personality and Social Psychology*, 61, 483-491.
- McNair, D., Lorr, M., & Droppelman, L. (1971). *Profile of Mood States Manual*. San Diego, CA: EDITS.
- Miller, S. M. (1979). Controllability and human stress: Method, evidence, and theory. *Behavior Research and Therapy*, 17, 287-304.
- Myers, J. K., & Weissman, M. M. (1980). Use of a self-report symptom scale to detect depression

- in a community sample. *American Journal of Psychiatry*, 137, 1081-1084.
- Newsom, J. T., Knapp, J. E., & Schulz, R. (1996). Logitudinal analysis of specific domains of internal control and depressive symptoms on patients with recurrent cancer. *Health Psychology*, 15, 323-331.
- Peterson, C., & Seligman, M. E. P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review*, 91, 347-374.
- Pozo, C., Carver, C. S., Noriega, V., Harris, S. D., Robinson, D. S., Ketcham, A. S., Moffat, F. L., & Clark, K. C. (1992). Effects of mastectomy versus lumpectomy on emotional adjustment to breast cancer: A prospective study of the first year postsurgery. *Journal of Clinical Oncology*, 10, 1292-1298.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Reed, G. M., Taylor, S. E., & Kemeny, M. E. (1993). Perceived control and psychological adjustment in gay men with AIDS. *Journal of Applied Social Psychology*, 23, 791-824.
- Robins, C. J. (1988). Attributions and depression: Why is the literature so inconsistent? *Journal of Personality and Social Psychology*, 54, 880-889.
- Rodin, J. (1986). Aging and health: Effects of the sense of control. *Science*, 233, 1271-1276.
- Rodin, J., & Langer, E. J. (1977). Long-term effects of a control-relevant intervention with the institutionalized aged. *Journal of Personality and Social Psychology*, 35, 897-902.
- Shapiro, D. H., Jr., Schwartz, C. E., & Astin, J. A. (1996). Controlling ourselves, controlling our world: Psychology's role in understanding positive and negative consequences of seeking and gaining control. *American Psychologist*, 51, 1213-1230.
- Schulberg, H. C., Saul, M., McClelland, M., Ganguli, M., Christy, W., Frank, R. (1985). Assessing depression in primary medical and psychiatric practices. *Archives of General Psychiatry*, 42, 1164-1170.
- Schulz, R., & Heckhausen, J. (1996). A life span model of successful aging. *American Psychologist*, 51, 702-714.
- Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social*

- Psychology*, 71, 549-570.
- Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist*, 38, 1161-1173.
- Taylor, S. E. (1990). Health psychology: The science and the field. *American Psychologist*, 45, 40-50.
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, 103, 193-210.
- Taylor, S. E., Helgeson, V. S., Reed, G. M., & Skokan, L. A. (1991). Self-generated feelings of control and adjustment to physical illness. *Journal of Social Issues*, 47, 91-109.
- Taylor, S. E., Lichtman, R. R., & Wood, J. V. (1984). Attributions, beliefs about control, and adjustment to breast cancer. *Journal of Personality and Social Psychology*, 46, 489-502.
- Thoits, P. A. (1986). Social support as coping assistance. *Journal of Consulting and Clinical Psychology*, 54, 416-423.
- Thompson, S. C. (1981). Will it hurt less if I can control it? A complex answer to a simple question. *Psychological Bulletin*, 90, 89-101.
- Thompson, S. C., Cheek, P. R., & Graham, M. A. (1988). The other side of perceived control: Disadvantages and negative effects. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health* (pp. 69-93). Beverly Hills, CA: Sage.
- Thompson, S. C., Collins, M. A., Newcomb, M. D., & Hunt, W. (1996). On fighting versus accepting stressful circumstances: Primary and secondary control among HIV-positive men in prison. *Journal of Personality and Social Psychology*, 70, 1307-1317.
- Thompson, S. C., Sobolew-Shubin, A., Galbraith, M. E., Schwankovsky, L., & Cruzen, D. (1993). Maintaining perceptions of control: Finding perceived control in low-control circumstances. *Journal of Personality and Social Psychology*, 64, 293-304.
- Thompson, S. C., & Spacapan, S. (1991). Perceptions of control in vulnerable populations. *Journal of Social Issues*, 47, 1-21.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92, 548-573.

Weiner, B., & Kukla, A. (1970). An attributional analysis of achievement motivation. *Journal of Personality and Social Psychology*, 15, 1-20.

Author Note

Data collection and preparation of the manuscript were facilitated by support from the American Cancer Society (PBR-56 and PBR-82) and from the National Cancer Institute (CA-64710).

Send correspondence concerning the article to Charles S. Carver, Department of Psychology, University of Miami, Coral Gables, FL 33124-2070. E-mail: Ccarver@miami.edu

Footnotes

¹ It should perhaps be noted that the concept of personal control is not as precise and unitary as it appears on the surface. Various theorists have distinguished among several types of control, including behavioral, cognitive, decisional, informational, and retrospective control (Averill, 1973; Thompson, 1981). Treatment of this diversity is beyond the scope of this article, however.

² The literature of attributions and depression supplies indirect evidence on this question. A review by Robins (1988) found that the locus dimension (personal versus external causal responsibility) is far less reliably linked to depression than are the stability and generality dimensions. The latter deal directly with the likelihood of future negative outcomes, whereas locus deals with the issue of where control resides.

³ Previous reports on this sample have used differing subsets of the sample because the analyses had different focuses. Carver et al. (1993) used a subset for whom nearly-complete information was available across the 1-year followup period, because they were interested in prospective prediction of coping to distress and vice versa. Pozo et al. (1992) omitted patients who had bilateral surgery, because they were interested in differences between mastectomy and lumpectomy patients. The analyses reported here began with all patients for whom a postsurgery interview was fully completed.

⁴ Examples of possible causal forces were provided to give subjects some idea of the range of

variables they might take into account, rather than in an attempt to be prescriptive. An earlier reader of this paper pointed out that controlling stress is a common way for patients to feel a sense of control over the disease, and that stress arises from events outside the self. Given that the response options explicitly distinguished between variables that subjects perceived as under their personal control versus variables outside their control, we believe it is reasonable to infer that a patient who felt that stress was under her control, and who believed that controlling stress would be the process that would keep her free of cancer, would choose the personal-control option. The response choices did not dictate what things people should and should not feel a sense of control over. They simply assessed whether (in the aggregate) patients believed that things they have control over were going to be more important or less important causal agents than things they believed were outside their control.

⁵ Subsidiary analyses were conducted to confirm that this effect generalized across the two samples (it did), that the effect was indeed generally linear (an ANOVA breaking subjects into as even-sized groups as could be created yielded distress means of .38 for all doubtful subjects, .17 for neutral subjects, -.01 for those whose confidence was 6-7, -.06 for those whose confidence was 8, and -.69 for those whose confidence was 9), and that there was no tendency toward an interaction that had been obscured in the regression analysis (there was not).

Figure 1. If perceptions of control are beneficial, cell A should experience better outcomes than cell B, and cell C better than cell D. If perceptions of control are beneficial when associated with good outcomes but detrimental when associated with bad outcomes, A should be better than B but C should be worse than D. The effect of perceived control per se can not be evaluated, however, by comparing cell A with cell D, which has been the case in many studies.

		Perception of personal causal responsibility	
		Yes	No
Confidence of desired outcome	Yes	A	B
	No	C	D

— UNPUBLISHED DATA —

Cognitive-Behavioral Stress Management Intervention
Decreases the Prevalence of Depression and Enhances the Sense
of Benefit Among Women Under Treatment for Early-Stage Breast Cancer

Michael H. Antoni

Jessica M. Lehman

Kristin M. Kilbourn

Amy E. Boyers

Susan E. Yount

Jenifer L. Culver

Susan M. Alferi

Bonnie A. McGregor

Patricia L. Arena

Suzanne D. Harris

Alicia A. Price

Charles S. Carver

Running head: Benefits from Early-Stage Breast Cancer

Correspondence: Michael H. Antoni
Department of Psychology
University of Miami
Coral Gables, FL 33124-2070

Phone: (305) 284-7397

Fax: (305) 284-3402

E-mail: MAntoni@miami.edu

Abstract

We tested effects of a 10-week group cognitive-behavioral stress management intervention among 115 women newly treated for early-stage breast cancer. The intervention reduced prevalence of moderate depression (which remained relatively stable in the control group) but did not affect other measures of emotional distress. The intervention also increased participants' reports that having breast cancer had made positive contributions to their lives, and it increased generalized optimism. Both of these remained significantly elevated at a 3 month and at a 9-month follow-up of the intervention. The intervention had the greatest impact on the women who were most in need of it: those lower in optimism at baseline. Discussion centers on the importance of examining positive responses to traumatic events—e.g., growth, appreciation of life, shift in priorities, positive affect—as well as negative responses, and of creating a focus for such responses in structured interventions.

Approximately 175,000 women in the United States will be diagnosed with breast cancer in 1999 (American Cancer Society, 1999). Breast cancer patients confront a variety of stressors, including the diagnosis itself (Andrykowski et al., 1998; Glanz & Lerman, 1992; Stanton & Snider, 1993), intrusive medical procedures and aversive side-effects of treatment (Gottschalk & Hoigaard, 1986; Hann et al., 1998; Jacobsen et al., 1993; Jacobsen et al., 1995; Kaplan, 1994; Longman et al., 1996), and a variety of personal, psychological, and physical losses (Carver et al., 1998; Deadman et al., 1989; Schag et al., 1993; Spiegel, 1996).

The impact of this experience has changed over the years for many women, however. Improvement in medical procedures and changes in the psychological climate surrounding the disease have both helped to blunt the impact of the disease and its treatment. Research in the past decade has found that, among early stage patients (i.e., those with good prognosis) who have no prior history of psychiatric disturbance, severe psychiatric symptoms are relatively rare, and far less common than among patients with more advanced cancers (Andersen, Anderson, & deProse, 1989; Bloom et al., 1987; Carver et al., 1993; Ganz et al., 1998; Gordon et al., 1980; Lansky et al., 1985; Penman et al., 1987; for reviews see Glanz & Lerman, 1992; Irvine, Brown, Crooks, Roberts, & Browne, 1991; Moyer & Salovey, 1996). The experience of early stage breast cancer is now widely seen as a crisis in the woman's life, which has many diverse ramifications (Spencer et al., 1999), but which is weathered successfully by the majority of patients during the period of about a year post-surgery (Andersen et al., 1989).

Positive Consequences

Although diagnosis of and treatment for cancer are stress-inducing and disruptive, there is an increasing awareness in both research and clinical communities that the cancer experience often has sequelae that patients view as positive or beneficial. A substantial number of patients report experiences such as improvement in personal resources and skills, an enhanced sense of purpose, enhanced spirituality, closer relations with significant others, and changes in life priorities (e.g., Andrykowski, Brady, & Hunt, 1993; Collins, Taylor & Skokan, 1990; Curbow et al., 1993; Dow et al., 1996; Ferrell et al., 1995; Ferrell et al., 1997; Fromm, Andrykowski, & Hunt, 1996; Kahn & Steeves, 1993; Kurtz, Wyatt, & Kurtz, 1995; Snodgrass, 1998). As paradoxical as it seems, some

cancer patients say that being diagnosed with cancer has been a positive experience in their lives (see Thornton, 1999, for a review of this literature).

Such findings among cancer patients join a diffuse but growing literature in other areas suggesting that traumatic events can yield positive outcomes (e.g., Aldwin, Sutton, & Lachman, 1996; Affleck & Tennen, 1996; Davis, Nolen-Hoeksema, & Larson, 1998; Ebersole & Flores, 1989; Folkman, 1997; Ickovics & Park, 1998; Lehman et al., 1993; McMillen, Smith, & Fisher, 1997; McMillen, Zuravin, & Rideout, 1995; Mohr et al., 1999; O'Leary & Ickovics, 1995; Park, Cohen, & Murch, 1996; Schaefer & Moos, 1992; Tedeschi & Calhoun, 1995, 1996; Tedeschi, Park, & Calhoun, 1998; Thompson, 1985; Updegraff & Taylor, in press). The events studied have varied widely, including bereavement, infertility, childhood sexual abuse, tornadoes, mass killings, and plane crashes. The positive contribution or growth response does not appear to stem primarily from the passage of time since the event—it sometimes occurs quite early (Burt & Katz, 1987; Fromm et al., 1996; McMillen et al., 1997). Nor does it appear to reflect simply an absence of distress from the event (Fromm et al., 1996; Park et al., 1996; Ryff, 1989)—indeed, there is even some suggestion that positive sequelae can relate positively to event severity, as though severe events offer the greatest potential for growth (McMillen et al., 1997). There is evidence that finding benefit in trauma can reduce distress later (McMillen et al., 1997). It seems to permit resolution of the experience, allowing the person to move onward with life (cf. Carver & Scheier, 1998; Scheier & Carver, in press).

Tedeschi and Calhoun (1995) have studied the experience of growth after trauma in some detail. They suggest that clinical intervention can help foster such growth. That is, in their view, an appropriate intervention can take advantage of the trauma-induced disruption in the person's life to foster a new organization that has benefits beyond the person's starting point (see also Calhoun & Tedeschi, 1998). This possibility is intriguing, but we are unaware of any published research that has examined it empirically. Doing so was one purpose of the study reported here.

Interventions Among Cancer Patients

Reviews of studies of interventions with cancer patients (Andersen, 1992; Trijsburg et al., 1992) suggest that the most effective procedures use a combination of cognitive-behavioral stress

management (CBSM) techniques. Of the studies reviewed by Trijsburg et al. (1992), almost all had reduction of stress and distress as the primary goal. Other goals included increasing effective coping strategies (11 of 22 studies), expression of concerns and feelings (10), preserving social support (9), debunking myths about the illness (8), promoting hope, positive self-image, adequate sexual relations (5), and encouraging relaxation (5).

We reasoned that a group-based CBSM intervention addressing a broad set of these goals would benefit breast cancer patients by fostering confidence for the future, increasing skills at stress management techniques, optimizing the use of support from others, enhancing the self-concept, and fostering an attitude of continued engagement with life. Our intervention was intended to induce these outcomes by teaching behavioral and cognitive strategies in the context of a supportive group, and by providing women the opportunity to role play the strategies in situations chosen to fit with the concerns that are uppermost in their mind.

In the study reported here we examined the experiences of early-stage breast cancer patients during the first year after diagnosis and treatment. The women were recruited into the project shortly after surgery, and were randomized to either a group psychosocial intervention or a control experience. We assessed the impact of the intervention on several indices, including measures of distress, perceptions of positive contributions arising from the experience of having breast cancer, and generalized optimism about the future.

Method

Participants

Participants in this study were early-stage breast cancer patients who were recruited from several Miami area hospitals and practices. In most cases, they responded to a letter from their physicians soliciting their participation. Others were recruited through flyers placed in doctors' offices and cancer treatment centers and distributed by the American Cancer Society. Those interested called the project's phone number and spoke with a (female) researcher who screened them for eligibility. Information regarding staging and date of surgery was obtained in this phone screen. Criteria for exclusion included previous cancer (7 excluded), prior psychiatric history (5 excluded), major concurrent disease (4 excluded), and lack of fluency in English (1 excluded).

The effects of the intervention were studied over an extended period of time. For purposes of this article we will distinguish between short-term and longer-term effects. Short-term effects are those observed immediately after the intervention and during the subsequent 3 months (i.e., to 6 months post-surgery). The sample discussed here regarding short-term effects is restricted to the 115 patients who completed the initial, 3-month (i.e., post-intervention), and 6 month assessments. A total of 136 completed the initial assessment. Attrition by the 3-month assessment was 8.1% ($n = 11$). An additional 7.2% ($n = 9$) failed to complete the 6-month assessment, for a total short-term attrition rate of 15.3% (attrition did not differ by condition). Comparisons between those who did and did not leave the study found no difference for stage, number of positive nodes, surgical procedure, age, ethnicity, marital status, or presence versus absence of chemotherapy or radiation. Those who left before the 3-month follow-up did not differ from those who remained on any time 1 variable (optimism, distress, depression, avoidance, intrusion, or positive contributions). Those who left between 3- and 6-month follow-ups did not differ from those who remained on any 3-month variable.

Among the 115 participants who completed the short-term measures, diagnoses were Stage 0 ($n = 11$), Stage I ($n = 55$), or Stage II ($n = 49$). Nodal involvement ranged from 0 to 24 ($M = 1.39$, $SD = 4.21$). Fifty-two of the women had lumpectomies, 50 had mastectomies, 12 had bilateral mastectomies, and one a bilateral lumpectomy. Mean age was 50.31 years ($SD = 9.49$, range = 29-79). Participants included 81 non-Hispanic Whites, 19 Hispanics, 10 Blacks, and 5 self-identified as "other." Eighty-three of the women were married or in an equivalent relationship, 18 were divorced or separated, 4 were widowed, and 10 were single. A positive family history of breast cancer was reported by 45 women. Average education was 15.14 years ($SD = 2.44$). Ninety-two were currently employed, and 23 were retired or not currently working outside the home. During the course of the study, 47 of the women were treated with chemotherapy, and 53 were treated with radiation.

A subsample of 96 of these women have also completed a 12-month follow-up assessment. This constitutes our longer-term follow-up. Comparison between those who completed the longer-term follow-up and those who did not revealed that the groups did not

differ from each other on any of the variables described above at baseline, or on any index of distress or the measure of positive contributions at 6 months.

Procedure

Participants completed an initial assessment by mail 4-8 weeks after their surgery date. Following this, participants were randomly assigned to intervention or control condition. Women assigned to the intervention condition (n = 52) participated in a Cognitive Behavioral Stress Management (CBSM) intervention (described below) beginning 6-8 weeks after surgery. Women assigned to the control condition (n = 63) participated in a one-day seminar approximately 16-18 weeks post-surgery (after completion of the second assessment).

Participants in both conditions met in groups of up to eight in a large room within the Psychological Services center at the UM Coral Gables campus, or a similar room on UM medical campus. Each room was equipped with flat couches utilized exclusively for progressive muscle relaxation (PMR) exercises. Both the intervention and the one-day seminar were co-led by post-doctoral fellows and advanced graduate students in clinical psychology (all female) who were trained in the intervention and seminar protocol. Follow-up assessments (also by mail) were completed at 3 months post-surgery (i.e., at the conclusion of the intervention and prior to the control seminar), at 6 months post-surgery, and at 12 months post-surgery. Assessments were handled by graduate students who were not involved in administering the intervention. Although the timing of the assessments was tied to the time of surgery rather than to other medical events such as adjuvant therapy, each assessment included measures of such medical events.

Intervention. The intervention consisted of a closed, structured group intervention, meeting weekly for ten 2-hour sessions. The intervention employed CBSM techniques interwoven with didactic information, the latter to stimulate the use of the CBSM skills (e.g., cognitive restructuring). The intervention focuses on learning to cope with daily stressors associated with cancer-and treatment-related problems and issues, and learning about optimal use of social resources. The intervention used group members and group leaders as coping role models (for positive social comparisons, and use of social support); encouraged emotional expression and provided the opportunity to experience social support; replaced feelings of doubt

with a sense of confidence; and discouraged avoidance coping and encouraged acceptance and reframing as coping responses.

The primary goals of the intervention were to provide subjects with information on stress responses and coping, teach anxiety reduction skills such as progressive muscle relaxation and relaxing imagery (Bernstein & Borkovec, 1973), modify maladaptive cognitive appraisals using cognitive restructuring (Beck & Emery, 1985), enhance interpersonal conflict resolution skills and emotional expression via assertion training (Fensterheim & Baer, 1975), and provide a supportive group environment and increase utilization of social support networks. Beyond these major goals, this CBSM package was designed to include a combination of problem-focused (e.g., active coping and planning) and emotion-focused (e.g., relaxation training, use of emotional support) coping strategies.

This intervention was similar to that used by Antoni et al. (1991) and Lutgendorf et al. (1997) in research on coping with HIV infection. The intervention includes in-session didactic material and experiential exercises and out-of-session assignments (practicing relaxation exercises and monitoring stress responses) that participants complete at home. It was modified in several ways for the present study. Most obviously, examples chosen as relevant to HIV in gay men were changed to a set chosen as relevant to breast cancer in women. Focus groups and pilot sessions taught us that imagery exercises involving heat and sunlight were uncomfortable for women undergoing radiation, and we replaced them with color-based imagery. We also learned that the 16-muscle group PMR exercise was tedious for many women and changed to a 7-muscle group PMR exercise. The module on social support previously came in the 10th week, but we moved it to week 7, as many women reported that interactions with their support networks were a major area of concern. Similar changes were made to the Participant Workbook: male icons were changed to female ones; references to physical symptoms were changed from HIV-related (e.g., pneumonia) to breast cancer-related (e.g., suspicious lumps, back pain). Otherwise, the techniques covered and the format used were the same as in the previous intervention studies.

Attendance at the group meetings averaged 8.65 (SD = 1.44) of 10 sessions. Reports were also collected on the incidence of relaxation practice outside group meetings (though this

request received only partial compliance). Of the 39 women who reported on this variable for 6 or more weeks, the average rate of weekly practice reported was 6.03 (SD = 3.24).

Control-group seminar. Rather than employ a no-treatment control group, we used a procedure in which participants received a condensed version of the information provided in the full-scale intervention. Women in this condition attended a day-long seminar in which they received information about the nature and effects of stress reactions; an outline of the cognitive appraisal process and how it relates to stress and emotional states; practice on various relaxation training exercises; and exercises for changing self-defeating cognitive appraisals, reducing tension, and acquiring adaptive coping strategies.

This session was designed to provide at least some information on all topics covered in the CBSM condition. However, it lacked the therapeutic group environment and accompanying emotional support, the opportunity to hear about other group members' weekly frustrations and triumphs in dealing with their situation, opportunities for role-playing the techniques and receiving group feedback, and the opportunity to observe other group members model new appraisals, relaxation techniques, and coping strategies. Obviously the presentation of these materials was also much more condensed than in the intervention groups.

This type of control has at least two benefits in comparison to no-treatment control or wait-list control groups. By providing participants with information relevant to adjustment to the breast cancer experience, it diminishes differential attrition in the control condition—a major pitfall of no-treatment control designs. Second, the fact that participants in the one-day seminar received information related to successful adjustment creates a stronger test of the impact of the intervention in the follow-up period (i.e., after the 3-month assessment).

Measures

The assessment questionnaires measured at each time point contained a large number of psychosocial measures, not all of which are directly relevant to the portion of the project under discussion in this paper. The following measures are discussed here.

Distress. We measured general mood disturbance with the Profile of Mood States, or POMS (McNair, Lorr, & Droppelman, 1981). This measure is designed to assess mood states

on several dimensions. Items are self-descriptive adjectives; respondents are to indicate the extent to which they have felt the emotional quality the item portrays during the past week. Responses are made on a 5-point scale ranging from “never” to “always.” The POMS is widely used in adjustment research and was in the vast majority of studies of interventions in breast cancer patients reviewed by Trijsburg et al. (1992).

Because the full POMS is long and researchers are concerned about participant response burden, several abbreviated versions of the POMS have been devised (e.g., Blesch et al., 1991; Carver et al., 1993; Cella et al., 1987; Curran, Andrykowski, & Studts, 1995; Guadagnoli & Mor, 1989; Shacham, 1983). We used the item set from Carver et al. (1993). The scales examined in this study were anxiety (with items tense, nervous, anxious), depression (helpless, unhappy, worthless, hopeless), and anger (angry, resentful, grouchy). Because these variables were strongly correlated in this sample, we used a composite distress score that averaged the anxiety, depression, and anger subscale scores (the procedure used by Carver et al., 1993). The average alpha for the items of this combined scale in this sample was .86.

Depression. We also included a more thorough measure of depression: the CES-D (Radloff, 1977), a 20-item scale developed for the Center for Epidemiologic Studies (for validity data see Myers & Weissman, 1980; Schulberg et al., 1985). The CES-D measures a range of cognitive, affective, motivational, and somatic symptoms (framed as “I” sentences). Options for responding range from “rarely” to “most of the time.” This measure is widely used in research applications, and cut-offs have been established for moderate and more severe depression (Radloff, 1977; Myers & Weissman, 1980; Schulberg et al., 1985). The mean alpha in this sample across three administrations was .89.

Impact of Events Scale. The Impact of Events Scale (IES, Horowitz, Wilner, & Alvarez, 1979) is a 15-item self-report measure that assesses experiences of intrusion and avoidance that are commonly associated with distress about life situations. Factor analysis of the IES yields two scales: avoidance and intrusion. The intrusion scale measures the extent to which one experiences unwanted thoughts and images related to a particular life stressor. An example item is “I had trouble falling asleep or staying awake because pictures or thoughts about it came into my mind.”

Alpha for this subscale in the current study averaged .85. The avoidance subscale assesses the extent to which respondents consciously take action to distract themselves in order to avoid thinking about a situation. An example item is "I tried not to think about it; I stayed away from reminders of it." Alpha for the avoidance scale averaged .79.

Concurrent associations among the various distress measures varied from moderate to relatively strong. The correlation between the POMS composite and CES-D averaged (across 4 assessments) .66; between CES-D and IES-avoidance averaged .45; between CES-D and IES-intrusion averaged .56; between POMS and IES-avoidance averaged .36; between POMS and IES-intrusion averaged .48.

Optimism. Optimism was assessed by the Life Orientation Test-Revised, or LOT-R (Scheier, Carver, & Bridges, 1994). The LOT-R consists of 6 coded items plus fillers. Three of the coded items are phrased positively (e.g., "In uncertain times I expect the best") and 3 are phrased negatively (e.g., "If something can go wrong for me, it will"). Each item was answered on a 4-point scale ranging from 1 ("I agree a lot") to 4 ("I disagree a lot"). An extensive body of research has been conducted in diverse settings that documents that the LOT is a sound and reliable predictor of relevant behavioral and psychological outcomes (Scheier & Carver, 1992). We measured optimism at each assessment point in this study. Internal reliability across the four measurements in this study averaged .80. Test-retest reliability from the initial measurement to the 3-month point was .76; from the 3-month to 6-month was .81; and from 6-month to 12-month was .81. The correlation between the initial measure and the 12-month measure was .70.

Optimism as a variable was treated in two ways in this study, based on two lines of reasoning. Given that optimism is conceptualized as a personality variable, the hypothesis that would most typically be posed is that the disposition to be optimistic versus pessimistic might have a moderating influence on who benefits most from the intervention. In particular, perhaps those who were relatively low in optimism initially would benefit most from the intervention. Another possibility we examined is that the intervention might have an impact on participants' levels of optimism. This possibility treats optimism as a dependent variable.

Optimism in this sample was inversely related to the distress measures, as is typically

the case. The correlation of LOT-R scores with concurrent POMS averaged $-.48$; with CES-D averaged $-.54$; with IES-avoidance averaged $-.27$; and with IES-intrusion averaged $-.34$.

Benefit finding. Assessment in this study also included a measure of perceived benefits arising from the experience of diagnosis and treatment of breast cancer. This measure derives from several sources, including a set of items by Behr, Murphy, and Summers (1992) which assess perceptions of positive contributions among parents of children with special needs. Several of those items were refocused onto breast cancer and additional items were written. We used the resulting item set in a previous cross-sectional study of early-stage breast cancer patients (Boyers et al., 1999). That study also permitted us to condense the item set by removing items endorsed infrequently and items that seemed redundant with others in the set.

The measure as used here has 17 items (Table 1). The stem for each is "Having had breast cancer has....," and the item expresses some potential benefit that might be derived from the experience. Responses were made on a scale with labels "Not at all" (1), "A little" (2), "Moderately" (3), "Quite a bit" (4), and "Extremely" (5). As can be seen in Table 1, the items assess benefits in a variety of domains, including acceptance of life's imperfections, becoming more cognizant of the role of other people in one's life, and developing a stronger sense of purpose in life. A factor analysis of responses from the initial assessment suggests that the measure is appropriately used as a unitary scale. That is, 4 factors had eigenvalues greater than 1, but the eigenvalue of the first factor was 7.73, whereas those of the second through fourth ranged from only 1.56 to 1.00. Further, all items loaded at or above $.50$ on the unrotated first factor, and only one item loaded more strongly on a factor other than that unrotated first factor. The internal reliability of the item set in this study averaged (across the four assessments) $.95$.

---- Insert Table 1 about here ----

Perceptions of benefits were relatively stable overall across the study period. Scores at the first assessment correlated $.75$ with 3-month scores, which correlated $.91$ with 6-month scores. Scores at 6 months correlated $.87$ with scores at 12 months. Perceptions of benefits were almost completely unrelated to distress levels. Concurrent correlations of benefit finding with the POMS composite averaged $-.10$; with the CES-D averaged $-.06$; with IES-avoidance averaged

-.01; and with IES-intrusion averaged .01. Nor was dispositional optimism strongly related to concurrent perceptions of benefits, though the relationship strengthened over time. The correlation across the first two assessments averaged .10; in the final two assessments the correlations were .22 and .24, $ps < .02$.

---- Insert Table 1 about here --

Emotional processing. Also included for exploratory purposes was an item set developed to assess the occurrence of emotional processing (Stanton, Kirk, Cameron, & Danoff-Burg, 1999). Two groups of items were included, one targeting the examination of emotions (e.g., "I've been taking time to figure out what I'm really feeling," "I've been exploring my emotions"), the other targeting the expression of emotions (e.g., "I've been expressing the feelings I am having," "I've been taking time to express my emotions"). Responses were made on a scale with labels "I haven't been doing this at all" (1), "I've been doing this a little bit" (2), "I've been doing this a medium amount" (3), and "I've been doing this a lot" (4). Stanton et al. (1999) have found that these scales correlate in conceptually sensible ways with a variety of other measures of emotion-related thinking and behavior.

We included these scales here in hopes of gaining access to an important aspect of the processes we expected to be evoked by the intervention. They thus served as a sort of manipulation check on an aspect of the intervention's "process" impact. Although these items sets were conceptualized by Stanton et al. as being distinct qualities, in our sample they were highly correlated (average r over 4 administrations = .72). For this reason, the two scale scores were standardized and averaged to create an index of emotional processing.

Results

Control Variables, Design, and Preliminary Analyses

To assess the need to incorporate control variables in the main analyses, we conducted several kinds of preliminary analyses. First, we compared the intervention and control groups to each other on all available demographic and medical variables. The groups proved to differ on two of these variables. First, women in the intervention condition were more likely to undergo chemotherapy (56%) at some point in the year (coded dichotomously) than were women in the

control condition (35%), $p < .03$. Second, women in the control condition were older ($M = 52.71$, $SD = 9.31$) than those in the intervention condition ($M = 47.40$, $SD = 8.95$), $F(1, 113) = 9.59$, $p < .01$. These variables were controlled for in subsequent analyses.¹

The design of the short-term portion of this study is a 2 (intervention vs control group) by 3 (initial, 3-month, and 6-month repeated measurement) split-plot design. The design of the long-term portion is a 2 (intervention vs control group) by 4 (initial, 3-month, 6-month, and 12-month repeated measurement) design. The long-term data are also examined as a 2 (intervention vs control group) by 2 (initial and 12-month repeated measurement) design. Before turning to the main analyses, we tested the intervention group for cohort differences on all dependent measures. Failing to find any significant difference among the groups, we proceeded to the main analyses.

Short-Term Distress

Participants completed several measures of distress: the POMS, the CES-D, and the IES avoidance and intrusion scales. The groups did not differ initially on any of them. All these measures declined over the short-term portion of the study (Table 1). The POMS index was significantly lower at the 3-month than at the initial assessment, $F(1, 113) = 4.34$, $p = .04$, and did not change significantly during the next interval. The CES-D also fell from the initial measure to the 3-month follow-up, $F(1, 112) = 4.55$, $p < .04$, but did not change significantly afterward.² IES avoidance showed a similar pattern, falling from time 1 to time 2, $F(1, 113) = 7.76$, $p < .01$, but not falling significantly afterward. The IES intrusion scale fell from the initial assessment to the 3-month follow-up, $F(1, 113) = 29.46$, $p < .001$, and then fell further from the 3- to the 6-month follow-up, $F(1, 113) = 7.08$, $p < .01$. In contrast to the overall changes, interactions between group and repeated measurement were nonsignificant. Nor did the two covariates (age and exposure to chemotherapy) account for significant variance in any of these analyses.

---- Insert Table 1 about here ----

We also examined the CES-D data categorically. The commonly used boundary for moderate depression on the CES-D is a score of 16 (Radloff, 1977; Myers & Weissman, 1980; Schulberg et al., 1985). At the time of the first assessment, approximately one-third of the sample had CES-D scores that met or exceeded that value (Table 2), not differing between groups. In the

control condition the proportion of women meeting this criterion did not change significantly over repeated measurements, Cochran $Q(2) = 1.44, p = .485$. In the intervention condition, however, the proportion of the sample meeting this criterion fell significantly across assessments, Cochran $Q(2) = 11.44, p < .004$. Separate comparisons between the initial value and each follow-up value among intervention participants indicated that the proportion of moderately depressed women in this condition was significantly lower at each follow-up than at baseline, $Q(1) = 8.07$ and 5.40 , respectively, $ps < .02$.

---- Insert Table 2 about here ----

Short-Term Benefit Finding

Reports of benefits from having had breast cancer did not differ between groups at the first assessment, but the groups subsequently diverged (Table 3). A repeated measurement main effect emerged, $(2, 226) = 12.42, p < .001$, along with a significant interaction between condition and repeated measurement, $F(2, 226) = 10.76, p < .001$. Reports of benefits in the intervention condition increased significantly between the initial assessment and the 3-month assessment (i.e., post-intervention), $F(1, 51) = 31.78, p < .001$. This variable in the intervention group remained significantly elevated at the 6-month follow-up compared to the initial reports, $F(1, 51) = 17.10, p < .001$, not differing significantly from the 3-month reports, $F = 1.86$. In contrast, reports of benefits in the control group did not change from the initial assessment to either follow-up, both $Fs < 1$. Intervention participants reported greater benefit than did those in the control group at both the 3-month assessment, $F(1, 113) = 5.95, p < .02$, and the 6-month assessment, $F(1, 113) = 4.77, p < .04$. The covariates jointly accounted for a significant portion of the variance in this analysis, $p < .03$; neither accounted for a significant share by itself, however.

---- Insert Table 3 about here ----

Differential Impact of the Intervention

Was the impact of the intervention on depression and benefit finding greater for some people than for others? We explored this question in terms of the idea that the intervention might have more impact on those who began with lower levels of optimism than among those higher in optimism. This was the first role we examined for optimism—that it might serve as a

moderator of the impact of the intervention. We tested this possibility by dividing the sample at the median on the initial optimism reports, and reanalyzing the data as before.

With respect to the categorical measure of presence versus absence of moderate depression, these further analyses indicated that the impact of the intervention occurred almost exclusively among women who were more pessimistic at the start of the study. Among the more optimistic women in this condition, only 1 met the criterion for moderate depression in the initial assessment, and she did not meet the criterion at any subsequent assessment (nor did any other woman of this group). Among the less optimistic women in this condition, 14 of 30 met the criterion for moderate depression at the initial assessment, whereas only 6 did at 3 months and 8 at 6 months. The shift in proportion was significant, Cochran Q (2) = 9.88, $p < .008$.

The benefit-finding data were also examined for differential effects. These data were reanalyzed as a 2 (intervention vs control group) by 2 (high versus lower optimism) by 3 (initial, 3-month, and 6-month repeated measurement) design. This analysis yielded a significant interaction between condition and repeated measures, as described above. It also revealed an interaction among condition, repeated measures, and level of optimism, $F(2, 222) = 3.20$, $p < .05$. This interaction, which is displayed in Figure 1, suggests two things. First, less optimistic women seemed to respond especially favorably to the intervention. Their initial reports of benefits were lower, but in response to the intervention their 3-month and 6-month reports equaled those of the more optimistic women. In contrast to this, those less optimistic women in the control condition tended to report consistently lower levels of benefits than their more optimistic control counterparts.

---- Insert Figure 1 about here ----

Optimism as an Outcome Variable

We also tested whether optimism levels might themselves be influenced by the intervention. That is, perhaps the intervention may have the potency to make participants more optimistic about their future. To that end, optimism had been reassessed at each measurement point. The difference between groups at the initial assessment was not significant. The groups subsequently shifted in opposite directions, reflected in a significant interaction between group

and repeated measurement, $F(2, 226) = 5.09, p < .01$ (Table 3). Among participants receiving the intervention, optimism scores displayed an upward trajectory across repeated assessments. The change from the initial assessment to the 3-month was not significant, but the change from 3 months to 6 months was, $F(1, 51) = 11.10, p < .01$. Six-month reports were also more optimistic than the initial ones, $F(1, 51) = 8.89, p < .01$. In contrast to this, control participants displayed a nearly significant shift toward pessimism from the initial assessment to the 3-month follow-up, $F(1, 62) = 3.81, p = .055$, followed by a nonsignificant rebound at 6 months ($F < 1$). Because the form of the interaction involved a crossover, the conditions did not differ significantly from each other at any assessment point. Nor did the covariates play any role in prediction of optimism.

This analysis was also repeated with initial optimism level as an additional factor. That analysis failed to support the hypothesis that shifts in optimism as a function of the intervention would be greater among the less optimistic women than among the more optimistic women.

Emotional Processing

A final variable examined in the short term was participants' reports of examining and expressing emotions. This measure serves as a kind of manipulation check on one aspect of the intervention's impact.³ The groups did not differ in levels of emotional processing initially (Table 3). Repeated measures analysis across the first two measurements (as a 2 by 2 design) yielded a significant interaction between condition and repeated measurement, $F(1, 113) = 4.24, p < .05$.⁴ At the 3-month assessment (just after the intervention), participants who had received the intervention reported higher levels of emotional examination and expression than did control subjects. However, the divergent influence on emotional processing was not maintained at the 6-month follow-up (Table 3). Thus, the intervention appeared to promote examination and expression of feelings, as expected, but the effect did not carry over into the subsequent period.

Did participants' levels of emotional processing have any relation to their experience of benefit finding or optimism? There were significant concurrent associations between emotional processing and benefits: at the initial assessment $r = .24, p < .01$, at the 3-month assessment $r = .25, p < .008$, and at the 6-month assessment $r = .39, p < .001$. There was also an association between increase in emotional processing from baseline to 3 months and increase in benefits

reported during that same period, $r = .23, p < .02$.

On the other hand, there was no evidence of an influence from one variable to the other. That is, we conducted regressions in which emotional processing at one time point was used to predict benefit finding at the next point, controlling for earlier benefit finding. In these tests emotional processing did not prospectively predict benefits. Nor, in tests of the opposite causal flow, did benefits prospectively predict emotional processing. Thus, the strongest statement we can make about emotional processing is that elevations in this experience accompanied elevations in benefit finding during the period of the intervention.

In contrast to the links between emotional processing and benefit finding, relations between emotional processing and optimism (and between changes in these variables) were uniformly low and nonsignificant. This suggests that changes in benefit finding and changes in optimism had different process bases.

Longer-Term Effects

As noted earlier, longer-term effects of the intervention were examined among the 96 participants who completed the 3 assessments of the short-term design plus a 12-month follow-up. Analysis of the distress measures among these participants yielded no information beyond the effects that were described earlier for the short term. More specifically, none of the distress measures shifted between 6 and 12 months post-surgery. There was a slight tendency among control participants toward a lower prevalence of moderate depression, more closely approaching that of the intervention participants, but this tendency did not approach significance.

Analysis of benefit finding yielded a significant repeated measures effect, $F(3, 282) = 7.08, p < .001$, and a significant interaction between experimental condition and repeated measurement, $F(3, 282) = 6.17, p < .001$ (see Figure 2). Chemotherapy also made a significant contribution to prediction in this analysis, $p < .05$. An analysis using only the first and final measurements (i.e., disregarding short-term follow-ups) yielded a similar pattern: a main effect for repeated measurement, $F(1, 94) = 12.04, p < .002$, and an interaction between condition and repeated measurement, $F(1, 94) = 4.22, p < .05$. Among women in the intervention condition, reported benefits were significantly higher at the one year mark than at the first assessment, $F(1,$

46) = 11.89, $p < .002$. Among those in the control condition, the tendency toward an increase did not approach significance ($p > .25$). Despite the difference between groups in slopes over time, the final difference between the groups at the 12-month point was not significant.

---- Insert Figure 2 about here ----

Analysis of optimism also yielded a significant repeated measures effect, $F(3, 282) = 4.37$, $p < .01$, and a significant interaction between condition and repeated measurement, $F(3, 282) = 4.31$, $p < .01$. Covariates made no contribution in this analysis. Analysis using only the first and final measurements (i.e., disregarding short-term follow-ups) yielded a similar pattern: a main effect for repeated measurement, $F(1, 94) = 5.39$, $p < .03$, and an interaction between condition and repeated measurement, $F(1, 94) = 8.39$, $p < .01$. Among intervention participants, optimism was significantly higher at the one year mark ($M = 20.81$, $SD = 3.10$) than at the first assessment ($M = 19.51$, $SD = 3.61$), $F(1, 46) = 10.91$, $p < .002$. Among control participants, there was virtually no change from the initial assessment ($M = 20.51$, $SD = 3.08$) to the one-year mark ($M = 20.37$, $SD = 3.28$).

Differential Long-Term Impact of the Intervention

We also tested the possibility of moderator effects in the longer term outcomes of the study, in the same manner as in the short-term outcomes. With respect to the categorical data for moderate depression, the tendency toward a further differential decline in depression prevalence among the less optimistic women did not approach significance. With respect to benefit finding, however, the analysis yielded (in addition to the effect of condition by repeated measurement) a significant interaction among condition, repeated measurement, and initial level of optimism, $F(1, 94) = 5.39$, $p < .03$. The form of this interaction, which is displayed in Figure 3, indicates that the long-term gain provided by the intervention occurred entirely among the women who entered the study relatively low in optimism (dashed lines). Among the optimistic women, the long-term reports of benefits from control participants were nearly the same as from those who experienced the intervention, at a level intermediate between the two groups of less optimistic women.

---- Insert Figure 3 about here ----

Benefit Finding and Optimism

It is of some interest that optimism and reports of benefit finding were rather distinct from one another in this sample. As noted in the description of the instruments in the Methods section, concurrent relations between these measures were not significant initially or the 3-month follow-up, and the relations were modest albeit significant at the 6-month and 12-month follow-ups, $r_s = .22$ and $.24$, $p_s < .02$. On the other hand, changes in these two outcomes across time did track each other moderately well after the first block of time. That is, changes in optimism and positive contributions from baseline to the 3-month point correlated only $.17$ ($p < .08$); but changes from baseline to 6 months correlated $.33$, $p < .001$, and changes from baseline to 12 months correlated $.38$, $p < .001$ (a pattern of associations that replicates a pattern reported by Davis et al., 1998).

Discussion

This study tested the impact of a cognitive-behavioral stress management group intervention on the experiences of women who had recently been diagnosed with and treated surgically for early stage breast cancer. These women were first assessed within two months of their surgery. The intervention took place over a 10 week period following the initial assessment. The women were reassessed 3 months after the initial assessment, 3 months after that, and again 6 months later (i.e., 12 months after surgery). We examined both short-term impact of the intervention (through 6 months) and longer-term impact (through 12 months).

The study has limitations that should be acknowledged. The sample was a group of women who were relatively educated, affluent, and motivated to participate. Ethnic minorities were not as well represented in the sample as one might prefer (though 30% identified themselves as such). Particularly important is that the participants all had early-stage cancers and were free of co-morbid physical and mental health problems. All these issues place constraints on the generalizability of the findings. We would argue that the experiences reported by these women are not unusual for early-stage patients (for evidence of the relatively low levels of emotional distress reported by such patients see, e.g., Andersen et al., 1989; Bloom et al., 1987; Carver et al., 1993; Ganz et al., 1998; Gordon et al., 1980; Lansky et al., 1985; Penman et al., 1987).

Nonetheless, these constraints on generalization should be acknowledged.

Despite these limitations, however, the findings of the study appear to make several points. One important point is that most of these breast cancer patients reported that their lives had changed in positive ways due to the diagnosis of cancer. The mean initial report of benefits from cancer, averaged across the 17 domains assessed and averaged across all participants in the study, was above 3—a response that signifies a “moderate” level of the experience of benefit. This finding joins a growing literature indicating that the experience of adversity has many consequences, some of which seem to represent long-term benefits. The data also yielded suggestive evidence that benefit finding related to increased emotional processing. That is, women who reported higher levels of emotional processing were also those who reported more benefits. There was no evidence, however, that either the experience of emotional processing or the realization of positive contributions had causal primacy.

It is also noteworthy that reports of benefits were not correlated with distress in this sample. This appears to indicate that reports of positive sequelae do not simply represent a lack of distress. Rather, they seem to have an affirmative meaning of their own.

Effects of the Intervention

The intervention used in this study used the breast cancer experience as an opportunity to teach participants broad-based strategies of stress management. The intervention had several effects on the women who participated in it. First, although only a third of the sample met the CES-D criterion for moderate depression at the initial assessment, the intervention reduced the prevalence of depression among these women. Thus, on this measure of emotional disturbance (though not others), the intervention had a discernable impact.

The intervention also increased reports of benefits from having had breast cancer. Indeed, it raised the mean report (averaged across items) to a level midway between “moderate” and “quite a bit.” The intervention also produced a change in the levels of participants’ reported optimism about the future. Given that optimism versus pessimism is a relatively stable aspect of personality (Scheier & Carver, 1992), this latter change is rather remarkable.

Both of these effects of the intervention were maintained at the third assessment (3

months after the conclusion of the intervention experience) and at the fourth assessment (9 months after the conclusion of the intervention). It might be argued that the intervention's immediate impact on reports of benefit finding simply represents a case of socially desirable responding. However, this is a much less persuasive argument for the 6- and 12-month assessments.

There was also evidence that the intervention had its greatest impact on the individuals who were in greatest need of it. That is, those who were least optimistic about their future at the time of the initial assessment were the ones whose reports of benefits increased the most over the period of the study, both short-term and longer-term. This pattern suggests that this intervention is on the right track, producing most benefit for the people who need it most.

As we noted in the introduction, Tedeschi and Calhoun (1995), who have written extensively about the experience of growth after trauma, have suggested that clinical intervention can help foster such growth. That is, intervention might be able to take advantage of the trauma-induced disruption in the person's life, to induce a new organization that has benefits that extend beyond the person's starting point (see also Calhoun & Tedeschi, 1998). Our data appear to support their contention. To the best of our knowledge, this is the first randomized trial to demonstrate such an effect.

There are hints in the literature that experiencing benefits and growth may have beneficial physical manifestations as well as psychological ones (Bower, Kemeny, Taylor, & Fahey, 1998). Indeed, data from a subset of the women in our sample, reported elsewhere (Cruess, Antoni, McGregor et al., 1999), suggest that this intervention can influence at least one physical parameter—cortisol—by way of the enhancement in positive contributions. Just how far the beneficial effects of such positive experiences may extend (e.g., immune responses, disease-free survival) is a question that we hope to examine in future research.

Positive Contributions and Meaning Making

The results of this study contribute to the growing literature on positive sequelae of traumatic events, a literature that in some ways remains unfocused conceptually. Many different terms are used in this literature, including growth, benefit-finding, positive contribution, meaning

making, and more. These terms have somewhat different implications. It is not clear to what extent the concepts overlap, nor is it clear whether there exists some core element that transcends the various concepts and is at the heart of the phenomena to which they apply.

Some suggest that the core element may be finding meaning in the event (e.g., Fife, 1994; Folkman, 1997; Janoff-Bulman, 1992; Park & Folkman, 1997; Silver, Boon, & Stones, 1983; Taylor, 1983; Thompson, 1985). Others, however, have noted that definitions of meaning are sometimes so broad that they obscure the process to which they refer (Davis et al., 1998). Often meaning-making and benefit-finding are simply used interchangeably (Thornton, 1999). However, Davis et al. (1998) have reported evidence that the term has two distinct construals—making sense of the event in an explanatory sense, and finding benefit in the event. Moreover, reports of acquiring these two different kinds of meaning are not correlated with one another. Interestingly enough, both sorts of meaning making seem to play a role in adjustment, but finding benefit appears to be the more important in the longer term (Davis et al., 1998).

Obviously our findings provide no resolution to the many questions that remain in this literature. However, they add more grist to the consideration of those questions, by pointing to the fact that at least certain changes in meaning (those constituting perceptions of benefit from the traumatic event) can be induced by a group intervention.

Implications

An obvious implication of the findings reported here is the importance of collecting information on positive experiences as well as negative experiences when studying people who are dealing with adversity (cf. Folkman, 1997). If we had collected measures of emotional distress but no measures of benefit finding, we would have missed the consistent impact of the intervention on positive experiences. It seems likely that a comparable situation exists in many other research settings. That is, when people confront adversity, they typically experience emotional upheaval, but they may also be having growth experiences at more or less the same time. Indeed, interventions among such people may be fostering growth as well as reducing distress. Unless the researcher tries to measure such positive experiences, however, their occurrence will be missed. This, in turn, means that an important part of the change process will

also be missed, and that our understanding of the phenomena will be incomplete.

Indeed, it is also worth emphasizing this issue with regard to designing the intervention itself. Part of the experience of responding to adversity is the opportunity to experience growth and positive changes. An intervention that focuses solely on reducing the negative runs the risk of failing to foster such positive change experiences. We suggest that it is important to keep this issue in mind when planning interventions, and to incorporate explicitly elements intended to foster the finding of benefit in adversity.

References

- Affleck, G. & Tennen, H. (1996). Construing benefits from adversity: Adaptational significance and dispositional underpinnings. Journal of Personality, 64, 899-922.
- Aldwin, C. M., Sutton, K. J., & Lachman, M. (1996). The development of coping resources in adulthood. Journal of Personality, 64, 837-871.
- American Cancer Society. (1999). Cancer facts and figures—1999. Atlanta: American Cancer Society.
- Andersen, B. L. (1992). Psychological interventions for cancer patients to enhance the quality of life. Journal of Consulting and Clinical Psychology, 60, 552-568.
- Andersen, B. L., Anderson, B., & deProsse, C. (1989). Controlled prospective longitudinal study of women with cancer: II. Psychological outcomes. Journal of Consulting and Clinical Psychology, 57, 692-697.
- Andrykowski, M. A., Brady, M. J., & Hunt, J. W. (1993). Positive psychosocial adjustment in potential bone marrow transplant recipients: Cancer as a psychosocial transition. Psycho-oncology, 2, 261-276.
- Andrykowski, M. A., Cordova, M. J., Studts, J. L., & Miller T. W. (1998). Posttraumatic stress disorder after treatment for breast cancer: Prevalence of diagnosis and use of the PTSD Checklist-Civilian Version (PCL-C) as a screening instrument. Journal of Consulting and Clinical Psychology, 66, 586-590.
- Antoni, M. H., Baggett, L., Ironson, G., August, S., LaPerriere, A., Klimas, N., Schneiderman, N., & Fletcher, M. A. (1991). Cognitive behavioral stress management intervention buffers distress responses and immunologic changes following notification of HIV-1 seropositivity. Journal of Consulting and Clinical Psychology, 59, 906-915.
- Beck, A. T., & Emery, G. (1985). Anxiety disorders and phobias: A cognitive perspective. New York: Basic Books.
- Behr, S. K., Murphy, D. L., & Summers, J. A. (1992). User's manual: Kansas inventory of parental perceptions. University of Kansas: Beach Center on Families and Disabilities.
- Bernstein, B., & Borkovec T. (1973). Progressive muscle relaxation training: A manual for

the helping professions. Champaign, Ill: Research Press.

Bloom, J. R., et al. (1987). Psychological response to mastectomy: A prospective comparison study. Cancer, 59, 189-196.

Bower, J., Kemeny, M., Taylor, S., & Fahey, J. (1998) Cognitive processing, discovery of meaning, CD4 decline, and AIDS-related mortality among bereaved HIV-seropositive men. Journal of Consulting and Clinical Psychology, 66, 979-986.

Boyers, A. E., Carver, C. S., Antoni, M. F., et al. (1998). Correlates of benefit finding and growth experiences among women treated for early stage breast cancer. Manuscript in preparation.

Burt, M.R. & Katz, B.L. (1987). Dimensions of recovery from rape: Focus on growth outcomes. Journal of Interpersonal Violence, 2, 57-81.

Calhoun, L. G., & Tedeschi, R. G. (1998). Beyond recovery from trauma: Implications for clinical practice and research. Journal of Social Issues, 54, 357-371.

Carver, C. S., & Scheier, M. F. (1998). On the self-regulation of behavior. New York: Cambridge University Press.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. Journal of Personality and Social Psychology, 65, 375-390.

Cella, D. F., Jacobsen, P. B., Orav, E. J., Holland, J. C., Silberfarb, P. M., & Rafla, S. (1987). A brief POMS measure of distress for cancer patients. Journal of Chronic Diseases, 40, 939-942.

Collins, R. L., Taylor, S. E., & Skokan, L. A. (1990). A better world or a shattered vision? Changes in life perspective following victimization. Social Cognition, 8, 263-285.

Cruess, D. G., Antoni, M. H., McGregor, B. A., Kilbourn, K. M., Boyers, A. E., Alferi, S. M., Carver, C. S., & Kumar, M. (1998). Cognitive behavioral stress management reduces serum cortisol. Manuscript under review.

Curbow, B., Legro, M. W., Baker, F., Wingard, J. R., & Somerfield, M. R. (1993). Loss

and recovery themes of long-term survivors of bone marrow transplants. Journal of Psychosocial Oncology, 10, 1-20.

Curran, S. L., Andrykowski, M. A., & Studts, J. L. (1995). Short form of the Profile of Mood States (POMS-SF): Psychometric information. Psychological Assessment, 7, 80-83.

Davis, C. G., Nolen-Hoeksema, S., & Larson, J. (1998). Making sense of loss and benefiting from the experience: Two construals of meaning. Journal of Personality and Social Psychology, 75, 561-574.

Deadman, J. M., Dewey, M. J., Owens, R. G., Leinster, S. J., Slade, P. D. (1989). Threat and loss in breast cancer. Psychological Medicine, 19, 677-681.

Dow, K. H., Ferrell, B. R., Leigh, S., Ly, J., & Gulasekaram, P. (1996). An evaluation of the quality of life among long-term survivors of breast cancer. Breast Cancer Research and Treatment, 39, 261-273.

Ebersole, P., & Flores, J. (1989). Positive impact of life crises. Journal of Social Behavior and Personality, 4, 463-469.

Elashoff, J. D. (1969). Analysis of covariance: A delicate instrument. American Educational Research Journal, 6, 383-401.

Fensterheim, H., & Baer, J. (1975). Don't say yes when you want to say no. New York: David McKay.

Ferrell, B. R., Dow, K. H., Leigh, S., Ly, J., & Gulasekaram, P. (1995). Quality of life in long-term cancer survivors. Oncology Nursing Forum, 22, 915-922.

Ferrell, B. R., Grant, M. M., Funk, B., Otis-Green, S., & Garcia, N. (1997). Quality of life in breast cancer survivors as identified by focus groups. Psycho-Oncology, 6, 13-23.

Fife, B. L. (1994). The conceptualization of meaning in illness. Social Science & Medicine, 38, 309-316.

Folkman, S. (1997). Positive psychological states and coping with severe stress. Social Science & Medicine, 45, 1207-1221.

Fromm, K., Andrykowski, M. A., & Hunt, J. (1996). Positive and negative psychosocial sequelae of bone marrow transplantation: Implications for quality of life assessment. Journal of

Behavioral Medicine, 19, 221-240.

Fromm, K., Andrykowski, M. A., & Hunt, J. (1996). Positive and negative psychosocial sequelae of bone marrow transplantation: Implications for quality of life assessment. Journal of Behavioral Medicine, 19, 221-240.

Ganz, P. A., Rowland, J. H., Desmond, K., Meyerowitz, B. E., & Wyatt, G. E. (1998). Life after breast cancer: Understanding women's health-related quality of life and sexual functioning. Journal of Clinical Oncology, 16, 501-514.

Glanz, K., & Lerman, C. (1992). Psychosocial impact of breast cancer: A critical review. Annals of Behavioral Medicine, 14, 204-212.

Gordon, W. A., Freidenbergs, I., Diller, L., Hibbard, M., Wolf, C., Levine, L., Lipkins, R., Ezrachi, O., & Lucido, D. (1980). Efficacy of psychosocial intervention with cancer patients. Journal of Consulting and Clinical Psychology, 48, 743-759.

Gottschalk, L. A., & Hoigaard, M. J. (1986). The emotional impact of mastectomy. Psychiatry Research, 17, 153-167.

Guadagnoli, E., & Mor, V. (1989). Measuring cancer patients' affect: Revision and psychometric properties of the Profile of Mood States (POMS). Psychological Assessment, 1, 150-154.

Hann, D. M., Jacobsen, P., Martin, S., Azzarello, L., & Greenberg, H. (1998). Fatigue and quality of life following radiotherapy for breast cancer: A comparative study. Journal of Clinical Psychology in Medical Settings, 5, 19-33.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of events scale. Psychosomatic Medicine, 41, 209-218.

Ickovics, J. R., & Park, C. L. (Eds.). (1998). Thriving (Special Issue). Journal of Social Issues, 54 (2).

Irvine, D., Brown, B., Crooks, D., Roberts, J., & Browne, G. (1991). Psychosocial adjustment in women with breast cancer. Cancer, 67, 1097-1117.

Jacobsen, P. B., Bovbjerg, D. H., & Redd, W. H. (1993). Anticipatory anxiety in women receiving chemotherapy for breast cancer. Health Psychology, 12, 469-475.

Jacobsen, P. B., Bovbjerg, D. H., Schwartz, M. D., Hudis, C. A., Gilewski, T. A., Norton, L. (1995). Conditioned emotional distress in women receiving chemotherapy for breast cancer. Journal of Consulting and Clinical Psychology, *63*, 108-114.

Janoff-Bulman, R. (1992). Shattered assumptions. New York: Free Press.

Kahn, D., & Steeves, R. (1993). Spiritual well-being: A review of the research literature. Quality of Life: A Nursing Challenge, *2*, 60-64.

Kaplan, H. S. (1994). A neglected issue: The sexual side-effects of current treatments for breast cancer. Canadian Journal of Human Sexuality, *3*, 151-163.

Kurtz, M. E., Wyatt, G., & Kurtz, J. C. (1995). Psychological and sexual well-being, philosophical/spiritual views, and health habits of long-term cancer survivors. Health Care for Women International, *16*, 253-262.

Lansky, S. B., et al. (1985). Absence of major depressive disorder in female cancer patients. Journal of Clinical Oncology, *3*, 1553-1559.

Lehman, D., Davis, C., DeLongis, A., Wortman, C. B., Bluck, S., Mandel, D., & Ellard, J. (1993). Positive and negative life changes following bereavement and their relations to adjustment. Journal of Social and Clinical Psychology, *12*, 90-112.

Longman, A. J., Braden, C. J., & Mishel, M. H. (1996). Side effects burden in women with breast cancer. Cancer Practice, *4*, 274-280.

Lutgendorf, S., Antoni, M. H., Ironson, G., Klimas, N., Starr, K., McCabe, P., Cleven, K., Fletcher, M. A. & Schneiderman, N. (1997). Cognitive behavioral stress management decreases dysphoric mood and Herpes Simplex Virus-Type 2 antibody titers in symptomatic HIV-seropositive gay men. Journal of Consulting and Clinical Psychology, *65*, 31-43.

McMillen, J. C., Smith, E. M., & Fisher, R. H. (1997). Perceived benefit and mental health after three types of disaster. Journal of Consulting and Clinical Psychology, *65*, 733-739.

McMillen, J. C., Zuravin, S., & Rideout, G. B. (1995). Perceived benefit from child sexual abuse. Journal of Consulting and Clinical Psychology, *63*, 1037-1043.

McNair, D., Lorr, M., & Droppelman, L. (1981). Manual for the Profile of Mood States. San Diego: Educational and Industrial Testing Service.

Mohr, D. C., Dick, L. P., Russo, D., Pinn, J., Boudewyn, A. C., Likosky, W., & Goodkin, D. E. (1999). The psychosocial impact of multiple sclerosis: Exploring the patient's perspective. Health Psychology, 18, 376-382.

Moyer, A., & Salovey, P. (1996). Psychosocial sequelae of breast cancer and its treatment. Annals of Behavioral Medicine, 18, 110-125.

Myers, J. K., & Weissman, M. M. (1980). Use of a self-report symptom scale to detect depression in a community sample. American Journal of Psychiatry, 137, 1081-1084.

O'Leary, V. E., & Ickovics, J. R. (1995). Resilience and thriving in response to challenge: An opportunity for a paradigm shift in women's health. Women's Health: Research on Gender, Behavior, and Policy, 1, 121-142.

Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. Journal of Personality, 64, 71-105.

Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. Review of General Psychology, 1, 115-144.

Penman, D. T., Bloom, J. R., Fotopoulos, S., Cook, M. R., Holland, J. C., Gates, C., Flamer, D., Murawski, B., Ross, R., Brandt, U., Muenz, L. R., & Pee, D. (1987). The impact of mastectomy on self-concept and social function: A combined cross-sectional and longitudinal study with comparison groups. Women and Health, 11, 101-130.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1, 385-401.

Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology, 57, 1069-1081.

Schaefer, J., & Moos, R. (1992). Life crises and personal growth. In B. Carpenter (Ed.), Personal coping: Theory, research, and application (pp. 149-170). Westport, CT: Praeger.

Schag, C. A., Ganz, P. A., Polinsky, M. L., Fred, C., Hirji, K., & Petersen, L. (1993). Characteristics of women at risk for psychosocial distress in the year after breast cancer. Journal of Clinical Oncology, 11, 783-793.

Scheier, M. F. & Carver, C. S. (1992). Effects of optimism on psychological and physical

well-being: Theoretical overview and empirical update. Cognitive Therapy and Research, *16*, 201-228.

Scheier, M. F., & Carver, C. S. (in press). Adapting to cancer: The importance of hope and purpose. In A. Baum & B. L. Andersen (Eds.), Psychosocial interventions for cancer. Washington, D.C.: American Psychological Association.

Scheier, M., Carver, C.S., & Bridges, M. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. Journal of Personality and Social Psychology, *67*, 1063-1078.

Schulberg, H. C., Saul, M., McClelland, M., Ganguli, M., Christy, W., & Frank, R. (1985). Assessing depression in primary medical and psychiatric practices. Archives of General Psychiatry, *42*, 1164-1170.

Shacham, S. (1983). A shortened version of the Profile of Mood States. Journal of Personality Assessment, *47*, 305-396.

Silver, R. C., Boon, C., & Stones, M. H. (1983). Searching for meaning in misfortune: Making sense of incest. Journal of Social Issues, *39*, 81-102.

Snodgrass, S. E. (1998). A personal account. Journal of Social Issues, *54*, 373-380.

Spencer, S. M., Lehman, J. M., Wynings, C., Arena, P., Carver, C. S., Antoni, M. H., Derhagopian, R. P., Ironson, G., & Love, N. (1999). Concerns about breast cancer and relations to psychosocial well-being in a multi-ethnic sample of early stage patients. Health Psychology, *18*, 159-169.

Spiegel, D. (1996). Cancer and depression. British Journal of Psychiatry, *168*, 109-116.

Stanton, A. L., Kirk, S. B., Cameron, C. L., & Danoff-Burg, S. (1999). Coping through emotional approach: Scale construction and validation. Manuscript under review (revise-resubmit).

Stanton, A. L., & Snider, P. R. (1993). Coping with a breast cancer diagnosis: A prospective study. Health Psychology, *12*, 16-23.

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. American Psychologist, *38*, 1161-1173.

Tedeschi, R. G., Park, C. L., & Calhoun, L. G. (Eds.). (1998). Posttraumatic growth: Positive change in the aftermath of crisis. Mahwah, NJ: Erlbaum.

Tedeschi, R. G., & Calhoun, L. G. (1995). Trauma and transformation: Growing in the aftermath of suffering. Thousand Oaks, CA: Sage.

Tedeschi, R. G., & Calhoun, L. G. (1996). The post-traumatic growth inventory: Measuring the positive legacy of trauma. Journal of Traumatic Stress, *9*, 455-471.

Thompson, S. C. (1985). Finding positive meaning in a stressful event and coping. Basic and Applied Social Psychology, *6*, 279-295.

Thornton, A. A. (1999). Perceiving benefits in the cancer experience. Manuscript submitted for publication.

Trijsburg, R. W., van Knippenberg, F. C. E., & Rijpma, S. E. (1992). Effects of psychological treatment on cancer patients: A critical review. Psychosomatic Medicine, *54*, 489-517.

Updegraff, J. A., & Taylor, S. E. (in press). From vulnerability to growth: Positive and negative effects of stressful life events. In J. H. Harvey & E. D. Miller (Eds.), Handbook of loss and trauma. New York: Bruner/Mazel.

Footnotes

¹ We also tested associations of medical and demographic variables with outcome variables. Several correlations emerged, most of them varying across assessments (e.g., being significant at baseline but not at follow-up, or vice versa), and none exceeding .28. Because use of covariates presumes comparable associations across cells, because the effect of small associations on the outcome of the analysis is minimal (Elashoff, 1969), and because these variables were not confounded with group assignment, we did not control for these additional variables.

² One participant who otherwise completed all short-term assessments failed to complete the page with the CES-D at the initial assessment, resulting in an N of 114 for the CES-D.

³ Other measures in the data set might have provided information on the processes by which the intervention had its influence, but they were not very informative. A measure of use of friends for emotional support yielded a marginally significant interaction ($p = .10$) such that the CBSM participants continued to seek emotional support from friends longer than was true of participants in the control condition. Use of friends for emotional support related to concurrent benefit-finding overall, $r_s = .22, .38, \text{ and } .47$ across the three short-term assessments, $p_s < .02$, but change from baseline in the use of friends for support related to benefit-finding only at the 6-month assessment, $r = .23, p < .02$. Within the intervention subset of the data, neither rate of attendance at group sessions nor reports of frequency of practicing relaxation between sessions related to benefit-finding at any time point.

⁴ Scores on emotional processing were relatively high overall. Raw scores at time two (expressed as an item mean response) were 2.89 in the intervention condition and 2.65 in the control condition (on a scale of 1-4), suggesting the possibility of a ceiling effect.

Table 1

Items Assessing Benefit-Finding Regarding Having Had Breast Cancer.

Having had breast cancer ...

1. has led me to be more accepting of things.
2. has taught me how to adjust to things I cannot change.
3. has helped me take things as they come.
4. has brought my family closer together.
5. has made me more sensitive to family issues.
6. has taught me that everyone has a purpose in life.
7. has shown me that all people need to be loved.
8. has made me realize the importance of planning for my family's future.
9. has made me more aware and concerned for the future of all human beings.
10. has taught me to be patient.
11. has led me to deal better with stress and problems.
12. has led me to meet people who have become some of my best friends.
13. has contributed to my overall emotional and spiritual growth.
14. has helped me become more aware of the love and support available from other people.
15. has helped me realize who my real friends are.
16. has helped me become more focused on priorities, with a deeper sense of purpose in life.
17. has helped me become a stronger person, more able to cope effectively with future life challenges.

Table 1

Short-Term Distress: Mean Scores on POMS Index, CES-D, IES-Intrusion, and IES-Avoidance, at the Initial Assessment, and at 3-Month and 6-Month Follow-ups, for the Complete Sample of 115 (SDs in parentheses), Along with F Values for Repeated Measurement Main Effects

Measure	Initial	3-Month	6-Month	F
POMS Distress	1.88 (0.57)	1.76 (0.56)	1.70 (0.60)	5.53 **
CES-D	12.03 (9.38)	10.29 (9.40)	9.54 (9.20)	5.56 **
IES-Intrusion	16.24 (5.19)	14.33 (5.05)	13.44 (4.93)	34.78 **
IES-Avoidance	15.57 (5.08)	14.50 (5.00)	13.81 (4.81)	9.96 **

* $p < .05$ ** $p < .01$

Table 2

Proportion of Women Meeting Criterion for Moderate Depression (CES-D Score of 16 or Higher) in Control and Intervention Conditions, At Initial, 3-Month, and 6-Month Assessments.

Condition	Initial	3-Month	6-Month
Control (n = 63)	28.6%	23.8%	22.2%
Intervention (n = 52)	32.7%	11.5%	15.4%

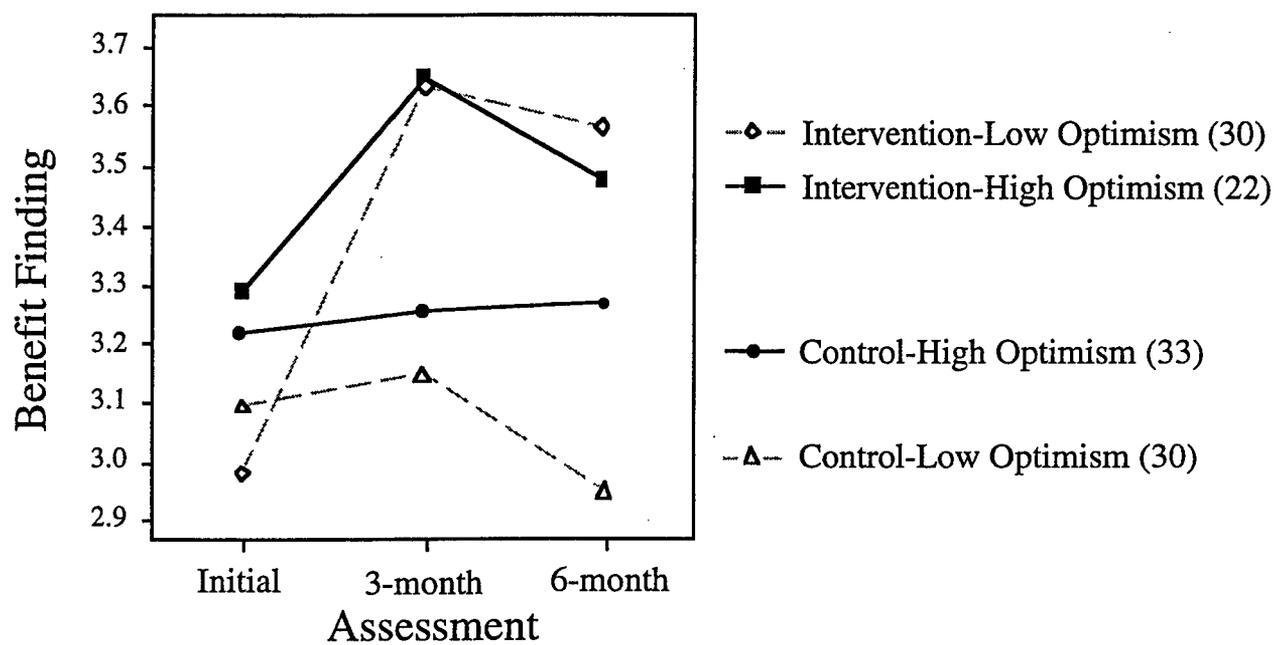
Table 3

Short-Term Mean Values on Benefit Finding Scale, Life Orientation Test, and the Z-Score Index of Emotional Processing: Initial Assessment, 3-Month Follow-up, and 6-Month Follow-up, for the 52 Intervention Participants and 63 Control Participants (SDs in parentheses)

Measure		Initial	3-Month	6-Month
Positive Contributions	Intervention	3.11	3.64	3.53
		(.81)	(.81)	(.85)
	Control	3.16	3.21	3.12
		(.93)	(1.05)	(1.11)
Life Orientation Test	Intervention	19.58	19.89	20.71
		(3.54)	(3.64)	(3.03)
	Control	20.29	19.68	19.98
		(3.15)	(3.78)	(3.58)
Emotional Processing	Intervention	-.04	.20	.02
		(.88)	(.88)	(.93)
	Control	.00	-.09	-.04
		(.95)	(1.01)	(.92)

Figure 1

Benefit finding among early-stage breast cancer patients who are relatively high and relatively low in initial optimism, and who experience the intervention and control conditions, as assessed at the initial, 3-month, and 6-month time points (group Ns in parentheses).



UNPUBLISHED DATA

Cognitive Behavioral Stress Management Reduces Serum Cortisol
By Enhancing Positive Contributions Among Women
Being Treated for Early-Stage Breast Cancer

Dean G. Cruess

Michael H. Antoni

Bonnie A. McGregor

Kristin M. Kilbourn

Amy E. Boyers

Susan M. Alferi

Charles S. Carver

Mahendra Kumar

University of Miami

Running Head: Cortisol and Positive Contributions From Breast Cancer

Correspondence: Michael H. Antoni
Department of Psychology
University of Miami
Coral Gables, FL 33124-2070

Phone: (305) 284-7397

Fax: (305) 284-1366

E-mail: MAntoni@miami.edu

Abstract

We examined the effect of a cognitive behavioral stress management intervention on serum cortisol in women being treated for Stage I or II breast cancer. Participants received a 10-week intervention (n = 24) starting 4-8 weeks post-surgery or were wait-listed (n = 10). Cortisol was assessed via radioimmunoassay just before the start of the intervention and immediately after its completion. At the same time points, the women reported the degree to which breast cancer had made positive contributions to their lives, among other measures. The intervention increased positive contributions and lowered serum cortisol (controlling for age, chemotherapy status, estradiol change, and menopausal status), whereas control subjects experienced neither change. Path analysis suggested that the intervention's effect on cortisol was mediated by increases in positive contributions. These findings suggest that positive growth during a time-limited intervention can influence the production of cortisol.

Most studies of cancer patients focus either on the disease itself or on psychological responses to the diagnosis and treatment. However, changes in hypothalamic pituitary adrenal (HPA) axis functioning have also been reported in women with breast cancer, including changes in the circadian rhythm of cortisol secretion (Touitou et al., 1996; Touitou et al., 1995) and elevation of glucocorticoids such as cortisol (Hays & O'Brian, 1989; Read et al., 1983). One recent study found higher plasma cortisol levels in 31 breast cancer patients than in 15 healthy age-matched controls (van der Pompe et al., 1996). Such differences may be due to disease- or treatment-related effects on endocrine regulation, or perhaps due to the psychological challenges that breast cancer patients must deal with in their daily lives. Breast cancer patients confront a cascade of stressors, including the diagnosis itself (Andrykowski et al., 1998; Glanz & Lerman, 1992; Stanton & Snider, 1993), ongoing intrusive medical procedures and severe side-effects of treatment (Gottschalk & Hoigaard, 1986; Hann et al., 1998; Jacobsen et al., 1993; Jacobsen et al., 1995; Kaplan, 1994; Longman et al., 1996), and a variety of personal, psychological, and physical losses (Carver et al., 1998; Deadman et al., 1989; Schag et al., 1993; Spiegel, 1996).

Many psychologists have addressed the possibility that adjuvant psychosocial interventions can promote better management of these stressors. A few have gone further, to ask whether such interventions may contribute to a reduction of HPA axis activation. Many studies have by now shown that psychological interventions can reduce distress, anxiety, and depressed mood, and enhance quality of life among women with breast cancer (Bridge et al., 1988; Gordon et al., 1980; Marchioro et al., 1996; Spiegel et al., 1981; for broader reviews see Andersen, 1992; Trijsburg, van Knippenberg, & Rijkman, 1992). However, far less research has examined change in indicators of HPA activation such as cortisol production.

Two recent studies have done so. One reported reductions in plasma cortisol levels in breast cancer patients completing a 13-week, supportive group intervention, with no change in cortisol among women assigned to a control group (van der Pompe et al., 1997). It is of interest that these changes occurred in the absence of change in distress. Another study of post-surgical breast cancer patients in a 10-week, psychological intervention reported a decrease in plasma

cortisol and an increase in the number of circulating lymphocytes after therapy (Schedlowski et al., 1994). Once again, this change in cortisol was not accompanied by a change in distress.

Although it is clear that a diagnosis of cancer is stress-inducing and disruptive at many levels, the experience of having cancer also has sequelae that patients often view as positive or beneficial. A substantial number of patients report such experiences as improved personal resources and skills, an enhanced sense of purpose, enhanced spirituality, closer relations with significant others, and changes in their life priorities (e.g., Collins, Taylor, & Skokan, 1990; Dow et al., 1996; Ferrell et al., 1995; Ferrell et al., 1997; Fromm, Andrykowski, & Hunt, 1996; Kahn & Steeves, 1993; Kurtz, Wyatt, & Kurtz, 1995). These changes apparently occur spontaneously in some cases. However, Tedeschi and Calhoun (1995), who have studied this experience in some detail, have suggested that clinical intervention can help foster these changes.

Might positive growth experiences of this sort have physiological repercussions? We are aware of no study that has considered this possibility. Earlier we described two studies which found that psychosocial interventions had beneficial influences on cortisol. In neither of these studies was there a relation between cortisol changes and changes in distress. However, neither study included a measure of positive responses. This leaves open the possibility that positive responses stimulated by the intervention might promote beneficial physiological changes. Testing this possibility was the focus of the analyses reported here.

In this article we report analysis of data from a subset of participants in a study of the psychological impact of a cognitive-behavioral stress management (CBSM) intervention in the weeks following surgery for early-stage breast cancer (Antoni et al., 1998). That project found that the intervention produced an increase in reports of positive contributions from having been diagnosed with and treated for breast cancer. It also increased participants' levels of optimism about their future. A subset of these participants also contributed blood for use in pilot-testing the effect of the intervention on physiological responses. That subsample is the focus of this report. In the analyses reported here, we tested the impact of the intervention on serum cortisol levels, and assessed the relationship between changes in cortisol and reports of distress, positive

contributions, and general optimism.

Method

Participants in the study from which this sample was drawn were recruited by physician referral and self-referral via a mailing from the American Cancer Society. Subjects were women diagnosed with Stage 1 or 2 breast cancer, who were recruited within eight weeks of their surgery. Potential participants were excluded if they had a previous cancer diagnosis, a prior history of psychiatric illness, a major concurrent disease, or lack of fluency in reading or speaking English.

The primary focus of that project was psychological. Partway through the study's recruitment period, however, new participants were offered an opportunity to provide additional data bearing on physiological functioning. The subset of participants who did so at the initial assessment (before assignment to condition) and at the post-intervention assessment (12 weeks after the first assessment) are the focus of this report.

These women were randomized to a 10-week CBSM intervention ($n = 24$) or a wait-list control condition ($n = 10$). The majority were nonHispanic Whites (23), 6 were Hispanic, 3 Black, and 2 "other." Most were employed full-time (30), with 1 employed part-time and 3 not employed. Twenty-one were married or in an equivalent relationship, 13 were single, widowed, divorced, or separated. Mean age was 45.65 ($SD = 7.61$), education averaged 15.50 years ($SD = 2.22$). The sample was evenly divided between Stage I (17) and Stage II disease (17). Nodal involvement ranged from 0-6 ($M = 0.63$, $SD = 1.29$). Fourteen of the women had lumpectomies, 15 had mastectomies, and 5 had bilateral mastectomies. Over the course of the study 11 had chemotherapy, 1 had radiation, and 3 tamoxifen. No demographic variable differed significantly between the two experimental groups. Chemotherapy status differed significantly between the groups, $\chi^2 = 6.74$, $p < .04$, with a higher percentage of chemotherapy in the control condition.

Procedures

Within 2-3 weeks of recruitment (time 1), participants completed an informed consent form and questionnaires bearing on their psychological responses to having been treated for breast cancer, along with personality and other variables. Participants provided a blood sample

for endocrine assay at about the same time point. After this initial assessment, participants were randomized to the intervention or the control group. After the intervention was completed (time 2), participants completed a second assessment and provided another blood sample.

Intervention. The experimental treatment was a group-based CBSM intervention consisting of 10 weekly meetings of approximately 2 hours. The intervention included both stress management and relaxation training components. The stress management portion focused on identifying cognitive distortions and using cognitive restructuring to generate more rational stressor appraisals, and techniques to improve coping skills, assertiveness, anger management, and social support utilization. Group discussions included personal experiences, experiential exercises, role-playing, and review of homework exercises emphasizing stress management concepts (for greater detail see Antoni et al., 1998).

The relaxation portion taught progressive muscle relaxation (Bernstein & Borkovec, 1973), meditation, abdominal breathing and guided imagery (Davis et al., 1988). Participants were asked to practice relaxation twice daily between group sessions. Each of the groups was led by one post-doctoral fellow and one advanced clinical psychology graduate student (all female). All group sessions were audio-taped and reviewed by a licensed clinical psychologist to ensure compliance with the treatment protocol.

Participants assigned to the wait-list control condition completed the same assessments at time 1 and time 2 as those assigned to CBSM. Approximately 4 weeks after time-2 assessments were completed, participants in the control condition were offered a one-day stress management seminar incorporating techniques similar to those provided during the CBSM intervention but without extensive opportunities for group discussion and practice using these techniques.

Measures

Serum cortisol. Cortisol was measured in serum obtained from subjects during venipuncture at pre- and post-intervention using a kit provided by Diagnostics Systems Laboratory (DSL-2100; DSL, 1996). Intra- and inter-assay sensitivity of this cortisol kit is 8.4% and 9.1%, respectively. To control for the diurnal rhythm of cortisol, all blood was collected at

the same time of day for all 34 participants (approximately 6:00PM) at both time points. Ten milliliters of blood was collected in red-capped tubes and then centrifuged at 2,500 rpm for 15 minutes at 4° C. Serum was separated, aliquoted into appropriately labeled freezer tubes, and stored in a -80° C freezer until use. Serum samples were analyzed via radioimmunoassay (RIA) competitive binding techniques, as described in detail elsewhere (Yalow & Berson, 1971). In order to control for the effects of time of menses on cortisol levels, we also assayed the sera for estradiol levels using an additional kit provided by Diagnostic Systems Laboratory (DSL-4400; DSL, 1996). Intra- and inter-assay sensitivity of this estradiol kit is 5.3% and 8.1%, respectively.

Positive contributions. A measure of perceived positive contributions from the experience of diagnosis and treatment of breast cancer was developed for the larger project from which this subsample is drawn. This measure derives from several sources, including a set of items by Behr, Murphy, and Summers (1992) assessing benefit in the experience of adversity among parents of children with special needs. Several of these items were refocused onto breast cancer, and additional items were written. The resulting item set was used in a cross-sectional study of a sample of early-stage breast cancer patients (Boyer et al., 1998), which permitted reduction of the item set.

The item set used here (which we will refer to as the Positive Contribution Scale, or PCS) has 17 items. Each is a statement beginning "Having had breast cancer has..." and ending with some positive gain from the experience. Respondents are to respond on a scale ranging from 1 ("Not at all") to 5 ("Extremely"). The items assess positive contributions in a variety of domains, including acceptance of life's imperfections (e.g., "has led me to be more accepting of things"), interpersonal growth (e.g., "has brought my family closer together"), and a stronger sense of purpose in life (e.g., "has helped me become more focused on priorities, with a deeper sense of purpose in life"). The internal reliability of the item set in the full sample of the study averaged across assessments was .95.

Distress. Distress was measured with the Profile of Mood States, or POMS (McNair, Lorr, & Droppelman, 1981). This measure assesses mood on several dimensions. Items are self-

descriptive adjectives; respondents indicate the extent to which they have felt the quality the item portrays during the past week. Responses are made on a 5-point scale ranging from “never” to “always.” The POMS is widely used in adjustment research and was in the majority of studies of interventions in breast cancer patients reviewed by Trijsburg et al. (1992).

Because the full POMS is long and many researchers are concerned about participant response burden, several abbreviated versions of the POMS have been devised (e.g., Blesch et al., 1991; Carver et al., 1993; Cella et al., 1987; Curran, Andrykowski, & Studts, 1995; Guadagnoli & Mor, 1989; Shacham, 1983). We used the item set from Carver et al. (1993). The scales examined in this study were anxiety (with items tense, nervous, anxious), depression (helpless, unhappy, worthless, hopeless), and anger (angry, resentful, grouchy). Because these variables were strongly correlated in this sample, we used a composite distress score that averaged the anxiety, depression, and anger subscale scores (the procedure used by Carver et al., 1993). The average alpha for the items of this combined scale in the full sample of the project was .86.

Optimism. Optimism was assessed using the Life Orientation Test-Revised (LOT-R, Scheier et al., 1994). The LOT-R has 6 scored items (plus 3 fillers) that assess optimism versus pessimism. The LOT-R as used here used a 4-point Likert scale ranging from 1 (“I agree a lot”) to 4 (“I disagree a lot”). The LOT has been used with multiple populations and has demonstrated sound internal reliability and validity (Scheier & Carver, 1992). The alpha for the initial administration of this measure in the full sample of the project was .79.

Results

Analysis began by examining relations between the dependent measures and demographic and medical variables (age, ethnicity, education, employment status, marital status, menopausal status, aerobic exercise, stage, surgical procedure, chemotherapy status, radiation therapy status, Tamoxifen use, positive lymph nodes) as potential control variables. Age related significantly to change in cortisol from time 1 to time 2, $r = -.36$, $p < .04$, as did menopausal status, $r = -.35$, $p < .05$, and estradiol change, $r = .44$, $p < .02$. These variables were statistically controlled for in all analyses of cortisol. Since chemotherapy status differed between groups, it was also controlled

for.

For each outcome variable (cortisol, positive contributions, POMS, and LOT-R scores), an analysis of covariance (ANCOVA) was used to test for a post-treatment difference between the CBSM and control groups. Each analysis controlled statistically for pre-treatment values of the dependent measure and chemotherapy status; analyses involving cortisol also controlled for the variables noted above.

Effects of the Intervention

As in the full sample of Antoni et al. (1998), positive contribution scores did not differ between groups before the intervention. However, an ANCOVA on post-intervention scores revealed a significant difference in post-intervention PCS scores between the CBSM and control groups, controlling for baseline scores and chemotherapy status, $F(1, 30) = 7.98, p < .01$.

Cortisol also did not differ between groups before the intervention. An ANCOVA on post-intervention scores revealed a significant difference between the groups, controlling for initial levels, age, change in estradiol levels, chemotherapy status, and menopausal status, $F(1, 27) = 4.59, p < .05$.

As in the full sample of Antoni et al. (1998), the subsample under study here had low levels of distress at the initial assessment, which did not differ between groups. After the intervention the groups still did not differ on POMS scores, $F(1, 30) = .01, p = .98$, which again is consistent with the pattern in the full sample. POMS scores were not related to serum cortisol levels at this time, however, $r = .03$. Nor was post-intervention POMS or change in POMS related to change in cortisol levels during the same time period, $\beta = .03, p > .75$.¹

As in the full sample the groups did not differ in LOT-R scores prior to the intervention. An ANCOVA revealed no difference between groups in post-intervention scores, controlling for initial scores and chemotherapy status, $F(1, 30) = 1.65, p = .21$. This result in this subsample differed from the result in the full sample, in which optimism was influenced by the intervention.

Relations Between Changes In Cortisol and Positive Contributions

The preceding analyses indicated that the intervention increased perceptions of positive

contributions from breast cancer and also reduced serum cortisol. The next question is whether these changes are related to one another. Because change in cortisol was strongly related to initial cortisol level, $r = -.75$, $p < .0001$, we did not compute cortisol change scores directly for these analyses; rather, we created residualized change scores by regressing post-intervention cortisol on initial cortisol (Llabre, Spitzer, Saab, Ironson, & Schneiderman, 1991). This residualized change score was then regressed on change in positive contribution (computed as a simple change score, because change in positive contribution did not strongly relate to initial level). This analysis also controlled for age, change in estradiol levels, chemotherapy status, and menopausal status. Even with these controls, there was a significant inverse relation between the two changes, $\beta = -.47$, $p < .01$. (Examination of a scatterplot of these data determined that this association was not driven by outliers in the distribution.) Thus, increase in positive contributions was related to decrease in cortisol.

Given this pattern of associations, we went on to test a model in which positive contributions were hypothesized to mediate the effect of the intervention on cortisol reduction (see Figure 1). There was a significant association between group assignment and PCS change, $\beta = -.33$, $p < .01$, a significant association between group and residualized cortisol, $\beta = .33$, $p < .05$, and a significant association between residualized cortisol and PCS change. Thus the conditions for testing a mediational model were satisfied. When PCS change scores were entered as a potential mediator, the relationship between group assignment and cortisol levels reduced substantially, becoming non-significant ($p > .30$). In contrast, the relationship between PCS change and cortisol change remained significant. This provides support for the notion that changes in positive contributions function as a mediator of the effect of the intervention on changes in cortisol levels.

---- Insert Figure 1 about here ----

Discussion

The analyses reported here examined a potential physiological benefit from a psychosocial intervention among patients newly diagnosed with early-stage breast cancer. We

found that controlling for initial cortisol levels, participants who experienced a 10-week group CBSM intervention subsequently had lower cortisol levels than did control participants. This difference in cortisol was not related to differences in distress. These two findings—a therapy effect on cortisol and an absence of a relation to distress reduction—both replicate data reported by Schedlowski et al. (1994) and van der Pompe et al. (1997).

Apparently, however, this is the first study to examine how a therapy-induced influence on cortisol might be linked to a change in a positive response, as opposed to a change in distress. The positive responses examined here were participants' perceptions of positive contributions in their lives arising from the cancer diagnosis, and a general optimism about the future. Reductions in cortisol proved to be associated with increases in perceptions of positive contributions. Further, results of path analysis were consistent with the hypothesis that the effect of the intervention on cortisol operated through the intervention's impact on positive contributions.

Conceptualizing Cortisol Activity

Recent work bearing on cortisol responses to psychosocial intervention has examined the role of distress, but found no support for such a role (Schedlowski et al., 1994; van der Pompe et al., 1997). The results of this study suggest two possibilities for further consideration. One possibility is that measures of positive responses permit assessment of minor variations in well-being in circumstances in which distress is relatively low. This line of reasoning suggests that the lack of relation between distress and cortisol in prior research, as well as the present study, was a consequence of low levels (and thus low variability) of distress. This possibility argues for the desirability of measuring positive responses in future work, but it suggests that positive responses will play an important role primarily (or perhaps only) when distress is low.

Another possibility, more provocative, is that previous researchers may have been looking in the wrong place. The key to cortisol activity may not be elevated distress but rather lack of positive affect or positive engagement. Although distress and lack of positive experiences often co-occur, such is not necessarily the case (as evidenced by the relative lack of an association between the two in this sample, and indeed in the larger sample from which this group is

drawn—Antoni et al., 1998). Possibly previous researchers were misled by instances in which elevated distress was closely accompanied by (and thus confounded with) diminished positive experience. If so, they might have made a misinference about which one was important.

There is evidence that aversive and incentive motivation are managed, at least in part, by two distinct aspects of the nervous system (e.g., Davidson, 1992, in press; Gray, 1990). This view would also argue for the importance of including measures of positive as well as negative responses in future studies, to determine whether one matters consistently more than the other. Such measures might include measures of positive affect (e.g., Derogatis, Abeloff, & Melisaratos, 1979) and of other positive states of mind (Adler, Horowitz, Garcia, & Moyer, 1998; Horowitz, Adler, & Kegeles, 1988), as well as positive contributions such as those measured here.

Evidence that is at least partially consistent with this line of thought has been obtained in recent projects that either manipulated or measured positive affect and cortisol among healthy persons. Two studies (Berk, Bittman, Covington, Bickford, Tom, & Westengard, 1997; Buchanan, al'Absi, & Lovallo, in press) induced increases in positive affect and reductions in cortisol by having participants view a humorous video. The increases in positive affect related to the reduction in cortisol (although in the Buchanan et al. study a reduction in negative affect also related to reduction in cortisol). Another study (Smyth, Ockenfels, Porter, Kirschbaum, Hellhammer, & Stone, 1998) assessed stressors and cortisol over a 2-day monitoring period and found that positive affect related to lower cortisol after controlling for several relevant individual differences. These findings, in conjunction with those reported here, argue for examining more closely the possibility of a link between positive experiences and cortisol.

Limitations and Potential Implications

We should be explicit about some of this study's limitations. First, the sample consisted of relatively healthy, highly educated women. Thus we cannot be certain that the results will generalize to more advanced breast cancers, other social strata, or other cancers. Second, this study did not compare the CBSM intervention to other kinds of treatments. It may be that the relaxation and cognitive skills taught here are not critical to the effect, that some other variable

was responsible both for the enhancement in perceptions of positive contributions and for reductions in cortisol. Third, we focused on changes in a relatively small sample across a 12-week period. Future work should follow participants over a longer term, to examine relations between intervention-induced positive growth and physiological response patterns.

Despite these limitations, the findings have tantalizing implications. It is known that glucocorticoids have immunosuppressive effects (Maier et al., 1994; McKewen et al., 1998). Evidence is mounting that CBSM interventions influence cortisol (Antoni et al., 1991; Antoni, Wagner, et al., 1998; Schedlowski et al., 1994; van der Pompe et al., 1997). Data from other populations also indicate that interventions of this sort can influence immune functioning (Esterling et al., 1992; Lutgendorf et al., 1997). There is even evidence that creating positive affect can influence blood leukocytes (Berk et al., 1997). Some correlational data are consistent with this picture as well. Stone et al (1994) found positive affect related to greater secretory immune responses to antigen challenge in healthy middle-aged men; Valdimarsdottir and Bovbjerg (1997) found positive affect related to greater natural killer cell (NK) activity in older women; and Vitaliano et al. (1998) found uplifts (positive experiences) related to greater NK activity in older caregivers.

Finally, Bower and colleagues recently reported that HIV-infected men who experienced a “discovery of meaning” after an AIDS-related bereavement showed less rapid decline in immune status (T-helper cell counts) and lower rates of AIDS-related mortality over a 2- to 3- year follow-up (Bower, Kemeny, Taylor, & Fahey, 1998). Discovery of meaning was defined as a major shift in values, priorities and perspectives surrounding the loss, and included, among other things, a greater appreciation for others, a heightened sense of living in the present and a commitment to enjoying life to the fullest—elements embodied in the positive contribution scale used in the present study. Interestingly, these authors speculated that changes in HPA axis-related hormones such as cortisol might act as physiological mediators for the association between discovery of meaning and immunologic and health outcomes observed in their sample. The overall pattern of evidence suggests the possibility that psychosocial interventions might

influence immune functioning in cancer patients and may do so by increasing positive growth and modulating cortisol levels. This is a possibility we hope to examine in future work.

References

- Adler, N., Horowitz, M., Garcia, A., & Moyer, A. (1998) Additional validation of a scale to assess positive states of mind. Psychosomatic Medicine, 60, 26 - 32.
- Andrykowski, M. A., Cordova, M. J., Studts, J. L., & Miller T. W. (1998). Posttraumatic stress disorder after treatment for breast cancer: Prevalence of diagnosis and use of the PTSD Checklist-Civilian Version (PCL-C) as a screening instrument. Journal of Consulting and Clinical Psychology, 66, 586-590.
- Antoni, M. H., Baggett, L., Ironson, G., LaPerriere, A., August, S., Klimas, N., Schneiderman, N., & Fletcher, M. A. (1991). Cognitive-behavioral stress management intervention buffers distress responses and immunologic changes following notification of HIV-1 seropositivity. Journal of Consulting and Clinical Psychology, 59, 906-915.
- Antoni, M. H., et al. (1998). Cognitive-Behavioral Stress Management Intervention Enhances Optimism and the Sense of Positive Contribution Among Women Under Treatment for Early-Stage Breast Cancer. Manuscript under review.
- Antoni, M. H., Wagner, S., Cruess, D. G., Kumar, M., Lutgendorf, S., Ironson, G., Dettmer, E., Williams, J., Klimas, N., Fletcher, M. A., & Schneiderman, N. (1998). Cognitive Behavioral Stress Management reduces Distress and 24-Hour Urinary Free Cortisol Output Among Symptomatic HIV-Infected Gay Men. Manuscript under review.
- Behr, S. K., Murphy, D. L., & Summers, J. A. (1992). User's manual: Kansas inventory of parental perceptions. University of Kansas: Beach Center on Families and Disabilities.
- Berk, L., Bittmen, B., Covington, T., Bickford, K., Tom, S., & Westengard, J. (1997). A video presentation of music, nature's imagery, and positive affirmations as a combined eustress paradigm modulates neuroendocrine hormones. Annals of Behavioral Medicine, 19, 201.
- Bernstein, D & Borkovec, T. (1973). Progressive Relaxation Training: A manual for the helping professions. Champaign, IL: Research Press.
- Bower, J., Kemeny, M., Taylor, S., & Fahey, J. (1998) Cognitive processing, discovery of meaning, CD4 decline. and AIDS-related mortality among bereaved HIV-seropositive men.

Journal of Consulting and Clinical Psychology, 66, 979 - 986.

Boyers, A. E., Carver, C. S., Antoni, M. F., et al. (1998). Correlates of positive contributions and growth experiences among women treated for early stage breast cancer.

Manuscript in preparation.

Bridge, L. R., Benson, P., Pietroni, P. C., & Priest, R. G. (1988). Relaxation and imagery in the treatment of breast cancer. British Medical Journal, 297, 1169-1172.

Buchanan, T., al'Absi, M., & Lovallo, W. (in press). Cortisol fluctuates with increases and decreases in negative affect. Psychoneuroendocrinology.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., Jr., & Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. Journal of Personality and Social Psychology, 65, 375-390.

Carver, C. S., Pozo-Kaderman, C., Price, A. A., Noriega, V., Harris, S. D., Derhagopian, R. P., Robinson, D. S., & Moffatt, F. L. (1998). Concern about aspects of body image and adjustment to early stage breast cancer. Psychosomatic Medicine, 60, 168-174.

Davidson, R. J. (1992). Anterior cerebral asymmetry and the nature of emotion. Brain and Cognition, 20, 125-151.

Davidson, R. J. (in press). Affective style and affective disorders: Perspectives from affective neuroscience. Cognition and Emotion.

Davis, M. D., Eshelman, E. R., & McKay, M. (1988). The Relaxation and Stress Reduction Workbook (3rd ed.). Oakland, CA: New Harbinger.

Deadman, J. M., Dewey, M. J., Owens, R. G., Leinster, S. J., et al. (1989). Threat and loss in breast cancer. Psychological Medicine, 19, 677-681.

Derogatis, L. R., Abeloff, M. D., & Melisaratos, N. (1979). Psychological coping mechanisms and survival time in metastatic breast cancer. Journal of the American Medical Association, 242, 1504-1508.

Esterling, B., Antoni, M., Schneiderman, N., LaPerriere, A., Ironson, G., Klimas, N., &

Fletcher, M. A. (1992). Psychosocial modulation of antibody to Epstein-Barr viral capsid antigen and human herpesvirus-type 6 in HIV-1 infected and at-risk gay men. Psychosomatic Medicine, 54, 354-371.

Glanz, K., & Lerman, C. (1992). Psychosocial impact of breast cancer: A critical review. Annals of Behavioral Medicine, 14, 204-212.

Gordon, W. A., Freidenbergs, I., Diller, L., Hibbard, M., Wolf, C., Levine, L., Lipkins, R., Ezrachi, O., & Lucido, D. (1980). Efficacy of psychosocial interventions with cancer patients. Journal of Consulting and Clinical Psychology, 48, 743-759.

Gottschalk, L. A., & Hoigaard, M. J. (1986). The emotional impact of mastectomy. Psychiatry Research, 17, 153-167.

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. Cognition and Emotion, 4, 269-288.

Hann, D. M., Jacobsen, P., Martin, S., Azzarello, L., & Greenberg, H. (1998). Fatigue and quality of life following radiotherapy for breast cancer: A comparative study. Journal of Clinical Psychology in Medical Settings, 5, 19-33.

Hays, J. H., & O'Brian, J. T. (1989). Endocrine and metabolic function in patients with neoplastic disease. In R. B. Herberman (Ed.), Influence of the host on tumor development. Dordrecht: Kluwer Academic Publishers.

Horowitz, M., Adler, N., Kegeles, S. (1988) A scale for measuring the occurrence of positive states of mind: A preliminary report. Psychosomatic Medicine, 50, 477 - 483.

Jacobsen, P. B., Bovbjerg, D. H., & Redd, W. H. (1993). Anticipatory anxiety in women receiving chemotherapy for breast cancer. Health Psychology, 12, 469-475.

Jacobsen, P. B., Bovbjerg, D. H., Schwartz, M. D., Hudis, C. A., et al. (1995). Conditioned emotional distress in women receiving chemotherapy for breast cancer. Journal of Consulting and Clinical Psychology, 63, 108-114.

Kaplan, H. S. (1994). A neglected issue: The sexual side-effects of current treatments for breast cancer. Canadian Journal of Human Sexuality, 3, 151-163.

Llabre, M. M., Spitzer, S. B., Saab, P. G., Ironson, G. H., & Schneiderman, N. (1991). The reliability and specificity of delta versus residualized change as measures of cardiovascular reactivity to behavioral challenges. Psychophysiology, *28*, 701-711.

Longman, A. J., Braden, C. J., & Mishel, M. H. (1996). Side effects burden in women with breast cancer. Cancer Practice, *4*, 274-280.

Lutgendorf, S. K., Antoni, M. H., Ironson, G., Klimas, N., Kumar, M., Starr, K., McCabe, P., Cleven, K., Fletcher, M. A., & Schneiderman, N. (1997). Cognitive-behavioral stress management decreases dysphoric mood and herpes simplex virus-type 2 antibody titers in symptomatic HIV-seronegative gay men. Journal of Consulting and Clinical Psychology, *65*, 31-43.

Maier, S. F., Watkins, L. R., & Fleshner, M. (1994). Psychoneuroimmunology: The interface between behavior, brain, and immunity. American Psychologist, *49*, 1004-1017.

Marchioro, G., Azzarello, G., Checchin, F., Perale, M., Segati, R., Sampognaro, E., Rosetti, F., Franchin, A., Pappagallo, G. L., & Vinante, O. (1996). The impact of a psychological intervention on quality of life in non-metastatic breast cancer. European Journal of Cancer, *32*, 1612-1615.

McEwan, B. (1998). Protective and damaging effects of stress mediators. New England Journal of Medicine, *338*, 171-179.

McGrady, A., Woerner, M., Bernal, G. A. A., & Higgins, J. T. (1987). Effect of biofeedback-assisted relaxation on blood pressure and cortisol levels in normotensives and hypertensives. Journal of Behavioral Medicine, *10*, 301-310.

McNair, D., Lorr, M., & Droppleman, L. (1981). Manual for the Profile of Mood States. San Diego: Educational and Industrial Testing Service.

Read, G. F., Wilson, D. W., Campbell, F. C., Holliday, H. W., Blamey, R. W., & Griffiths, K. (1983). Salivary cortisol and dehydroepiandrosterone sulphate levels in postmenopausal women with primary breast cancer. European Journal of Cancer and Clinical Oncology, *19*, 477-483.

Schag, C. A., Ganz, P. A., Polinsky, M. L., Fred, C., Hirji, K., & Petersen, L. (1993).

Characteristics of women at risk for psychosocial distress in the year after breast cancer. Journal of Clinical Oncology, 11, 783-793.

Schedlowski, M., Jung, C., Schimanski, G., Tewes, U., & Schmoll, H. J. (1994). Effects of behavioral intervention on plasma cortisol and lymphocytes in breast cancer patients: An exploratory study. Psychooncology, 3, 181-187.

Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. Cognitive Therapy and Research, 16, 201-228.

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. Journal of Personality and Social Psychology, 67, 1063-1078.

Smyth, J., Ockenfels, M., Porter, L., Kirschbaum, C., Hellhammer, D., & Stone, A. A. (1998). Stressors and mood measured on a momentary basis are associated with salivary cortisol secretion. Psychoneuroendocrinology, 23, 353-370.

Spiegel, D. (1996). Cancer and depression. British Journal of Psychiatry, 168, 109-116.

Spiegel, D., Bloom, J. R., Kraemer, H. C., & Gottheil, E. (1989). Effect of psychosocial treatment on survival of patients with metastatic breast cancer. Lancet, 2:8668, 888-891.

Spiegel, D., Bloom, J. R., & Yalom, I. (1981). Group support for patients with metastatic cancer: A randomized outcome study. Archives of General Psychiatry, 38, 527-533.

Stanton, A. L., & Snider, P. R. (1993). Coping with a breast cancer diagnosis: A prospective study. Health Psychology, 12, 16-23.

Surwit, R. S., & Feinglos, M. N. (1983). The effects of relaxation on glucose tolerance in non-insulin-dependent diabetes. Diabetes Care, 6, 176-179.

Tedeschi, R.G., & Calhoun, L.G. (1995). Trauma and transformation: Growing in the aftermath of suffering. Thousand Oaks, CA: Sage.

Touitou, Y., Levi, F., Bogdan, A., Benavides, M., Bailleul, F., & Missett, J. L. (1995). Rhythm alteration in patients with metastatic breast cancer and poor prognostic factors. Journal

of Cancer Research and Clinical Oncology, 121, 181-188.

Touitou, Y., Bogdan, A., Levi, F., Benavides, M., & Auzeby, A. (1996). Disruption of the circadian patterns of serum cortisol in breast and ovarian cancer patients: Relationships with tumour marker antigens. British Journal of Cancer, 74, 1248-1252.

van der Pompe, G., Antoni, M. H., & Heijnen, C. J. (1996). Elevated basal cortisol levels and attenuated ACTH and cortisol responses to a behavioral challenge in women with metastatic breast cancer. Psychoneuroendocrinology, 21, 361-374.

van der Pompe, G., Antoni, M. H., Visser, A., & Garssen, B. (1996). Adjustment to breast cancer: The psychobiological effects of psychosocial interventions. Patient Education and Counseling, 28, 209-219.

van der Pompe, G., Duivenvoorden, H. J., Antoni, M. H., Visser, A., & Heijnen, C. J. (1997). Effectiveness of a short-term group psychotherapy program on endocrine and immune function in breast cancer patients: An exploratory study. Journal of Psychosomatic Research, 42, 453-466.

Yalow, R., & Berson, S. (1971). Introduction and general considerations. In W. D. Odell & W. H. Daughday (Eds.), Principles of Competitive Protein Binding Assays. Philadelphia: JB Lippencott, 1-19.

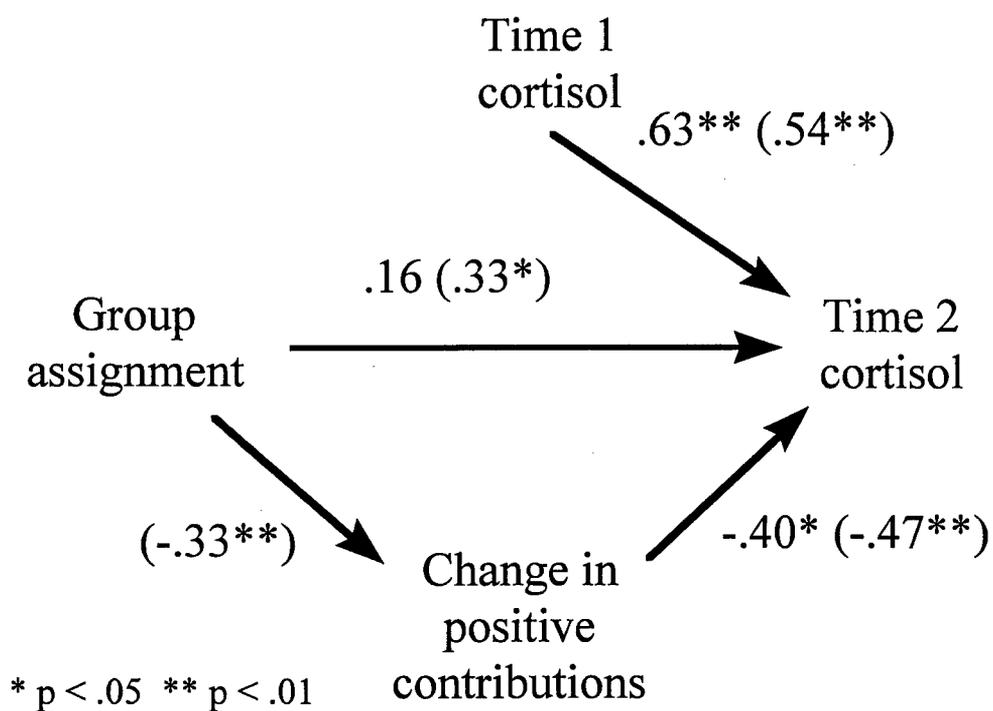
Author Note

This work was supported by grants from the National Cancer Institute (CA-64710), the Department of Defense (J4236-DAMD1794), and the National Institute of Mental Health (T32-MH18917). We thank the study participants for their invaluable assistance. We also thank Jesus Fernandez for his laboratory expertise in conducting cortisol assays and Neil Schneiderman for consultation on interpretation of the cortisol data. Correspondence should be sent to Michael H. Antoni, Department of Psychology, University of Miami, Coral Gables, FL 33124-2070. E-mail: Mantoni@miami.edu

Footnote

¹ It might be argued that the relaxation component of the intervention decreased physical tension, which reduced HPA axis activity (McGrady et al., 1987; Surwit & Feinglos, 1983). This reasoning suggests that support should be most likely for the affect of anxiety, which involves the greatest amount of physical tension. However, analysis using only the anxiety scale from the POMS yielded a pattern very similar to that for the combined index of distress.

Figure 1. Path model testing the mediating effect of change in Positive Contribution Scale (computed as a change score) on the relationship between group assignment (CBSM versus control) and serum cortisol change (residualized by regressing time 2 cortisol on time 1 cortisol). Within parentheses are simple associations, outside parentheses are standardized regression coefficients from the full model.





DEPARTMENT OF THE ARMY
US ARMY MEDICAL RESEARCH AND MATERIEL COMMAND
504 SCOTT STREET
FORT DETRICK, MARYLAND 21702-5012

REPLY TO
ATTENTION OF:

MCMR-RMI-S (70-1y)

18 Jan 01

MEMORANDUM FOR Administrator, Defense Technical Information
Center, ATTN: DTIC-OCA, 8725 John J. Kingman
Road, Fort Belvoir, VA 22060-6218

SUBJECT: Request Change in Distribution Statement

1. The U.S. Army Medical Research and Materiel Command has reexamined the need for the limitation assigned to technical reports written for Grant DAMD17-94-J-4236. Request the limited distribution statement for Accession Document Number ADB257296 be changed to "Approved for public release; distribution unlimited." This report should be released to the National Technical Information Service.

2. Point of contact for this request is Ms. Judy Pawlus at DSN 343-7322 or by email at judy.pawlus@det.amedd.army.mil.

FOR THE COMMANDER:

A handwritten signature in cursive script, appearing to read "Phyllis M. Rinehart", is written over the typed name.

PHYLIS M. RINEHART
Deputy Chief of Staff for
Information Management