5-2006

Expressive Writing and Breast Cancer: Outcomes and Linguistic Analyses

Kelly N. Hughes
Utah State University

Recommended Citation

Hughes, Kelly N., "Expressive Writing and Breast Cancer: Outcomes and Linguistic Analyses" (2006). *All Graduate Theses and Dissertations*. 6230.
https://digitalcommons.usu.edu/etd/6230

EXPRESSIVE WRITING AND BREAST CANCER: OUTCOMES AND LINGUISTIC ANALYSES

by

Kelly N. Hughes

A dissertation submitted in fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Psychology

Approved

UTAH STATE UNIVERSITY
Logan, Utah

2006

ABSTRACT

Expressive Writing and Breast Cancer:
Outcomes and Linguistic Analyses

by

Kelly N. Hughes, Doctor of Philosophy

Utah State University, 2006

Major Professor: Dr. M. Scott DeBerard
Department: Psychology

This project examined the impact of an expressive writing intervention as compared to a general health information control on breast cancer patients' postradiation treatment. It further examined the content of the expressive writing narratives. The sample included women who were completing radiation treatment for breast cancer at the Huntsman Cancer Institute and City of Hope hospital. The measures utilized in this study were self-report instruments targeting psychological distress (PANAS, IES) and general functioning (SIP), as well as demographic questionnaires. Results revealed the expressive writing intervention significantly impacted positive affect over time. Furthermore, participants from both the treatment and control groups evidenced improvements in psychological distress and general functioning over time. Linguistic analyses revealed participants' use of positive affect words increased across writing sessions, whereas the use of negative affect words and cognitive words did not change. Additionally, the use of past tense words decreased across writing sessions, whereas the use of present tense words increased and the use of future tense remained constant. The findings revealed from this study indicate that an expressive writing intervention can positively impact breast cancer patients up to 1 year postradiation treatment. Furthermore, the analysis of writing trends suggests that the use of positive affect words, the decrease in use of past tense words, along with the increase of present tense words across writing sessions, may be important linguistic components in positive outcomes.

(180 pages)

ACKNOWLEDGMENTS

I would like to thank the researchers from the original project from which this study was born. I want to specifically thank Lillian Nail, principal investigator of the original project, and Robert Croyle and Betty Ferrell, co-investigators of the original project. I especially want to thank Lee Ellington, co-investigator of the original project. Her support and feedback were invaluable to this study. Without her openness and excitement about working with students outside of her university, this project would have never been realized.

I would like to thank my dissertation committee: M. Scott DeBerard, dissertation chair and major professor, who was willing to think outside of the box and explore unique avenues to find a project I was excited to commit myself to. I was fortunate to have David Stein as a committee member for the second time during my graduate career. His insightful feedback helped to fine-tune this project. Committee members JoAnn Tschanz and Mary Doty also provided fresh perspectives and invaluable support and feedback throughout this project.

Finally, I would like to thank my husband, family, and friends who have stood by my side through this journey. Their support and love helped me to achieve what was once only a dream.

Kelly N. Hughes

CONTENTS

Page

Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Cancer is the second leading cause of death in women (Anderson & Smith, 2005), with breast cancer being the second leading cause of cancer-related deaths in women (American Cancer Society, 2005). A total of 2,278,269 women were diagnosed with breast cancer as of January of 2002 (Ries et al., 2005). Breast cancer is not only highly prevalent, but rates of breast cancer have also been steadily increasing. Incidence rates of breast cancer increased 3.8% each year from 1980 to 1987 and 0.3% each year from 1987 to 2002 (Edwards et al., 2005). It is estimated that 212,920 women will be newly diagnosed with breast cancer in 2006 (American Cancer Society, 2006). Furthermore, the death rate from breast cancer has decreased 2.3% each year from 1990 to 2002 (American Cancer Society, 2005). It is apparent that more women are being diagnosed with breast cancer each year and more women are also surviving this disease.

Receiving a cancer diagnosis, particularly a breast cancer diagnosis, and enduring various treatment and recovery processes can be quite emotionally distressing. Individuals coping with breast cancer often find themselves experiencing high levels of psychological distress (Palmer, Kagee, Coyne, & DeMichele, 2004) and decreased quality of life (Bertero, 2002; de Haes & Welvaart, 1985; for review see Moyer & Salovey, 1996). This psychological distress has been demonstrated to manifest in depression, anxiety, and trauma-related symptoms. For instance, 12-37% of breast cancer patients have experienced a major depressive episode related to having cancer (Love, Kissane, Bloch, & Clarke, 2002; Manzanera, Lafay, Papet, & Senon, 2003;

Shou, Ekeberg, Ruland, Sandvik, & Karesen, 2004). Furthermore, anxiety appears to affect a larger percentage of individuals with breast cancer than in the general population (Hjerl, Andersen, Keiding, Mortensen, & Jorgensen, 2002), with up to 48% of breast cancer patients experiencing severe anxiety symptoms (Montazeri et al., 2000).

Many women further react to breast cancer as if it were a trauma. Researchers have demonstrated that up to 32% of individuals experience posttraumatic stress disorder (PTSD) related to their breast cancer (Naidich & Motta, 2000). However, receiving a PTSD diagnosis in the context of breast cancer appears to vary according to the type of assessment and diagnostic tools utilized (Kangas, Henry, & Bryant, 2002). Furthermore, it has been demonstrated that experiencing intrusion and avoidance symptoms related to one's breast cancer is typically more common than meeting full criteria for PTSD (Alter et al., 1996; Butler, Koopman, Classen, & Spiegel, 1999; Cordova et al., 1995; Green, Epstein, Krupnick, & Rolland, 1997; Koopman et al., 2002; McGarvey et al., 1998). Individuals who experience intrusion symptoms often reexperience the traumatic event through thoughts or dreams, feel as if the event is recurring, or experience distress or physiological reactivity when exposed to reminders of the trauma. Avoidance symptoms are characteristic of avoiding thoughts, feelings, people, places, conversations, and other such reminders of the distressing event. It may also be characterized by an inability to remember an important aspect of the trauma, anhedonia, feeling detachment from others, experiencing a restricted range of affect, or having the sense of a shortened future (American Psychiatric Association [APA], 2000).

These traumatic stress symptoms have been found to be further inversely related to breast cancer patients' confidence in their ability to cope with the disease (Koopman et al.).

Individuals who experience trauma typically feel strong emotions (fear, helplessness) and struggle to work through the experience (i.e., avoid stimuli associated with the event, experience distressing thoughts about the event; APA, 2000). Several trauma-related theories exist that emphasize the importance of processing the distressing event in order to experience assimilation and possible positive increases in psychological and physical functioning (Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988; Foa, Steketee, & Rothbaum, 1989; Horowitz, 1986). Furthermore, studies have demonstrated that the act of disclosing thoughts and emotions can be quite beneficial in reducing psychological distress. Specifically, writing about one's deepest thoughts and feelings (expressive writing) related to a distressing event has been associated with decreased physician visits, improved immune functioning, and improved psychological functioning (Francis & Pennebaker, 1992; Greenberg & Stone, 1992; Greenberg, Wortman, & Stone, 1996; Petrie, Fontanilla, Thomas, Booth, & Pennebaker, 2004).

There has been a proliferation of research over the past decade in the area of expressive writing as a treatment for trauma-related experiences. Research has demonstrated that written emotional expression specifically related to a traumatic experience can have a variety of positive effects on healthy populations (Donnelly & Murray, 1991; Francis & Pennebaker, 1992; Greenberg et al., 1996; Pennebaker, Colder, & Sharp, 1990; Pennebaker, Kiecolt-Glaser, & Glaser, 1988). However, few studies have examined the effects of expressive writing on ill or diseased populations, with even fewer examining the effects of expressive writing with cancer patients, particularly breast cancer patients. Researchers have demonstrated expressive writing to have positive effects (e.g., decrease in pain severity, better sleep quality, decrease in avoidance behaviors) on individuals with prostate cancer and gynecological cancers (Rosenberg et al., 2002; Zakowski, Ramati, Morton, Johnson, & Flanigan, 2004), and metastatic renal cell carcinoma (de Moor et al., 2002). In terms of breast cancer, the effects of expressive writing on patient outcomes vary across studies. Of the studies that have examined breast cancer patients, one found the expressive writing intervention to have positive effects on physical health outcomes, but no effect on psychological adjustment (Stanton et al., 2002). Another study examined the effect of expressive writing on psychological adjustment and side-effect severity, but found the intervention to have no effects on these outcomes. Unfortunately, the authors did not examine physical health outcomes. However, they found indications in the writing samples that participants found the writing task to be helpful, suggesting that the intervention may have had an effect on outcomes (i.e., physical health) that were not examined in this study (Walker, Nail, & Croyle, 1999). A third study examined the effect of journaling on breast cancer patients while simultaneously participating in a 12-week support group. Unfortunately, due to the simultaneous participation in a support group, the authors could not extrapolate the unique effects of the expressive writing intervention on outcome (Smith, Anderson-Hanley, Langrock, & Compas, 2005).

Despite research demonstrating various positive effects of expressive writing across a number of populations, very few studies have examined the key linguistic components of expressive writing that may contribute to improved participant outcomes. Utilizing a computerized linguistic analysis program, researchers have shown that participants gain the most health benefits from expressive writing if their compositions are made up of positive emotion words, negative emotion words, and cognitive words connoting insight, meaning, or causal thinking patterns (Pennebaker & Francis, 1996; Pennebaker & Seagal, 1999). Currently, research is mixed with regard to the effect of the use of positive emotion words versus negative emotion words. For instance, research has demonstrated the use of negative emotion words to be associated with improved health outcomes (Low, Stanton, & Danoff-Burg, 2006; Pennebaker, 1993); whereas, the use of positive emotion words is associated with no health improvements (Pennebaker). Others have found the opposite to be true, indicating the use of negative emotion words to be either unrelated to or negatively related to health outcomes and the use of positive emotion words to be associated with improvements in health (Pennebaker & Francis; Pennebaker, Mayne, & Francis, 1997). Further research is needed to determine the specific linguistic components related to improved outcomes.

In summary, receiving a breast cancer diagnosis and subsequently enduring various treatment methods and recovery processes can be quite stressful and can result in symptoms of depression, anxiety, and posttraumatic stress. Research has demonstrated that the written disclosure of thoughts and emotions after a distressing event can have positive health consequences. Currently, there is a paucity of research examining the use of expressive writing interventions with breast cancer patients as well as little research in the area of linguistic content analysis of expressive writing exercises. The purpose of this project was to examine the effect of an expressive writing intervention on breast cancer patients, as well as examine the content of the expressive writing narratives to identify critical components that may account for the positive effects of such writing in this population.

CHAPTER II

REVIEW OF LITERATURE

The review of literature outlines research conducted on the psychological consequences (i.e., depression, anxiety, positive and negative affect, and trauma-related symptoms) of receiving a breast cancer diagnosis and enduring treatment for the disease. The negative effects of experiencing a life-threatening disease will be explored, including theories related to cognitive processing and emotional expression. Research pertaining to the use of expressive writing, as a means of increasing emotional expression, and its effects will also be outlined. Finally, research examining the specific components of expressive writing narratives that are related to outcome will be reviewed.

Breast Cancer and Psychological Distress

Receiving a breast cancer diagnosis and enduring ensuing treatment and recovery processes are associated with a high level of emotional distress. Women with breast cancer may feel helpless and hopeless about the future (Pettingale, 1984), have low self-esteem (Anderson & Johnson, 1994), and develop negative body image (Moyer, 1997). Women may further experience distress from fear of death (Vickberg, 2003), pain (Maunsell, Brisson, & Deschenes, 1993), fear of cancer recurrence (Figueiredo, Fries, & Ingram, 2004; Vickberg), and general unpredictability of the future (Voogt et al., 2005). This psychological distress is often manifested through depression, anxiety, or generally low positive mood. Due to advances in detection and treatment, more and more women are surviving this pervasive disease and may struggle to cope with associated physical and psychological distress (Wingo, Tong, & Bolden, 1995). The increased survival rate illustrates the need for interventions that target the distress associated with having and surviving breast cancer.

Depression and Anxiety

Several factors make diagnosing depression in cancer patients difficult. First and primarily, depression can be difficult to accurately detect in this population due to commonly overlapping physical symptoms of depression and cancer. Specifically, the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000) criteria for a major depressive episode includes physical symptoms such as fatigue, psychomotor retardation or agitation, insomnia or hypersomnia, and weight loss or gain. These symptoms may also be experienced as the result of having cancer and enduring various cancer treatments (American Cancer Society, 2006). The following prevalence studies that are discussed did not specify whether they adjusted for physical symptoms related to cancer versus those related specifically to depression.

Several studies have examined the prevalence of depression and anxiety in general cancer patients (i.e., breast, prostate, lymphoma, neck; Berard, Boermeester, & Viljoen, 1998; Ciaramella & Poli, 2001; Derogatis et al., 1983; Hotopf, Chidgey, Addington-Hall, & Ly, 2002; Ritterband & Spielberger, 2001), with fewer studies examining depression and anxiety rates in breast cancer patients specifically. Available research has demonstrated that depression and anxiety rates in breast cancer patients

(29-37%; Burgess et al., 2005; Epping-Jordan et al., 1999; Love et al., 2002; Manzanera et al., 2003; Shou et al., 2004) can be several times the rates found in the general population (5-9%; American Psychiatric Association, 2000) and may be related to mortality risk for breast cancer patients (Hjerl et al., 2003). However, varying rates of psychological morbidity are reported for this population. Several factors contribute to different rates of depression and anxiety in breast cancer patients, including stage of treatment (diagnosis, treatment, recovery), type of treatment (lumpectomy, mastectomy), stage of breast cancer (early versus late stage cancer; see Table 1), primary versus recurrent breast cancer, age, and assessment measure utilized (Epping-Jordan et al.; Fallowfield, Hall, Maguire, & Baum, 1990; Hopwood, Howell, & Maguire, 1991; Kissane et al., 2004; Montazeri et al., 2000; Pinder, Ramirez, Richards, & Gregory, 1994; Tibbs, 2003).

Researchers provide conflicting findings (see Table 2) with regard to changes in rates of depression and anxiety from the time breast cancer is diagnosed to the posttreatment period (Shou et al., 2004; Tibbs, 2003). Depression in breast cancer patients near the time of diagnosis ranges from 22-34% (Epping-Jordan et al., 1999; Montazeri et al., 2000; Shou et al.). Epping-Jordan and colleagues examined depression and anxiety rates in breast cancer patients within an average of 11 days after being diagnosed with cancer and again at 3- and 6-months postdiagnosis. They utilized the *Symptom Checklist-90 Revised* (SCL-90R), a self-report measure of psychological distress that includes a depression and anxiety scale. They found 34% of breast cancer patients experience depression symptoms in the clinical range based on the SCL-90R.

Table 1

Breast Cancer Stage

Stage	Definition
Stage 0	- earliest form of breast cancer - cancer cells located within a duct that have not penetrated into surrounding fatty tissue or lobules - cancer has not spread to distant sites
Stage I	- tumor ≤2cm and has not spread to axillary lymph nodes - cancer has not spread to distant sites
Stage II	- no tumor is in the breast, but it is in 1 to 3 axillary lymph nodes - or, tumor ≤2cm and has spread to 1 to 3 axillary lymph nodes - or, tumor is 2cm-5cm and has or has not spread to axillary lymph nodes - or, tumor ≥5cm but has not grown into the chest wall or spread to axillary lymph nodes - cancer has not spread to distant sites
Stage III	- tumor ≤5cm and has spread to 4 to 9 axillary lymph nodes or to internal mammary nodes - or, tumor > 5cm and has spread to 1 to 9 axillary lymph nodes or to internal mammary nodes - or, tumor has spread into the chest wall or skin and has spread to 0 to 9 axillary lymph and may have spread to internal mammary nodes - or, tumor is any size and has spread to either 10 or more axillary lymph nodes, 1 or more lymph nodes under or over the clavicle, or to internal mammary lymph nodes - cancer has not spread to distant sites
Stage IV	- late stage breast cancer - tumor can be any size and has spread to distant organs (bone, liver, lung) or to lymph nodes far from the breast[a]

[a] American Cancer Society, 2006

Depression rates decreased at 3 and 6 months postbreast cancer diagnosis with 29% and 26% experiencing clinical range depression symptoms, respectively. At the time of diagnosis, 40% noted significant anxiety symptoms, which decreased to 18% at 3 months, and then increased to 21% at 6 months postdiagnosis. Montazeri and colleagues (2000) examined depression and anxiety in women 3 months after receiving a breast cancer diagnosis utilizing the *Hospital Anxiety and Depression Scale* (HADS). The

Table 2

Depression and Anxiety in Breast Cancer Patients

Authors	Year	Measures	*n*	Rates of distress
Burgess et al.	2005	Structured Clinical Interview for DSM-IIIR (SCID)	202	Depression, anxiety, or both: 1-5 years after diagnosis: 48%, 25%, 23%, 22%, 15%, respectively with breast cancer recurrence: 45%
Cohen	2002	SCL-90R	80	Recurrent breast cancer patients obtained significantly higher scores on anxiety and depression subscales than nonrecurrent breast cancer patients.
Epping-Jordon et al.	1999	SCL-90R	110	34% clinical range depression symptoms at diagnosis, 29% at 3 months, 26% at 6 months postdiagnosis 40% clinical range anxiety symptoms at diagnosis, 18% at 3 months, 21% at 6 months postdiagnosis
Fallowfield et al.	1990	"standard methods"	269	Depression: Mastectomy: 29% following surgery 27% at 3 months postsurgery 21% at 1 year postsurgery Lumpectomy: 22% following surgery 15% at 3 months postsurgery 19% at 1 year postsurgery
Hopwood et al.	1991	HADS & RSCL	214	HADS: 9% depressed; 17% borderline 9% anxious; .5% borderline 9% depressed and anxious; 1% borderline RSCL: 22% met clinical cutoff for psychological morbidity
Jenkins, May, & Hughes	1991	CIDI, HAS, MADRS	22	18% depressed 14% anxious 14% both depressed and anxious

(*table continues*)

Authors	Year	Measures	*n*	Rates of distress
Kissane et al.	2004	MILP, HADS	503	Early stage breast cancer 37% depressive disorders: 10% major depressive disorder, 2% dyshymic disorder, 25% adjustment disorder with depressed or mixed depressed/anxious mood 9% anxiety disorders: 2% generalized anxiety disorder, 1% panic disorder, 2% PTSD, 4% adjustment disorder with anxious mood Late stage breast cancer 32% depressive disorders 7% major depressive disorder, 2% dysthymic disorder, 23% adjustment disorder with depressed or mixed depressed/anxious mood 7% anxiety disorders 2% generalized anxiety disorder, 0% panic disorder, 1% PTSD, 4% adjustment disorder with anxious mood
Manzanera et al.	2003	HADS	54	Early stage cancer patients (89% breast cancer) 32% depressed 13% major depressive disorder, 19% adjustment disorders 30% anxious 15% agoraphobia, 9% generalized anxiety disorder, 6% panic disorder
Montazeri et al.	2000	HADS	151	3 months after diagnosis 22% depressed: 14% borderline depressive symptoms 48% anxious; 29% borderline anxiety symptoms
Pinder et al.	1993	HADS	139	Advanced stage breast cancer 12% depressed 19% anxious

(*table continues*)

Authors	Year	Measures	*n*	Rates of distress
Shou et al.	2004	HADS	165	Time of diagnosis: 12% depressed 34% anxious 3 months after breast surgery: 6% depressed 24% anxious 1 year after breast surgery: 9% depressed 26% anxious
Tibbs	2003	CES-D	79	At radiation treatment completion: 29% depressed 2 weeks after radiation treatment completion: 23% depressed 6 weeks after radiation treatment completion: 28% depressed

HADS is a self-report measure with two subscales (depression and anxiety). Scores of 11 or more on either subscale indicate a significant case of depression or anxiety and a score of 8 to 10 indicates depression or anxiety in the borderline clinical range. They found a lower depression rate in breast cancer patients, with 22% experiencing significant depressive symptoms. They further found 14% were experiencing depressive symptoms in the borderline clinical range. With regard to anxiety, 48% reported clinically significant symptoms and 29% reported experiencing borderline symptoms. Tibbs (2003) was interested in the psychological adjustment of women after completing radiation treatment for breast cancer. She measured depression through the *Center for Epidemiological Studies - Depression Scale* (CES-D), a self-report measure of depression that signifies clinically significant depressive symptoms when a score of 16 or above is obtained. She found 29% of women experienced depression at the end of treatment, which decreased at 2 weeks posttreatment (23%) and then increased (28%) by their follow-up medical appointment 6 weeks posttreatment. Finally, Shou and colleagues (2004) reported changes in depression and anxiety in women with breast cancer at the time of diagnosis and 3 and 6 months after surgery. Utilizing the HADS, they found 12%, 6%, and 9% of women to experience clinically significant depressive symptoms and 34%, 24%, and 26 experience significant anxiety at diagnosis, 3 months postsurgery, and 6 months postsurgery, respectively.

Depression rates in breast cancer patients at the end of treatment range from 22-30% with most evidencing a decrease in symptoms up to 1 year posttreatment (Fallowfield et al., 1990; Tibbs, 2003). Tibbs examined the prevalence of depression in patients who had completed surgery or radiation treatment and who were entering the survival phase of breast cancer. She found depression to decrease 2 weeks after treatment completion, but then increase almost 6 weeks later near patients' follow-up doctor appointment. Approximately one third of participants experienced clinically significant symptoms of depression at the end of radiation treatment as well as 6 weeks later. Fallowfield and colleagues examined depression rates in women with breast cancer immediately after completing breast surgery and 3 and 12 months after surgery. They found women who underwent a mastectomy to evidence a downward trend in depression rates, with 29% experiencing depression after surgery, 27% at 3 months, and 21% experiencing depressive symptoms at 1 year postsurgery. With regard to women who underwent a lumpectomy, depression rates decreased from the time immediately following surgery (22%) to 3 months later (15%) and then increased at 1 year postsurgery (19%). The differences in depression rates between patients who underwent mastectomy versus those who underwent lumpectomy were not found to be significantly different.

Regarding breast cancer stage, Kissane and colleagues (2004) found that early stage (stage I or II) and late or advanced stage (stage IV) breast cancer patients experience similar rates of depression and anxiety, with adjustment disorders being the most common diagnoses. They utilized the *Monash Interview for Liaison Psychiatry* (MILP; a structured psychiatric interview for medically ill patients used to diagnose mood, anxiety, and substance abuse disorders) and the HADS. They found 37% of early stage patients to have a depressive disorder (9.6% major depressive disorder, 2.3%

dysthymic disorder, 24.8% adjustment disorder with depressed mood or mixed depressed/anxious mood), and 9% with an anxiety disorder (2% generalized anxiety disorder, 1% panic disorder, 2% PTSD, 4% adjustment disorder with anxious mood) approximately 3 months after breast surgery. With regard to late stage breast cancer patients, 31% had a depressive disorder (6.5% major depressive disorder, 1.5% dysthymic disorder, 23% adjustment disorder with depressed mood or mixed depressed/anxious mood), and 7% had an anxiety disorder (2% generalized anxiety disorder, 1% PTSD, 4% adjustment disorder with anxious mood) 63 months after receiving their cancer diagnosis. Manzanera and colleagues (2003) found slightly lower rates of depression (32% total = 13% major depressive disorder, 19% adjustment disorders) in early stage cancer patients (women with breast cancer represented 89% of participants) and much higher rates of anxiety (30% total = 15% agoraphobia, 9% generalized anxiety disorder, 6% panic disorder) utilizing the HADS. Hopwood and colleagues (1991) found lower rates of depression and similar rates of anxiety in advanced stage breast cancer patients. Based on scores from the HADS, they found 9% of women with advanced stage breast cancer experienced depression, 9% experienced anxiety, and 9% experienced anxiety and depression (total of 27% with psychological morbidity). They found fewer women (22%) were identified as experiencing psychological morbidity based on scores from the *Rotterdam Symptoms Checklist* (RSCL; a self-report measure of quality of life that includes a subscale pertaining to psychological symptoms). Finally, Pinder and colleagues (1993) reported 12% of advanced stage breast cancer patients to meet the clinical cutoff for significant depressive symptoms using the HADS and 19% with significant anxiety symptoms.

Breast cancer recurrence has also been associated with depression and anxiety symptoms in women (Cohen, 2002; Jenkins et al., 1991). Cohen utilized SCL-90R to examine psychological distress in breast cancer patients. She found individuals with a recurrent diagnosis of breast cancer to have significantly higher scores on depression and anxiety subscales of the SCL-90R as compared to women with a primary and localized (stage I or II) breast cancer diagnosis. Jenkins and colleagues found 46% of women with recurrent breast cancer to experience psychological morbidity. They specifically found participants were "psychologically ill" with depression (18%), anxiety (14%), or both depression and anxiety (14%). The identification of psychological morbidity was based upon results from the Composite International Diagnostic Interview (CIDI; structured assessment of psychological illness), the *Montgomery Asberg Depression Rating Scale* (MADRS; a self-report measure of depression), the *Hamilton Anxiety Scale* (HAS; a self-report measure of anxiety), and the *Eysenck Personality Inventory* (EPI; a self-report measure of personality characteristics).

In addition, breast cancer patients who are older tend to experience lower levels of depression and anxiety as compared to their younger counterparts (Kissane et al., 2004; Pinder et al., 1994; Tibbs, 2003). Specifically, women over the age of 55 have been found to report fewer symptoms of depression than women under the age of 55 (Tibbs). Women with early stage breast cancer who are diagnosed with a depressive disorder are also significantly younger on average (47.6 years) than women who are not depressed (53.2 years; Kissane et al.). In addition, being under the age of 50 has been found to be associated with the development of a persistent (lasting more than 6 weeks after being diagnosed with breast cancer) depressive and/or anxiety disorder (Pinder et al.).

Positive and Negative Affect

Depression and anxiety have historically been difficult to distinguish, as they are highly comorbid and strongly associated with each other (Fawcett & Kravitz, 1983; Murphy et al., 2004). They share common symptoms (e.g., irritability, sleep disturbance, psychomotor agitation/restlessness, fatigue, difficulty concentrating), which contributes to their comorbidity (American Psychiatric Association, 2000). Self-report measures of depression and anxiety have further been found to be highly correlated (Dobson, 1985), demonstrating their symptom overlap and difficult discriminability. Dobson found significant correlations (range = .37-.86) between five self-report measures of depression and four self-report measures of anxiety, suggesting the difficulty in discriminating between these two constructs. Some suggest depression and anxiety lie on the same continuum (Angst & Dobler-Mikola, 1985) or represent subfactors of a larger internalizing disorder model that includes all depressive (major depressive episode, dysthymia) and anxiety (generalized anxiety disorder, social phobia, simple phobia, agoraphobia, panic disorder) disorders (Krueger, 1999).

Research suggests that positive and negative affect represent the primary dimensions of the majority of self-report measures of mood (Watson & Tellegen, 1985). Positive affect is characterized by attention, activity, and interest level. High positive affect indicates overall enjoyable interaction with one's environment or excitement, determination, high activity, and pride. Low positive affect reflects low energy and fatigue. Overall, negative affect is associated with general distress, hostility, fear, guilt, nervousness, and irritability (Watson, Clark, & Tellegen, 1988b).

Researchers have examined the relationship between positive and negative affect and depression and anxiety and have found them to be correlated (Crawford & Henry, 2004; Watson et al., 1988b). Research demonstrates high negative affect to be reflective of anxiety and the combination of high negative affect and low positive affect to be related to depression (Boon & Peeters, 1999; Watson, Clark, & Carey, 1988a). Specifically, Watson and colleagues found negative affect to be significantly correlated with 55% (median $r = .22$) of anxiety symptoms (including symptoms of panic disorder, phobias, and obsessive compulsive disorder) and 95% (median $r = .33$) of depressive symptoms (both with correlations ranging from .20 to .57). They further found negative affect to be significantly positively correlated with any depressive diagnosis (.51) and any anxiety diagnosis (.32) based on the Diagnostic Interview Schedule. Positive affect was found to be significantly negatively correlated with any depressive diagnosis (-.38), but was not significantly related to any anxiety diagnosis except social phobia (-.23). Crawford and Henry reported similar findings. They examined the relationship between positive and negative affect and depression and anxiety utilizing the Depression Anxiety and Stress Scales (DASS) and the Hospital Anxiety and Depression Scale (HADS). Results indicated positive affect was more strongly negatively correlated with depression ($r = -.48$ to $-.52$) than anxiety ($r = -.30$ to $-.31$) and negative affect was strongly positively correlated with both depression (*r* = .44 to .60) and anxiety (*r* = .60 to .65). Jolly, Dyck, Kramer, and Wherry (1994) found additional evidence of a strong negative relationship between positive affect and depression (r = -.61), a weaker relationship between positive affect and anxiety (*r* = -.39), and a strong positive relationship between negative affect and depression (*r* = .77) and anxiety (*r* = .75).

Unlike the overlap between depression and anxiety, positive and negative affect have been established as distinct constructs of psychological functioning with relatively little overlap (Watson, Clark, & Carey, 1988a). This finding lead to the development of a self-report measure (Positive and Negative Affect Scale; PANAS) that specifically measures these constructs and is viewed as a more discriminate measure of affective state (Watson, Clark, & Tellegen, 1988b). The PANAS is a self-report measure consisting of two subscales, positive affect (PA) and negative affect (NA), each made up of 10 items. The directions instruct individuals to respond to each item in a way that indicates how they have been feeling over a specified period of time (e.g., in the past few days, over the past 2 weeks). Each item is rated on a Lickert scale of 1 (not at all; 2: a little; 3: moderately; 4: quite a bit) to 5 (extremely; Watson et al., 1988b). PA in the general population ranges from 29.1-36.2 and NA ranges from 14.8-22.1, depending on the time period specified in the instructions (e.g., how do you feel in the present moment, how do you generally feel; Crawford & Henry, 2004; Watson et al., 1988b).

Since the development of the PANAS, researchers have set out to determine if the PA and NA subscales of the PANAS are, in fact, independent constructs. During the development and validation process of the PANAS, Watson and colleagues (1988b) reported a small negative correlation between PA and NA subscales (*r* = -.12 to -.23, over six occasions of measurement). Schmukle, Egloff, and Burns (2002) examined trait ("how do you feel in general, that is, on average") and state ("how do you feel right now, that is, at the present moment") PA and NA in undergraduate university students. They found that trait PA and NA are independent, but state PA and NA are slightly negatively correlated (*r* = -.16 to -.27 over three occasions of measurement). Mehrabian (1997) found a similar negative correlation (*r* = -.12) between state PA and NA in an undergraduate university student population. The highest correlation between state PA and NA was -.30, and was found in a general adult population in the United Kingdom (Crawford & Henry, 2004). Overall, research has demonstrated the PA and NA subscales of the PANAS to evidence very little overlap and to represent relatively distinct constructs (Schmukle et al.; Watson et al., 1988b).

Few researchers have examined PA and NA in individuals with cancer and particularly in individuals with breast cancer. However, some emergent trends are evident. Voogt and colleagues (2005) examined PA and NA in advanced stage cancer patients. They found PA to be lower in individuals with advanced stage cancer than individuals in the general population. However, they found NA to be comparable to that of the general population. They suggest that psychological distress characterized by depression and anxiety may be largely related to low PA, as opposed to high NA as found in psychiatric populations (Boon & Peeters, 1999). Walker, Nail, Larsen, Magill, and Schwartz (1996) examined PA and NA in individuals with early stage, localized breast or prostate cancer at 20 months postradiation treatment. They found these individuals to have relatively high positive affect (*M* = 38.7) in comparison to the general population but comparable negative affect (*M* = 17.0). In another study with stage I or II breast cancer patients, Walker and colleagues (1999) found similar levels of positive (*M* = 36.6) and negative affect (*M* = 17.7). When examining the quality of life in women with breast cancer, Andrykowski and colleagues (1996) found mean positive affect levels (33.6) to be relatively lower, but consistent with the general population (Crawford & Henry, 2004; Watson et al., 1988b).

Trauma-Related Symptoms

There has been a proliferation of research in the area of PTSD in breast cancer patients particularly since the *DSM-IV-TR* (APA, 2000) added life-threatening illness as a possible stressor that could result in sufficient trauma to lead to a PTSD diagnosis. In order to obtain a diagnosis of PTSD, one must have been exposed to a traumatic event that involved actual or threatened death, injury, or threat to one's physical well-being, and the individual's response must be characterized by helplessness, fear, or horror. Diagnostic criteria for PTSD further requires the experience of at least one intrusion symptom (i.e., recurrent distressing thoughts, images, or perceptions, recurrent dreams, feeling or behaving as if the event were recurring, distress when exposed to reminders of the event, physiological reactivity when exposed to reminders of the event), at least three avoidance symptoms (i.e., avoidance of thoughts, feelings, or conversations related to the event, avoidance of activities, places, or people that serve as reminders of the event, inability to remember an important part of the event, decreased interest in activities, feeling detached or estranged from others, experiencing a decreased range of affect, feeling as if one's future is shortened), and at least two symptoms of hyperarousal (i.e., trouble falling or staying asleep, irritability, difficulty concentrating, hypervigilance, exaggerated startle response). Furthermore, these symptoms must elicit significant distress in one's social, occupational, or other area of functioning and must last for more than 1 month (APA, 2000).

Despite having established relatively agreed upon criteria for PTSD, rates of this disorder in individuals with breast cancer tend to vary greatly depending on several factors, including which diagnostic tool is utilized. Kangas and colleagues (2002) conducted a review of literature on studies of cancer-related PTSD, including studies specifically examining breast cancer patients. The review of breast cancer studies will be discussed here. The majority of studies utilized a cross-sectional design and examined patients 2 months to 12 years postprimary treatment for breast cancer. Kangas and colleagues reported rates of PTSD to vary according to diagnostic instrument utilized. Researchers using the PTSD Clinical Interview for DSM-IV (SCID) found incidence rates ranging from 0-9% (Andrykowski, Cordova, Studts, & Miller, 1998; Mundy et al., 2000; Palmer et al., 2004). Those utilizing the cut-off method (score of at least 50) with the PTSD Checklist Civilian Version (PCL-C), a self-report measure of PTSD, found incidence rates ranging from 5-12% (Andrykowski & Cordova, 1998; Andrykowski et al., 1998; Cordova et al., 1995; Jacobsen et al., 1998), whereas those utilizing the symptom cluster method (focuses on the required number of specific symptoms) with the PCL-C found incidence to range from 6-19% (Andrykowski & Cordova, 1998; Andrykowski et al., 1998; Jacobsen et al.). Higher rates of PTSD (14%-

32%) were found in individuals with breast cancer when using the Clinician Administered PTSD Scale—Structured Interview (CAPS-I; Naidich & Motta, 2000; Pitman et al., 2001). Incidence rates of PTSD also appear to be higher in individuals with middle- to advanced-stage (stage II-IV) breast cancer (Jacobsen et al.) as compared to early- to middle-stage (stage I-IIIA) breast cancer (Andrykowski & Cordova, 1998; Andrykowski et al., 1998; Cordova et al., 1995). Other researchers found lower rates of PTSD (4%) in breast cancer patients when using the SCID and further found younger women to be more likely to respond to their breast cancer diagnosis with intense helplessness, fear, or horror (Palmer et al., 2004).

Kangas and colleagues (2002) summarized several studies that examined intrusion and avoidance symptoms in breast cancer patients utilizing the Impact of Events Scale (IES). The IES is a self-report measure of subjective distress that specifically examines the experience of intrusive thoughts or emotions ("I thought about it when I didn't mean to"; "Any reminder brought back feelings about it") and avoidance behaviors ("I tried to remove it from my memory"; "I tried not to talk about it") in relation to a specific stressor, like breast cancer. Overall, 5-52% of breast cancer patients evidenced high (score ≥ 20) intrusion and avoidance symptoms (Butler et al., 1999; Tjemsland, Soreide, & Malt, 1996a, 1996b, 1998). Furthermore, researchers have found subclinical (experiencing symptoms of PTSD consistent with two of the three symptom categories—intrusion, avoidance, hyperarousal) rates of PTSD in 5-13% of breast cancer patients (Andrykowski & Cordova, 1998; Andrykowski et al., 1998).

Koopman and colleagues (2002) examined intrusion and avoidance symptoms in stage I to III breast cancer patients who had received their breast cancer diagnosis within the past year. They found 12% scored in the clinical range (score ≥20) on the intrusion subscale and 27% scored in the clinical range on the avoidance subscale of the IES.

Wide variation has been noted in incidence rates of breast cancer-related PTSD. This variation appears to be influenced by a number of methodological factors, including the use of cross-sectional versus longitudinal study designs, the use of different assessment measures (structured interviews versus self-report), and the use of retrospective data (Kangas et al., 2002). Participant factors also seem to influence rates of PTSD in this population, including stage of breast cancer (Jacobsen et al., 1998), age, and marital status (Tjemsland et al., 1996a). It is important to note that research has demonstrated previous life stressors to increase the likelihood of developing trauma symptoms related to a current traumatic event, whether that traumatic event be the diagnosis of breast cancer (Baider, De-Nour, & Atara, 1997) or other traumatic event (Ullman & Siegel, 1994), which may further complicate this clinical picture.

It is apparent that many individuals with breast cancer evidence trauma-related symptoms (i.e., intrusion, avoidance) at least at a subsyndromal yet significant level. It seems that the confounding factors related to determining whether a woman has actual breast cancer-related PTSD are outweighed by the overwhelming finding that many women with this disease experience significant trauma-related distress and could benefit from intervention.

Conclusions: Psychological Distress and Breast Cancer

Research has demonstrated that breast cancer patients often experience significant psychological distress throughout their experience with cancer. Many women with breast cancer experience significant related psychological distress, including depression, anxiety, PTSD, low PA, and intrusion and avoidance symptoms. Rates of psychological distress vary according to various methodological (e.g., assessment measure used, cross-sectional versus longitudinal data) and participant factors (e.g., breast cancer stage, primary versus recurrent breast cancer, type of cancer treatment, age, marital status). Additionally, researchers have explored alternative ways to describe and measure psychological distress that avoids the necessity of a disease or illness label, specifically through the examination of positive and negative affect (i.e., PANAS) and trauma-related symptoms (i.e., intrusion, avoidance). It is obvious that a large number of individuals diagnosed with breast cancer often struggle with significant levels of distress at various times after disease diagnosis, treatment, and recovery. Therefore, psychological interventions to help alleviate such distress in breast cancer survivors are warranted.

Disclosure

Theoretical Implications

Disclosure refers to the act of expressing thoughts and emotions, which can occur through verbal (talking) or nonverbal (e.g., writing) means. Several theories exist to help explain changes that can occur during the disclosure process, which help individuals to better cope with psychological distress, including traumatic experiences. Most theories depict distressing or traumatic experiences as being incongruent with a person's schema or cognitive representation of safety and well-being (Hollon & Kriss, 1984; Horowitz, 1986). Some postulate that a fear network or traumatic memory network is formed as a result of the distressing event (Creamer, Burgess, & Pattison, 1992; Foa et al., 1989). The trauma may further challenge the individual's view of the self and/or of the world (e.g., good things happen to good people and bad things happen to bad people, the world is a just place) leaving one in a general state of conflict with no way of making sense of or understanding the distressing event (Resick & Schnicke, 1996). To optimize health and well-being, the individual must process the traumatic experience in order to assimilate it into one's existing cognitive schemata. Preexisting schemata must also be modified to accommodate the incongruent information accrued from processing the distressing experience (Chemtob et al., 1988; Foa et al.; Horowitz). In order to adequately process and make sense of such a distressing and cognitively incongruent event, one must express thoughts and emotions related to the event (Nemeroff et al., 2006). Foa and Jaycox (1999) found that negative thoughts and the tendency to avoid thoughts and emotions related to a trauma is common immediately following a traumatic event. However, individuals who continue to avoid their trauma-related thoughts and emotions are at higher risk to developing PTSD. The active concealment of distressing personal information from others has also been found to be correlated with anxiety and depression (Ichiyama et al., 1993; Larson & Chastain, 1990). Conversely, the expression of one's thoughts and emotions related to a traumatic experience has been found to be physically and psychologically beneficial (Frisina, Borod, & Lepore, 2004; Smyth, 1998).

Pennebaker and Beall (1986) posited a theory that relates inhibition to physiological and disease processes. Inhibition is defined as the failure to talk, write, or think about a personally distressing event. They discuss the inhibition of behaviors, thoughts, and feelings as physiologically taxing the body. The physiological demands that inhibition places on the body can exert cumulative stress over time. The resultant physiological stress can increase the likelihood of developing a stress-related disease (see Selye, 1978). Research has since supported this inhibition theory. Specifically, inhibiting one's thoughts and emotions can have immediate physiological effects on the body by increasing autonomic activity as measured by skin conductance levels and heart rate (Hughes, Uhlmann, & Pennebaker, 1994). Furthermore, it has been associated with more long-term cumulative effects, such as negative health consequences (e.g., increases in physician visits, increased illness; Pennebaker, 1999; Pennebaker & Susman, 1988), decreased immune functioning (Pennebaker et al., 1988; Petrie, Booth, & Pennebaker, 1998; Petrie et al., 2004), increased psychological distress (Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Donnelly & Murray, 1991; Foa, Rothbaum, Riggs, & Murdock, 1991), neoplastic disease (Jamner, Schwartz, & Leigh, 1988), and poor disease course in cancer patients (Epping-Jordan, Compas, & Howell, 1994; Jensen, 1987). The converse has also received support as disclosure has been associated with improved health as well as a reduction in ruminations (Pennebaker & Susman).

Disclosure and Breast Cancer: Patterns and Effects

Few studies have examined disclosure patterns in breast cancer patients, but the available research sheds some light on expression tendencies in this population. Henderson, Davison, Pennebaker, Gatchel, and Baum (2002) specifically examined degree of disclosure (not at all, a little, somewhat, very much) related to one's breast cancer experience. They found that the majority of women discussed their disease at least somewhat, but 15-23% disclosed only a little with family members, medical personnel, or friends. Some breast cancer patients did not discuss their disease at all with family (8%), medical personnel (6%), or friends (8%). With regard to desire to discuss their breast cancer, more than half indicated at least a moderate desire. However, 19% indicated not wanting to talk about their experience at all and 12% wanting at least somewhat to keep their breast cancer a secret.

Stanton and colleagues (2000) assessed the predictive power of emotionally expressive coping on psychological and physical adjustment to breast cancer. They examined stage I and II breast cancer patients (*N* = 92) at an average of 20 weeks postbreast cancer treatment (i.e., surgery, chemotherapy, radiation). Data were again collected 3 months later. Outcome measures utilized included the COPE (coping skills related to having breast cancer, including avoidance behaviors), the Hope Scale (behaviors related to goals), FACT (health related quality of life), POMS (psychological distress, vigor), perceived health, and number of medical visits. Participants, who reported coping by expressing their cancer-related emotions, evidenced fewer medical appointments, an increase in perceived physical health and vigor (POMS), and a decrease in distress as compared to participants who reported low emotional expression. Furthermore, for individuals who indicated having receptive social support, emotionally expressive coping was related to increased quality of life (FACT). However, individuals who expressed an avoidant coping style evidenced an increase in distress and a decrease in positive emotion at the 3-month follow-up.

Other researchers were interested in the effects of the inhibition of emotional expression in individuals with breast cancer. Servaes, Vingerhoets, Vreugdenhil, Keuning, and Broekhuijsen (1999) examined potential differences in the inhibition of emotional expression between breast cancer patients and healthy controls. They found that breast cancer patients exhibit greater emotional constraint and ambivalence about emotional expression than controls. However, breast cancer patients did not differ from controls on their willingness to talk with others about their emotions, their overall propensity to express emotions, and alexithymia. Iwamitsu, Shimoda, Abe, Kodama, and Okawa (2003) specifically studied the effect of emotional inhibition (i.e., failure to express negative emotions) on overall distress level. They found that the inhibition of negative emotions, as measured pre- and postbreast cancer diagnosis, was related to an increase in emotional distress (e.g., anxiety, depression) after being diagnosed with breast cancer. It appears that individuals who have a tendency to restrain emotional expression, experience higher levels of distress when diagnosed with breast cancer as compared to individuals who express their emotions. Additionally, the inhibition of negative affect and an overall repressive personality style have also been related to the spread of breast cancer (Jensen, 1987). Finally, others have found high negative affectivity and high emotional constraint to predict shortened survival time in recurrent breast cancer patients (Weihs, Enright, Simmens, & Reiss, 2000).

Many women with breast cancer appear to express thoughts and emotions related to their disease experience (Henderson et al, 2002). However, some women do not express themselves and actively inhibit negative emotions (Henderson et al.; Iwamitsu et al., 2003; Weihs et al., 2000). Not disclosing one's thoughts and feelings related to their breast cancer experience has been demonstrated to have deleterious effects on individuals and has specifically been associated with the spread of cancer and with an earlier death (Jensen, 1987; Weihs et al.). Conversely, the act of expressing one's thoughts and emotions related to their experience of cancer has been demonstrated to have positive physical and emotional consequences (de Moor et al., 2002; Low et al., 2006; Rosenberg et al., 2002; Stanton et al., 2002; Walker et al., 1999; Zakowski et al., 2004). The following outlines literature pertaining to the effects of expressing one's thoughts and emotions within the context of expressive writing.

Expressive Writing

Over the past 20 years, research examining the effects of disclosure through expressive writing as a treatment for distressing experiences has proliferated. Pennebaker and Beall (1986) were pioneers in this area. They developed an expressive writing research paradigm that many researchers have utilized (e.g., de Moor et al., 2002; Norman, Lumley, Dooley, & Diamond, 2004; Petrie et al., 1998; Rosenberg et al., 2002). First, participants are randomly assigned to either an expressive writing group (express deepest thoughts and feelings related to the trauma) or a control condition (write about facts surrounding a trauma or trivial subjects). Participants in the expressive writing group are then instructed to write for a relatively short period of time (i.e., 20 to 30 minutes) for 3 to 4 days. They are instructed to write about an experienced traumatic or "tragic emotional event" (Petrie et al.). Other studies have instructed participants to write about a specific distressing experience such as chronic pelvic pain (Norman et al., 2004) or cancer (Rosenberg et al., 2002). Since Pennebaker developed this expressive writing paradigm, many subsequent researchers have examined its effects on both healthy populations and populations with either acute or chronic illnesses (e.g., cancer, rheumatoid arthritis). While this review of literature will include previous reviews of studies involving healthy participants, the primary focus will be on studies examining cancer patients.

Previous Reviews of Expressive Writing Literature

Two systematic reviews of expressive writing literature have been published. One review examined expressive writing studies that utilized physically and psychologically healthy participants (Smyth, 1998), whereas the other examined studies that utilized participants with physical or psychiatric disorders (Frisina et al., 2004).

Smyth (1998) conducted a systematic review of literature examining written emotional expression and its effect on health. He specifically examined randomized experiments that utilized the written emotional expression intervention developed by Pennebaker and Beall (1986). He further only included studies that utilized physically and psychologically healthy participants, and studies that instructed a treatment group to write about traumatic events and a control group to write about innocuous events. Additionally, studies included in the review utilized an outcome measure of health (mental, physical, general functioning) and provided sufficient information to calculate effect size. Smyth found 13 studies that met these criteria. He calculated an overall effect size of *d* = .47, indicating a 23% improvement in overall health and well-being. He further calculated an effect size for each outcome, which included reported health (*d* = .42; i.e., health center visits, self-reported symptoms, upper respiratory illness), psychological well-being (*d* = .66; i.e., positive and negative affect, anxiety, etc.), physiological functioning (*d* = .68; i.e., T-helper lymphocytes, blood pressure, cholesterol, etc.), general functioning (*d* = .33; i.e., grade point average, absenteeism, reemployment, etc.) and health behaviors (*d* = .03; i.e., alcohol/drug use, exercise, sleeping habits, etc.). All outcome effect sizes were found to significantly differ from zero, with the exception of health behaviors. Several covariates were examined. Specifically, neither the number of writing sessions (1 to 5) nor the length of each writing session (15 to 30 minutes) were associated with the overall effect size; however, the period of time within which the writing session took place (1 to 28 days) was related to the overall effect size, but was not specifically related to psychological well-being or physiological functioning. Being asked to write about past, current, or past and current traumas was not related to the overall effect size. However, higher mean psychological well-being effect sizes were found for participants who wrote about current traumas and higher mean physiological functioning effect sizes were found for participants who wrote about either past or current traumas as compared to those who wrote about past traumas only. The percentage of male participants was also found to be positively associated with the overall effect size, whereas age was not.

Frisina and colleagues (2004) conducted a meta-analysis of written emotional disclosure with clinical populations. Inclusion criteria included utilizing participants with a physical or psychiatric illness, an experimental design, Pennebaker and Beall's (1986) expressive writing task (or some close variant), a quantitative measure of physical health, mental health, health behaviors, or general functioning, and sufficient data to calculate effect sizes. The authors found nine studies that met these criteria. An overall effect size was calculated for each study and for each outcome type and then averaged across studies and outcome types to yield a significant overall mean effect size of $d = .19$, $p < .05$. Five of the nine studies utilized physical health outcome measures, which produced an overall effect size of $d = .21$, $p = .01$. Eight of the nine studies utilized psychological health outcome measures, which produced a nonsignificant effect size of $d = .07$, $p = .17$. Despite not finding a significant overall effect for psychological outcome, specific mental health outcomes indicated participants evidenced improvements in the areas of depression (Beck Depression Scale, Automatic Thoughts Questionnaire, Symptom Checklist-90), anxiety (Perceived Stress Scale), mood (PANAS-Positive Affect, Profile of Mood States), and sleep quality (Pittsburg Sleep Quality Index).

Based on the respective reviews, physically and psychologically healthy individuals appeared to not only generally have benefited from writing about a traumatic or distressing experience, but also benefited specifically in reported health, psychological well-being, and physiological and general functioning. Psychologically and physically ill populations also significantly benefited from such an intervention but to a marginal degree. They evidenced significant improvements in physical health, but not in overall psychological well-being. The failure to find a significant effect on psychological well-being may in part be due to the inclusion criteria the various studies utilized. The studies that examined psychiatrically ill populations did not exclude participants if they were participating in psychotherapy or taking medications for their psychiatric illness. The simultaneous participation in other treatments made it difficult to disentangle the unique impact of the expressive writing intervention on outcomes (Frisina et al., 2004).

Expressive Writing with Cancer Populations

Research involving participants with cancer will be examined in more detail, followed by studies specifically of breast cancer patients.

Other cancers. de Moor and colleagues (2002) examined the effects of expressive writing on late stage (stage IV) metastatic renal cell carcinoma (kidney cancer) patients as compared to a neutral writing control ($N = 42$). The treatment group was instructed to write about their deepest thoughts and feelings related to their cancer during four writing sessions. The control group (neutral writing group) was instructed to write about various health behaviors (i.e., diet, sleep, physical activity). Psychological and behavioral adjustment were assessed, utilizing the Impact of Events Scale (IES;

intrusive thoughts and avoidant behaviors), Perceived Stress Scale (PSS; self-reported stress), Profile of Mood States (POMS; tension-anxiety, depression-dejection, anger-hostility, confusion-bewilderment, vigor, fatigue), and the Pittsburg Sleep Quality Index (PSQI; subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication, daytime dysfunction). Follow-up data were collected on the day of the last writing session and at 4, 6, 8, and 10 weeks posttreatment. The majority of participants were male (86%) and had an average age of 56. No differences between the treatment and control groups were found on psychological adjustment measures of IES, the PSS, and the majority of the subscales on the POMS with the exception of the vigor subscale on which the expressive writing group reported significantly higher levels of vigor. However, significant differences were found between the treatment and control group on the PSQI, with the treatment group experiencing less sleep disturbance, better sleep quality, increased time spent sleeping, as well as less daytime dysfunction.

Rosenberg and colleagues (2002) conducted an expressive writing study with prostate cancer patients (*N* = 30). Participants were randomized to either an expressive writing disclosure group or a nondisclosure control group. The treatment group similarly wrote on four different days for 20 to 30 minutes about either their experience with cancer or other traumatic life experience. All participants were male and had a mean age of 70. Outcome measures included the National Medical Care Utilization and Expenditure Survey, immune function and disease markers (prostate-specific antigen [PSA] values, peripheral blood T-cell proliferation, serum cytokine levels), Brief Pain

Inventory (BPI), Medical Outcomes Study-Short Form-36 (MOS-SF-36), Functional Assessment of Cancer Therapy Scale-Prostate (FACT), Symptom Checklist-90 Revised (SCL-90-R), Brief POMS, Rumination Scale, and the Ways of Coping-Cancer Version. Follow-up outcome data were collected at 3- and 6-months posttreatment. Again, results indicated no differences between treatment and control groups with regard to psychological outcome measures (SCL-90-R, Brief POMS, Rumination Scale, Ways of Coping-Cancer Version), quality of life (MOS-SF-36, FACT), and disease and immunocompetence measures. However, results indicated a trend toward lower number of health care contacts and reduced medication use for the treatment group. Furthermore, level of pain severity remained unchanged over time for the treatment group (mild pain), but worsened for the control group (from mild pain at baseline, to moderate pain at 3 months, to severe pain at 6-month follow-up).

Zakowski and colleagues (2004) examined the effect of written disclosure on participants with prostate or gynecological cancers (uterine, ovarian, cervical). They were specifically interested in determining whether the expressive writing intervention would serve to buffer social constraint effects on distress. They defined social constraint as perceived insufficient social support that results in hesitation or unwillingness to express thoughts and feelings to others as related to a stressful event, like cancer. They argued that individuals with social constraints thus may not have the opportunity to process distressing experiences. Participants were randomly assigned to either an expressive writing condition (*n* = 62), where they wrote about their deepest thoughts and feelings related to the cancer experience across 3 consecutive days, or to a control condition (*n* = 42), where they wrote about daily activities without expressing emotions or opinions. Approximately half of the participants were female (52%) and had a mean age of 60. The researchers assessed changes in social constraint (Social Constraint Scale) and psychological distress (Brief Symptoms Inventory, IES). Follow-up data were collected 6-months posttreatment. Findings revealed no significant changes in distress levels (BSI scores) or level of social constraint for the treatment group. However, treatment group participants who reported high levels of social constraint at baseline exhibited distress levels (BSI scores) comparable to individuals with low levels of social constraint at follow-up. Individuals in the control group, who reported high levels of social constraint, subsequently reported high levels of distress at the 6-month follow-up. Analyses further indicated no effect of expressive writing on intrusive thoughts. However, individuals in the treatment group reported relatively fewer avoidance behaviors than control participants at the 6-month follow-up.

Breast cancer. Walker and colleagues (1999) conducted a pilot study examining the effects of expressive writing on breast cancer patients as compared to a usual care control group (no writing). They were specifically interested in the psychosocial effects of expressive writing, as well as determining if this intervention would have a dose-related effect, with more disclosure opportunities leading to increased effect. Participants had early stage breast cancer (stage I or II) and were in their last week of radiation treatment. Mean age was 54. Participants were randomly assigned to either one of two expressive writing groups or a usual care control group (*n* = 16). One expressive writing group was instructed to write about their deepest thoughts and feelings related to their cancer experience one time (*n* = 12), whereas the other expressive writing group wrote about their experience on three consecutive days (*n* = 16). Psychosocial adjustment was measured with the PANAS (state and trait forms), the IES, and the SEC (Side Effect Severity Checklist). Follow-up psychological functioning data were collected 1 week, 4 to 6 weeks, 4 months, and 7 months postradiation treatment. Results indicated expressive writing intervention did not significantly impact psychological adjustment (PA and NA, intrusion and avoidance symptoms) of participants. The authors hypothesized that this may have been due to the small sample size and thus, low statistical power. Despite having no effect on psychological functioning outcomes, many participants indicated the expressive writing experience to be helpful both in their writings and at a follow-up interview. Participants specifically commented on the writing providing them with a means to express emotions they thought might be taxing for others to hear about, helping to sort out particular concerns and identify priorities, and being generally helpful.

Stanton and colleagues (2002) examined effects of an expressive writing intervention (deepest thoughts and feelings related to breast cancer experience) as compared to a benefit finding (positive aspects of breast cancer experience) and control (facts about the cancer experience) condition. They utilized participants (*N* = 60) who had early stage breast cancer and were no more than 20 weeks postmedical treatment (i.e., surgery, chemotherapy, radiotherapy). All three conditions entailed writing for 20 minutes across four writing sessions (within a 3-week time period), with the difference being the topic about which the participants wrote (thoughts and feelings about breast cancer experience, benefits of the cancer experience, and facts related to the experience). Follow-up data were collected 1- and 3-months postintervention. Analyses revealed no significant effects on psychological outcomes (POMS, FACT) for any of the three groups. The authors speculate that this may have been due to participants reporting overall higher quality of life and lower levels of distress as compared to breast cancer patients in other studies. Significant differences between groups were obtained for physical health outcomes (negative somatic symptoms, number of medical visits). Specifically, the expressive writing group evidenced a significantly fewer physical symptoms (mean = 17), as well as had fewer medical appointments (mean = 0.40) related to their breast cancer as compared to the benefit finding (physical symptoms: mean = 22; medical appointments: mean = .90) and control groups (physical symptoms: mean = 30; medical appointments: mean = 2.20) at 3 months posttreatment. Finally, participants who wrote about their deepest thoughts and feelings and indicated low cancer-related avoidance experienced a decrease in distress. However, those who indicated a high level of avoidance evidenced a higher level of distress at 1-month follow-up. This trend persisted through the 3-month follow-up period.

Low and colleagues (2006) examined data from Stanton and colleagues (2002) to determine the means by which such an expressive writing intervention was related to decreased physical symptoms and medical appointments. They specifically analyzed mediator effects (i.e., heart rate, postwriting mood) on group variables. Heart rate habituation during the writing session was greatest for the expressive writing condition (mean = 16.78, *SE* = 1.52, $p < .05$) as compared to the benefit finding and control conditions. Furthermore, within writing session heart rate habituation mediated the effects of the expressive writing intervention on physical symptoms. Participant mood immediately following expressive writing had no significant impact on the overall group effect. The authors indicate these findings suggest the decrease in autonomic nervous system arousal that occurred after engaging in an expressive writing exercise, is related to the processing of emotions associated with a difficult past experience.

Conclusions: Disclosure

According to two meta-analyses of related expressive writing literature, it appears that expressive writing has significant and meaningful effects on healthy individuals as well as on physically and psychologically ill individuals who experienced a distressing event. Positive effects were found for reported health, psychological well-being, and physiological functioning for healthy participants. Spacing writing sessions across a longer time period (i.e., 1 week between each writing session versus 24 hours between each session); being male seem to increase the magnitude of positive effects for healthy individuals. Furthermore, significant positive overall effects for physical health were found for physically and psychologically ill people.

The three studies located pertaining to the use of expressive writing with cancer patients provides somewhat limited findings due to the relatively small sample sizes. However, overall it appears that health outcomes (medical contacts, sleep, medication use) are positively impacted by the expressive writing intervention and that psychological outcomes are not impacted by the intervention. Thus it is clear that more research in this area is needed.

Content Analysis of Expressive Writing Essays

As discussed previously, expressive writing can have positive psychological and health outcomes for healthy populations and positive health outcomes for ill or diseased populations. The next important question to examine is: what are the linguistic variables of the expressive writing exercise that are related to improved outcomes? This question was originally posited by Pennebaker (1993) who was interested in determining why expressive writing is related to positive health benefits. He arrived at this important question only after first examining the topic about which participants wrote. He found that when instructing participants to write about a distressing event, they differed not in the topic they wrote about, but in the manner within which they wrote or expressed themselves. For example, two of his study participants both wrote about problems they had with a roommate; however, one merely listed the roommate's character flaws, whereas the other participant examined conflict with the roommate in a self-reflective manner (Pennebaker). Other researchers have reported similar differences, including the finding that participants who express significant emotion experience increased immune function as compared to those who do not express emotion when disclosing (Esterling, Antoni, Kumar, & Schneiderman, 1990). Thus, Pennebaker was interested in determining to what degree specific words, people choose to use to express their thoughts and feelings, help to induce positive benefits of disclosure.

Few studies have examined the linguistic content of expressive writing essays. Furthermore the majority of studies that performed content analyses utilized healthy participants (Pennebaker, 1993; Pennebaker & Francis, 1996; Pennebaker et al., 1997).

One study examined participants with kidney cancer (de Moor et al., 2002), and two examined participants with breast cancer (Low et al., 2006; Walker et al., 1999). The most common linguistic content variables examined across studies, included negative emotions (i.e., sad, anxious, angry), positive emotions (i.e., happy, relief, joy), and cognition, which consists of insight, causal, and self-reflective words (i.e., realize, understand, because).

Researchers utilized the Linguistic Inquiry and Word Count program (LIWC; Francis & Pennebaker, 1993), which was recently updated (Pennebaker, Francis, & Booth, 2003), to analyze the linguistic content of expressive writing essays. The LIWC was originally developed to examine written or spoken passages from individuals who had experienced a trauma or generally distressing event. It is a text analysis program that processes many different categories of words including those related to emotions (positive and negative) and cognition (causal- and insight-related words). This program analyzes text by searching for words that are categorized within its dictionary file. The dictionary file for the original LIWC program contained over 2,000 words or word stems that made up 61 specific word categories (i.e., positive emotion words, cognitive words). The program was designed to examine a text document and determine the percentage of words within selected language dimensions in relation to the entire text document. The dictionary in the LIWC program was developed by compiling a list of words from thesaurus, emotion-related questionnaires, dictionaries, and groups of judges. After compiling the set of words, a minimum of two judges must have conferred independently as to which word category (i.e., negative emotion words) each word should be placed. The words were then examined for a second time, and at least three new judges had to reach agreement on the inclusion of words within a broader category (Pennebaker & Francis, 1996). The purpose of using such a program to analyze the linguistic content of expressive writing essays related to a distressing event is to help determine if specific writing styles (e.g., using positive emotion words, cognitive words) lead to improved outcomes.

Pennebaker (1993) examined the linguistic content of expressive writing essays from three previous studies (Pennebaker, 1991, as cited in Pennebaker, 1993; Pennebaker et al., 1988, 1990) in order to explore why writing can be advantageous. After analyzing a number of different linguistic dimensions, he found that participants who evidenced health improvements utilized a larger proportion of negative emotion words (i.e., anxiety, sadness) than positive emotion words as compared to participants who did not improve. Pennebaker further found that the participants who improved evidenced similar total numbers of cognitive processing words as the participants who did not improve. However, participants who improved progressed from using fewer cognitive processing words in the first writing session to more cognitive processing words by the last writing session. Expressing negative emotion as well as evidencing cognitive processing is consistent with most trauma theories that suggest emotional expression and cognitive processing, or assimilation of traumatic experiences, are necessary to make sense of and positively cope with distressing events (Chemtob et al., 1988; Foa et al., 1989; Horowitz, 1986).

Pennebaker and Francis (1996) obtained some contrary conclusions to

Pennebaker's previous findings. Specifically, they found negative emotion words to be unrelated to changes in health outcomes. Furthermore, the use of positive emotion words was related to better health outcomes. With regard to cognitive processing, similar results to Pennebaker (1993) were found with increased cognitive processing across writing sessions leading to positive health outcomes.

Pennebaker and colleagues (1997) reanalyzed data from six existing studies that utilized language variables as health predictors. Participants included college students (Pennebaker & Francis, 1996; Pennebaker et al., 1988, 1990), medical students (Petrie, Booth, Pennebaker, Davison, & Thomas, 1995), maximum-security male inmates (Richards, Pennebaker, & Beall, 1995, as cited in Pennebaker et al., 1997), and unemployed male professionals who had been laid off from their jobs (Spera, Buhrfeind, & Pennebaker, 1994). The authors found the use of more negative emotion words in relation to positive emotion words to be associated with negative outcomes. This is in direct conflict with Pennebaker's (1993) earlier findings. The authors further found the use of more positive emotion words in relation to fewer negative words to be related to better health. This is similar to results Pennebaker and Francis obtained, which indicated that the use of positive emotion words are related to better health outcomes. A regression analysis using adjusted distress as the outcome revealed that participants who reported greater distress at follow-up used more death-related and positive words and used fewer past tense verbs and unique words as compared to participants experiencing less distress. With regard to cognition, the increased use of cognitive processing words from the first day of writing to the last was associated with decreased physician visits and reported physical symptoms, as well as improved grades and gaining employment.

de Moor and colleagues (2002) examined the linguistic content of expressive writing essays in participants with kidney cancer. Unfortunately, they did not provide details of this analysis. The authors noted the expressive writing essays to be significantly different from control essays on 24 of 32 different word categories, including affective, cognitive, and social processing. They provided no more explanation of findings.

Walker and colleagues (1999) conducted the most applicable experiment to the current project. They examined the linguistic content of narratives written by patients with breast cancer. The authors did not comment on the relationship of linguistic components to outcome, as the expressive writing intervention was not found to be significantly related to outcome. However, the authors reported writing trends for the expressive writing treatment group. They computed paired *t* tests to assess change in the percentage of words across various categories from the first writing session to the third. Walker and colleagues found a significant increase in words related to general affect and decreases in words pertaining to metaphysical concerns (death, religion) as well as words related to body functions and states. They did not specifically examine cognitive processing words.

The most recent study to examine the linguistic content of expressive writing narratives also utilized a breast cancer population. Low and colleagues (2006) examined the linguistic content of narratives from participants who were either instructed to write about their deepest thoughts and feelings related to their breast cancer experience (general disclosure) or write about the benefits of their cancer experience (benefit finding). General writing trends included an increase in the use of positive emotion words across writing sessions for both groups, a decrease in negative emotion words across sessions for the general disclosure group, and greater use of cognitive words for the general disclosure group as compared to the benefit finding group. They found no significant changes in the use of cognitive words across writing sessions for either treatment group.

Conclusions: Linguistic Analyses

Due to the small number of studies and heterogeneous sample populations in this area of research, the following summary should be considered preliminary. Overall, studies demonstrated the expression of negative and positive affective words to lead to better outcomes. Unfortunately, conflicting findings were found with regard to the effect of the percent of negative words expressed in relation to the percent of positive words expressed. Additionally, the increased use of cognitive words across writing sessions resulted in increased positive outcomes. This is the most consistent finding across studies. Cognitively processing the events of a trauma is thought to be necessary for cognitive assimilation, understanding, and overcoming traumatic experiences (Chemtob et al., 1988; Foa et al., 1989; Horowitz, 1986).

Summary and Objectives of the Current Project

Current literature indicates the diagnosis and treatment of breast cancer to be quite distressing for many women. Research has further demonstrated expressive writing to have positive effects for some healthy individuals who have experienced distressing or traumatic events. Although limited, research suggests expressive writing positively impacts physical health outcomes in women with breast cancer. Additionally, researchers have begun to explore specific linguistic components of expressive writing narratives that are related to positive outcomes. However, there is a relative dearth of literature in the area of expressive writing in breast cancer patients, as well as linguistic analyses of such writings. The current project examined the effect of an expressive writing intervention on breast cancer patients, as well as examined the content of the expressive writing narratives to identify critical components that may facilitate the positive effects of such writing in this population. The following questions were addressed by this project:

1. Does an expressive writing intervention impact positive affect, negative affect, intrusion and avoidance symptoms, or general functioning as compared to a general health information control?

2. What are the relationships between the use of positive words, negative words, cognitive words, and verb tense across the three writing sessions with positive affect, negative affect, intrusion and avoidance symptoms, and general functioning?

3. Is perception of prior disclosure at baseline related to intrusion and avoidance symptoms, positive affect, negative affect, or general functioning at baseline and follow-up?

CHAPTER III

METHOD

Data Collection

This study utilized a portion of an extant data set collected through a grant from the National Institute of Nursing Research (R01 NR04571-02) at The University of Utah awarded to Lillian M. Nail, R.N., Ph.D., principal investigator (Appendix A). The original study was a randomized clinical trial utilizing a three-group design. The investigators were interested in determining the effectiveness of two primary interventions designed to facilitate the coping process following radiation therapy for breast cancer. The concrete objective information intervention (not utilized in the current project) intended to address side effects or symptoms and unexpected experiences of breast cancer patients. Its aim was to improve patients' confidence, understanding, and ability to apply specific strategies and accurate expectations regarding side effects, symptoms, and experiences related to the completion of radiation therapy. The expressive writing intervention (EW) addressed negative cancer-related thoughts and emotions that are often inhibited. The aim of this intervention was to reduce inhibition of cancer-related thoughts and emotions through linguistic expression. The concrete objective information and expressive writing interventions were derived from self-regulation theory and designed to target postradiation treatment coping processes in women with breast cancer. Specifically, the concrete objective information intervention targeted instrumental coping and the expressive writing intervention targeted emotional coping. The expressive writing intervention involved instructing participants to write about their deepest thoughts and feelings related to their cancer and cancer treatment (Appendix B). They were told to write for 30 minutes on three different days over the following 5 days (e.g., write today, skip a day, and write on the following two consecutive days).

The third treatment group, general health information (GHI), provided information to participants that might typically be offered to patients by their health care providers and was considered a treatment as usual control. This intervention entailed participants listening to a tape recording on the final day of their radiation therapy (Appendix C). They were further instructed to review a pamphlet that contained the same information as provided on the tape recording on the following two days. The health information provided to participants was obtained from common patient education materials found in cancer treatment facilities. The information specifically included a description of changes in radiation treatment side effects that are often experienced after the completion of such a treatment, thoughts and feelings women experience following treatment, cancer resources, as well as posttreatment medical information. The description of side effect changes included information about dry or peeling skin, numbness, fatigue, hot flashes, and difficulty sleeping. Information related to thoughts and feelings focused on a description of common patterns of thinking or feeling, including thinking about cancer and cancer treatment when one did not intend to, experiencing feelings about cancer and cancer treatment after encountering a reminder or trigger, and feelings of derealization or emotional numbness. With regard to cancer resources, participants were provided contact information (i.e., telephone numbers, internet addresses, street addresses) for the American Cancer Society and NCI, and were encouraged to access cancer information through local public libraries, bookstores, and libraries at colleges and universities. They were also advised to write down contact information for their radiation treatment facility and doctor, as well as the specifics of their disease (i.e., type of cancer, date of diagnosis, date treatment was completed). Additionally, the GHI group was provided with information about expected follow-up doctor visits and how to get the most out of those visits. They were further provided with general information on taking advantage of health insurance coverage and how and where one could volunteer her time working with others who have cancer if she so desired.

The primary goals of the current project was to examine the effectiveness of Pennebaker and Beall's (1986) expressive writing intervention with breast cancer patients and to analyze the linguistic content of written narratives. The project was modeled after existing expressive writing literature that compared an expressive writing treatment group to either a benign writing group (e.g., write about facts of an event, objectively describe an object or event; Booth, Petrie, & Pennebaker, 1997; Pennebaker & Beal, 1986; Pennebaker & Francis, 1996; Stanton et al., 2002) or treatment as usual, nonwriting control group (Richards, Beal, Seagal, & Pennebaker, 2000; Rosenberg et al., 2002; Walker et al., 1999). Therefore, the current project examined only two (EW and GHI groups) of the original study's three treatment groups. The rationale for excluding the concrete objective information treatment group was based on the premise that it was outside of the scope of an expressive writing intervention study.

Patients completed baseline measures 1 week prior to their completion of radiation therapy and were then randomized to either the concrete objective information, EW, or GHI conditions. Instructions for the interventions were then provided during the patients' final radiation therapy appointment.

In the original study, the decision to study the effects of this treatment postradiation therapy completion was made as a result of research indicating this can be a stressful time for cancer patients. After completing cancer treatment, many individuals have unexpected intrusive thoughts about their cancer experience, avoid reminders of their cancer (Walker et al., 1996), and avoid thinking about their cancer (Jarrett, Ramirez, Richards, & Weinman, 1992). Furthermore, patients have indicated the often more intense social support that was present during their diagnosis and treatment declines and fear of cancer recurrence increases (Maher, 1982). It was because of the potential for experiencing stress that it was determined the postradiation treatment period would be well suited for such an intervention.

Participants

The target population for the study consisted of women receiving curative radiation therapy for breast cancer. Participants were recruited from Huntsman Cancer Institute in Salt Lake City, Utah, and City of Hope in Duarte, California. In order to participate in the original study, participants were required to meet several criteria, including being at least 21 years of age, receiving curative radiation therapy for stage I, II, or III breast cancer, being able to speak, read, and write English, being able to engage in self-care activities independently, and having no known substance abuse problems. Participants further could not at the time of the study be receiving psychiatric services or have a history of cognitive deficit. Data collection took place from July 1998 through December 2000.

A total of 275 breast cancer patients were recruited for the original study and randomized to one of the three treatment groups, concrete objective information, EW, and GHI. The current project examined the EW treatment group (*N* = 89) as compared to the GHI control group (*N* = 91). Baseline data for one GHI group participant was lost due to research error. Therefore, this subject was dropped from all analyses, leaving 90 participants in the GHI control group (Figure 1). Furthermore, 1-week follow-up outcome data was not obtained from one treatment group participant, as a result of being unable to contact that person, and from one control group participant for an unknown reason. Follow-up data at 4 weeks, 6 months, and 1 year postradiation treatment were not obtained for two EW group participants due to the participants requesting to drop out of the study at the 4-week follow-up. One-year follow-up data were also not obtained from seven EW group participants (six due to inability to contact them, one due to an unknown reason) and from two GHI group participants (due to inability to contact them). Finally, two EW participants and one GHI group participant were deceased by the 1-year follow-up from cancer-related complications, which precluded the collection of further data from those participants.

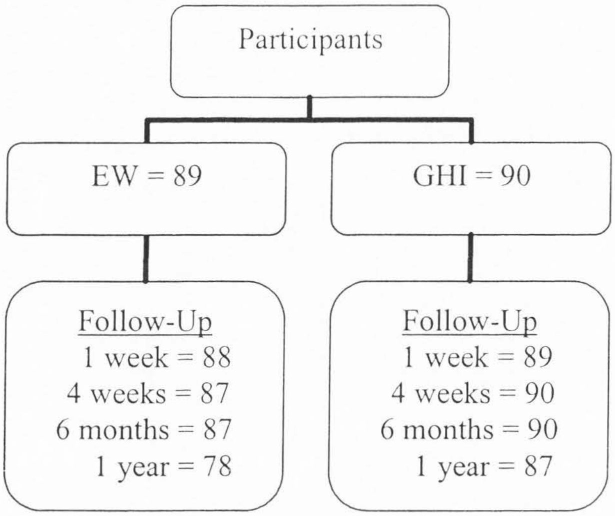

Figure 1. Participant profile graph depicts the participant profile from baseline through the 1-year follow-up.

Measures

Data were collected through several self-report measures. Participants specifically completed a general screening form, a demographic form, two measures assessing psychological distress, one measure of general functioning, and an assessment of prior disclosure (Appendix D). The following outlines descriptions and psychometric properties of each assessment instrument as well as a description of the linguistic analysis program utilized.

Participant Screening Form

The Participant Screening Form was made up of questions related to participant inclusion criteria. Specific questions pertained to general contact information, breast cancer diagnosis and treatment, primary language, psychiatric care, substance abuse, independence of self-care, living environment (i.e., institutional setting), and cognitive functioning.

Demographic Data

General demographic data (e.g., age, ethnicity, education level, marital status, employment) were obtained directly from participants through a demographic questionnaire. Information pertaining to their breast cancer (e.g., stage of disease) was obtained from medical records.

Positive and NA Schedule (PANAS)

The PANAS, as developed by Watson and colleagues (1988), is a 20-item assessment that measures the principal dimensions of mood, and positive and NA. It is comprised of two 10-item subscales, the PA subscale and the NA subscale. PA is described as attentive, interested, alert, excited, enthusiastic, inspired, proud, determined, strong, and active. NA is described as distressed, upset, hostile, irritable, scared, afraid, ashamed, guilty, nervous, and jittery. High PA is characterized by excitement and high energy, whereas low PA is characterized by lethargy and sadness. General negative mood states (e.g., anger, fear, guilt) reflect high NA, whereas tranquility and calmness are associated with low NA. Validity and reliability have been well established. Internal consistency for PA ranges from .86 to .90, and from .84 to .87 for NA, depending upon the time instruction utilized (i.e., right now, today, during the past few days, during the past week, during the past year, in general or on average). Convergent validity was high, such that the convergent correlations ranged from .89 to

.95. Discriminant correlations were low (-0.02 to -0.18). External validity has also been supported through significant correlations with other measures of psychological distress (Beck Depression Inventory: PA = -.35, NA = .56; State-Trait Anxiety Inventory State Anxiety Scale: PA = -.35, NA = .51). Additionally, the correlation between the two PANAS subscales is low, indicating PA and NA share 1-5% of their variance (Watson et al., 1988). This is a strong indication of the scales' relative independence. Furthermore, Watson and colleagues reported mean PA to range from 29.1 to 36.2 and NA to range from 14.8 to 22.1 depending upon the time period assessed (e.g., today, past few days, past year). Participants in the present study were instructed to answer questions on the PANAS according to how they had been feeling over the past few days. The reliability coefficient alpha of PA and NA of the present data are .87 and .89, respectively.

Sickness Impact Profile (SIP)

The SIP is a measure of sickness-related dysfunction and was developed for use with individuals with acute and chronic illnesses (Bergner et al., 1976). The full version of the SIP consists of 12 subscales that address behaviors such as participation in social activities and ability to complete activities of daily living. Research on women receiving radiation therapy for breast cancer has demonstrated the subscales of home management, mobility, recreation and pastimes, and work are the most relevant to functional outcomes for this population (Graydon, 1988, 1994). In order to decrease the burden of completing such a lengthy measure, only these four subscales were administered to participants. Previous research has indicated that selecting specific subscales pertinent to disruption in functioning related to a particular clinical situation or to gender does not compromise vital data. Furthermore, the subscales themselves retain adequate psychometrics (Graydon, 1994; Johnson, 1996; Johnson, Nail, Lauver, King, & Keys, 1988; Nail, 1993; Nail, King, & Johnson, 1986). Participants in the present study were also specifically instructed to respond to items in terms of changes due to having breast cancer and enduring breast cancer treatment, in order to avoid confounding effects of changes related to other illnesses, seasonal changes in activities, or life events.

It has been demonstrated that the SIP has high test-retest reliability (.92) and internal consistency (.94). Additionally, validity has been demonstrated through correlations with self-reported dysfunction (.69) and illness (.63; Bergner, Bobbitt, Carter, & Gilson, 1981). Prior to rescoring, reliability coefficient alphas for subscales used in the present study were .72 for home management, .73 for mobility, .70 for recreation and pastimes, and .42 for work. The work subscale does not account for individuals who are not working because of nonhealth-related factors, like being retired or unemployed (from a lay off), and, therefore, does not provide an accurate assessment of impairment in this area (Pollard & Johnston, 2001). Furthermore, due to the low reliability of the work subscale, it was excluded from analyses.

Researchers have reported problems with the original method used to score the SIP (McDowell & Newell, 1987; Pollard & Johnston, 2001; Post, de Bruin, de Witte, & Schrijvers, 1996). The original scoring procedure produced an individual score for each subscale or area of functioning, as well as a total score representative of general functioning. Each item in the various subscales was weighted to reflect the degree of dysfunction that item represented. In order to obtain a percentage limitation score for a particular subscale, the weighted score for each item endorsed was summed, divided by the maximum possible score for that subscale, and then multiplied by 100. The problem with this scoring procedure is related to the summing of endorsed weighted items. An individual who is functionally more impaired than another, may appear to exhibit less dysfunction due to endorsing fewer items. For example, if someone endorsed, "I am not doing any of my usual physical recreation activities," it would imply that they would logically not endorse other items within that subscale such as, "I do my hobbies and recreation for shorter periods of time." However, using the original scoring procedure, the more items the respondent endorses the higher the limitation score. Therefore, if someone were to endorse the item representative of the highest limitation (e.g., I am not doing any of my usual physical recreation or activities), it would preclude them from endorsing other items and result in receiving a misleading score reflective of a lower level of limitation than they actually experience. Pollard and Johnston proposed a new scoring method that produces a limitation score that more accurately reflects the individual's true level of functioning. They proposed using the item endorsed by the respondent with the maximum weight. For example, if a respondent endorsed three items, the item with the highest weight would be used to calculate the percent limitation score. The percent limitation score is then calculated by dividing the maximum item weighting endorsed by the maximum item weighting in that subscale and multiplying by 100 (see Figure 2). After rescoring, similar reliability coefficient alphas for the three

$$100 * \frac{\text{max item weighting endorsed}}{\text{max item weighting in subscale}}$$

Figure 2. Percent limitation score graph depicts the percent limitation score formula for subscale scoring on the SIP.

subscales were obtained with .74 for home management, .71 for mobility, and .68 for recreation and pastimes.

Impact of Events Scale-Revised (IES)

The IES consists of 15-items that are answered on a 4-point Likert scale (from 0 = not at all, to 3 = often). It was designed to assess avoidant and intrusive thoughts and emotions (Horowitz, Wilner, & Alvarez, 1979) that are similar to avoidant and intrusive symptoms characteristic of PTSD (American Psychiatric Association, 2000). The IES is comprised of two subscales that assess intrusive thoughts and feelings (intrusive subscale) and avoidance of particular thoughts, feelings, and situations (avoidance subscale). Avoidance and intrusion symptoms are of particular interest to the current project, as research has demonstrated many breast cancer survivors experience such distressing symptoms (Cordova et al., 1995). For purposes of this study, participants were asked to complete the IES in relation to having breast cancer. The IES determines the frequency participants have experienced a situation related to breast cancer (i.e., "*I tried not to talk about it*," "*Any reminder brought back feelings about it*") (Zilberg, Weiss, & Horowitz, 1982) and produces separate scores for the intrusion and avoidance subscales, as well as a total stress score. Clinical interpretation of total stress scores is as follows: 0-8, subclinical range; 9-25, mild range; 26-43, moderate range; 44-75, severe range (Marren & Christianson, 2004). Furthermore, a score greater than or equal to 20 on either subscale is indicative of a high, clinically meaningful score (Horowitz, 1982).

The IES has established test-retest reliability for the total assessment score (.87), the intrusion subscale (.89), and the avoidance subscale (.79; Horowitz et al., 1979). Reliability coefficient alphas for the present project were .84 for the avoidance subscale, .89 for the intrusion subscale, and .91 for the complete measure.

Perception of Disclosure (DIS)

The DIS was a single-item measure used to assess participants' history of prior disclosure. Participants' perception of the extent to which they had already expressed their deepest thoughts and feelings about their cancer experience through writing or discussion with others was assessed. Participants rated the extent of prior disclosure on a scale ranging from 0 (not at all) to 10 (complete disclosure).

This measure is similar to those used in previous expressive writing research (Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker et al., 1988). However, research is mixed with regard to the impact of prior disclosure on one's ability to benefit from an expressive writing intervention. For example, researchers found that up to 75% of participants wrote about thoughts and feelings related to a traumatic event that they had not previously disclosed to anyone. These particular participants went on to experience a decrease in health problems (Pennebaker & Beall).

Greenberg and Stone randomly assigned participants to either write about a previously discussed traumatic event or a traumatic event that they had "kept to themselves." They found no differences in outcome between individuals who wrote about a previously undisclosed traumatic event versus those who wrote about a traumatic event they had previously discussed with others. Further research is necessary to determine the impact of prior disclosure on the benefits one may experience as a result of expressive writing.

Linguistic Inquiry and Word Count (LIWC)

The LIWC was used to analyze the linguistic content of expressive writing narratives. The LIWC was developed by Francis and Pennebaker (1993) and was recently updated (Pennebaker et al., 2003). The LIWC was developed to analyze emotional, cognitive, structural, and process elements of written and verbal speech, particularly of individuals who have experienced a traumatic or distressing event. The most recent version of the LIWC contains a default dictionary made up of 2,300 words and word stems. The dictionary words are organized into word categories, including 17 standard linguistic dimensions (e.g., word count, percentage of pronouns, numbers), 25 categories related to psychological constructs (e.g., PA, NA, cognition), 19 categories related to personal concerns (e.g., work, leisure activities), and10 categories pertaining to relativity (i.e., time, space, motion). Each word represents applicable word categories. For example, the word "cried" is contained in four different linguistic categories, including sadness, overall affect, negative emotion, and past tense verb. The LIWC searches text files and calculates the percentage of words in the text that reflect various linguistic dimensions (e.g., social processes, time, metaphysical issues, leisure activity) as found in the comprehensive LIWC dictionary. The LIWC has adequate validity demonstrated through positive correlations with independent judges' content ratings (negative emotionality = .69; positive emotionality = .64).

The current project examined words reflecting positive emotions (e.g., happy, good, joy), negative emotions (e.g., hate, worthless, scared), cognitive processes (e.g., know, because, consider), and verb tense (e.g., walk, walked, will). The rationale for examining these particular word categories is based on previous research. First, trauma and disclosure theories indicate that the expression of one's thoughts and emotions related to a distressing event is necessary to process or make sense of the experience (Nemeroff et al., 2006). Research has demonstrated that individuals who were instructed to express their deepest feelings about a distressing event evidenced health benefits, whereas those who merely wrote about the facts of an event did not (Esterling et al., 1990). Other researchers found that individuals who wrote about the facts as well as their feelings related to a traumatic event evidenced significant improvements in health problems relative to individuals who just wrote about the facts of a trauma. Furthermore, participants who wrote about facts and emotions experienced long-term improvements in health, whereas those who just wrote about their emotions did not (Pennebaker & Beall, 1986). Based on this research and the previously summarized research on the resultant linguistic patterns of expressive writing interventions, emotion-related words and cognitive process words were examined. Specifically, PA and NA words were examined, as opposed to general affective processes, as this is the most comprehensive and descriptive way to examine emotional expression with the LIWC. Lastly, researchers have found a relationship between the use of past tense verbs and distress, indicating that the use of fewer past tense verbs is related to greater distress (Pennebaker et al., 1997). Therefore, the current project also examined verb tense.

Procedure

Two weeks prior to radiation therapy completion, participants were recruited during their routine medical appointment. They were asked to complete a Participant Screening Form in order to determine whether they met inclusion criteria for the study. One week prior to completion of treatment, participants who met inclusion criteria were interviewed to obtain baseline data (demographic variables, IES, SIP, PANAS, DIS). Participants were then randomized to one of the three treatment groups. At participants' final radiation therapy appointments, they were provided with instructions for participating in the study. Participants in the EW intervention were instructed to write about their "very deepest thoughts and feelings about [their] cancer and cancer treatment." They were asked to write for 30 minutes on 3 consecutive days over a 5-day time period. Participants in the GHI control group were provided with general information about where to find resources related to cancer and cancer treatment. The IES, SIP, PANAS, and DIS were again completed by participants at 1 week, 4 weeks, 6 months, and 1 year postradiation treatment. This follow-up interval was chosen in order ascertain both short-term and long-term effects of the intervention.

CHAPTER IV

RESULTS

This section provides results of data analyses organized by research questions presented in Chapter II. Preliminary analyses were first conducted to obtain descriptive information (e.g., age, ethnicity, education, marital status, stage of disease, history of prior treatment) for the participants. The preliminary analyses are followed by results of statistical calculations guided by the research questions.

Analyses were conducted on an intent-to-treat basis. The principle of intention-to-treat as applied to statistical analyses and in relation to the current project, refers to the practice of including all participants in all analyses regardless of whether they were compliant with the treatment they were randomized to receive (e.g., as in clinical trials; May, DeMets, Friedman, Furberg, & Passamani, 1981). Research has demonstrated that, by excluding participants who did not adhere to the treatment protocol, results can be easily biased. Treatment compliance is reasoned to be in and of itself a measure of outcome. Therefore, if analyses are adjusted for treatment compliance (i.e., excluding participants who were not compliant with the intervention), it results in one outcome being adjusted for another outcome that may lead to confounding results (DeMets, 2004), inaccuracies, and difficulty in interpreting findings (Friedman, Furberg, & DeMets, 1996). Therefore, all data collected from participants within the current project were examined irrespective of treatment compliance in order to preserve internal validity and avoid biasing treatment comparisons (Schulz & Grimes, 2002).

The intention-to-treat principle presented as an issue within the current project when it was discovered that all of the expressive writing group participants did not write as instructed. Specifically, of the 89 participants who were randomized to the expressive writing intervention, 67 wrote three times as instructed, two wrote two times, and two wrote only one time. Eighteen people who were randomized to the treatment group did not write at all. Reasons for not writing included overtly refusing to write, merely not completing any of the writing sessions, leaving radiation treatment early (prior to the patient's last radiation appointment when the treatment protocol was dispensed), and unknown reasons. Other participants who did not write indicated that they had mailed their expressive writing narratives; however, the researchers never received them (Table 3).

Preliminary Analyses

Prior to addressing the research questions for the present study, descriptive analyses were conducted on baseline measures of age, ethnicity, marital status,

Table 3

Reasons for Not Writing

	Frequency (*N* = 18)	
Reason	*n*	%
Refused	3	17
Did not complete	6	33
Left radiation treatment early	1	6
No information	4	22
Lost in the mail	4	22

education, employment, religion, stage of disease, and history of prior psychiatric treatment. The questionnaire utilized provided a list of five to eight specific options to check for each demographic question. Therefore, in order to better summarize the information provided, the data were collapsed to form conceptually meaningful groups for marital status, education, and employment (Table 4).

Data were further analyzed for significant demographic differences between the expressive writing treatment group and the general health information control group utilizing *t* tests and chi-squared analyses. No statistically significant differences between groups were found (Table 5). In addition, data were analyzed for differences

Table 4

Summary of Collapsed Demographic Groups

Category	Participant response options	Collapsed groups	
Marital status	Single (never married) Separated or Divorced Widow Married Cohabitating	1. Single:	never married separated divorced
		2. Married:	married cohabitating
Education	8th grade or less Some high school High school graduate/GED Technical school graduate Some college Master's degree Doctorate degree	1. Less than high school graduate:	8th grade or less some high school
		2. High school graduate, some college, and technical school graduate	
		3. College graduate and above:	college graduate master's degree doctorate degree
Employment status	Full-time (≥30 hours/week) Part-time Homemaker Unemployed Retired Disabled	1. Employed:	full-time part-time
		2. Unemployed:	unemployed homemaker retired disabled

Table 5

Test of Statistical Differences Between Treatment and Control

	Chi Square/*t*		Cramer's V/*SMD*[a]
Variable	value	*p*-value	value
Ethnicity	7.67	0.18	0.21
Marital status	0.82	0.37	0.07
Education	1.67	0.43	0.10
Employment status	2.01	0.16	0.11
Religiosity	8.81	0.12	0.22
Breast cancer stage	0.10	0.95	0.02
Therapy since CA diagnosis	0.37	0.55	0.05
Focus of therapy	0.01	0.93	0.01
Age	-0.56	0.57	0.09[a]
Number of therapy sessions	0.05	0.96	0.01[a]

[a] *SMD* = standardized mean difference as related to *t* test.

across demographic variables and baseline outcome variables for participants from the data collection site in California versus those from the data collection site in Utah. No significant differences were found with the exception of history of therapy since one's cancer diagnosis ($t = 3.00$; $p = 0.00$). Specifically, of the 45 participants who reported seeing a therapist since their breast cancer diagnosis, 20 were from the site in California. This is noteworthy as 40.8% ($N = 20$) of participants from California had previously seen a therapist, whereas only 19.2% of participants from Utah had seen a therapist.

The final sample for the present study consisted of 180 participants (expressive writing group = 89; general health information group = 91). Participant characteristics are presented in Table 6. The majority were Caucasian ($N = 145$; 80.6%) and were

Table 6

Summary of Participant Characteristics

	Treatment group ($N = 89$)		Control group ($N = 91$)	
Variable	*n*	%	*n*	%
Age				
21-34	2	2.0	8	8.1
35-44	16	17.7	11	12.2
45-54	26	29.0	31	34.1
55-64	20	22.4	21	23.1
65 and Above	25	28.7	20	22.0
Ethnicity				
Caucasian	78	87.6	67	73.6
Hispanic	6	6.7	12	13.2
Asian	3	3.4	5	5.5
African American	0	0	1	1.1
Native American	0	0	3	3.3
Other	0	0	1	1.1
Marital Status				
Single	26	29.2	32	35.2
Married/cohabitating	63	70.8	58	63.7
Education				
Less than HS grad	7	7.9	4	4.4
HS grad, some college, Tech school	53	59.6	61	67.0
College grad and above	29	32.6	25	27.5
Employment status				
Employed	41	46.1	52	57.1
Unemployed	46	51.7	38	41.8
Religiosity				
Religious				
LDS	33	37.1	33	36.3
Protestant	32	36.0	19	20.9
Catholic	12	13.5	22	24.2
Jewish	0	0.0	2	2.2
Other	3	3.4	5	5.5
Not religious	9	10.1	8	8.8

(*table continues*)

	Treatment group ($N = 89$)		Control group ($N = 91$)	
Variable	*n*	%	*n*	%
Breast cancer stage				
Stage I	37	41.6	37	40.7
Stage II	43	48.3	45	49.5
Stage III	9	10.1	9	9.9
Prior disclosure				
0-3 (little)	17	19.1	13	14.4
4-7 (moderate)	24	26.9	29	32.3
8-10 (high)	48	54.0	48	53.3

Note. Percentages based on the number of participants who responded to each individual question. The number of respondents for each question ranged from 87 to 89 for the treatment group and from 89 to 90 for the control group.

diagnosed with either stage I ($N = 74$; 41.1%) or stage II ($N = 88$; 48.9%) breast cancer. Participants ranged in age from 24 to 89 (mean = 54.81; $SD = 12.64$). Many participants were married or cohabitating ($N = 121$; 67.2%) and noted affiliation with a particular religion ($N = 178$; 89.5%). Approximately half of participants were employed ($N = 93$; 51.6%). Few participants noted seeing a therapist since their breast cancer diagnosis ($N = 45$; 25%; see Table 7). The vast majority of those who had participated in therapy, did so for fewer than five sessions ($N = 37$; 82.2%) and most utilized therapy to focus on their cancer experience ($N = 34$; 75.6%). Furthermore, the majority of participants ($N = 96$; 53.6%) indicated having engaged in a high degree of disclosure related to their breast cancer experience prior to entering the study, while few reported having disclosed relatively little ($N = 30$; 16.8%).

Table 7

Therapeutic History

	Treatment group (*N* = 89)		Control group (*N* = 91)	
Variable	*n*	%	*n*	%
Therapy since CA diagnosis				
Yes	24	27.0	21	23.1
No	64	71.9	69	75.8
Focus of therapy				
Cancer related	18	75.0	16	76.2
Other issues	6	25.0	5	23.8
Number of therapy sessions				
1 session	11	45.8	9	42.9
2-5 sessions	10	41.7	7	33.3
≥6 sessions	3	12.5	3	14.3

Research Questions

Effect of Treatment

The first research question sought to determine whether an expressive writing intervention had an impact on outcomes (PANAS: PA and NA; SIP: general functioning; RIES: intrusion and avoidance symptoms), by specifically examining changes in the EW treatment group outcome scores from baseline to each follow-up point (1 week, 4 weeks, 6 months, 1 year) as compared to the GHI group scores. It was originally proposed to answer this research question by conducting mixed factorial ANOVAs with one between subjects factor (treatment vs. control) and one within subjects factor (time interval). However, after further exploration, it was determined that linear mixed models would provide more accurate analyses of the data. This decision was based on three main factors. First, linear mixed models accommodate for missing data, which is common when data is collected longitudinally (Fitzmaurice, Lairds, & Ware, 2004), as in the present study. The current study contains missing data for several reasons, including participants refusing to participate or to complete a measure, incomplete measures, and losing measures in the mailing process. Linear mixed models are able to accommodate for missing data by simultaneously modeling for fixed effects (mean response or population characteristics shared by all participants) and random effects (effects unique to each individual participant; Fitzmaurice et al.). By allowing for random variation across individuals, and thus multiple missing data points, each individual's data are retained (Edwards, 2000). This not only provides a more accurate picture of outcome, but also serves to maintain the integrity of the sample size, which can impact power and statistical significance (Cohen, 1988). Mixed factorial ANOVAs on the other hand, cannot accommodate for missing data, and in fact omit participants if they have missing data. This can lead to sampling bias, as the analyses are conducted solely on participants without missing data (Gueorguiva & Krystal, 2004). Second, linear mixed models assume data to be dynamic; that is, longitudinal data need not change in a linear pattern over time. Outcome data are not assumed to change linearly, as in ANOVAs, but are allowed to change in a nonlinear or curvilinear manner. Lastly, it is common for an individual's outcome data to be correlated at each follow-up point in a longitudinal design. In fact, the present study yielded correlations, ranging from .20 ($p = 0.02$) to .76 ($p = 0.00$), between data points for the three outcome measures (PANAS, SIP, IES). If correlations between individuals' repeated outcome scores are not considered, parameter estimations can be deflated, hypothesis tests are likely to have increased Type I error, and statistical power may be decreased. To avoid such bias, linear mixed models utilize the correlations or covariance between repeated individual observations when modeling data (Edwards). Conversely, mixed factorial ANOVAs assume that the values of outcome observations are independent, which can lead to such biases (Edwards) and nonnormality (Ferrell, 2005).

Prior to fitting the linear mixed models, general exploratory analyses were conducted examining the relationship between group (EW and GHI) and outcomes (PANAS, SIP, IES). Then, the relationship between each covariate of interest and outcome was examined. The covariates of interest were age, breast cancer stage, previous therapy, marital status, education, and prior disclosure. The decision to include these particular covariates within the models was based upon findings of previous research, results of exploratory analyses, and the nature of the intervention. Previous research has indicated that younger individuals with breast cancer (typically under age 55) tend to respond to their cancer diagnosis with greater distress (Palmer et al., 2004), increased symptoms of depression and anxiety (Kissane et al., 2004; Pinder et al., 1994; Tibbs, 2003), and increased intrusion symptoms as compared to older individuals (Tjemsland et al., 1996a, 1996b). Concerning cancer stage, more advanced stage cancer is associated with increased incidence of PTSD (Jacobsen et al., 1998) and lower PA (Voogt et al., 2005). Being married has also been associated with intrusive symptomatology (Tjemsland et al., 1996a, 1996b). In addition, it is hypothesized that a history of participating in therapy (i.e., opportunity to express thoughts and emotions) may be related to outcome given that these individuals may have already had not be assumed that just because one participated in therapy that she necessarily engaged in meaningful disclosure. It also cannot be assumed that if one did not participate in therapy, she has not disclosed her thoughts and feelings. Therefore, a measure of perception of prior disclosure was also included as a covariate. Furthermore, provided that the intervention in the present study involved expressing oneself through the act of writing, it was hypothesized that education level may impact outcome. Lastly, results of exploratory analyses revealed significant relationships between the aforementioned covariates and various outcomes.

The structure of final models included one independent variable (intervention), one dependent variable (outcome), and seven covariates (time, age, stage, previous therapy, marital status, education, prior disclosure). Fixed effects (between-subjects factor) within each model included group means for EW and GHI, and random effects (within-subjects factor) included individual participant variables and the intercept. A residual term was also included in the models, which allowed for random intercepts, controlling for potential baseline differences. Interaction effects were originally included in all final modeling. However, no significant interactions between group and time were found for any model. In order to free up variance potentially accounted for by the interaction terms, the interaction terms were removed from the models and the models were rerun. In addition, due to the relatively few prior studies conducted on the effects of expressive writing on breast cancer patients, and thus the exploratory nature of the present study, hypotheses regarding which covariates would be most important to examine were not possible. Therefore, the final models presented are full models, which retain all covariates irrespective of statistical significance.

PANAS. Exploratory analyses were first conducted on PA (Figure 3). Both the EW and GHI groups evidenced an increase in PA from baseline (EW: mean = 34.02, *SD* = 7.30; GHI: mean = 33.11, *SD* = 7.80) to the 1-year follow-up (EW: mean = 38.09, *SD* = 8.84; GHI: mean = 34.75, *SD* = 9.43). However, the EW group appears to have made larger gains in PA at 1 year postradiation treatment as compared to the GHI group (Table 8). Interestingly, the EW group's PA scores did not steadily increase from baseline, but increased at 1 week by .90 of a point, decreased at 4 weeks by .69 of a point, and then increased from that point forward. The GHI group had a slightly different trajectory, with a decrease in PA at 1 week by 1.81 points and then increased

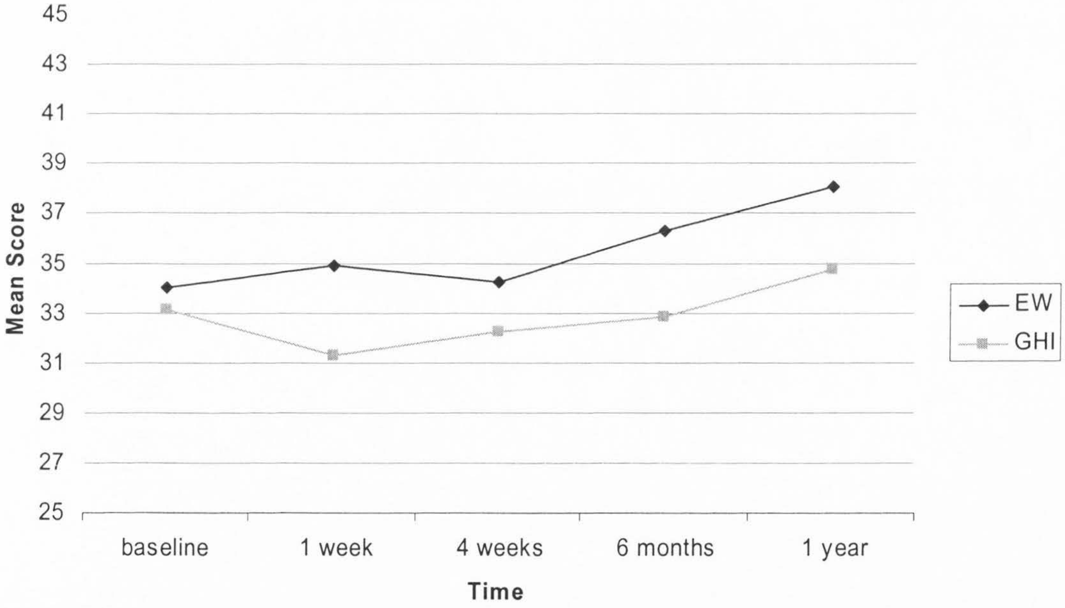

Figure 3. PANAS: Mean PA scores. Graph depicts overall mean PA scores for treatment versus control groups from baseline through 1 year posttreatment.

Table 8

PANAS: Mean PA Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
PANAS: PA										
EW	34.02	7.30	34.92	7.62	34.23	8.04	36.26	7.61	38.09	8.84
GHI	33.11	7.80	31.30	8.65	32.23	8.43	32.85	8.75	34.75	9.43

from that point forward. Furthermore, baseline PA scores for both groups were similar to scores of individuals in the general population (33.3), when asked about their affect over the past few days (Watson et al., 1988b) as in the present study.

With regard to the relationship between PA and the covariates, Pearson *R* correlations revealed few significant relationships (Table 9). Specifically, a small negative relationship was found between PA and cancer stage at baseline ($r = -.20$, $p = 0.01$), indicating that higher PA is associated with lower cancer stage. PA was also positively associated with previous therapy at 4 weeks ($r = .15$, $p = 0.05$) and education at 6 months ($r = .18$, $p = 0.02$).

After exploratory analyses were performed a linear mixed model was fitted with the seven predictor variables of time, age, stage, previous therapy, marital status, education, and prior disclosure, and one dependent variable of PA. Fixed effects (between-subjects factor) within the model included PA group means for EW and GHI. Random effects (within-subjects factor) included individual participant variables and

Table 9

Correlations Between PA Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
PANAS: PA						
Baseline	.09 (0.29)	-.20 (0.01)*	.12 (0.11)	-.04 (0.61)	.07 (0.35)	.18 (0.02)*
1 week	.03 (0.73)	-.13 (0.10)	.06 (0.45)	.04 (0.59)	.09 (0.26)	.19 (0.01)*
4 weeks	.03 (0.72)	-.09 (0.24)	.15 (0.05)*	-.03 (0.66)	.01 (0.92)	.17 (0.02)*
6 months	-.07 (0.40)	-.14 (0.08)	.06 (0.44)	.15 (0.06)	.18 (0.02)*	.17 (0.03)*
1 year	.07 (0.44)	-.10 (0.27)	.01 (0.88)	.09 (0.31)	.12 (0.17)	.08 (0.32)

* *p*-value ≤ 0.05.

the intercept. A residual term was also included in the model, which allowed for random intercepts. As shown in Table 10, results yielded a significant intervention effect for PA. This indicated that the EW group evidenced a significantly larger increase in PA over time as compared to the GHI group, but the GHI group significantly improved over time as well. Cancer stage was demonstrated to have a significant impact on outcome, such that individuals with a more advanced stage breast cancer tended to have lower PA. Please note that participants within the study had stage I, II, or III breast cancer. Therefore, "more advanced stage cancer" is in reference to participants of this study, as opposed to individuals with stage IV (advanced stage) cancer. Previous disclosure was also significantly related to PA, indicating the greater degree of prior disclosure the higher the reported PA.

Table 10

Linear Mixed Model: PA

Variable	Regression coefficient	*SE*	*t*	*p*-value	95% Confidence interval Lower	Upper
Intercept	28.30	4.31	6.58	0.00*	19.81	36.80
Intervention	2.57	0.94	2.72	0.01*	0.71	4.43
Time	0.04	0.01	3.04	0.00*	0.01	0.07
Age	-0.02	0.04	-0.41	0.69	-0.09	0.06
Cancer stage	-1.63	0.76	-2.15	0.03*	-3.13	-0.13
Therapy	2.10	1.15	1.82	0.07	-0.17	4.36
Marital status	-0.11	1.01	-0.11	0.91	-2.10	1.88
Education	0.91	0.88	1.03	0.30	-0.83	2.64
Prior disclosure	0.46	0.16	2.92	0.00*	0.15	0.77

* *p*-value ≤ 0.05.p

Variance and covariance estimates for the random parameters of the model were also examined and are presented in Table 11. Analyses revealed that the intercept varied significantly across individuals (UN; 1,1), but there was not an interaction between the intercept and linear slope across participants (UN; 2,1). However, the linear slope varied significantly across individuals (UN; 2,2).

Exploratory analyses on the trajectory of NA across the year of follow-up indicated a slow decline in scores (Figure 4). Although the treatment group evidenced a mean NA score that was 1.71 points lower than the GHI group at baseline, this difference was not found to be statistically significant ($t = 1.55, p = 0.12$). From baseline to 1 week (first postintervention assessment) NA scores decreased by 1.41 points for the EW treatment group and by 1.85 points for the GHI group (Table 12).

Table 11

Estimates of Covariance Parameters: PA

					95% Confidence interval	
Parameter	Estimate	*SE*	Wald *Z*	*p*-value	Lower	Upper
Residual	27.56	1.79	15.40	0.00*	24.26	31.29
UN (1,1)	32.63	4.64	7.04	0.00*	24.69	43.11
UN (2,1)	-0.06	0.09	-0.64	0.52	-0.25	0.12
UN (2,2)	0.01	0.00	3.48	0.00*	0.01	0.02

* *p*-value ≤ 0.05.

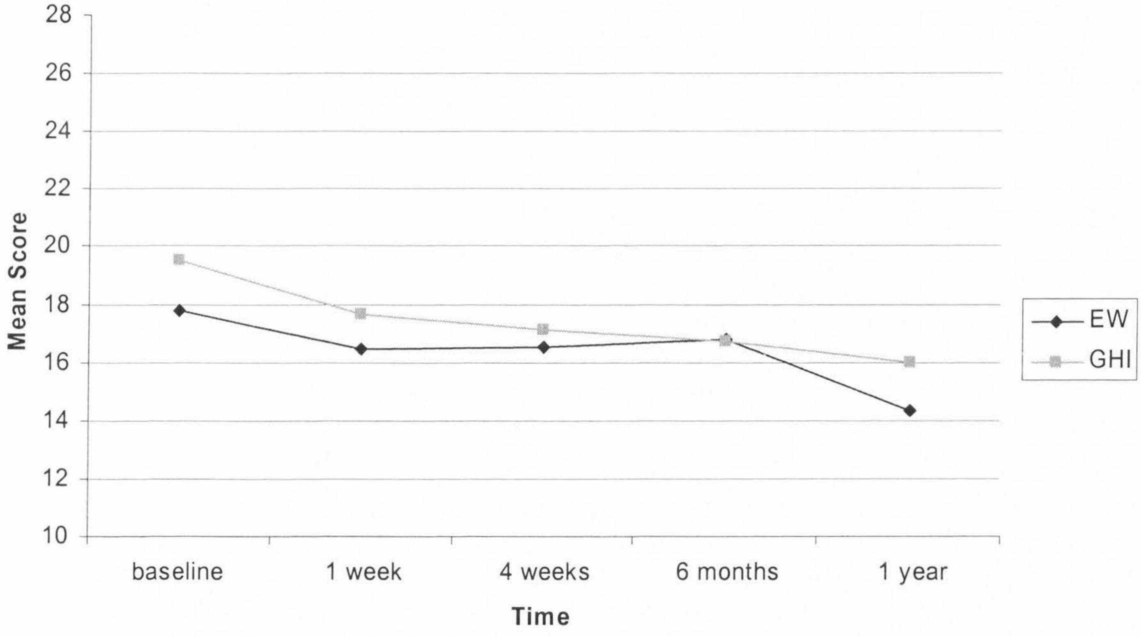

Figure 4. PANAS: Mean NA scores. Graph depicts overall mean NA scores for treatment versus control groups from baseline through 1-year posttreatment.

Table 12

PANAS: Mean NA Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
PANAS: NA										
EW	17.81	6.95	16.41	6.84	16.48	6.75	16.77	7.54	14.31	5.36
GHI	19.52	7.78	17.67	7.48	17.11	7.50	16.72	6.82	16.01	5.93

Scores for the EW and GHI groups then diverged in their trajectories. The EW treatment group evidenced a slight increase in NA from 1 week to 6 months and then a sharp decrease from 6 months to 1 year. Conversely, the GHI group evidenced a slight but steady decline in scores from 1 week to the 1 year follow-up assessment. Furthermore, baseline NA scores for both groups were similar to scores of individuals in the general population (17.4), when asked about their affect over the past few days (Watson et al., 1988b) as in the present study.

Preliminary analyses of the relationship between NA scores and covariates revealed few and inconsistent relationships (Table 13). Specifically, age was associated with NA at baseline and 1 week, suggesting that younger individuals experienced greater NA. Breast cancer stage was found to have a positive relationship with NA at baseline and 1-week postradiation treatment, indicating that as breast cancer stage goes up, NA scores also tend to increase. Furthermore, previous therapy was negatively related to NA at baseline (but at no other time point), suggesting that participants who had higher levels of NA did not have a history of previous therapy. Marital status was

Table 13

Correlations Between Baseline NA Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
PANAS: NA						
Baseline	-.21 (0.01)*	.18 (0.02)*	-.17 (0.02)*	.04 (0.64)	-.03 (0.74)	-.13 (0.08)
1 week	-.17 (0.03)*	.25 (0.00)*	-.11 (0.18)	.02 (0.80)	-.08 (0.32)	-.05 (0.56)
4 weeks	-.10 (0.21)	.09 (0.22)	-.04 (0.62)	-.07 (0.37)	-.00 (0.95)	-.06 (0.46)
6 months	-.07 (0.37)	.11 (0.15)	-.04 (0.66)	-.07 (0.40)	-.04 (0.65)	-.07 (0.35)
1 year	-.12 (0.15)	.15 (0.10)	-.03 (0.71)	-.25 (0.00)*	-.14 (0.10)	-.12 (0.18)

* *p*-value ≤ 0.05.

also related to NA, indicating that participants who were single tended to experience increased NA at 1-year posttreatment.

After exploratory analyses were performed, a linear mixed model was fitted with identical predictor and dependent variables used for the PA model. Results revealed no significant intervention effect (Table 14). However, all participants evidenced significant improvements in NA over time. Furthermore, more advanced breast cancer was associated with higher levels of NA.

IES. Exploratory analyses were conducted on intrusion and avoidance symptoms (IES). With regard to intrusion symptoms, general trends indicated a slight decrease in symptoms from baseline through the 4-week follow-up period (Figure 5). Then, the EW group evidenced an increase in intrusion symptoms at 6 months (*M* = 10.52; *SD* = 9.15) and a sharp decrease at 1 year (*M* = 7.53; *SD* = 7.24). Conversely, the GHI group reported a slight decrease in symptoms from baseline to the 6-month follow-up, with a sharper decline at 1-year postradiation treatment (Table 15). With regard to participant's

Table 14

Linear Mixed Model: NA

Variable	Regression coefficient	*SE*	*t*	*p*-value	95% Confidence interval	
					Lower	Upper
Intercept	23.82	3.76	6.33	0.00*	16.39	31.25
Intervention	-0.79	0.82	-0.96	0.34	-2.41	0.83
Time	-0.03	0.01	-3.18	0.00*	-0.05	-0.01
Age	-0.06	0.03	-1.67	0.10	-0.12	0.01
Cancer stage	1.55	0.67	2.33	0.02*	0.24	2.86
Therapy	-0.55	1.01	-0.55	0.58	-2.55	1.44
Marital status	-1.03	0.88	-1.17	0.24	-2.76	0.70
Education	-0.87	0.77	-1.13	0.26	-2.38	0.65
Prior disclosure	-0.16	0.14	-1.15	0.25	-0.43	0.11

* *p*-value ≤ 0.05.

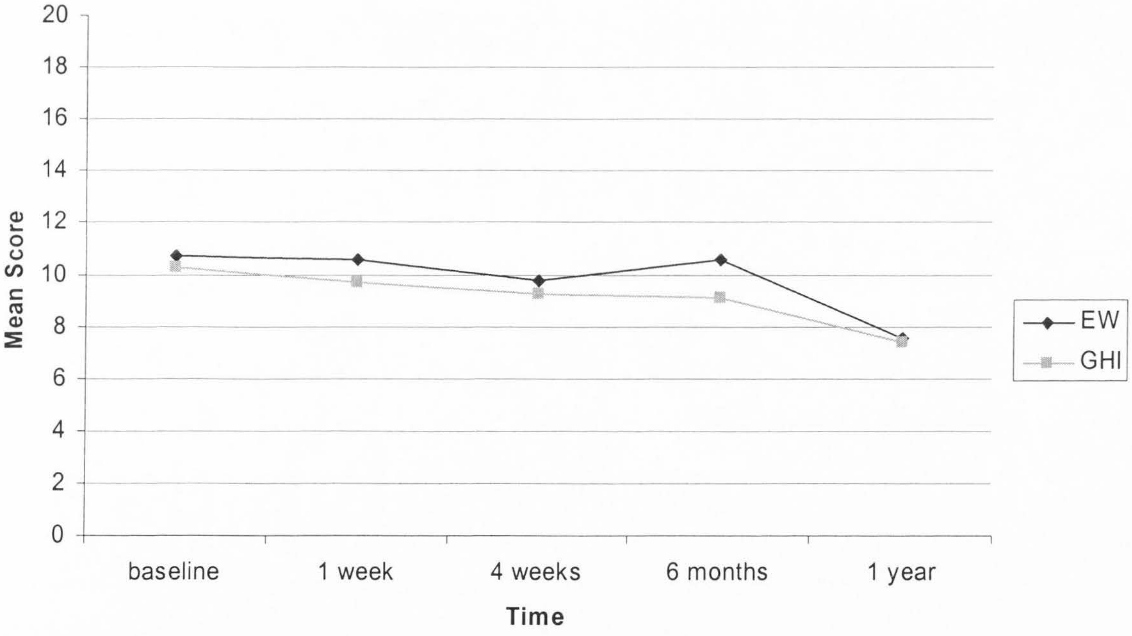

Figure 5. IES: Mean intrusion scores. Graph depicts overall mean intrusion scores for treatment versus control groups from baseline through 1-year posttreatment.

Table 15

IES: Mean Intrusion Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
IES: Intrusion										
EW	10.76	8.80	10.57	8.36	9.71	8.54	10.52	9.15	7.53	7.24
GHI	10.27	9.47	9.69	8.71	9.26	9.14	9.07	8.67	7.39	6.88

average total stress scores (sum of intrusion and avoidance scores), both the EW and GHI groups reported symptoms in the mild range from baseline ($M = 21.69$; $SD = 16.90$) through 1 year ($M = 15.36$; $SD = 14.31$) postradiation treatment.

Research has indicated that obtaining a score ≥ 20, on either the intrusion or avoidance subscale, is indicative of significant stress that necessitates further assessment and potential intervention (Horowitz, 1982). Therefore, intrusion scores were examined with regard to the frequency with which the clinical cutoff score (≥ 20) was obtained (Table 16). Due to having similar scores, this was examined for both the EW and GHI groups combined. Approximately 14% of individuals obtained a high score (at or above 20) on the intrusion subscale from baseline through the 4-week follow-up point. Scores at 1-year postradiation treatment indicated an almost 50% decrease in the number of participants scoring at or above this clinical cutoff.

Exploratory analyses were also conducted on the relationship between intrusion symptoms and covariates (Table 17). The most consistent significant relationships were

Table 16

Intrusion Subscale: Frequency of Scoring ≥ 20 (clinical cutoff)

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
IES	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Intrusion	12	14.1	12	14.1	12	14.1	13	16.0	6	8.2

Note. Percentages are based on the number of individuals who responded to the IES questionnaire at each time point.

Table 17

Correlations Between Intrusion Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
IES: Intrusion						
Baseline	-.21 (0.01)*	.13 (0.09)	-.13 (0.09)	.04 (0.61)	.07 (0.37)	-.10 (0.17)
1 week	-.29 (0.00)*	.21 (0.01)*	-.15 (0.05)*	.04 (0.60)	.01 (0.96)	-.07 (0.40)
4 weeks	-.29 (0.00)*	.16 (0.03)*	-.11 (0.16)	-.03 (0.68)	-.00 (0.99)	-.04 (0.60)
6 months	-.28 (0.00)*	.16 (0.05)*	-.07 (0.41)	-.04 (0.61)	.05 (0.50)	-.08 (0.33)
1 year	-.33 (0.00)*	.08 (0.34)	-.08 (0.34)	-.05 (0.54)	.05 (0.58)	-.10 (0.25)

* *p*-value ≤ 0.05.

found between intrusion symptoms and age (significant at all time points except 1 week postradiation treatment) and intrusion symptoms and cancer stage (significant at 1 week, 4 weeks, and 6 months). These findings indicated that younger individuals tend to experience more intrusion symptoms than their older counterparts and individuals with more advanced cancer also experienced more intrusion symptoms than individuals with less advanced breast cancer. In addition, previous therapy was found to be related to intrusion symptoms at 1-week postradiation treatment, indicating that individuals with no history of previous therapy experienced greater intrusion symptoms.

After exploratory analyses were performed, a linear mixed model was fitted with the seven predictor variables of time, age, stage, previous therapy, marital status, education, and prior disclosure, and one dependent variable of intrusion. Fixed effects (between-subjects factor) within the model included intrusion group means for EW and GHI. Random effects (within-subjects factor) included individual participant variables and the intercept. A residual term was also included in the model, which allowed for random intercepts, controlling for potential baseline differences. As shown in Table 18, results indicated no intervention effect (regression coefficient = 0.81; $p = 0.42$). A significant time effect was found (regression coefficient = -0.03; $p = 0.00$) indicating participants tended to experience a decrease in intrusion symptoms over time. Lastly, there was a significant relationship between age and intrusion symptoms (regression coefficient = -0.18; $p = 0.00$) with younger individuals experiencing higher levels of intrusive symptoms as compared to their older peers.

With regard to avoidance symptoms, the EW and GHI groups evidenced similar trajectories over time (Figure 6). As seen in Table 19, participant's scores remained relatively constant from baseline to 6 months posttreatment (ranging from a mean of 11.20 to 10.84). Reported avoidance symptoms then sharply decreased from 6 months to 1 year for both the EW and GHI groups (EW: $M = 7.94$, $SD = 8.61$; GHI: $M = 7.75$, $SD = 9.29$).

Table 18

Linear Mixed Model: Intrusion Symptoms

Variable	Regression coefficient	*SE*	*t*	*p*-value	95% Confidence Interval Lower	95% Confidence Interval Upper
Intercept	19.53	4.73	4.13	0.00*	10.20	28.86
Intervention	0.84	1.03	0.82	0.42	-1.20	2.88
Time	-0.03	0.01	-3.04	0.00*	-0.06	-0.01
Age	-0.18	0.04	-4.23	0.00*	-0.27	-0.10
Cancer Stage	1.49	0.84	1.78	0.08	-0.16	3.14
Therapy	-0.44	1.27	-0.35	0.73	-2.95	2.06
Marital Status	-0.58	1.10	-0.52	0.60	-2.76	1.60
Education	0.50	0.96	0.52	0.60	-1.40	2.40
Prior Disclosure	-0.18	0.17	-1.06	0.29	-0.52	0.16

* *p*-value ≤ 0.05.

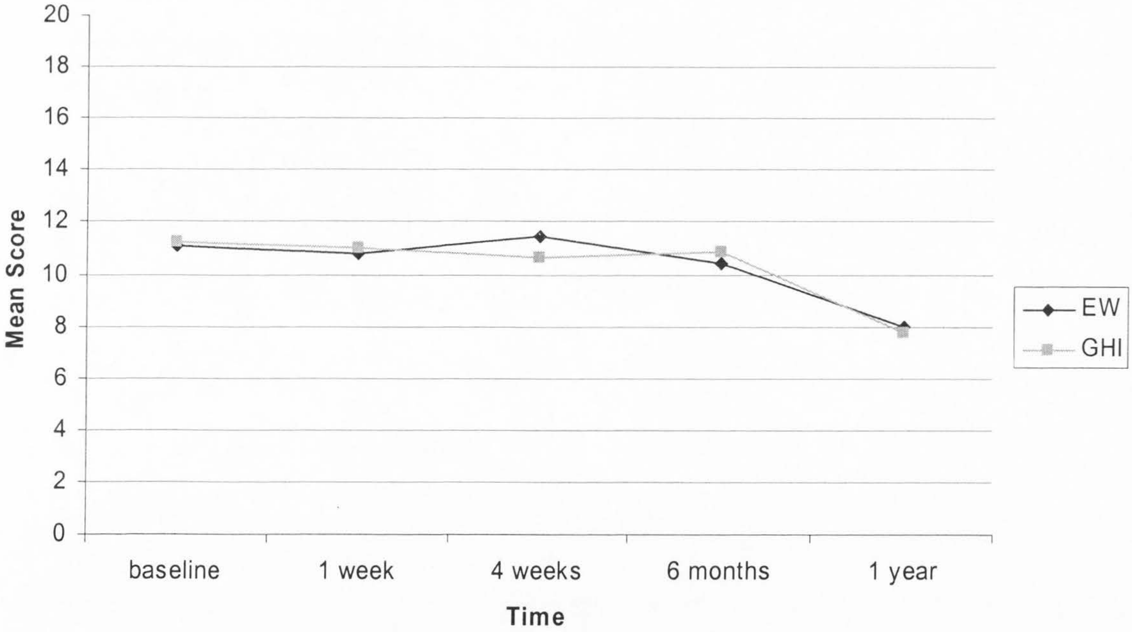

Figure 6. IES: Mean avoidance scores. Graph depicts overall mean avoidance scores for treatment versus control groups from baseline through 1-year posttreatment.

Table 19

IES: Mean Avoidance Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
IES: Avoidance										
EW	11.10	9.68	10.77	9.64	11.45	9.60	10.37	10.06	7.94	8.61
GHI	11.20	9.54	11.01	10.92	10.62	10.35	10.84	10.29	7.75	9.29

Avoidance scores were also examined with regard to the frequency with which participants scored at or above the clinical cutoff (≥20). Approximately one fifth of participants evidenced high scores from baseline to 6 months (Table 20), indicating the experience of a significant stress response. Furthermore, similar to the trajectory for intrusion scores, the number of participants who obtained a score within this clinical cutoff decreased by about 50% at 1-year postradiation treatment.

Further exploratory analyses revealed few significant relationships between avoidance symptoms and covariates (Table 21). Specifically, symptoms of avoidance were related to age at the 4-week follow-up ($r = -.07$, $p = 0.03$) and to previous therapy at baseline ($r = -.17$, $p = 0.02$). The experience of avoidance symptoms was consistently negatively related to a history of prior disclosure, indicating that a smaller degree of prior disclosure was associated with the experience of more avoidance symptoms.

After exploratory analyses were performed, a linear mixed model was fitted with identical predictor and dependent variables used for the intrusion model (Table 22). The

Table 20

Avoidance Subscale: Frequency of Scoring ≥ 20

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
IES	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Avoidance	19	21.4	19	21.4	18	21.6	17	20.8	7	9.9

Note. Percentages are based on the number of individuals who responded to the IES questionnaire at each time point.

Table 21

Correlations Between Avoidance Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
IES: Avoidance						
Baseline	-.04 (.062)	-.01 (0.90)	-.17 (0.02)*	.12 (0.12)	-.07 (0.38)	-.21 (0.00)*
1 week	-.09 (0.27)	.07 (0.36)	-.13 (0.10)	.09 (0.24)	-.09 (0.25)	-.26 (0.00)*
4 weeks	-.17 (0.03)*	.05 (0.51)	-.10 (0.20)	.07 (0.38)	-.08 (0.28)	-.22 (0.00)*
6 months	-.14 (0.08)	.07 (0.36)	-.03 (0.67)	-.05 (0.50)	-.03 (0.73)	-.23 (0.00)*
1 year	-.14 (0.11)	.11 (0.18)	-.05 (0.55)	-.02 (0.83)	-.04 (0.68)	-.25 (0.00)*

* p-value ≤ 0.05.

model failed to reveal a significant treatment effect (Regression Coefficient = -0.13, $p = 0.91$). However, all participants evidenced significant improvements in avoidance symptoms over time (Regression Coefficient = -0.04, $p = 0.00$). History of prior disclosure was also significantly related to avoidance symptoms (regression coefficient = -0.77, $p = 0.00$).

SIP. Exploratory analyses on limitation in the area of home management revealed a decline in limitation over time with a sharper decrease from 1 week to 1 year

Table 22

Linear Mixed Model: Avoidance Symptoms

Variable	Regression coefficient	*SE*	*t*	*p*-value	95% Confidence interval Lower	95% Confidence interval Upper
Intercept	23.71	5.589	4.25	0.00*	12.69	34.74
Intervention	-0.13	1.22	-0.11	0.91	-2.55	2.28
Time	-0.04	0.01	-3.45	0.00*	-0.06	-0.02
Age	-0.07	0.05	-1.34	0.18	-0.17	0.03
Cancer stage	0.31	0.99	0.31	0.76	-1.64	2.25
Therapy	-2.43	1.49	-1.63	0.11	-5.38	0.51
Marital status	1.45	1.31	1.11	0.27	-1.14	4.03
Education	-0.98	1.14	-0.86	0.39	-3.23	1.27
Prior disclosure	-0.77	0.21	-3.74	0.00*	-1.17	-0.36

* p-value ≤ 0.05.

postradiation treatment (Figure 7). No significant differences were found between the EW and GHI groups at baseline ($t = 0.95$, $p = 0.34$) and both groups shared a similar change trajectory across time. As discussed previously, SIP scores are reported as a percentage of limitation. Therefore, participants evidenced a decrease in limitation in home management activities from being about 50% limited to a limitation of less than 25% (Table 23). That is, their limitation in this area of general functioning improved by 50% over the year following radiation treatment.

With regard to the relationship between limitation in home management activities and specific covariates, analyses indicated several notable relationships (Table 24). Functioning in home management was significantly related to cancer stage in an

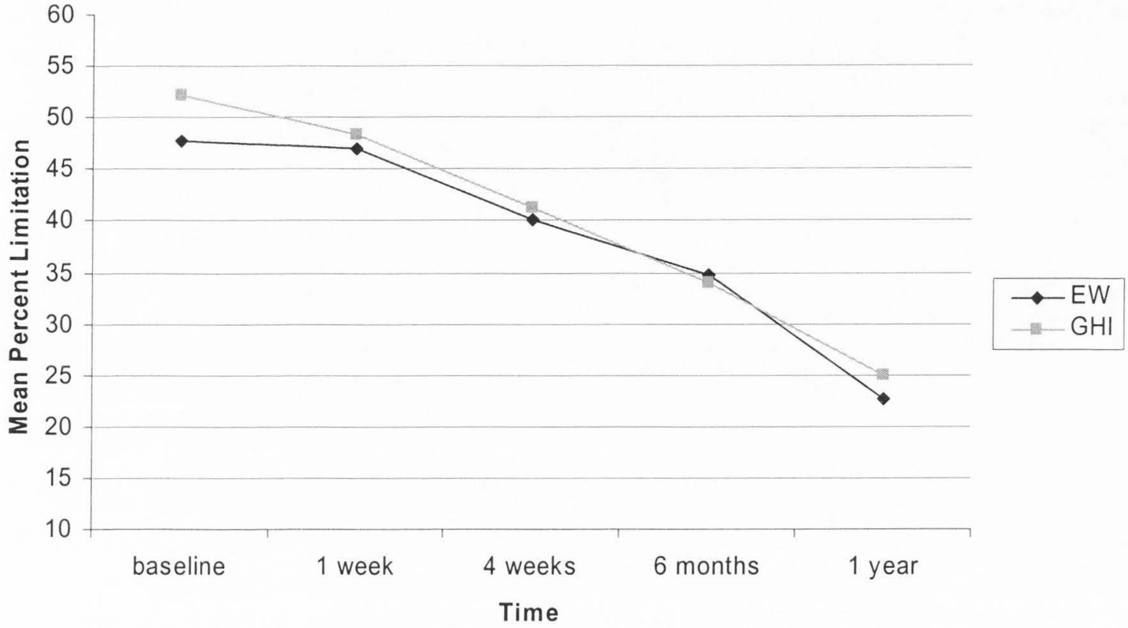

Figure 7. SIP: Mean home management scores. Graph depicts overall mean Home Management scores for treatment versus control groups from baseline through 1-year posttreatment.

Table 23

SIP: Mean Home Management Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
IES: Home management										
EW	47.65	34.16	46.96	36.58	40.01	37.79	34.74	37.87	22.62	33.75
GHI	52.22	30.19	48.33	36.28	41.25	34.84	33.95	36.79	24.89	34.20

Table 24

Correlations Between Home Management Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
SIP: Home management						
Baseline	-.02 (0.76)	.21 (0.00)*	-.16 (0.03)*	.04 (0.58)	-.20 (0.01)*	-.03 (0.67)
1 week	.03 (0.73)	.17 (0.03)*	-.01 (0.87)	-.04 (0.64)	-.20 (0.01)*	.03 (0.70)
4 weeks	-.09 (0.26)	.20 (0.01)*	-.18 (0.02)*	-.23 (0.00)*	-.09 (0.24)	.03 (0.73)
6 months	.02 (0.80)	.16 (0.05)*	-.16 (0.04)*	-.14 (0.07)	-.06 (0.45)	-.02 (0.80)
1 year	.13 (0.13)	.07 (0.43)	-.15 (0.07)	-.11 (0.20)	-.04 (0.65)	.08 (0.33)

* p-value ≤ 0.05.

expected direction, with more advanced cancer related to increased limitation in this area at baseline ($r = .21$, p 0.00) through the 6-month follow-up ($r = .16$, $p = 0.05$). Results indicated a small relationship between previous therapy and home management, in that those with a history of previous therapy experienced less limitation as compared to those with no psychotherapy history. This relationship was significant at baseline ($r = -.16$, $p = 0.03$), 4 weeks ($r = -.18$, $p = 0.02$), and 6 months ($r = -.16$, $p = 0.04$). In addition, education was negatively related to home management at baseline ($r = -.20$, $p = 0.01$) and 1 week only ($r = -.20$, $p = 0.01$), meaning that those with lower levels of education tended to evidence greater limitation in this area. Lastly, marital status was negatively related to home management at 4 weeks ($r = -.23$, $p = 0.00$), indicating being single at the time of the study was related to greater limitation in this area of functioning as compared to being married or cohabitating.

After exploratory analyses were performed, a linear mixed model was fitted with the seven predictor variables of time, age, stage, previous therapy, marital status, education, and prior disclosure and one dependent variable of home management. Fixed effects (between-subjects factor) within the model included home management group means for EW and GHI. Random effects (within-subjects factor) included individual participant variables and the intercept. A residual term was also included in the model, which allowed for random intercepts. As shown in Table 25, no significant intervention effect was found (regression coefficient = -1.76, $p = 0.62$). However, participants evidenced significant improvement in home management limitations across time (regression coefficient = -0.39, $p = 0.00$). Furthermore, several covariates predicted this change over time. Specifically, breast cancer stage (regression coefficient = 8.40, $p = 0.00$), previous therapy (regression coefficient = -10.69, $p = 0.02$), and education (regression coefficient = -8.85, $p = 0.01$) were significantly related to outcome.

Table 25

Linear Mixed Model: Home Management

Variable	Regression coefficient	*SE*	*t*	*p*-value	95% Confidence interval	
					Lower	Upper
Intercept	67.68	16.24	4.17	0.00*	35.63	99.74
Intervention	-1.76	3.57	-0.49	0.62	-8.80	5.29
Time	-0.39	0.54	-7.26	0.00*	-0.50	-0.29
Age	0.17	0.15	0.16	0.25	-0.12	0.46
Cancer stage	8.40	2.88	2.92	0.00*	2.72	14.09
Therapy	-10.69	4.37	-2.45	0.02*	-19.30	-2.07
Marital status	-5.12	3.81	-1.35	0.18	-12.64	2.39
Education	-8.85	3.31	-2.67	0.01*	-15.39	-2.31
Prior disclosure	0.35	0.60	0.59	0.56	-0.82	1.52

* *p*-value ≤ 0.05.

Exploratory analyses related to the mobility subscale of the SIP revealed unique changes over time (Figure 8). No significant differences were found between the EW and GHI group at baseline ($t = 0.77$, $p = 0.44$). As seen in Table 26, at 1-week postradiation treatment both groups reported an increase in mobility limitations (EW: $M = 23.27$, $SD = 32.94$; GHI: $M = 30.92$, $SD = 35.93$), with the GHI group experiencing a greater increase in limitation. Both groups subsequently reported consistent decreases in limitation at 4 weeks (EW: $M = 21.28$, $SD = 33.36$; GHI: $M = 18.27$, $SD = 29.67$), 6 months (EW: $M = 12.71$, $SD = 27.33$; GHI: $M = 13.29$, $SD = 28.73$), and 1 year (EW: $M = 10.21$, $SD = 23.11$; GHI: $M = 9.75$, $SD = 25.31$). Overall, participants evidenced a range of 12-16% improvement in functioning in the area of mobility across the year follow-up.

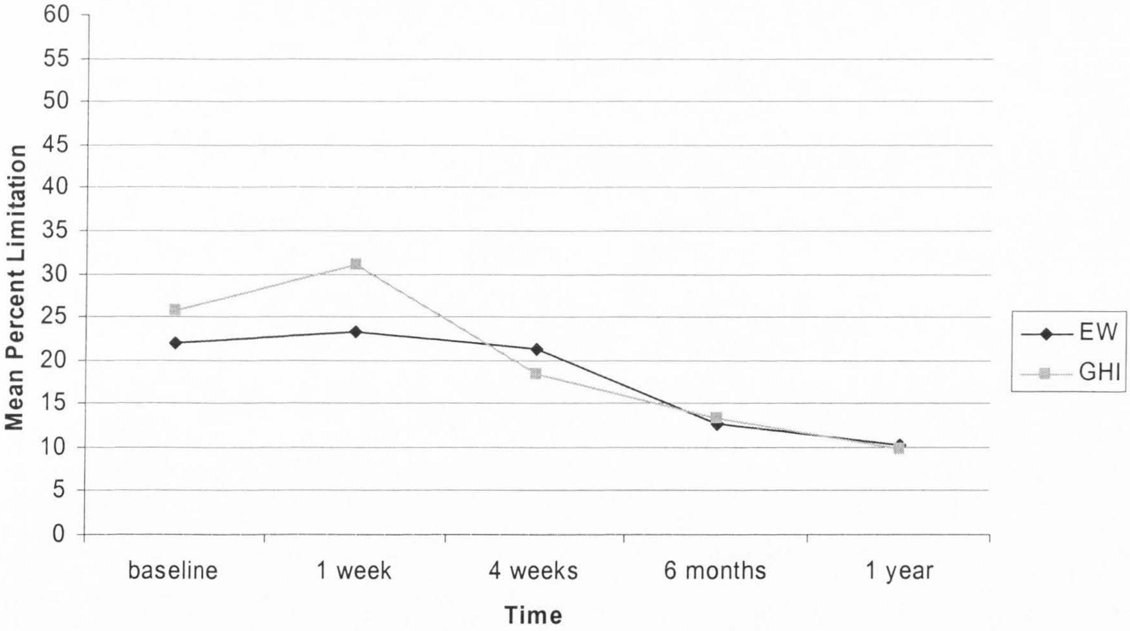

Figure 8. SIP: Mean mobility scores. Graph depicts overall mean Mobility scores for treatment versus control groups from baseline through 1-year posttreatment.

Table 26

SIP: Mean Mobility Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
SIP: Mobility										
EW	21.86	32.31	23.27	32.94	21.28	33.36	12.71	27.33	10.21	23.11
GHI	25.69	33.75	30.92	35.39	18.87	29.67	13.29	28.73	9.75	25.31

Exploratory analyses were then conducted with mobility and the covariates. A consistent relationship was found between limitation in mobility and previous therapy across all time points (Table 27), indicating that individuals with a history of participating in psychotherapy tended to experience decreased limitation in this area. Breast cancer stage was found to be positively related to mobility at baseline ($r = .24$, $p = 0.00$), 1 week ($r = .29$, 0.00), and 4 weeks ($r = .18$, $p = 0.02$), denoting that increased limitation is associated with more advanced breast cancer. Lastly, a significant relationship was also found between marital status and mobility at the 6-month follow-up ($r = -.19$, $p = 0.02$).

After exploratory analyses were performed, a linear mixed model was fitted with identical predictor and dependent variables used for the home management model (Table 28). Analyses indicted that the model found no significant intervention effect (regression coefficient = -1.23, $p = 0.69$). However, participants evidenced a decrease in mobility limitations over time (regression coefficient = -0.25, $p = 0.00$). Furthermore,

Table 27

Correlations Between Mobility Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
SIP: Mobility						
Baseline	-.12 (0.11)	.24 (0.00)*	-.17 (0.03)*	-.10 (0.21)	-.12 (0.12)	.02 (0.81)
1 week	-.05 (0.52)	.29 (0.00)*	-.26 (0.00)*	.00 (0.96)	-.04 (0.64)	.09 (0.25)
4 weeks	-.07 (0.34)	.18 (0.02)*	-.18 (0.02)*	.05 (0.55)	-.05 (0.48)	-.06 (0.43)
6 months	.06 (0.46)	.03 (0.71)	-.18 (0.02)*	-.19 (0.02)*	.03 (0.74)	.04 (0.64)
1 year	-.01 (0.87)	.05 (0.59)	-.24 (0.01)*	-.01 (0.95)	.00 (0.96)	.02 (0.85)

* p-value ≤ 0.05.

Table 28

Linear Mixed Model: Mobility

Variable	Regression coefficient	*SE*	*t*	p-value	95% Confidence interval	
					Lower	Upper
Intercept	42.20	13.93	3.03	0.00*	14.68	69.73
Intervention	-1.23	3.06	-0.40	0.69	-7.28	4.81
Time	-0.25	0.69	-5.17	0.00*	-0.34	-0.15
Age	0.13	0.13	1.01	0.32	-0.12	0.38
Cancer stage	4.60	2.50	1.84	0.07	-0.34	9.73
Therapy	-13.65	3.78	-3.61	0.00*	-21.12	-6.18
Marital status	-2.53	3.26	-0.78	0.44	-8.97	3.91
Education	-2.87	2.85	-1.01	0.32	-8.49	2.76
Previous disclosure	0.12	0.51	0.24	0.81	-0.88	1.13

* p-value ≤ 0.05.

history of previous therapy was found to predict improvements over time (regression coefficient = -13.65, $p = 0.00$).

Exploratory analyses for the recreation and pastimes subscale of the SIP revealed that the EW and GHI groups were significantly different at baseline ($t = 2.61$, $p = 0.01$). However, due to including random effects within the linear mixed model, this baseline difference was controlled for, making interpretations of findings possible. With regard to the trajectory of change across time (Figure 9), the EW group evidenced a steady decrease in limitation in recreation and pastimes. The GHI group experienced an increase in limitation in this area of functioning at 1-week postradiation treatment, but then sharply decreased in limitation through the one year follow-up (Table 29).

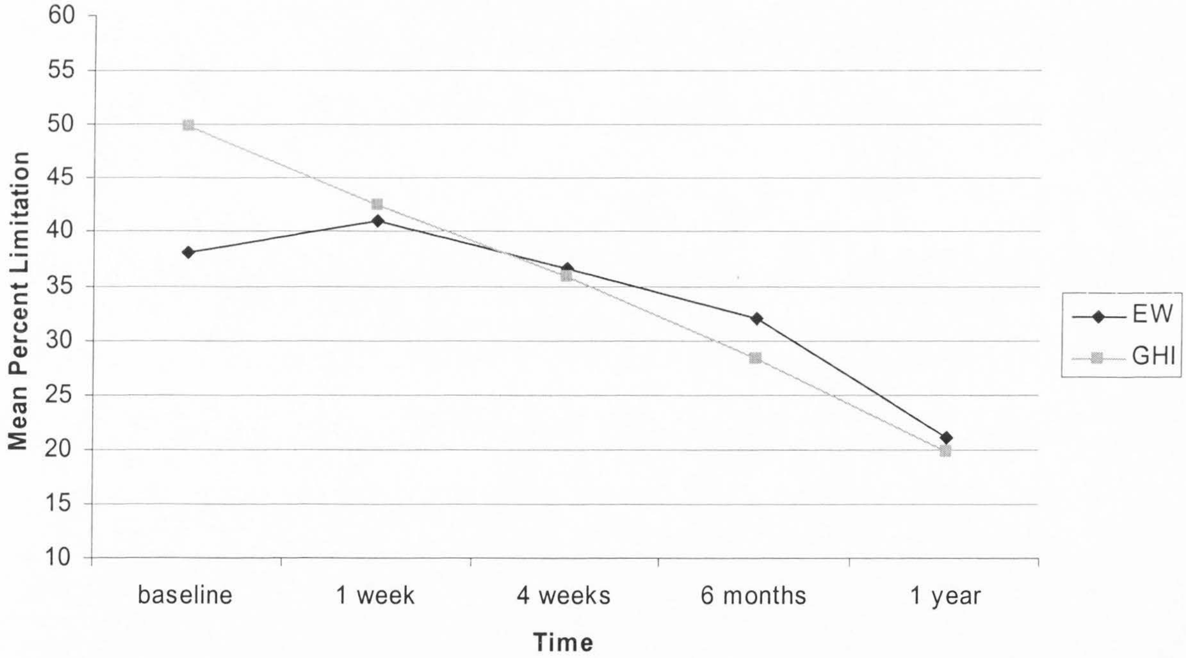

Figure 9. SIP: Mean recreation and pastime scores. Graph depicts overall mean recreation and pastimes scores for treatment versus control groups from baseline through 1-year posttreatment.

Table 29

SIP: Mean Recreation and Pastimes Outcome Scores for EW and GHI Groups

	Time									
	Baseline		1 week		4 weeks		6 months		1 year	
Variable	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
SIP: Recreation and pastimes										
EW	38.01	31.82	41.02	32.18	36.64	33.19	31.89	32.22	20.99	29.56
GHI	49.83	28.20	42.50	33.51	35.90	34.29	28.32	32.53	19.86	29.33

Exploratory analyses were conducted to determine the relationship between limitation in the area of recreation and pastime and covariates (Table 30). A significant relationship was found for cancer stage with greater limitation associated with more advanced stage breast cancer (1 week: $r = .18, p = 0.02$; 4 weeks: $r = .25, p = 0.00$; 6 months: $r = .18, p = 0.03$). A significant relationship was also found for previous therapy at 4 weeks ($r = -.18, p = 0.02$) and 1 year ($r = -.25, p = 0.00$) postintervention.

After exploratory analyses were performed, a linear mixed model was fitted with the same seven predictor variables (time, age, stage, previous therapy, marital status, education, prior disclosure) and one dependent variable (PA) as used in previous models (Table 31). Fixed effects (between-subjects factor) within the model included recreation and pastimes group means for EW and GHI. Random effects (within-subjects factor) included individual participant variables and the intercept. Particularly important to this model, a residual term was included, which allowed for random intercepts and controlled for the baseline difference. The model revealed no significant intervention

Table 30

Correlations Between Recreation and Pastime Scores and Covariates

Outcome	Age	Cancer stage	Previous therapy	Marital status	Education	Prior disclosure
SIP: Recreation & Pastime						
Baseline	-.10 (0.24)	.14 (0.07)	-.11 (0.16)	.03 (0.67)	-.05 (0.53)	.05 (0.51)
1 week	-.13 (0.10)	.18 (0.02)*	-.11 (0.14)	-.05 (0.50)	-.05 (0.53)	.01 (0.87)
4 weeks	-.08 (0.33)	.25 (0.00)*	-.18 (0.02)*	-.05 (0.50)	.02 (0.84)	.03 (0.65)
6 months	-.04 (0.59)	.18 (0.02)*	-.13 (0.10)	-.14 (0.07)	-.03 (0.75)	.07 (0.40)
1 year	-.08 (0.34)	.14 (0.11)	-.25 (0.00)*	-.02 (0.86)	-.08 (0.34)	.05 (0.53)

* *p*-value ≤ 0.05.

Table 31

Linear Mixed Model: Recreation and Pastime

Variable	Regression coefficient	*SE*	*t*	*p*-value	95% Confidence Interval	
					Lower	Upper
Intercept	53.93	15.80	3.41	0.00*	22.74	85.12
Intervention	-1.36	3.47	-0.39	0.70	-8.21	5.50
Time	-0.38	0.05	-7.18	0.00*	-0.48	-0.28
Age	-0.05	0.14	-0.32	0.75	-0.33	0.24
Cancer stage	7.78	2.81	2.77	0.01*	2.23	13.34
Therapy	-8.66	4.26	-2.03	0.04*	-17.07	-0.25
Marital status	-2.69	3.70	-0.73	0.47	-10.00	4.61
Education	-3.28	3.22	-1.02	0.31	-9.64	3.08
Previous disclosure	0.50	0.58	0.87	0.39	-0.64	1.64

* *p*-value ≤ 0.05.

effect (regression coefficient = -1.36, $p = 0.70$). However, both groups of participants significantly improved over time (regression coefficient = -0.38, $p = 0.00$). Furthermore, breast cancer stage (regression coefficient = 7.78, $p = 0.01$) and previous therapy (regression coefficient = -8.66, $p = 0.04$) significantly predicted outcome, in that more advanced stage breast cancer predicted greater limitation and previous therapy predicted decreases in limitation over time.

Summary. To summarize the findings for the first research question, the expressive writing intervention evidenced a significant positive impact on reported PA. No significant intervention effects were found for the other outcome measures. However, both the EW and GHI groups demonstrated significant improvements in NA, intrusion and avoidance symptoms, and limitations in home management, mobility, and recreation and pastime over time.

Linguistic Analyses

Prior to answering the second research question, descriptive analyses were conducted on the expressive writing narratives. Utilizing the LIWC program, the mean percent of words utilized from particular linguistic categories was first determined (see Tables 32 and 33). Participants wrote an average of 473 words during each of the three writing sessions (range = 19-1,644). The total word count of the narratives decreased significantly from the first to the third writing session (writing 1 to writing 2: $t = 4.68$, $p = 0.00$; writing 2 to writing 3: $t = 2.93$, $p = 0.01$).

With regard to affect when averaging across the three writing sessions, less than 5% of total words used were positive or negative emotion words (positive emotion:

Table 32

Linguistic Analyses of Expressive Writing Narratives: Part I

	Total words		Positive emotion words		Negative emotion words		Cognitive words	
Writing session	Mean %	range	Mean %	range	Mean %	range	Mean %	range
Writing 1 (*N* = 68)	566.55	119-1644	2.32	0.37-4.91	2.09	0.33-4.73	7.56	3.20-11.77
Writing 2 (*N* = 65)	466.88	47-1314	2.90	0.00-8.49	2.01	0.00-6.72	7.40	1.60-12.77
Writing 3 (*N* = 66)	401.11	19-1461	3.22	0.00-13.23	1.94	0.00-10.53	7.36	3.30-13.04
Combined writings (*N* = 200)	473.02	71-1252	2.80	0.00-13.23	2.02	0.00-10.53	7.46	1.60-13.04

Table 33

Linguistic Analyses of Expressive Writing Narratives: Part II

	Tense					
	Past		Present		Future	
Writing session	Mean %	range	Mean %	range	Mean %	range
Writing 1 (*N* = 68)	7.58	0.84-13.82	9.82	3.07-22.69	1.03	0.00-3.63
Writing 2 (*N* = 65)	6.05	0.36-11.36	11.14	3.27-25.53	1.30	0.00-4.58
Writing 3 (*N* = 66)	5.18	0.00-15.79	13.12	5.08-21.74	1.44	0.00-4.55
Combined writings (*N* = 200)	6.27	0.00-15.79	11.35	3.07-25.53	1.25	0.00-4.58

mean = 2.80%; negative emotion: mean = 2.02%). Participants utilized significantly more positive emotion words than negative emotion words ($t = 4.10$; $p = 0.00$). Furthermore, participants' use of positive emotion words increased across writing sessions, but only reached significance for the difference between the first and second writing session (writing 1 to writing 2: $t = -2.94$; $p = 0.01$; writing 2 to writing 3:

$t = -1.68$; $p = 0.10$). The use of negative emotion words appeared to stay relatively constant across sessions (writing 1 to writing 2: $t = .29$; $p = 0.77$; writing 2 to writing 3: $t = .53$; $p = 0.60$). When averaging across all three writing sessions, participants utilized more cognitive words (mean = 7.46%) than affect words. The use of cognitive words also remained constant across writing sessions (writing 1 to writing 2: $t = .18$; $p = 0.86$; writing 2 to writing 3: $t = .08$; $p = 0.94$).

The examination of verb tense revealed that the majority of participants produced narratives characterized by more present tense words (mean = 11.35%) than past tense (mean = 6.27%) or future tense words (mean = 1.25%) when averaged across the three writing sessions. Analyses of change in verb tense over time indicated a significant decrease in past tense verbs (writing 1 to writing 2: $t = 3.84$; $p = 0.00$; writing 2 to writing 3: $t = 1.97$; $p = 0.05$), an increase in present tense verbs (writing 1 to writing 2: $t = -3.16$; $p = 0.00$; writing 2 to writing 3: $t = -3.40$; $p = 0.00$), and an increase in the use of future tense verbs, which was significant only from the first to the second writing session (writing 1 to writing 2: $t = -2.17$; $p = 0.03$; writing 2 to writing 3: $t = -.58$; $p = 0.57$).

After determining the linguistic content of the narratives, analyses specific to the second research question were performed. The second research question sought to ascertain the relationship between the use of various linguistic variables (i.e., positive emotion words, negative emotion words, cognitive words, and verb tense) and outcome (i.e., PA, NA, intrusion and avoidance symptoms, general functioning). In order to answer this research question, 2-tailed pairwise Pearson *R* correlations were conducted with seven linguistic variables and seven outcome variables, including the PANAS, IES, and SIP. Some caution in interpreting these relationships should be employed due to the large number of correlations conducted and thus, the increased risk of Type I error. However, these analyses should be considered exploratory in nature and used to provide truly preliminary information on the relationships between outcome and linguistic variables.

With regard to the PANAS, scores from the NA and PA subscales were analyzed separately (Table 34). Positive emotion words were significantly positively related to PA at 1-week posttreatment ($r = .24$; $p = 0.05$). Negative emotion words were found to be significantly negatively correlated with PA at 6-months posttreatment ($r = -.25$; $p = 0.04$). The use of negative emotion words was positively correlated with NA at the 1-week follow-up ($r = .33$; $p = 0.01$). Analyses further revealed a significant negative relationship between the use of cognitive words and PA at 1-year posttreatment ($r = -.263$; $p = 0.05$). Finally, the use of past tense words was found to have a significant negative relationship with NA at 6-months posttreatment ($r = -.24$; $p = 0.05$), indicating NA decreases with the use of past tense words. No relationship was found between NA and the use of cognitive words or present and future tense words.

Analyses revealed additional significant relationships between linguistic variables and avoidance and intrusion symptoms (Table 35). The use of negative emotion words was found to have a significant positive relationship with intrusion symptoms at 4 weeks ($r = .32$; $p = 0.01$) and 6 months ($r = .26$; $p = 0.03$). The use of

Table 34

PANAS: Relationship Between Linguistic Variables and PA and NA

	PA								NA							
	1 week		4 weeks		6 months		1 year		1 week		4 weeks		6 months		1 year	
Linguistic category	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*
Word count	.18	.14	.10	.43	-.13	.30	.08	.56	-.04	.77	.00	.99	-.02	.87	-.10	.47
Positive emotion	.24	.05*	-.02	.85	.05	.67	-.03	.84	-.06	.65	-.09	.49	.03	.80	.11	.44
Negative emotion	-.12	.32	-.12	.34	-.25	.04*	-.20	.15	.33	.01*	.19	.14	.20	.12	.11	.41
Cognitive	-.14	.27	-.09	.50	-.03	.82	-.26	.05*	.07	.60	-.01	.96	.11	.40	.21	.13
Tense																
Past	-.01	.92	-.05	.69	.01	.96	-.08	.57	-.19	.12	-.02	.88	-.24	.05*	-.10	.46
Present	-.08	.52	-.05	.72	-.04	.73	-.10	.48	.18	.14	-.07	.56	.20	.12	.18	.19
Future	.06	.65	.06	.66	.06	.66	.14	.32	.08	.50	.14	.28	.06	.62	-.01	.96

* p-value ≤ 0.05.

Table 35

IES: Relationship Between Linguistic Variables and Intrusion and Avoidance Symptoms

	Intrusion								Avoidance							
	1 week		4 weeks		6 months		1 year		1 week		4 weeks		6 months		1 year	
Linguistic category	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*
Word count	.04	.76	.00	.99	.08	.53	.12	.37	-.04	.77	.02	.86	-.05	.72	.02	.89
Positive emotion	-.14	.26	-.09	.49	.07	.59	.09	.53	-.07	.56	-.06	.64	.16	.21	.18	.18
Negative emotion	.10	.42	.32	.01*	.26	.03*	.12	.37	-.01	.94	.14	.28	.15	.24	.10	.49
Cognitive	-.04	.78	.06	.66	.10	.41	.19	.17	.09	.45	.02	.89	.07	.58	.15	.29
Tense																
Past	-.06	.65	-.05	.70	-.08	.52	-.11	.44	.01	.94	-.14	.25	-.27	.03*	-.27	.05*
Present	-.11	.88	-.00	.99	.02	.89	.01	.92	.04	.76	.12	.35	.25	.05*	.25	.07
Future	.16	.20	.04	.74	.13	.31	-.07	.60	.13	.31	.04	.73	.15	.24	.20	.15

* *p*-value ≤ 0.05.

past tense words was negatively related to avoidance symptoms at 6 months ($r = -.27$; $p = 0.03$) and 1-year ($r = -.27$; $p = 0.05$) posttreatment. Furthermore, the use of the present tense was positively related to avoidance symptoms at 6 months follow-up ($r = .25$; $p = 0.05$).

With regard to the SIP, specific linguistic variables were not found to be related to household management activities or recreation and pastime activities (Tables 36 and 37). However, total word count at 4 weeks and 6 months was positively related to mobility. The SIP score represents the percent of limitation in that area of general functioning, indicating that as total word count increased limitation in mobility also increased.

Prior Disclosure

Prior to answering the last research question, descriptive analyses were performed on reported history of prior disclosure (Table 38). This measure consisted of one question that asked participants to rate how much they had disclosed (i.e., through talking or writing) their deepest thoughts and feelings related to their cancer and cancer treatment. They rated their prior disclosure on a scale ranging from 0, not at all, to 10 completely. To summarize the rating scale into more meaningful and interpretable categories, responses from 0 to 3 are interpreted as little disclosure, 4 to 7 as moderate disclosure, and 8 to 10 as high disclosure. Just over half (53.6%) of participants indicated disclosing to a large degree prior to entering the study. One third (29.6%) reported moderate disclosure and just over 15% said they had disclosed relatively little.

Table 36

SIP: Relationship Between Linguistic Variables and General Health (Part 1)

	Household management								Mobility							
	1 week		4 weeks		6 months		1 year		1 week		4 weeks		6 months		1 year	
Linguistic category	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*
Word count	.14	.25	.01	.95	.01	.93	-.14	.32	.13	.32	.24	.05*	.42	.00*	.02	.89
Positive emotion	-.11	.39	.05	.72	-.16	.21	.12	.40	-.01	.92	-.10	.45	-.10	.42	.02	.92
Negative emotion	.10	.44	.03	.83	-.04	.76	.06	.69	.21	.09	.00	.98	-.14	.26	.03	.85
Cognitive	.06	.64	.07	.59	.06	.62	-.17	.23	.04	.77	.12	.34	.00	.98	-.09	.52
Tense																
Past	.24	.06	.08	.51	.05	.67	-.01	.96	.07	.60	.14	.28	.15	.22	.15	.27
Present	-.13	.30	-.01	.96	.08	.54	.01	.96	.02	.90	-.12	.34	-.06	.66	-.00	.99
Future	-.13	.30	-.01	.96	.08	.54	.01	.96	.02	.90	-.12	.34	-.06	.66	-.00	.99

* *p*-value ≤ 0.05.

Table 37

SIP: Relationship Between Linguistic Variables and General Health (Part II)

	Recreation and pasttime							
	1 week		4 weeks		6 months		1 year	
Linguistic category	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*
Word count	.20	.11	.17	.18	.21	.10	-.01	.94
Positive emotion	-.07	.58	.04	.78	-.09	.48	.15	.28
Negative emotion	.03	.82	.16	.21	.06	.63	.04	.77
Cognitive	.18	.15	.24	.05	.15	.23	.00	.98
Tense								
Past	-.05	.69	.02	.90	-.08	.54	-.15	.27
Present	.14	.28	.04	.77	.13	.30	.18	.21
Future	.06	.64	.01	.91	.03	.80	.10	.49

* p-value ≤ 0.05.

Table 38

Summary of Prior Disclosure

	DIS ($N = 179$)	
Rating	*n*	%
0-3 (little)	30	16.8
4-7 (moderate)	53	29.6
8-10 (high)	96	53.6

The final research question asked whether a relationship exists between perception of prior disclosure at baseline and positive and NA (PANAS), general functioning (SIP: Home management, mobility, recreation and pastimes), or trauma-related symptoms (RIES: Intrusion and avoidance) at baseline or follow-up. In order to answer this research question, history of prior disclosure was included as a covariate in all previously presented linear mixed models. In addition, further exploratory analyses were performed. Specifically, 2-tailed pairwise Pearson *R* correlations were conducted with DIS and outcome, including PANAS, SIP, and RIES (Table 39). Results reveal a significant positive relationship between perception of prior disclosure and PA at baseline ($r = .18, p = 0.02$), 1 week ($r = .19, p = .01$), 4 weeks ($r = .17, p = 0.02$), and 6 months ($r = .17, p = 0.03$) follow-up, indicating that as perception of prior disclosure increased so did PA. A negative relationship was found between perception of prior disclosure and avoidance symptoms at baseline ($r = -.21, p = 0.00$), 1 week ($r = -.21$, $p = 0.00$), 4 weeks ($r = -.22, p = 0.00$), and 1 year ($r = -.25, p = 0.00$) follow-up,

Table 39

Relationship Between Perception of Prior Disclosure and Outcome

	Time									
	1 week		4 weeks		6 months		1 year		1 week	
Outcome variable	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*	*R*	*p*
PANAS										
PA	.183*	.015	.188*	.014	.174*	.022	.165*	.034	.082	.322
NA	-.131	.083	-.045	.562	-.057	.459	-.073	.352	-.115	.176
SIP										
Household mgmt.	-.032	.674	.030	.698	.027	.726	-.020	.799	.084	.327
Mobility	.018	.814	.089	.247	-.061	.425	.037	.636	.017	.845
Recreation/Pastime	.050	.512	.013	.867	.034	.653	.066	.399	.054	.528
RIES										
Avoidance	-.214*	.004	-.214*	.004	-.224*	.003	-.230	.003	-.251*	.003
Intrusion	-.104	.168	-.104	.168	-.066	.396	-.077	.326	-.099	.245

* p-value ≤ 0.05.

indicating that lower levels of prior disclosure are associated with increased avoidance symptoms. No relationship was found between perception of prior disclosure and NA, general functioning, or intrusion symptoms.

CHAPTER V

DISCUSSION

The primary aim of the present study was to determine the effects of an expressive writing intervention on the emotional and physical well-being of breast cancer patients as compared to a treatment-as-usual control group. The secondary aim of the study was to examine the linguistic content of expressive writing narratives. This study specifically examined three research questions. The following presents a summary of results, relates the current study findings to previous research, presents implications and limitations of the project, as well as future directions.

Summary of Findings

The first research question asked, "Does an expressive writing intervention impact PA, NA, intrusion and avoidance symptoms, or general functioning as compared to a general health information control?" In order to answer this question, a series of linear mixed models were conducted. Results revealed a significant treatment effect for PA, indicating that the EW group evidenced significantly greater improvement in PA over time in relation to the GHI group. The GHI group also showed significant improvements in PA across time. No other intervention effects were found for the other outcome measures. However, analyses revealed that individuals in both the EW and the GHI groups reported significant improvements on all outcomes over time, including NA, intrusion and avoidance symptoms, and general functioning (home management, mobility, recreation and pastimes). Based on this finding it is difficult to determine whether participants felt better as a function of time, or whether they evidenced improvements as a result of receiving the EW and GHI interventions. Unfortunately, without having a nonintervention or neutral writing control, this determination cannot be made. This will be discussed in further detail later in the discussion. With regard to the covariates examined within each model, several significant effects were found. Specifically, more advanced breast cancer was associated with lower PA, higher NA, and greater limitation in home management and recreation and pastimes. It should be noted that participants within the study had stage I, II, or III breast cancer (individuals were excluded from the study if they had stage IV cancer). Therefore, "more advanced stage cancer" is specific to participants of this study, as opposed to individuals with stage IV (advanced stage) cancer. Moreover, it appears that individuals with more advanced breast cancer tend to experience overall decreased psychological well-being and have a lower level of general functioning. Additionally, perceived prior disclosure at baseline was found to be related to positive long-term effects on measures of psychological well-being. Specifically, a greater history of prior disclosure was associated with higher PA, and a smaller degree of prior disclosure was related to the experience of more avoidance symptoms. Younger age was also associated with greater intrusion symptoms. Having a history of participating in previous therapy was associated with decreases in limitations in the areas of home management, mobility, and recreation and pastimes across time. Lastly, having a higher level of education was related to decreases in limitations in home management.

The second research question asked, "What are the relationships between the use of positive words, negative words, cognitive words, and verb tense across the three writing sessions with PA, NA, intrusion and avoidance symptoms, and general functioning?" Analyses indicated few and inconsistent relationships. For instance, the use of negative emotion words was negatively related to PA at 6 months, and positively related to NA at 1 week. This suggests that the use of negative emotions words is related to decreases in PA and increases in NA. This is as would be expected in that one's choice of emotionally charged words seemed to reflect one's emotional state (or vice versa). Findings also indicated that NA tended to decrease with the use of past tense verbs. PA also tended to decrease with the use of cognitive words. With regard to intrusion and avoidance symptoms, the use of negative emotion words was related to increases in intrusion symptoms. The use of past tense verbs was also related to decreases in avoidance symptoms, whereas the use of present tense verbs was associated with the increase of avoidance symptoms. Concerning the relationship between the primary linguistic components analyzed and general functioning, no significant relationships were found. The relationship between linguistic variables and outcome measures should be interpreted as preliminary and exploratory, due to the large number of correlational analyses that were conducted and due to the inconsistent findings across time (i.e., significant relationships were often found at only one of the four postintervention follow-up periods). Overall, they should also be interpreted with caution.

General descriptive linguistic analyses revealed that the use of PA words tended to increase across writing sessions, whereas the use of NA words and cognitive words tended to remain constant across the three writing sessions. With regard to verb tense, the use of past tense verbs decreased across writing sessions, but the use of present and future tense words increased. Overall, participants utilized more present tense words than future or past and more future tense words than past tense words.

Finally, the third research question asked, "Is perception of prior disclosure at baseline related to intrusion and avoidance symptoms, PA, NA, or general functioning at baseline and follow-up?" This question was primarily answered within the first research question, as prior disclosure was included within each linear mixed model as a covariate. However, results will be briefly reiterated here. Overall, perceived prior disclosure at baseline was found to be related to positive long-term effects on measures of psychological well-being (i.e., PA, avoidance symptoms), but not related to general functioning. General descriptive findings revealed that most participants reported a history of disclosing thoughts and feelings related to their cancer experience. However, up to one third of participants had only moderately disclosed up to that point, with 15% disclosing very little to not at all.

Integration of Current Findings and Related Literature

The majority of existing expressive writing studies focusing on patients with general cancers, found no effect of an expressive writing intervention on psychological well-being (de Moor et al., 2002; Rosenberg et al., 2002). However, these studies utilized predominantly male participants. One study utilizing relatively equal numbers of males and females found the expressive writing intervention to be related to a decrease in avoidance behaviors at 6 months postintervention (Zakowski et al., 2004). Unfortunately, the researchers did not assess affect. Studies examining the impact of such an intervention on breast cancer patients revealed positive effects on physical health (Stanton et al., 2002), but no effects on psychological well-being (Stanton et al.; Walker et al., 1999). Overall, previous research continues to be mixed with regard to the impact of expressive writing on psychological well-being. However, it is important to note that, aside from the contrasts in gender across most previous studies and the present project, the studies that found no impact on psychological well-being utilized a low number of participants (*N* = 15-21) in each intervention group (de Moor et al.; Rosenberg et al.; Stanton et al.; Walker et al.). This may have also impacted the ability of their findings to reach statistical significance. The present study adds to the controversy of findings in this area in that the expressive writing intervention was significantly related to increased PA over time, but unrelated to intrusion and avoidance symptoms. Individuals who were randomized to receive the expressive writing intervention reported significantly greater postintervention gains in PA as compared to the GHI group. Differences were consistent even when controlling for a variety of covariates (i.e., age, cancer stage, previous therapy, marital status, education, prior disclosure) that were thought to potentially influence outcome. Further research is needed to help clarify whether women with breast cancer can garner benefit from expressive writing and in what specific domains (e.g., psychological well-being, physical health, general functioning) may be impacted by such an intervention.

With regard to linguistic trends, the present study found an increase in PA words across sessions, but no change in NA words. Despite future research being warranted, these findings may help to somewhat resolve contradictions across previous studies. That is, Pennebaker (1993) found participants who evidenced health improvements utilized a larger proportion of negative emotion words (i.e., anxiety, sadness) than positive emotion words as compared to participants who did not improve. However, that finding is not only contrary to the present study's findings, but is also contrary to two other primary studies that have employed linguistic analyses in the context of expressive writing (Pennebaker & Francis, 1996; Pennebaker et al., 1997). For instance, Pennebaker and colleagues found that the use of positive emotion words was related to better health. Pennebaker and Francis also found that the more positive emotion words participants used, the better their health after the writing intervention. Based on previous research, one may speculate that the present study's finding of a significant relationship between the use of positive emotion words and PA and the finding that the use of positive words increased over time, may have impacted the significant increase in PA across the year of follow-up. However, additional research on these relationships is warranted.

The current study found no changes in the use of cognitive words across writing sessions, which is in direct conflict with the most consistent linguistic finding reported in existing studies. Researchers have specifically reported positive outcomes to be related to an increase in the use of cognitive words across writing sessions (Pennebaker, 1993; Pennebaker & Francis, 1996; Pennebaker et al., 1997). However, these studies utilized physically healthy participants. Low and colleagues (2006) examined the linguistic content of expressive writing essays in a breast cancer population and found no significant changes in the use of cognitive words across writing sessions. The present study found the same result. The failure to find an increase in the use of cognitive words with breast cancer patients could be due to a variety of factors. First, it may be related to the trauma about which the participants wrote. That is, it may be inappropriate to compare findings from a study that examined expressive writing about one's transition to college or about being laid off of work, for example, to studies that examined expressive writing about one's breast cancer experience. The topic about which one writes may help to dictate the specific linguistic components that lead to positive outcomes. However, this warrants further study. Furthermore, it can be hypothesized that the mere physical condition of having breast cancer, may impact how and what participants write about, particularly when compared to healthy controls. Lastly, it should be highlighted that this study did find that participants used significantly more cognitive words than affective words, which indicates participant's essays were at least in part focused on cognitive processing.

The use of verb tense has not been widely examined in expressive writing literature. However, despite few researchers examining this domain, findings seem to be consistent across studies, including the present study. Pennebaker and Francis (1996) also found a decrease in the use of past tense words across writing sessions in a similar study examining a sample of college students. Walker and colleagues (1999) found a decrease in past tense words and an increase in present and future tense across writing sessions as well. With regard to the present study, participants utilized more present tense verbs than past or future tense verbs. A decrease in past tense verbs and an increase in the use of present and future tense verbs across writing sessions was also noted. Furthermore, the use of past tense verbs was associated with a decrease in avoidance symptoms. Participants were in the process of completing radiation therapy for their breast cancer upon entering this study. Given that they were at the end of that treatment, and in light of the present findings, it could be hypothesized that the use of past tense verbs indicates participants may have been confronting or disclosing about previously avoided thoughts and feelings. Once this disclosure took place, it logically follows that they might progress to writing about thoughts and feelings related to the present time or future. However, again it should be noted that given the exploratory nature of the analyses, such hypotheses and conjecture should be interpreted as preliminary and contingent upon further study.

Finally, little research exists that explores disclosure patterns among breast cancer patients. However, findings from the present study are commensurate with the results of previous investigations. Generally, findings from the current project indicated that over 15% of participants reported having disclosed relatively little prior to entering the study. This finding is consistent with existing research that reported 15-23% of breast cancer patients had disclosed little to family, friends, and medical professionals (Henderson et al., 2002). The current project found that having a history of prior disclosure was associated with increased PA across both treatment groups. Conversely, a history of little prior disclosure was associated with avoidance symptoms. These findings suggest what would be expected based on trauma and inhibition theories

(Chemtob et al., 1988; Foa et al., 1989; Horowitz, 1986; Pennebaker & Beall, 1986); that is, the more one discloses about a distressing event the better one feels, and the more one inhibits thoughts and emotions related to such an event the more one experiences related avoidance symptoms. Furthermore, in breast cancer patients research has demonstrated that inhibiting one's thoughts and feelings related to having breast cancer is associated with breast cancer metastasis and with an earlier death (Jensen, 1987; Weihs et al., 2000).

The present study found a significant effect over time for both the EW and GHI groups across all outcome variables. This study also collected data longitudinally for 1 year postintervention, which is the longest longitudinal study in this area of research. One reason the present study may have found significant effects over time is due to collecting data over a longer follow-up period. Prior studies examining the effect of expressive writing on breast cancer patients collected data longitudinally, but for 7 months maximally (Walker et al., 1999). The majority of changes in psychological well-being that were detected in the present study were not apparent until approximately 6 months postintervention. For instance, sharp increases in PA were not found until 6 months posttreatment. With regard to intrusion and avoidance symptoms, participants did not evidence substantial declines in symptoms until 1 year posttreatment. If participant change was not measured up to 1 year postintervention, the positive changes observed may not have been detected. Furthermore, the patterns of change over time may look different if not measured longitudinally. For example, participants reported decreases in NA at 1 week posttreatment, with little change from 1 week to 6 months. If the follow-up assessments had stopped at 6 months, then the sharp decline in NA from the 6 month to the 1 year follow-up would have gone undetected. The trajectory of change for NA would have appeared to represent an immediate improvement in symptoms and then a leveling off trend, as opposed to what actually occurred, which was additional improvement in symptoms after 6 months. It seems that measuring participant change longitudinally for at least 1 year was beneficial in revealing potentially more accurate changes in functioning over time.

Limitations

Both the participants, who received the EW intervention and those who received the GHI intervention, evidenced significant improvements on all measures of psychological well-being and general functioning across time. This overwhelmingly positive finding points to a potential flaw in the way the two groups have been described and a potential threat to internal validity. The EW group was considered the treatment group and the GHI group was originally described as a treatment-as-usual control. However, analyses seem to reveal that the GHI may, in fact, be more accurately described as a treatment itself. Breast cancer patients are typically provided with general information about what to expect posttreatment and where to find resources related to breast cancer and its treatment. However, the GHI group received detailed information via audiotape and were provided with a written copy of the information that they were instructed to read on the following consecutive two days. Based on the way this information was disseminated to patients as well as the detail included in the information, it is speculated that the GHI potentially functioned as a treatment. It appears that both interventions were related to positive effects in participants over time. Unfortunately, these results can only be described as being associated with outcomes and warranting further study. Due to not having a true nontreatment control group, it is impossible to determine whether participants' improvements in psychological well-being and general functioning were due to the treatments themselves or to the passage of time, or some other threat to internal validity. Therefore, a major limitation to this study is the control group utilized. Cleaner comparisons could have been made if either a wait-list or no-intervention control group was utilized. A neutral writing control group would have also helped to make more descriptive comparisons. Researchers, who have utilized a neutral writing control group, have been better able to make assumptions about the effects of the expressive writing intervention (Francis & Pennebaker, 1992; Greenberg et al., 1996; Pennebaker et al., 1990; Pennebaker & Francis, 1996). The neutral writing control is typically instructed to write about an innocuous subject (e.g., describe the room you are sitting in, write about your plans for the day). By utilizing a neutral writing control, the participants are essentially engaging in the same task, but with a different focus, making assertions about causal versus correlation effects easier.

Two additional threats to internal validity have been identified. First, participants were studied over 1 year of time. During that year, which occurred postradiation treatment, participants would have had time to potentially mature or grow emotionally and cognitively. This growth or maturation would be particular to having completed treatment for a life-threatening illness. Additionally, it is possible that participants experienced or were exposed to something during the year of follow-up assessment that impacted their psychological well-being or general functioning and that affected outcome. However, participants in both the EW and GHI groups experienced similar changes over time suggesting that if they had matured or experienced a confounding event, it did not differentially impact outcome.

The outcome data for this study was entirely based upon self-report measures and did not include measures of physical health. Having some objective measure of adjustment that could either be corroborated or be obtained independently of participants may have added a level of objectivity to outcomes. However, it is noted that all self-report measures utilized had adequate reliability and validity. Measures of physical health (e.g., medical visits, blood pressure, heart rate) have been demonstrated to be useful objective measures of adjustment. In fact, expressive writing has been found to positively impact physical health, emphasizing the importance of including such objective measures of adjustment (Greenberg & Stone, 1992; Greenberg et al., 1996; Pennebaker & Beall, 1986; Pennebaker et al., 1988; Petrie et al., 1995).

In addition, this study was interested in determining the effects of prior disclosure on outcome in order to determine who might most benefit from such an expressive writing intervention. It may have been even more informative if perception of disclosure was also measured after each of the writing sessions. This may have provided information about the extent to which participants perceived they disclosed during their writing, which in turn may have illuminated the depth of disclosure necessary to produce positive outcomes.

Finally, with regard to external validity, several potential threats exist. First, the majority of participants in the present study were Caucasian. However, this is characteristic of the region of the country from which participants were sampled. Furthermore, it appears to be typical based on other studies utilizing breast cancer patients (Stanton et al., 2000, 2002; Walker et al., 1999). The majority of participants were also married and had at least a high school education (with many having graduated from college). These sample characteristics are also typical of existing research (Stanton et al., 2000, 2002; Walker et al.). With regard to cancer stage, the majority of participants had either stage I or stage II breast cancer with very few having stage III cancer. Research has demonstrated that individuals with more advanced breast cancer experience similar rates of depression and anxiety (Kissane et al., 2004), but experience higher incidence rates of PTSD as compared to individuals with earlier stage cancer (Andrykowski & Cordova, 1998; Andrykowski et al., 1998; Cordova et al., 1995; Jacobsen et al., 1998). Consequently, generalizing results of the present study to individuals with higher than a beginning- to middle-stage breast cancer (stage I, II, or III), warrants further research. In addition, all subjects participated in this study at the end of their radiation treatment. The time immediately following completion of radiation treatment was chosen for this intervention study because it has been found to be characterized by distress (Jarrett et al., 1992; Maher, 1982; Walker et al., 1996). However, this indicates that generalizing results to breast cancer patients who are in a different phase of treatment or recovery warrants additional study.

Implications

Research has revealed that most women with breast cancer have at least somewhat discussed their disease with others. However, many disclosed relatively little (15-23%) with others (Henderson et al., 2002). This finding is consistent with the present project. Furthermore, previous research indicated that more than half of participants wanted at least moderately to discuss their experience with others. Conversely, 19% of women said they did not want to talk about their experience at all, and 12% at least somewhat wanted to keep their breast cancer a secret (Henderson et al.). It appears that most women with breast cancer disclose their thoughts and feelings to others. However, there is a subset of women who do not disclose to others and a subset who do not want to discuss their experience with other people. It seems that this expressive writing intervention is unwittingly tailored specifically to individuals who may not want to express their thoughts and feelings about their breast cancer experience to others. The writing paradigm provides a confidential, private, outlet that can be used to express oneself without the pressure and uneasiness one might feel if discussing such a sensitive topic with other people.

Researchers have demonstrated that the inhibition of breast cancer-related thoughts and feelings has been associated with cancer metastasis (Jensen, 1987) and with a shortened survival time in recurrent breast cancer patients (Weihs et al., 2000). This grim finding is even more worrisome, provided the number of breast cancer patients who do not want to discuss their experience with others, including those who want to keep their experience a secret (Henderson et al., 2002). However, the expression of cancer-related thoughts and emotions has been associated with positive physical and psychological consequences (de Moor et al., 2002; Low et al., 2006; Rosenberg et al., 2002; Stanton et al., 2002; Walker et al., 1999; Zakowski et al., 2004). Based on this body of literature, it logically can be concluded that breast cancer patients should be encouraged to express their thoughts and emotions specific to their cancer experience and should be provided with a means to do so. Expressive writing is a confidential, noncost prohibitive, easy intervention that to date has not evidenced any contradictory findings that would not support providing such an intervention to breast cancer patients. One might argue that taking 20 to 30 minutes out of one's day to write about a potentially emotionally difficult subject could be taxing to the average breast cancer patient, particularly if she is experiencing treatment side-effects (e.g., fatigue; King, Nail, Kreamer, Strohl, & Johnson, 1985). However, it may be speculated that the potential long-term benefits (e.g., increased PA, decreased negative physical symptoms, decreased medical appointments; Stanton et al., 2002) of the intervention outweigh the potential short-term uneasiness that may result from confronting something that may be emotionally difficult.

Future Directions

It is evident that expressive writing is not only likely beneficial for physically healthy individuals, and has also been demonstrated to be potentially beneficial for individuals with breast cancer. However, findings remain mixed with regard to the specific areas of functioning (i.e., psychological well-being, physiological functioning, physical health) that expressive writing can impart positive effects. Future research should employ a range of self-report and objective measures examining multiple areas of functioning and adjustment in order to accurately assess how expressive writing can impact breast cancer patients.

Similar to the limitations of the present study, it is recommended that future studies examining the effect of expressive writing on breast cancer patients employ a true control group or neutral writing comparison group. Furthermore, using at least one objective measure of adjustment, particularly a measure of physical health when examining expressive writing in breast cancer patients, is recommended.

A systematic review of expressive writing studies utilizing physically and psychologically healthy participants found that those studies that spaced writing sessions across a longer time period evidenced more significant outcomes (Smyth, 1998). The present study had participants write on 3 consecutive days. Despite the present study examining breast cancer patients, as opposed to healthy individuals as in previous research, further examination of the effect of spacing expressive writing sessions across a longer time period is warranted.

The present study sought to extend the existing and extensive expressive writing literature, which has primarily focused on healthy participants, to a breast cancer population. Few expressive writing studies have collected data longitudinally. This is the first study in the area to collect data up to 1 year postintervention. The significant treatment effect on PA at 1 year postintervention, as well as the significant positive effect over time on all outcome measures, points to the importance of studying the effects of expressive writing interventions longitudinally. This example of longitudinal research design will hopefully provide a jumping off point for future research on expressive writing.

REFERENCES

Alter, C. L., Pelcovitz, D., Axelrod, A., Gondenberg, B., Harris, H., Meyers, B., et al. (1996). Identification of PTSD in cancer survivors. *Psychosomatics, 37*, 137-143.

American Cancer Society. (2005). *Breast cancer facts and figures 2005-2006*. Atlanta, GA: Author.

American Cancer Society. (2006). *Detailed guide: Breast cancer*. Atlanta, GA: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

Anderson, M. S., & Johnson, J. (1994). Restoration of body image and self-esteem for women after cancer treatment. *Cancer Practice, 2*(5), 345-349.

Anderson, R. N., & Smith, B. L. (2005). Deaths: Leading causes for 2002. *National Vital Statistics Reports, 53*(17), 1-90.

Andrykowski, M. A., & Cordova, M. J. (1998). Factors associated with PTSD symptoms following treatment for breast cancer: Test of the Anderson model. *Journal of Traumatic stress, 11*(2), 189-203.

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*(3), 586-590.

Andrykowski, M. A., Curran, S. L., Studts, J. L., Cunningham, L., Carpenter, J. S., McGrath, P. C., et al. (1996). Psychosocial adjustment and quality of life in women with breast cancer and benign breast problems: A controlled comparison. *Journal of Clinical Epidemiology, 49*, 827-834.

Angst, J., & Dobler-Mikola, A. (1985). The Zurich study: VI. A continuum from depression to anxiety disorders? *European Archives of Psychiatry and Neurological Sciences, 235*(3), 179-186.

Baider, L., De-Nour, H., & Atara, K. (1997). Psychological distress and intrusive thoughts in cancer patients. *Journal of Nervous and Mental Disease, 185*(5), 346-348.

Berard, R. M. F., Boermeester, F., & Viljoen, G. (1998). Depressive disorders in an outpatient oncology setting: Prevalence, assessment, and management. *Psycho-Oncology, 7*, 112-120.

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, 14*, 787-895.

Bergner, M., Bobbitt, R. A., Kressel, S., Pollard, W. E., Gilson, B. S., & Morris, J. R. (1976). The sickness impact profile: Conceptual formulation and methodology for the development of a health status measure. *International Journal of Health Services, 6*(3), 393-415.

Bertero, C. M. (2002). Affected self-respect and self-value: The impact of breast cancer treatment on self-esteem and QOL. *Psycho-Oncology, 11*, 356-364.

Boon, M. T., & Peeters, F. P. (1999). Dimensions of affectivity in depression and anxiety. *Dutch Journal of Psychiatry, 41*(2), 109-113.

Booth, R. J., Petrie, K. J., & Pennebaker, J. W. (1997). Changes in circulating lymphocyte numbers following emotional disclosure: Evidence of buffering? *Stress Medicine, 13*, 23-29.

Bryant, R. A., Moulds, M. L., Guthrie, R. M., Dang, S. T., & Nixon, R. D. V. (2003). Imaginal exposure alone and imaginal exposure with cognitive restructuring in treatment of posttraumatic stress disorder. *Journal of Clinical and Consulting Psychology, 71*(4), 706-712.

Burgess, C., Cornelius, V., Love, S., Graham, J., Richards, M., & Ramirez, A. (2005). Depression and anxiety in women with early breast cancer: Five-year observational cohort study. *British Medical Journal, 10*, 1-4.

Butler, L. D., Koopman, C., Classen, C., & Spiegel, D. (1999). Traumatic stress, life events, and emotional support among women with advanced breast cancer: Cancer-related traumatic stress symptoms associated with past and current stressors. *Health Psychology, 18*, 555-560.

Chemtob, C., Roitblat, H. L., Hamada, R. S., Carlson, J. G., & Twentyman, C. T. (1988). A cognitive action theory of posttraumatic stress disorder. *Journal of Anxiety Disorders, 2*, 253-275.

Ciaramella, A., & Poli, P. (2001). Assessment of depression among cancer patients: The role of pain, cancer type and treatment. *Psycho-Oncology, 10*, 156-165.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2^{nd} ed.) New York: Academic.

Cohen, M. (2002). Coping and emotional distress in primary and recurrent breast cancer patients. *Journal of Clinical Psychology in Medical Settings, 9*(3), 245-251.

Cordova, M. J., Andrykowski, M. A., Redd, W. H., Kenady, D. E., McGrath, P. C., & Sloan, D. A. (1995). Frequency and correlates of posttraumatic-stress-disorder-like symptoms after treatment for breast cancer. *Journal of Consulting and Clinical Psychology, 63*, 981-986.

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43*, 245-265.

Creamer, M., Burgess, P., & Pattison, P. (1992). Reaction to trauma: A cognitive processing model. *Journal of Abnormal Psychology, 101*(3), 452-459.

de Haes, J. C. J. M., & Welvaart, K. (1985). Quality-of-life after breast cancer surgery. *Journal of Surgical Oncology, 28*, 123-125.

de Moor, C., Sterner, J., Hall, M., Warneke, C., Gilani, Z., Amato, R., et al. (2002). A pilot study of the effects of expressive writing on psychological and behavioral adjustment in patients enrolled in a Phase II trial of vaccine therapy for metastatic renal cell carcinoma. *Health Psychology, 21*(6), 615-619.

DeMets, D. L. (2004). Statistical issues in interpreting clinical trials. *Journal of Internal Medicine, 255*, 529-537.

Derogatis, L. R., Morrow, G. R., Fetting, J., Pennman, D., Piasetsky, S., Schinale, A. M., et al. (1983). The prevalence of psychiatric disorders among cancer patients. *Journal of the American Medical Association, 249*, 751-757.

Dobson, K. S. (1985). An analysis of anxiety and depression scales. *Journal of Personality Assessment, 49,* 522-527.

Donnelly, D. A., & Murray, E. J. (1991). Cognitive and emotional changes in written essays and therapy interviews. *Journal of Social and Clinical Psychology, 10*(3), 334-350.

Edwards, L. (2000). Modern statistical techniques for the analysis of longitudinal data in biomedical research. *Pediatric Pulmonology, 30*(4), 330-344.

Edwards, B. K., Brown, M. L., Wingo, P. A., Howe, H. L., Ward, E., Ries, L. A. G., et al. (2005). Annual report to the nation on the status of cancer 1975-2002, featuring population-based trends in cancer treatment. *Journal of the National Cancer Institute, 97*, 1407-1427.

Epping-Jordan, J. E., Compas, B. E., & Howell, D. C. (1994). Predictors of cancer progression in young adult men and women: Avoidance, intrusive thoughts, and psychological symptoms. *Health Psychology, 13*, 539-547.

Epping-Jordan, J. E., Compas, B. E., Osowiecki, D. M., Oppedisano, G., Gerhardt, C., Primo, K., et al. (1999). Psychological adjustment in breast cancer: Processes of emotional distress. *Health Psychology, 18*(4), 315-326.

Esterling, B. A., Antoni, M. H., Kumar, M., & Schneiderman, N. (1990). Emotional repression, stress disclosure responses, and Epstein-Barr viral capsid antigen titers. *Psychosomatic Medicine, 52*(4), 397-410.

Fallowfield, L. J., Hall, A., Maguire, G. P., & Baum, M. (1990). Psychological outcomes of different treatment policies in women with early breast cancer outside a clinical trial. *British Medical Journal, 22*, 575-580.

Fawcett, J., & Kravitz, H. M. (1983). Anxiety syndromes and their relationships to depressive illness. *Journal of Clinical Psychiatry, 44*(8), 8-11.

Ferrell, J. (2005, October). *A comparison of linear mixed models to generalized linear mixed models: A look at the benefits of physical rehabilitation in cardiopulmonary patients*. Paper presented at the Midwest SAS User Group Conference, Cincinnati, OH.

Figueiredo, M. I., Fries, E., & Ingram, K. M. (2004). The role of disclosure patterns and unsupportive social interactions in the well-being of breast cancer patients. *Psycho-Oncology, 13*(2), 96-105.

Fitzmaurice, G. M., Laird, N. M., & Ware, J. H. (2004). *Applied longitudinal analysis*. New York: Wiley.

Foa, E. B., & Jaycox, L. H. (1999). Cognitive-behavioral theory and treatment of post-traumatic stress disorder. In: D. S. Spiegel (Ed.), *Efficacy and cost-effectiveness of psychotherapy* (pp. 23-61). Washington, DC: American Psychiatric Press.

Foa, E. B., Rothbaum, B. O., Riggs, D. S., & Murdock, T. B. (1991). Treatment of posttraumatic stress disorder in rape victims: A comparison between cognitive-behavioral procedures and counseling. *Journal of Consulting and Clinical Psychology, 59*(5), 715-723.

Foa, E. B., Steketee, G., & Rothbaum, B. O. (1989). Behavioral-cognitive conceptualizations of posttraumatic stress disorder. *Behavior Therapy, 20*, 155-176.

Francis, M. E., & Pennebaker, J. W. (1992). Putting stress into words: The impact of writing on physiological, absentee, and self-reported emotional well-being measures. *American Journal of Health Promotion, 6*(4), 280-287.

Francis, M. E., & Pennebaker, J. W. (1993). *LIWC: Linguistic inquiry and word count (technical report)*. Dallas, TX: Southern Methodist University.

Friedman, L. Furberg, C., & DeMets, D. (1996). *Fundamentals of clinical trials* (3rd ed). New York: Springer-Verlag.

Frisina, P. G., Borod, J. C., & Lepore, S. J. (2004). A meta-analysis of the effects of written exmotional disclosure on the health outcomes of clinical populations. *Journal of Nervous and Mental Disease, 192*(9), 629-634.

Graydon, J. E. (1988). Factors that predict patients' functioning following treatment for cancer. *International Journal of Nursing Studies, 25*(2), 117-124.

Graydon, J. E. (1994). Women with breast cancer: Their quality of life following a course of radiation therapy. *Journal of Advanced Nursing, 19*, 617-622.

Green, B. L., Epstein, S. A., Krupnick, J. L., & Rolland, J. H. (1997). Trauma and medical illness: Assessing trauma-related disorders in medical settings. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 160-191). New York: Guilford.

Greenberg, M. A., & Stone, A. A. (1992). Emotional disclosure about traumas and its relation to health: Effects of previous disclosure and trauma severity. *Journal of Personality and Social Psychology, 63*(1), 75-84.

Greenberg, M. A., Wortman, C. B., & Stone, A. A. (1996). Emotional expression and physical health: Revising traumatic memories or fostering self-regulation? *Journal of Personality and Social Psychology, 71*(3), 588-602.

Gueorguieva, R., & Krystal, J. H. (2004). Move over ANOVA. Progress in analyzing repeated-measures data and its reflection in papers published in the Archives of General Psychiatry. *Archives of General Psychiatry, 61*, 310-317.

Henderson, B. N., Davison, K. P., Pennebaker, J. W., Gatchel, R. J., & Baum, A. (2002). Disease disclosure patterns among breast cancer patients. *Psychology and Health, 17*(1), 51-62.

Hjerl, K., Andersen, E. W., Keiding, N., Mouridsen, H. T., Mortensen, P. B., & Jorgensen, T. (2003). Depression as a prognostic for breast cancer mortality. *Psychosomatics: Journal of Consultation Liaison Psychiatry, 44*(1), 24-30.

Hjerl, K., Andersen, E. W., Keiding, N., Mortensen, P. B., & Jorgensen, T. (2002). Increased incidence of affective disorders, anxiety disorders, and non-natural mortality in women after breast cancer diagnosis: A nation-wide cohort study in Denmark. *Acta Psychiatrica Scandinavica, 105*, 258-264.

Hollon, S. D., & Kriss, M. R. (1984). Cognitive factors in clinical research and practice. *Clinical Psychology Review, 4*(1), 35-76.

Hopwood, P., Howell, A., & Maguire, P. (1991). Psychiatric morbidity in patients with advanced cancer of the breast: Prevalence measured by two self-rating questionnaires. *British Journal of Cancer, 64*, 349-352.

Horowitz, M. J. (1982). Stress response syndromes and their treatment. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 711-732). New York: Free Press.

Horowitz, M. J. (1986). *Stress response syndromes* (2nd ed.). New York: Aronson.

Horowitz, M. Wilner, N., & Alvarez, W. (1979). Impact of event scale: A measure of subjective distress. *Psychosomatic Medicine, 41*, 209-218.

Hotopf, M., Chidgey, J., Addington-Hall, J., & Ly, K. L. (2002). Depression in advanced disease: A systematic review Part 1. Prevalence and case findings. *Palliative Medicine, 16*(2), 81-97.

Hughes, C. F., Uhlmann, C., & Pennebaker, J. W. (1994). The body's response to processing emotional trauma: Linking verbal text with autonomic activity. *Journal of Personality, 62*(4), 565-585.

Ichiyama, M. A., Colbert, D., Laramore, H., Heim, M., Larone, K., & Schmidt, J. (1993). Self-concealment and correlates of adjustment in college students. *Journal of College Student Psychotherapy, 7*(4), 55-68.

Iwamitsu, Y., Shimoda, K., Abe, H., Kodama, M., & Okawa, M. (2003). Differences in emotional distress between breast tumor patients with emotional inhibition and those with emotional expression. *Psychiatry and Clinical Neurosciences, 57*, 289-294.

Jacobsen, P. B., Widows, M. R., Hann, D. M., Andrykowski, M. A., Kronish, L. E., & Fields, K. K. (1998). Posttraumatic stress disorder symptoms after bone marrow transplantation for breast cancer. *Psychosomatic Medicine, 60*(3), 366-371.

Jamner, L. D., Schwartz, G. E., & Leigh, H. (1988). The relationship between repressive and fensive coping styles and monocyte, eosinophile, and serum glucose levels: Support for the opeiod peptide hypothesis of repression. *Psychosomatic Medicine, 50*, 567-575.

Jarrett, S. R., Ramirez, A. J., Richards, M. A., & Weinman, J. (1992). Measuring coping in breast cancer. *Journal of Psychosomatic Research, 36*(6), 593-602.

Jenkins, P. L., May, V. E., & Hughes, L. E (1991). Psychological morbidity associated with local recurrence of breast cancer. *International Journal of Psychiatry in Medicine, 21*(2), 149-155.

Jensen, M. R. (1987). Psychobiological factors predicting the course of breast cancer. *Journal of personality, 55*, 317-342.

Johnson, J. E. (1996). Coping with radiation therapy: Optimism and the effect of preparatory interventions. *Research in Nursing and Health, 19*, 3-12.

Johnson, J. E., Nail, L. M., Lauver, D., King, K. B., & Keys, H. (1988). Reducing the negative impact of radiation therapy on functional status. *Cancer, 61*, 46-51.

Jolly, J. B., Dyck, M. J., Kramer, T. A., & Wherry, J. N. (1994). Integration of positive and negative affectivity and cognitive content-specificity: Improved discrimination of anxious and depressive symptoms. *Journal of Abnormal Psychology, 103*(3), 544-552.

Kangas, M., Henry, J. L., & Bryant, R. A. (2002). Posttraumatic stress disorder following cancer. A conceptual and empirical review. *Clinical Psychology Review, 22*, 499-524.

King, K. B., Nail, L. M., Kreamer, K., Strohl, R. A., & Johnson, J. E. (1985). Patients' descriptions of the experience of receiving radiation treatment. *Oncology Nursing Forum, 12*, 55-61.

Kissane, D. W., Grabsch, B., Love, A., Clarke, D. M., Bloch, S., & Smith, G. C. (2004). Psychiatric disorder in women with early stage and advanced breast cancer: A comparative analysis. *Australian and New Zealand Journal of Psychiatry, 39*(5), 320-326.

Koopman, C., Butler, L. D., Classen, C., Giese-Davis, J., Morrow, G. R., Westendorf, J., et al. (2002). Traumatic stress symptoms among women with recently diagnosed primary breast cancer. *Journal of Traumatic Stress, 15*(4), 277-287.

Krueger, R. F. (1999). The structure of common mental disorders. *Archives of General Psychiatry, 56,* 921-926.

Larson, D., & Chastain, R. L. (1990). Self-concealment: Conceptualization, measurement, and health implications. *Journal of Social and Clinical Psychology, 9*(4), 439-455.

Love, A. W., Kissane, D. W., Bloch, S., & Clarke, D. M. (2002). Diagnostic efficiency of the Hospital Anxiety and Depression Scale in women with early stage breast cancer. *Australian and New Zealand Journal of Psychiatry, 36*(2), 246-250.

Low, C. A., Stanton, A. L., & Danoff-Burg, S. (2006). Expressive disclosure and benefit finding among breast cancer patients: Mechanisms for positive health effects. *Health Psychology, 25*(2), 181-189.

Maher, E. L. (1982). Anomic aspects of recovery from cancer. *Social Science and Medicine, 6*(8), 907-912.

Manzanera, C., Lafay, N., Papet, N., & Senon, J. L. (2003). Depression, anxiety, and cancer. *Annales Medico-Psychologiques, 161*(2), 140-146.

Marren, J., & Christianson, S. (2004). Best practices in nursing care to older adults. *The Hartford Institute for Geriatric Nursing, 19*, 23-24.

Maunsell, E., Brisson, J., & Deschenes, L. (1993). Arm problems and psychological distress after surgery for breast cancer. *Canadian Journal of Surgery, 36*, 315-320.

May, G. S., DeMets, D. L., Friedman, L. M., Furberg, C., & Passamani, E. (1981). The randomized clinical trial: Bias in analysis. *Circulation, 64*, 669-673.

McDowell, I., & Newell, C. (1987). Measuring health: A guide to rating scales and questionnaires. New York: Oxford University Press.

McGarvey, E. L., Canterbury, R. J., Koopman, C., Clavet, G., Cohen, R., Largay, K., et al. (1998). Acute stress disorder following diagnosis of cancer. *International Journal of Rehabilitation and Health, 4*, 1-15.

Mehrabian, A. (1997). Comparison of the PAD and PANAS as models for describing emotions and for differentiating anxiety from depression. *Journal of Psychopathology and Behavioral Assessment, 19*(4), 331-357.

Montazeri, A., Harirchi, I., Vahdani, M., Khaleghi, F., Jarvandi, S., Ebrahimi, M., et al. (2000). Anxiety and depression in Iranian breast cancer patients before and after diagnosis. *European Journal of Cancer Care, 9*(3), 151-157.

Moyer, A. (1997). Psychosoical outcome of breast conserving surgery versus mastectomy: A meta-analytic review. *Health Psychology, 16*, 284-298.

Moyer, A., & Salovey, P. (1996). Psychosocial sequelae of breast cancer and its treatment. *Annals of Behavior Medicine, 18*(2), 110-125.

Mundy, E. A., Blanchard, E. B., Cirenza, E., Gargiulo, J., Maloy, B., & Blanchard, C. G. (2000). Posttraumatic stress disorder in breast cancer patients following autologous bone marrow transplantation or conventional cancer treatments. *Behaviour Research and Therapy, 38*, 1015-1027.

Murphy, J. M., Horton, N. J., Laird, N. M., Monson, R. R., Sobol, A. M., & Leighton, A. H. (2004). Anxiety and depression: A 40-year perspective on relationships regarding prevalence, distribution, and comorbidity. *Acta Psychiatria Scandinavica, 109*, 355-375.

Naidich, J. B., & Motta, R. W. (2000). PTSD-related symptoms in women with breast cancer. *Journal of Psychotherapy in Independent Practice, 1*(1), 35-54.

Nail, L. M. (1993). Coping with intracavitary radiation treatment for gynecologic cancer. *Cancer Practice, 1*, 218-224.

Nail, L. M., King, K. B., & Johnson, J. E. (1986). Coping with radiation treatment for gynecologic cancer: Mood and disruption in usual function. *Journal of Psychosomatic Obstetrical Gynecology, 5*, 271-281.

Nemeroff, C. B., Bremner, J. D., Foa, E. B., Mayberg, H. S., North, C. S., & Stein, M. B. (2006). Posttraumatic stress disorder: A state-of-the-science review. *Journal of Psychiatric Research, 40*(1), 1-21.

Norman, S. A., Lumley, M. A., Dooley, J. A., & Diamond, M. P. (2004). For whom does it work? Moderators of the effects of written emotional disclosure in a randomized trial among women with chronic pelvic pain. *Psychosomatic medicine, 66*, 174-183.

Palmer, S. C., Kagee, A., Coyne, J. C., & DeMichele, A. (2004). Experience of trauma, distress, and posttraumatic stress disorder among breast cancer patients. *Psychosomatic Medicine, 66*, 258-264.

Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic, and therapeutic implications. *Behaviour Research Therapy, 31*(6), 539-548.

Pennebaker, J. W. (1999). The effects of traumatic disclosure on physical and mental health: The values of writing and talking about upsetting events. *International Journal of Emergency Mental Health, 1*, 9-18.

Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95*(3), 274-281.

Pennebaker, J. W., Colder, M., & Sharp, L. K. (1990). Accelerating the coping process. *Journal of Personality and Social Psychology, 58*(3), 528-537.

Pennebaker, J. W., & Francis, M. E. (1996). Cognitive, emotional, and language processes in disclosure. *Cognition and Emotion, 10*(6), 601-626.

Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2003). *Linguistic inquiry and word count, LIWC2001*. Mahwah, NJ: Erlbaum.

Pennebaker, J. W., Kiecolt-Glaser, J. K., & Glaser, R. (1988). Disclosure of traumas and immune function: Health implications for psychotherapy. *Journal of Consulting and Clinical Psychology, 56*(2), 239-245.

Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology, 72*(4), 863-871.

Pennebaker, J. W., & Seagal, J. D. (1999). Forming a story: The health benefits of narrative. *Journal of Clinical Psychology, 55*(10), 1243-1254.

Pennebaker, J. W., & Susman, J. R. (1988). Disclosure of traumas and psychosomatic processes. *Social Science Medicine, 26*(3), 327-332.

Petrie, K. J., Booth, R. J., & Pennebaker, J. W. (1998). The immunological effects of thought suppression. *Journal of Personality and Social Psychology, 75*(5), 1264-1272.

Petrie, K. J., Booth, R. J., Pennebaker, J. W., Davison, K. P., & Thomas, M. G. (1995). Disclosure of trauma and immune response to a Hepatitis B vaccination program. *Journal of Consulting and Clinical Psychology, 63*(5), 787-792.

Petrie, K. J., Fontanilla, I., Thomas, M. G., Booth, R. J., & Pennebaker, J. W. (2004). Effect of written emotional expression on immune function in patients with Human Immunodeficiency Virus infection: A randomized trial. *Psychosomatic Medicine, 66*(2), 272-275.

Pettingale, K. W. (1984). Coping and cancer prognosis. *Journal of Psychosomatic Research, 28*(5), 363-364.

Pinder, K. L., Ramirez, A. J., Black, M. E., Richards, M. A., Gregory, W. M., & Rubens, R. D. (1993). Psychiatric disorder in patients with advanced breast cancer: Prevalence and associated factors. *European Journal of Cancer, 29A*(4), 524-527.

Pinder, K. L., Ramirez, A. J., Richards, M. A., & Gregory, W. M. (1994). Cognitive responses and psychiatric disorder in women with operable breast cancer. *Psycho-Oncology, 3*, 129-137.

Pitman, R. K., Lanes, D. M., Williston, S. K., Guillaume, J. L., Metzger, L. J., Gehr, G. M., & Orr, S. P. (2001). Psychophysiologic assessment of posttraumatic stress disorder in breast cancer patients. *Psychosomatics, 42*(2), 133-140.

Pollard, B., & Johnston, M. (2001). Problems with the sickness impact profile: A theoretically based analysis and a proposal for a new method of implementation and scoring. *Social Science and Medicine, 52*(6), 921-934.

Post, M. W. M., de Bruin, A., de Witte, L., & Schrijvers, A. (1996). The SIP68: A measure of health-related functional status in rehabilitation medicine. *Archives of Physical and Medical Rehabilitation, 77,* 440-445.

Resick, P. A., & Schnicke, M. K. (1996). *Cognitive processing therapy for rape victims.* Newbury Park, CA: Sage.

Richards, J. M., Beal, W. E., Seagal, J. D., & Pennebaker, J. W. (2000). Effects of disclosure of traumatic events on illness behavior among psychiatric prison inmates. *Journal of Abnormal Psychology, 109*, 156-160.

Ries, L. A. G., Harkins, D., Krapcho, M., Mariotto, A, Miller, B. A., Feuer, E. J., et al. (Eds.). (2005). *SEER cancer statistics review: 1975-2003.* Bethesda, MD: National Cancer Institute.

Ritterband, L. M., & Spielberger, C. D. (2001). Depression in a cancer patient population. *Journal of Clinical Psychology in Medical Settings, 8*(2), 85-93.

Rosenberg, H. J., Rosenberg, S. D., Ernstoff, M. S., Wolford, G. L., Amdur, R. J., Elshamy, M. R., et al. (2002). Expressive disclosure and health outcomes in a prostate cancer population. *International Journal of Psychiatry in Medicine, 32*(1), 37-53.

Schmukle, S. C., Egloff, B., & Burns, L. R. (2002). The relationship between positive and negative affect in the Positive and Negative Affect Schedule. *Journal of Research in Personality, 36*, 463-475.

Schulz, K. G., & Grimes, D. A. (2002). Sample size slippages in randomized trials: Exclusions and the lost and wayward. *Lancet, 359*, 781-785.

Selye, H. (1978). *The stress of life. (Revised).* Oxford, England: McGraw-Hill.

Shou, I., Ekeberg, O., Ruland, C. M., Sandvik, L., & Karesen, R. (2004). Pessimism as a predictor of emotional morbidity one year following breast cancer surgery. *Psycho-Oncology, 13*(5), 309-320.

Servaes, P., Vingerhoets, A. J. J. M., Vreugdenhil, G., Keuning, J. J., & Broekhuijsen, A. M. (1999). Inhibition of emotional expression in breast cancer patients. *Behavioral Medicine, 25*(1), 23-27.

Smith, S., Anderson-Hanley, C., Langrock, A., & Compas, B. (2005). The effects of journaling for women with newly diagnosed breast cancer. *Psycho-Oncology, 14*, 1075-1082.

Smyth, J. M. (1998). Written emotional expression: Effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology, 66*(1), 174-184.

Spera, S. P., Buhrfeind, E. D., & Pennebaker, J. W. (1994). Expressive writing and coping with job loss. *Academy of Management Journal, 37*(3), 722-733.

Stanton, A. L., Danoff-Burg, S., Cameron, C. L., Bishop, M., Collins, C. A., Kirk, S. B., et al. (2000). Emotionally expressive coping predicts psychological and physical adjustment to breast cancer. *Journal of Consulting and Clinical Psychology, 68*(5), 875-882.

Stanton, A. L., Danoff-Burg, S., Sworowski, L. A., Collins, C. A., Branstetter, A. D., Rodriguez-Hanley, A., et al. (2002). Randomized, controlled trial of written emotional expression and benefit finding in breast cancer patients. *Journal of Clinical Oncology, 20*(20), 4160-4168.

Tibbs, T. L. (2003). Psychological adjustment and quality of life among women completing radiation treatment for breast cancer. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 64*(3-B), 1509.

Tjemsland, L., Soreide, J. A., & Malt, U. F. (1996a). Traumatic distress symptoms in early breast cancer. I: Acute response to diagnosis. *Psycho-Oncology, 5,* 1-8.

Tjemsland, L., Soreide, J. A., & Malt, U. F. (1996b). Traumatic distress symptoms in early breast cancer. II: Outcome six weeks post surgery. *Psycho-Oncology, 5,* 295-303.

Tjemsland, L., Soreide, J. A., & Malt, U. F. (1998). Posttraumatic distress symptoms in operable breast cancer. III: Status one year after surgery. *Breast Cancer Research and Treatment, 47*, 141-151.

Ullman, S. E., & Siegel, J. M. (1994). Predictors of exposure to traumatic events and posttraumatic stress sequelae. *Journal of Community Psychology, 22*(4), 328-338.

Vickberg, S. M. J. (2003). The Concerns About Recurrence Scale (CARS): A systematic measure of women's fears about the possibility of breast cancer recurrence. *Annals of Behavioral Medicine, 25*(1), 16-24.

Voogt, E., van der Heide, A., van Leeuwen, A. F., Visser, A. P., Cleiren, M. P. H. D., Passchier, J., et al. (2005). Positive and negative affect after diagnosis of advanced cancer. *Psycho-Oncology, 14*, 262-273.

Walker, L. B., Nail, L. M., & Croyle, R. T. (1999). Does emotional expression make a difference in reactions to breast cancer? *Oncology Nursing Forum, 26*, 1025-1032.

Walker, L. B., Nail, L. M., Larsen, L., Magill, J., & Schwartz, A. (1996). Concerns, affect, and cognitive disruption following completion of radiation treatment for localized breast or prostate cancer. *Oncology Nursing Forum, 23*(8), 1181-1187.

Watson, D., Clark, L. A., & Carey, G. (1988a). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology, 97*(3), 346-353.

Watson, D., Clark, L. A., & Tellegen, A. (1988b). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin, 98*(2), 219-235.

Weihs, K. L., Enright, T. M., Simmens, S. J., & Reiss, D. (2000). Negative affectivity, restriction of emotions, and site of metastases predict mortality in recurrent breast cancer. *Journal of Psychosomatic Research, 49*(1), 59-68.

Wingo, P. A., Tong, T., & Bolden, S. (1995). Cancer statistics, 1995. *CA: A Cancer Journal for Clinicians, 45*, 8-30.

Zakowski, S. G., Ramati, A., Morton, C., Johnson, P., & Flanigan, R. (2004). Written emotional disclosure buffers the effects of social constraints on distress among cancer patients. *Health Psychology, 23*(6), 555-563.

Zilberg, N. J., Weiss, D. S., & Horowitz, M. J. (1982). Impact of events scale: A cross-validation study and some empirical evidence supporting a conceptual model of stress response syndromes. *Journal of Consulting and Clinical Psychology, 50*, 407-414.

APPENDICES

Appendix A

Grant Proposal

Principal Investigator/Program Director *(Last, first, middle)*: Nail, Lillian M.

ESCRIPTION. State the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project. escribe concisely the research design and methods for achieving these goals. Avoid summaries of past accomplishments and use of the first person. his description is meant to serve as a succinct and accurate description of the proposed work when separated from the application. If the ppli is funded, this description, as is, will become public information. Therefore, do not include proprietary/confidential information. DO NOT SPACE PROVIDED.

This randomized clinical trial tests two means of facilitating the adjustment of breast cancer (BC) patients (Stages I, II, and III) during an infrequently studied but critical timeframe—post-radiation therapy (RT). The majority of women diagnosed with BC receive RT but little nursing research is aimed at understanding and facilitating the coping processes following the common experience of RT. This project will provide the first critical comparison of two theoretically derived interventions which target the post-RT-coping processes of women with BC. The two interventions, which we have pilot tested, target the instrumental and emotional coping functions specified by Levanthal's self-regulatory theory. First, Concrete Objective Information (COI) addresses unexpected experiences and side effects/symptoms. Second, Expressed Emotional (EE) targets negative cancer-related thoughts and emotions which may inhibited. The use of theoretically-based information, the COI improves patients' confidence, understanding, and ability to apply accurate expectations and interventions to specific side effects/symptoms and experiences associated with the end of RT and follow-up visits. The EE, by the linguistic integration of expressed emotion and the increased insight of the cancer experiences, reduces patients' active inhibition of cancer-related thoughts and emotions. Following baseline measures, one of two interventions or a control condition will be administered during a patient's final week of RT at oncology centers in two different cities. Measures of output and mediating variables will be collected via the telephone at 1 week, 4 weeks, and 6 months post-RT. Repeated measures MANCOVA and hierarchial multiple regression analyses will be used to test the study hypotheses. The interventions tested in this study have high relevance to oncology nursing practice and will significantly advance theoretical understanding of coping processes.

FORMANCE SITE(S) *(organization, city, state)*

niversity of Utah College of Nursing, Salt Lake City, UT
ity of Hope National Medical Center, Duarte, CA

Y PERSONNEL. See instructions on Page 11. *Use continuation pages as needed* to provide the required information in the format shown below.

Name	Organization	Role on Project
illian M. Nail	University of Utah, College of Nursing	Principal Investigator
. Lee Walker	University of Utah, College of Nursing	Co-Investigator
obert T. Croyle	University of Utah, Psychology	Co-Investigator
etty Ferrell	The City of Hope National Medical Center	Co-Investigator
race E. Dean	The City of Hope National Medical Center	Research Nurse
an E. Johnson	University of Rochester, School of Nursing	Consultant
. Mori	University of Utah, School of Medicine	Biostatistician
nnette Stanton	University of Kansas, Dept. of Psychology	Consultant
Robert Stewart	University of Utah, School of Medicine	Radiation Oncologist
. Pennebaker	Southern Methodist University, Dept. of Psychology	Consultant
L. Vora	The City of Hope National Medical Center	Consultant

Appendix B

Expressive Writing Instructions

Instructions to Subjects in EE Intervention

As I mentioned earlier, our study is comparing different ways of helping people cope with the experience of cancer and cancer treatment. The program that we've developed for you is something new and promising. This program involves writing about your feelings. What I'd like you to do is to spend one-half hour each day during three of these next four or five days writing about your experiences. For example, you might choose to write today, tomorrow, and the next day; or you might write today, skip tomorrow and write for one-half hour the following day and the day after that.

During the first session, and again on the other two days you write, I want you to spend thirty minutes writing. Let go and write about your very deepest thoughts and feelings about your cancer and cancer treatment. I'm sure I don't need to tell you that cancer and cancer treatment can be a traumatic experience for many people. Sometimes it's awkward or difficult to discuss your feelings with others. We believe that writing about them might be a good way of working through and sorting out these strong and complicated emotions. In your writing, you might want to write about your feelings about your diagnosis, the impact of the disease on your personal relationships, or your feelings about radiation treatment.

Don't worry about your grammar or spelling. These aren't important. What is important is that you write for the whole thirty minutes about your deepest thoughts and emotions, especially those that you might not have talked about with anyone. Really try to dig down into your thoughts and feelings and explore them in your writing.

When you are writing at home, if you prefer to use a word processor or typewriter, please do so. After you finish writing on each of these days, please complete the 1-page questionnaire asking about your mood. Put all materials in the envelope provided, seal it, and bring the packet with you when you come for your clinic visit on your last day of treatment. One of the researchers will meet you at the clinic to pick up the envelope.

Day 2 Date____________

Please use the pages provided to write about your deepest thoughts and feelings about your cancer and cancer treatment especially those that you might not have talked about with anyone. If you prefer, you can use a word processor or type writer. Do not worry about grammar or spelling. What is most important is that you write for 30 minutes. At the end of the half hour, complete the attached rating form.

Appendix C

General Health Information

Things to Remember as Treatment Ends

POST RADIATION TREATMENT COPING PROCESSES
RESEARCH GRANT
UNIVERSITY OF UTAH
COLLEGE OF NURSING

General Health Message

This message is designed to give you information about resources available to you and things that you do now that your radiation therapy is ending. Over the past few years, the way people get information about cancer and cancer treatment has changed. Many organizations, like the Natonal Cancer Institute and the American Cancer Society, have information available by computer, by telephone, and in print. Both the American Cancer Society and the National Cancer Institute provide telephone numbers for people to call who have questions about cancer. Local units of the American Cancer Society also provide a variety of services for cancer patients and maintain libraries of reading materials. Telephone numbers, Internet computer address information, and the address of the nearest American Cancer Society Unit are listed in the information sheet that goes along with this tape.

Both the American Cancer Society and the National Cancer Institute produce written materials for cancer patients. You can access these materials by calling the appropriate organization. Other sources of information from books or articles for cancer patients include public libraries, bookstores, libraries at colleges and universities with schools of medicine or nursing, and the National Cancer Institutes. Many popular magazines publish articles about cancer as well. Your local public library is a good place to locate these articles.

There are some things you will need to do and keep track of after you finish treatment. First, make sure that you have the address and telephone number of the radiation treatment facility and the name of the doctor who treated you written down in a safe place in case you ever need to request your records. Even though it may seem like something you won't forget, it is a good idea to keep this information in written form. You will also want to write down the type of cancer you have, when it was diagnosed, and the month and year when you finished treatment.

The staff at the treatment setting will provide you with information about scheduling your follow-up appointments. Some patients continue seeing the doctors and nurses from the radiation therapy center for some time. Others go back to their Health Maintenance Organization or primary care provider for their follow-up care. The arrangements recommended to you will depend upon the usual practice followed in your treatment center and the arrangement the center has with your health insurance company. If you find that you will be moving out of the area and have been getting follow-up care at the radiation treatment center, make sure to find out if the people here recommend that you contact a radiation treatment center in your new location to arrange your follow-up care.

At each follow-up visit, make sure you understand what tests, if any, you need to have done before the next visit. The type of test recommended depends upon the type of cancer you had, how your treatment went, and your other medical problems. You may or may not have things like routine blood tests scheduled as part of your follow-up care.

The schedule of follow-up visits also depends on a lot of different factors. If you find that follow-up visits are being planned at times when you will be on an extended trip or if you split your time between this area and another place, discuss your usual travel habits with the people at the treatment center to determine if your follow-up visits can be delayed or if they could be done somewhere else.

Remember to keep track of changes in your medications or any new health problems so you can update your doctor at each visit. If you have complicated medications, it is always a good idea to bring the bottles of pills to all your visits. Make sure that all your doctors know about each other so they can share information.

You will also want to be sure you know who to contact at the Radiation Treatment Center in case you have questions about any bills or statements you or your insurance company receive after your treatment is completed. You can get this information at the reception desk if it is not on any of the information sheets you received at the radiation treatment center.

You will also want to be sure you are taking full advantage of the insurance coverage you have. Many people don't know about all the benefits they are entitled to so it is a good to look over your policy to make sure that you are submitting all the bills you should. If you have questions about your insurance coverage, check with your employer's benefits office or your insurance company for assistance in interpreting your benefits. If you have concerns about items your insurance company is or is not paying, you can contact the radiation treatment center so they can send in a claim that was turned down so it gets reviewed again. Your doctor may need to write a letter to explain anything that was unusual about your treatment. You will need to contact the doctor to discuss this. The local unit of the American Cancer Society can help you identify which agency in your state regulates insurance companies if you find that you need to file a complaint.

Remember to write down questions and take notes whenever you talk to someone to get information or during a follow-up visit. Sometimes people who have finished treatment want to help other people who are having similar experiences. If you find that you are interested in a volunteer opportunity, you can contact the local unit of the American Cancer Society or the volunteer office at your local hospital or at the institution where the treatment facility is located. American Cancer Society volunteers fill a variety of jobs. These include stuffing envelopes and answering telephones, giving out information over the telephone about resources in the community, serving on the Board of Directors of the local group, or giving public education programs at meetings in the community. Hospital volunteers may help transport patients, deliver flowers and mail, greet patients and visitors, assist with paperwork, or serve as visitors for patients in the hospital. You may find that there are other organizations in your area which can use volunteers to help transport people who do not drive to medical visits, spend time with people at home, deliver equipment, or make sure that people get a hot meal.

If you have questions about the material in this tape, please ask them once you tell the person with you that the tape is finished.

Appendix D

Assessment Measures

Subj # ____________ Medical Record # ______________________ Consent _____________ Baseline ____________
Intervention ______________ Intervention _______________

Participant Screening Form
Post-Radiation Treatment Research

Name ____ **Date Screened** ___________________

Age __________ **Phone** __________________________ **Time of Appt** ____________________

Family History ___________________________________

Researcher Initials _________________

Dx Date ___________________________________

Agreed to Participate _____

Refused ____ **(if stated, note reason)**

____

Clinic Site 1 _____ **UH** 2 _____ **StM** 3 ______ **COH** 4 ______ **LDS** 5 _____ **Cottonwood**

Physician ____

Tx Start Date _____________________________

Tx End Date ________________ **Confirmed Date** ________________

Duration _________________

Dose ______________________________

Stage ______________________________

Tumor ______________________________

Node ______________________________

Bio
CA Treatment: 1___Lump 2___Ax 3___Chemo

4___Mast 5___Stem Cell 6___ Bone Marrow 7___Tam

Other Illnesses or Conditions

____

____

____

Ineligible Criteria

1___ Under 21

2___ Stage 0

3___ Stage IV/Mets

4___ Unable to speak, write, or read English

5___ Receiving psychiatric care

6___ Substance abuse

7___ Not independent in self care

8___ Living in an institutional setting

9___ Cognitive deficit

10 ___ Previous radiation treatment

11 ___ Previous CA (except skin)

Medications ____

____

Subj # ________
Data Line ________ Tx end date ______________

Baseline Demographic Questionnaire

Directions: Please answer all of these questions accurately. The information you provide will be used only for this project and will not be seen by anyone else.

1. Today's date: ____ / ____ / ____ (month / day / year)

2. Your age: _____ years

3. Your race or ethnic background:
   - 1☐ Asian or Pacific Islander
   - 2☐ African American
   - 3☐ Caucasian
   - 4☐ Native American
   - 5☐ Hispanic/Latino
   - 6☐ Other ______________

4. Your marital status:
   - 1☐ Single (never married)
   - 2☐ Separated or divorced
   - 3☐ Widow
   - 4☐ Married
   - 5☐ Cohabitating

5. Highest grade of school completed:
   - 1☐ 8th grade or less
   - 2☐ Some high school
   - 3☐ High school graduate/GED
   - 4☐ Technical school graduate
   - 5☐ Some college
   - 6☐ College graduate
   - 7☐ Masters degree
   - 8☐ Doctorate degree

6. Your employment status:
   - 1☐ Full-time(30 hours per week or more)
   - 2☐ Part-time
   - 3☐ Homemaker
   - 4☐ Unemployed
   - 5☐ Retired
   - 6☐ Disabled

Subj # ________
Data Line ________ Tx end date ________________

7. What is your religion?	1☐ LDS 2☐ Catholic 3☐ Protestant (Christian) 4☐ Jewish 5☐ Other (if you checked any of the above boxes, answer 7a) 6☐ Not a religious person
7a. Do you consider yourself to be an active or inactive member of your religion? (By active, we mean that you attend services regularly).	1☐ Active 2☐ Inactive
8. How many people, including yourself, (live in in your household?	_____ (# of people in household)
9. Have you been hospitalized within the past six months?	1☐ Yes 2☐ No (skip to #10)
9a. If yes, what was the reason for your hospital stay(s)?	______________________________ ______________________________
10. Have you seen a counselor (therapist, psychiatrist, psychologist, social worker) at any time since you have been diagnosed with cancer?	1☐ Yes 2☐ No (skip to #11)
10a. Was the counseling focused on issues related to cancer or was it primarily focused on other issues?	1☐ Cancer-related 2☐ Other issues
10b. Indicate the approximate number of counseling sessions you have had since being diagnosed with cancer.	______________

Subj # ________
Data Line ________ Tx end date ________________

11. During the past seven days, how often have you worried about your cancer?	1☐ Not at all 2☐ Rarely 3☐ Sometimes 4☐ Much of the time 5☐ Nearly all of the time
12. Do you suffer from any other illness or conditions besides cancer? (e.g., hypertension, multiple sclerosis)	1☐ Yes (If yes, answer 12a) 2☐ No

12a. Please list all other illnesses or conditions:

____

____

13. Please write the month and year you were first diagnosed with breast cancer.

____

Subj # ________ Line Number ________

PANAS Questionnaire-(State)

Directions: The words listed below describe different feelings and emotions. Please read each item then circle the number that indicates how much you have felt that way in the past few days.

1=not at all 2=a little 3=moderately 4=quite a bit 5=extremely

1. Irritable	1	2	3	4	5
2. Alert	1	2	3	4	5
3. Disgusted with myself	1	2	3	4	5
4. Inspired	1	2	3	4	5
5. Nervous	1	2	3	4	5
6. Jittery	1	2	3	4	5
7. Active	1	2	3	4	5
8. Afraid	1	2	3	4	5
9. Guilty	1	2	3	4	5
10. Interested	1	2	3	4	5
11. Distressed	1	2	3	4	5
12. Excited	1	2	3	4	5
13. Upset	1	2	3	4	5
14. Strong	1	2	3	4	5
15. Enthusiastic	1	2	3	4	5
16. Scared	1	2	3	4	5
17. Hostile	1	2	3	4	5
18. Determined	1	2	3	4	5
19. Proud	1	2	3	4	5
20. Attentive	1	2	3	4	5

Subj # __________
Data Line _______

SICKNESS IMPACT PROFILE

Code Number: ____________________

Baseline questionnaire instructions

Before beginning this questionnaire, please read the following instructions.

You have certain activities that you do in carrying on your life. Sometimes you do all of these activities. Other times, because of your present illness you may not do these activities in the usual way; you may cut some out; you may do some for shorter lengths of time; you may do some in different ways. We are interested in learning about any changes that describe you now and are related to your present illness.

In this questionnaire there will be a good number of statements about how people's health could affect their lives. Read all the statements. Think carefully about the statements and be sure to check those problems you are experiencing now. When you read a statement that applies to you, describing how your present illness is affecting your daily life, please check it.

To explain further, we have provided you with an example. You might read the statement "I am not driving my car." If this statement can be answered "yes" because of your health and describes you today, you should check it. Also, if you have not been driving for some time because of your present illness, and are still not driving today, you should respond to this statement.

On the other hand, if you never drive OR are not driving today because your car is being repaired, the statement, "I am not driving my car" is not related to your health and you should not respond to it. If you simply are driving less, or are driving shorter distances, and feel that the statement only partially describes you, please do not respond to it.

Remember, we are interested in recent changes in your activities that are related to your present illness.

Subj # ________
Data Line ______

(HM-0668)

This group of statements has to do with any work you usually do in caring for your home or yard. Considering just those things that you do, please respond to (check) only those statements that you are <u>sure</u> describe you today and are related to your state of health.

---

1. I do work around the house only for short periods of time or rest often.	_______	(117-054)
2. I am doing less of the regular daily work around the house than I would usually do.	_______	(119-044)
3. I am not doing <u>any</u> of the regular daily work around the house that I would usually do.	_______	(120-086)
4. I am not doing <u>any</u> of the maintenance or repair work that I would usually do in my home or yard.	_______	(001-062)
5. I am not doing <u>any</u> of the shopping that I would usually do.	_______	(106-071)
6. I am not doing <u>any</u> of the house cleaning that I would usually do.	_______	(116-077)
7. I have difficulty doing handwork, for example, turning faucets, using kitchen gadgets, sewing, carpentry.	_______	(107-069)
8. I am not doing <u>any</u> of the clothes washing that I would usually do.	_______	(111-077)
9. I am not doing heavy work around the house.	_______	(115-044)
10. I have given up taking care of personal or household business affairs, for example, paying bills, banking, working on budget.	_______	(105-084)

Check here when you have read all statements on this page ☐

Subj # __________
Data Line _______

(M-0719)

Please respond to (check) only those statements that you are sure describe you today and are related to your state of health.

---

1. I am getting around only within one building. _______ (134-086)

2. I stay within one room. _______ (128-106)

3. I am staying in bed more. _______ (130-081)

4. I am staying in bed most of the time. _______ (131-109)

5. I am not now using public transportation. _______ (140-041)

6. I stay home most of the time. _______ (133-066)

7. I am only going to places with restrooms nearby. _______ (125-056)

8. I am not going into town. _______ (124-048)

9. I stay away from home only for brief periods of time. _______ (139-054)

10. I do not get around in the dark or in unlit places without someone's help. _______ (121-072)

Check here when you have read all statements on this page ☐

Subj # __________
Data Line ________

(RP-422)

This group of statements has to do with activities you usually do in your free time. These activities are things that you might do for relaxation, to pass the time, or for entertainment. Please respond to (check) <u>only</u> those statements that you are <u>sure</u> describe you today and are related to your state of health.

---

1. I do my hobbies and recreation for shorter periods of time. ________ (215-039)
2. I am going out for entertainment less often. ________ (214-036)
3. I am cutting down on <u>some</u> of my usual inactive recreation and pastimes, for example, watching TV, playing cards, reading. ________ (207-059)
4. I am not doing <u>any</u> of my usual inactive recreation and pastimes, for example, watching TV, playing cards, reading. ________ (208-084)
5. I am doing more inactive pastimes in place of my other usual activities. ________ (211-051)
6. I am doing fewer community activities. ________ (216-033)
7. I am cutting down on <u>some</u> of my usual physical recreation or activities. ________ (210-043)
8. I am not doing <u>any</u> of my usual physical recreation or activities. ________ (209-077)

Check here when you have read all statements on this page ☐

Subj # __________
Data Line________

RIES

Instructions: Below is a list of comments made by people after they completed treatment for breast cancer. Please circle the number which indicates how often each of these comments was true for you in the past week.

0 = Not at all 1 = Rarely 2 = Sometimes 3 = Often

1. I thought about it when I didn't mean to.	0	1	2	3
2. I avoided letting myself get upset when I thought about it or was reminded of it.	0	1	2	3
3. I tried to remove it from memory.	0	1	2	3
4. I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind.	0	1	2	3
5. I had waves of strong feelings about it.	0	1	2	3
6. I had dreams about it.	0	1	2	3
7. I stayed away from reminders of it.	0	1	2	3
8. I felt as it hadn't happened or was not real.	0	1	2	3
9. I tried not to talk about it.	0	1	2	3
10. Pictures about it popped into my mind.	0	1	2	3
11. Other things kept making me think about it.	0	1	2	3
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.	0	1	2	3
13. I tried not to think about it.	0	1	2	3
14. Any reminder brought back feelings about it.	0	1	2	3
15. My feelings about it were kind of numb.	0	1	2	3

Subj # ________
Data Line________

DIS
(baseline)

Since finding out you had cancer, how much have you disclosed your deepest thoughts and feelings about having cancer and about your cancer treatment by talking, writing to others, or writing in a journal? On a zero to 10 scale indicate the number that best represents your responses to this question with zero being "not at all" and ten being "complete disclosure."

Not at all										Completely
0	1	2	3	4	5	6	7	8	9	10

VITA

KELLY N. HUGHES

VA San Diego Healthcare System (116A4Z)
8810 Rio San Diego Drive
San Diego, CA 92161
(619) 400-5234
(435) 512-2112
hughes_kelly@hotmail.com

EDUCATION

2005-2006 **Psychology Intern**
University of California San Diego / VA San Diego Healthcare System, San Diego, CA
APA accredited

2000-Present **Ph.D. Candidate**
Utah State University, Logan, UT
Clinical/Counseling/School Psychology
Emphasis in Health Psychology
Combined Program
M.S. in Psychology
APA accredited

1995-1999 **B.A., Psychology**
Northern Arizona University, Flagstaff, AZ
Minor in Spanish

RESEARCH EXPERIENCE

January 2004- May 2005 **Research Assistant**
Avalon Hills Residential Eating Disorders Program
Petersboro, Utah
Collected pre and post treatment outcome data. Conducted psychodiagnostic assessments and clinical intakes.
Directed by Benita Quakenbush-Roberts, Ph.D.

January 2004- May 2005 **Research Assistant**
Student Health Center, Utah State University
Collected data on graduate student therapists' experience working in a student health center setting.
Directed by Kevin Masters, Ph.D. & M. Scott DeBerard, Ph.D.

August 2002- December 2003 **Research Assistant**

Psychology Department, Utah State University

Administrated and interpreted intelligence tests and self-report measures. Conducted intake interviews, parent training, and stress management training. Examined the effect of parent training and parental stress management on symptom reduction in children with ADHD. Examined the effect of stimulant medications on IQ scores of children with ADHD.

Directed by Gretchen A. Gimpel, Ph.D.

January 2001- May 2001 **Project Manager/Co-Investigator**

Psychology Department, Utah State University

Assisted with grant application. Coordinated a study investigating school counselors' experience with internalizing and externalizing struggles in students. Collected, analyzed, and interpreted data.

Directed by Susan Crowley, Ph.D.

August 2000- May 2001 **Research Assistant**

Psychology Department, Utah State University

Compiled data used for departmental self-study. Conducted structured phone interviews for an eating disorders study.

Directed by David Stein, Ph.D.

PUBLICATIONS

Gimpel, G.A., Collett, B.R., Veeder, M.A., Gifford, J.A., Sneddon, S., Bushman, B., **Hughes, K.**, & Odell, D.J. (2004). The effects of stimulant medication on the cognitive performance of children with ADHD. Clinical Pediatrics, 44, 405-411.

MANUSCRIPTS IN PREPARATION

Hughes, K. N., Ellington, L., & DeBerard, M. S. Expressive Writing and Breast Cancer: Outcomes and Linguistic Analyses.

Hughes, K.N., & Crowley, S. School Counselors' Experience with Internalizing versus Externalizing Symptoms in Students.

PRESENTATIONS AT PROFESSIONAL CONVENTIONS

Hughes, K. N., Ellington, E., DeBerard, M. S., & Nail, L. M. (2006, March). Expressive Writing and Breast Cancer: Outcomes and Linguistic Analyses. Poster accepted to be presented at the Society of Behavioral Medicine 2006 Annual Meeting, San Francisco, California.

Hughes, K. N., & Crowley, S. L. (2004, October). Internalizing versus Externalizing Disorders: What do School Mental Health Professionals Know? Poster presented at the Kansas Conference on Clinical Child and Adolescent Psychology, Lawrence, Kansas.

Hughes, K. N., & Crowley, S. (2004, July). Students' Internalizing Symptoms: What do School Mental Health Professionals Know? Poster presented at the 112th Annual Convention of the American Psychological Association, Honolulu, Hawaii.

Gimpel, G. A., Gifford, J., Veeder, M. A., Sneddon, P., Bushman, B., Carter, J., Brent, M., **Hughes, K. N.,** Suzuki, E., Berglof, H., & Odell, D. (2004, July). Addition of Stress Management Training to Parent Training. Poster presented at the 112th Annual Convention of the American Psychological Association, Honolulu, Hawaii.

Collett, B., Gimpel, G., Johnson, C., Veeder, M., Gunderson, T., Gee, M., Ehrlick, A., **Hughes, K.,** Berglof, H., & Odell, D. J. (2002, August). The Effects of Stimulant Medication on Children's Cognitive Performance. Poster presented at the 110th Annual Convention of the American Psychological Association, Chicago, Illinois.

Ewbank, A., **Hughes, K.,** Paperman, J., Callanan, B., & Hunt, L., (1998, April). Gender and Sense of Direction: Can Females Improve with Practice? The Western Psychological Association and Rocky Mountain Psychological Association Joint Convention, Albuquerque, New Mexico.

CLINICAL EXPERIENCE

August 2006- Present	**Postdoctoral Fellow** **VA San Diego Healthcare System** San Diego, CA Conduct neuropsychological evaluations, screening interviews, and individual psychotherapy with women who have experienced domestic violence as part of an fMRI domestic violence study. Conduct individual and group psychotherapy with male and female veterans who have experienced military sexual trauma. Participate in multidisciplinary treatment team meetings.
July 2005- June 2006	**Psychology Intern** **Behavioral Medicine VA San Diego Healthcare System** San Diego, CA Conducted clinical intakes, screenings, psychodiagnostic assessment, and brief interventions with medical patients in a primary care setting. Conducted organ and bone marrow transplant evaluations, group psychotherapy, and short and long-term individual psychotherapy. Provided group therapy for smoking cessation in both inpatient and outpatient settings.

July 2005- June 2006	**<u>Psychology Intern</u>** **Child and Adolescent Psychiatry Service, UCSD Department of Psychiatry** San Diego, CA Conducted psychodiagnostic and neuropsychological assessments, clinical intakes, crisis interventions, and treatment planning for children and adolescents (ages 3-17) on an inpatient unit. Provided individual, family, and group psychotherapy, community consultation, and discharge planning. Participated and presented cases in multidisciplinary treatment team meetings and collaborated with a variety of professionals.
June 2004- May 2005	**<u>Graduate Student Intern</u>** **Avalon Hills Residential Eating Disorders Program** Petersboro, UT Facilitated admittance interviews, lead and co-lead group therapy (DBT skills, process, art therapy, spirituality/wellness, body image), individual therapy, and family therapy. Participated and presented cases in multidisciplinary treatment team meetings.
January 2004- May 2004; August 2004- May 2005	**<u>Clinical Health Psychology Trainee</u>** **Student Health Center** Utah State University Logan, UT Conducted intake interviews and individual therapy with university students. Collaborated with M.D.'s and nurses regarding general medicine and psychiatric medicine referrals. Worked with students presenting with a variety of psychopathology and adjustment issues.
May 2004- August 2004	**<u>Clinical Health Psychology Trainee</u>** **Cardiac Rehabilitation Unit** Brigham City Community Hospital Brigham City, UT Performed psychosocial assessments and individual stress management interventions with cardiac rehabilitation patients. Taught group classes on stress management.
January 2004- May 2004	**<u>Clinical Psychology Trainee</u>** **Avalon Hills Residential Eating Disorders Program** Petersboro, UT Conducted admittance interviews, lead and co-lead group therapy, provided individual therapy, supervised outdoor challenges, and participated in a multidisciplinary treatment team.

July 2003- June 2004	**Graduate Student Intern** **Bear River Mental Health Services, Inc.** Logan, UT Conducted intake interviews, psychological evaluations, and provided individual and group therapy. Worked with clients presenting with depression, anxiety, eating disorders, personality disorders, psychotic disorders, and the seriously and persistently mentally ill. Participated on a multidisciplinary treatment.
May 2003- July 2003	**Child Clinical Psychology Trainee** **Autism Support Services: Education, Research, and Training** Utah State University Logan, UT Conducted applied behavior analysis (ABA) treatment with autistic children of ages 2 to 5 and collaborated with a treatment team.
August 2002- May 2003	**Counseling Psychology Practicum Student** **Utah State University Counseling Center** Logan, UT Conducted intake interviews and individual and couples therapy for USU students. Participated in outreach presentations on eating disorders and effective communication and co-led an eating disorders group.
August 2002- December 2002	**Psychology Trainee** **Interdisciplinary Training Program** Utah State University Logan, UT Member of an interdisciplinary team focused on increasing awareness of the impact of disabilities on individuals of all ages. Explored societal and legislative perspectives on disabilities and interdisciplinary practice and research.
May 2001- June 2003	**Mental Health Specialist** **Bear River Early Head Start** Logan, UT Conducted psychodiagnostic assessments and provided individual and marital therapy and parent training for families. Conducted in-service trainings for staff.
August 2001- June 2003	**Mental Health Specialist** **Bear River Preschool Head Start** Logan, UT Conducted intake interviews and provided individual and marital therapy, as well as parent training for children and adults. Conducted home visits and staff consultations.

August 2001-
May 2002

School Psychology Practicum Student
Center for Persons with Disabilities, Clinical Services
Utah State University
Logan, UT
Case-coordinator for multidisciplinary team providing services to children and adolescents. Conducted psychodiagnostic assessments for children and adolescents with learning disabilities, behavior and mood disorders, and intellectual deficits. Responsible for writing integrative evaluation reports.

January 2001-
August 2001

Clinical Psychology Practicum Student
Psychology Community Clinic
Utah State University
Logan, UT
Conducted intake interviews, psychodiagnostic evaluations, and provided individual therapy to clients from the community including both children and adults.

May 2001-
August 2001

Clinic Assistant
Psychology Community Clinic
Utah State University, Logan, UT
Managed mental health office, particularly evaluation and testing materials. Entered clinical outcome data for ongoing research.

HONORS AND AWARDS

August 2000- **Dean's List**
August 2004 Utah State University

July 2004 & **Graduate Student Senate Travel Award**
October 2004 Utah State University

ACTIVITIES

October 2003- **Graduate Student Senate Representative**
May 2004 Utah State University

August 2002- **Student Representative**
May 2003 Utah Psychological Association

December 2001- **Volunteer American Red Cross**
May 2002 Disaster Response Network, Logan, UT

PROFESSIONAL ORGANIZATIONS

2000-Present	American Psychological Association - Graduate Student Member
2004-Present	Division 38 of APA, Health Psychology - Graduate Student Member
2002-2005	Utah Psychological Association - Graduate Student Member

References Available Upon Request