

THE LONG-TERM PSYCHOSOCIAL IMPACT OF BREAST CANCER ON YOUNG
SURVIVORS AND THEIR PARTNERS

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DEDICATION

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Long-term psychosocial consequences of breast cancer are increasingly more important to study as survivors are living longer. However, the survivors do not experience cancer alone; their significant others often suffer just as much if not more than the survivors themselves. In this dissertation, we explore some long-term consequences of cancer within the context of the Social Cognitive Processing Theory (SCPT). SCPT proposes that an individual must be able to discuss their feelings in order to cognitively process a traumatic event, such as cancer. If discussions are hindered, in particular by a significant other, then one will be unable to work through his/her concerns, leading to poor psychological outcomes, such as depression and fear of recurrence.

The purpose of this dissertation is to use SCPT to identify causal mechanisms of depressive symptoms and fear of recurrence using a large sample of young breast cancer survivors and their partners. For one paper, we also included a large set of older participants for comparison. This dissertation is divided into three distinct articles. Each article tests long-term consequences of breast cancer and its treatment on breast cancer survivors and their partners using SCPT to explain relationships. First we examine the hypothesized predictors of younger breast cancer survivors' depressive symptoms including the partner variable of depressive symptoms. The second article addresses the partners by predicting their depressive symptoms using SCPT. The third and final article seeks to identify the relationship of predictors and FOR on both survivors and their partners again using SCPT.

For survivors, structural equation modeling analyses found significant direct and indirect paths between depressive symptoms and theoretical variables, including social

constraints (stb=.266, $p<.001$) and intrusive thoughts (stb=.453, $p<.001$). In partners, cognitive processing variables (intrusive thoughts and cognitive avoidance) mediated the relationship between social constraints and depressive symptoms ($F(5,498)= 19.385$, $R^2=.163$, $p<.001$). And finally, cognitive processing mediated the relationship between social constraints and fear of recurrence both for survivors [$F(3,213)= 47.541$, $R^2=.401$, $p<.001$] and partners [$F(3,215)= 27.917$, $R^2=.280$, $p<.001$]. The evidence from these studies supports the use of SCPT in predicting depressive symptoms and fear of recurrence in both long-term survivors and partners.

Victoria Champion, Ph.D.

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ABBREVIATIONS

Abbreviations	Term
BCS	Breast Cancer Survivor
SCPT	Social Cognitive Processing Theory
QOL	Quality of Life
PTSD	Posttraumatic Stress Disorder
SEER	Surveillance, Epidemiology, and End Results Program
DSM-IV	The Diagnostic and Statistical Manual of Mental Disorder-Version IV
FOR	Fear of Recurrence
BCPRG	Breast Cancer Progress Review Group
ECOG	Eastern Cooperative Oncology Group
HIPAA	Health Insurance Portability and Accountability Act
IES	Impact of Events Scale
CES-D	Center for Epidemiologic Studies Depression Scale
CARS	Concerns About Recurrence Scale
SEM	Structural Equation Modeling
CFI	Comparative Fit Index
RMSEA	Root Mean Square Error of Approximation
STB	Standardized Beta Regression Coefficient
EFT	Emotion Focused Therapy
YP	Partners of Younger Breast Cancer Survivors
OP	Partners of Older Breast Cancer Survivors
CI	Confidence Interval

CHAPTER ONE

In this chapter, I provide an introduction to the dissertation topic and the significance of long-term psychosocial problems in breast cancer survivors and their partners. The chapter continues with an explanation of the theoretical framework, Social Cognitive Processing Theory. Next, the chapter describes with the approach, including: objectives of the larger parent grant, sample, and recruitment procedures. The chapter concludes with a brief description of each of the three articles within the dissertation.

Background and Significance

Approximately 92% of women diagnosed with breast cancer live past the 5-year survival mark [1] as a result of earlier diagnosis and to scientific advances in treatment [1, 2]. Almost all survivors experience symptoms resulting from their disease and treatment that last throughout their life [2]. Furthermore, although the majority of women are diagnosed after age 50 [1], premenopausal women account for 25% of breast cancer survivors [3]. Women diagnosed at a younger age often go through menopause prematurely because of chemotherapy, a fact that affects other survivorship problems such as psychological distress [4]. Researchers report that as many as 20% of BCS report psychological problems [5, 6]. Furthermore, studies have shown that a diagnosis of breast cancer affects the family system, especially the partner. In fact, a secondary analysis found that men partnered with a breast cancer survivor experienced a 50% increased risk of being hospitalized with affective disorders [7]. Before we can develop interventions to prevent or ameliorate the extended symptoms related to a breast cancer diagnosis and treatment, we must study the factors that impact these symptoms. It is also imperative that we include the partner and the dyadic relationship in these younger survivors.

Although a breast cancer diagnosis is a life-altering event for any woman, older survivors experience different concerns and symptoms than those diagnosed at an earlier age [8]. Younger survivors report more psychological distress, which leads to decreased quality of life [9, 10] for both the survivor and her partner. Younger BCS may experience more distress because of their developmental life stage and interrupted life processes such as occupational changes, child-rearing, reproductive concerns and relationship changes, many of which are not concerns for older women [11]. Young women need support in dealing with fertility issues, sexuality changes, and early menopause [4, 12], especially if the young survivor desires more children. The

differences in life development stage between younger and older BCS could be responsible for their different responses to cancer leaving younger survivors at increased risk for distress as compared to their older counterparts [11, 13, 14]. Because of the differential impact of breast cancer on age groups, it is necessary to analyze symptoms and quality of life in a younger sample.

While we lack adequate research on symptoms experience by younger BCS, an even more urgent problem is the lack of studies that include their partners or the impact of the dyadic relationship on outcomes for both the BCS and her partner [15]. Partners report similar or even increased distress when compared to the survivor herself [16-21], and an estimated 20-30% of spouses suffer from mood disturbances related to a spouse's illness [22]. Nakaya found that partners of BCS had a higher risk of depression than partners whose wives had not been diagnosed with breast cancer [7]. Although some studies have gathered partner data, it is almost always collected within the first year to 18 months following diagnosis and treatment and is commonly used solely to predict survivor outcomes [23]. The trajectory of psychological symptoms for partners of breast cancer survivors is not known and needs more attention [24].

Many BCS experience psychological distress (including depression, fear of recurrence, anxiety, and other adverse outcomes) after treatment, which has adverse effects on overall QOL [25, 26]. As many as 15% of BCS report 2 or more posttraumatic stress disorder (PTSD) symptoms [27]. Women who report less social support report higher PTSD symptomatology [27], and in turn women who report greater social support report less PTSD symptomatology [28]. Younger age is also a risk factor for greater PTSD symptomatology [29]. Furthermore, researchers report that distress experienced by either partner has been found to directly affect distress levels in their spouse, and a negative outlook in one partner is associated with a negative outlook and higher psychological distress in their partner [30]. However, these relationships have not been

tested adequately beyond the first year of diagnosis since the majority of studies have stayed within this narrow timeframe [23, 31]. Younger BCS may live decades after their cancer diagnosis and continue to experience the effects of cancer.

Social Cognitive Processing Theory

The Social Cognitive Processing Theory (SCPT) was proposed by Lepore [32], with the main tenet being that integration of traumatic events into a sense of self occurs through cycles of intrusive thoughts and avoidance. This pattern continues until the cancer experience begins to make sense to either the survivor or her partner. SCPT asserts that talking about the event facilitates cognitive processing, leading to "completion" when the event no longer needs to be processed [32]. However, the theory proposes that if open discussion of the event is blocked or met with unsupportive responses, called social constraints, the person may not be able to adequately process the trauma [33]. If processing is hindered, the survivor or partner can experience long-term negative effects including prolonged cycles of avoidance and intrusive thoughts, depression, anxiety, and distress leading to lower overall QOL [34, 35]. The constructs supported by SCPT and used for this study are described below and illustrated in Figure 1.

Antecedent variables that prior research has found to be related to our mediating and outcome variables will be included in all analyses. These variables include current age of the survivor, length of time from diagnosis, education, and income. Whether found to be significant or not [36], many studies have controlled for a host of socio-demographic and treatment variables, including age, race, education [11], treatment type (surgery and chemotherapy, radiation, and tamoxifen), and disease stage [37]. Within different samples, these antecedent variables yielded mixed results relative to significance. Time since diagnosis coupled with a younger age at diagnosis predicted worse social and psychological outcomes in one sample of 105 BCS an average of 12

years after diagnosis [38], and another sample of BCS 10 years after diagnosis reported worse social and physical QOL than at 5 years after diagnosis [37]. Yet in a national survey in Denmark, time since diagnosis was not significant [10]. Education level may have an impact on survivor outcomes, as SEER data reports the relative risk of mortality by breast cancer ranges from 1.16-1.36 for women who have less than 12 years of education [39]. Furthermore, a large-scale study of partners adjusted for age, income, education, work status (retired, unemployed, working, or other), and alcohol use [7]. Another found education and age to be significant relative to positive and negative affect but not with variables in the SCPT [24]. Finally, race will not be used as an antecedent in this project due to the high percentage of Caucasian participants derived from the Eastern Cooperative Oncology Group, which comprises a large portion of the sample.

Social constraint is characterized by avoidance, denial, criticism, and concern minimization relating to the trauma and may be inadvertent [32, 33, 40]. In traumatic events including cancer diagnoses, high social constraint has been associated with greater distress [35, 41] and less cognitive processing of the trauma [24, 32], especially when experienced by the spouse [42]. In particular, partner relationships that are characterized by low empathy and high withdrawal are a risk factor for women having a poor psychological response to breast cancer [43, 44], even years after a cancer diagnosis. Specifically, BCS' intrusive thoughts, avoidance [24], depression, and decreased wellbeing are associated with higher levels of social constraint [45, 46], ultimately impeding cognitive processing [24, 33]. See Figure 1 for a diagram of the conceptual model described.

Lepore proposes that short-term cycling of intrusive thoughts (repetitive, unbidden trauma-related thoughts or images) and cognitive avoidance (attempt to distance the individual from trauma-related thoughts and feelings) at time of diagnosis can be disruptive for the person but is necessary for processing the trauma of cancer

[32, 46, 47] and experiencing posttraumatic growth or 'completion' [32]. However, long-term exposure to a trauma - such as the diagnosis and treatment of breast cancer - can cause PTSD-like symptoms if the cognitive processing is not completed [48]. Diagnosis of a life-threatening illness meets DSM-IV criteria for a traumatic stress exposure for PTSD, including intrusive thoughts and cognitive avoidance, as well as hyperarousal [49]. Symptoms of PTSD may not decrease over time [27] and impact approximately 5-10% of BCS, correlating with decreased QOL [48]. Prolonged cycling of intrusive thoughts and avoidance are indicative of PTSD [48]. Therefore, if long term survivors have successfully processed the trauma, survivors and their partners should display low levels of intrusive thoughts and cognitive avoidance [32]. Furthermore, incomplete cognitive processing has been identified as the link between interpersonal factors (social support and social constraint) and psychological adjustment to the cancer experience [32]. Studies with BCS samples have found intrusive thoughts at baseline predict depression [50], intrusive thoughts mediated the relationship between social constraints and depression [45], and yet another found cognitive avoidance mediated the relationship between negative spouse behaviors and increased patient distress [51]. Furthermore, partners also experience intrusive thoughts and cognitive avoidance [52]. This process, however, has only once been examined in partners other than to predict patient outcomes [24, 52]. The study by Sheridan and colleagues, though helpful in providing support for studying partners' cognitive processing, was conducted during active treatment [24]. Therefore, the long-term impact of intrusive thoughts and cognitive avoidance on partners has yet to be determined.

Despite the attention given to depressive symptoms in the literature, depression is misdiagnosed and undertreated among BCS [53], and as many as 25% of survivors that were 5 years out from diagnosis were found to suffer from clinical depression [54]. Survivors suffering from depression also are at risk for higher side-effect burden than

those who are not depressed [55]. Depression may increase the survivor's experience of anxiety and pain [56], as well as difficulty sleeping [57]. Depression has also consistently been linked to poorer adherence to medical care, longer hospital stays, higher mortality, and reduced overall quality of life [58, 59]. Long-term distress is harmful to the survivor [60], as well as to a partner. Psychological distress also affects partners sometimes more than the survivors themselves [16, 17, 19-21], with odds of depression 3.5 times that of partners of healthy controls [23]. These partners are less likely to receive mental health treatment [23].

FOR is described as affecting 55-90% of BCS [61-63], causing significant distress years after diagnosis. Fear of recurrence (FOR) affects mental health outcomes, causing emotional distress, intrusive thoughts, and lower QOL in survivors [64] and partners [61, 65-67]. Younger age is a risk factor for both partners [66] and BCS, who report greater FOR than older BCS [68-70]. Areas of greatest concern in these younger women include worries about health and death [57, 69]. Additionally, an unsupportive partner relationship may enhance FOR, with lower levels of social support being consistently associated with FOR [68] in both the survivor and her partner [65, 71]. In fact, partners cite help managing their FOR as being one of their biggest unmet needs [72]. Interestingly, FOR in one partner is not necessarily similar to the opposite partner's FOR [73], thus emphasizing the importance of addressing each partner's concerns.

Fear of a breast cancer recurrence (FOR) is the most common concern among survivors (BCS) and their partners during survivorship. As many as 55-90% of BCS report FOR throughout survivorship [61, 63], and partners often report as much if not more FOR than the BCS [74, 75]. Recent findings suggest an interdependence of FOR levels among survivors and their partners [74, 75], although one's own beliefs about the illness, rather than the opposite partner's beliefs, influence his or her FOR to a greater extent. For this reason, measuring and addressing each person's FOR is important.

Furthermore, women diagnosed at a young age and their partners report more FOR than older women and their partners. Young survivors suffer uniquely compared to their older counterparts due to their stage of life, including such things as illness being unexpected in young age, launching into adulthood, or having young children. Young women who are mothers are at risk for higher FOR than young women without children [76]. These women also experienced more intrusive thoughts about cancer [76].

While it may be expected that greater disease severity leads to greater FOR, this is not necessarily the case. Liu found that 29% of women with ductal carcinoma in situ and early invasive breast cancer experienced moderate-to-high levels of FOR 2 years post diagnosis [68]. Rather, physical symptoms have been found to have a strong association with FOR [77]. This is not the case for partners, however, who report more FOR when the survivor's disease was more severe [75].

Prior research has shown mixed results as to the relationship between FOR with depression in long-term survivorship. Some studies show high levels of FOR and diminishing depression over time, while others show maintained levels of all variables over time. A recent study found FOR explained 19% of the variance in an adjusted model to predict depression [78].

One relationship that has yet to be tested in the breast cancer population, and minimally addressed within other cancer populations, is that of fear of recurrence and social-cognitive processing. Some evidence for this relationship was found within the gynecologic literature, where "holding back" (feeling unable to discuss cancer with significant others) and receiving negative responses from family and friends when trying to discuss cancer were significantly associated with fear of recurrence [79]. In the testicular literature, FOR was strongly associated with intrusive thoughts and cognitive avoidance [80]. Before we can intervene, we must understand the relationship between FOR and other long-term psychosocial issues of BCS and their partners.

Approach

The data used for this study came from a breast cancer survivorship study, “Quality of Life in Younger Breast Cancer Survivors” (American Cancer Society RSGPB-04-089-01, PI: Victoria Champion). The purpose of the parent study was to compare Quality of Life (QOL) in breast cancer survivors and their partners who were 45 years old or under at diagnosis with two groups: 1) breast cancer survivors and their partners who were diagnosed at age 55 to 70, and 2) an age-matched ‘acquaintance’ group.

A total of 599 young BCS identified by the Indiana University Simon Cancer Center and the Eastern Cooperative Oncology Group sites, as described below in recruitment procedures, were determined to be eligible and consented to the study. Of the 599 survivors, 505 (84%) returned data and 227 (51%) partners consented to participate in the study and returned materials. A total of 227 younger BCS and their partners will be used to conduct dyadic analyses (papers 1 and 3) for this project. For the paper that solely focuses on partners (paper 2), data from partners of both younger (diagnosed before age 45 years) and older survivors (diagnosed between ages 55 and 70 years) were used. See paper 2 for rationale. A total of 507 partners were used for those analyses.

Women used in this study met the following eligibility criteria: 1) were age 45 or younger at initial diagnosis, 2) were 3 to 8 years from initial diagnosis without a breast cancer recurrence, 3) received chemotherapy (Adriamycin, Cyclophosphamide, Doxorubicin, or any within the Taxel family) as part of their initial treatment, 4) were Stage 1 through Stage 3 at original diagnosis, 5) could read and write, and 6) had a consenting partner who provided data. Eligible women were identified through the statistical office of the Eastern Cooperative Oncology Group and treating oncologist at Indiana University. Being partnered was not a criterion for the larger study. However, for this analysis, we only use younger survivors who also have partner data.

Human subjects protection was obtained from the parent site institutional review (IRB) board of Indiana University and from each of the cooperating sites within the Eastern Cooperative Oncology Group (ECOG). Both informed consent and HIPAA compliance forms were approved by each IRB. The study was approved through the Eastern Cooperative Oncology Group and the National Cancer Institute. Initially, the statistical office for ECOG identified women who met eligibility criteria and forwarded the names to the women's treating physicians at an ECOG site. The treating physician or designee contacted the women and asked for permission to forward their name and contact information to Indiana University. If an eligible woman agreed, Indiana University received the contact information and mailed the woman a brochure explaining the study followed by a phone call. A research assistant called the survivor and, if verbal consent was obtained, the woman was mailed the informed consent and questionnaire. Also if verbal consent was obtained, the survivor was asked if she had a partner who could be contacted about participation. If a partner was available, a brochure was again mailed and phone contact made. Consent and data collection were identical to that of the survivor. Eligible women also were identified through the IU/Wishard Hospital physicians. Once verbal consent was given for IU to contact, names were passed to the project manager at IU. Research assistants (RAs) then sent packets describing the study, and then called potential participants to explain the study and obtain verbal consent to send materials.

Both the questionnaire and consent were returned in a postage-paid envelope. Follow-up reminder phone calls were made if the survey and informed consent were not received within two weeks. Of the survivors who agreed to participate, 84% returned data and 227 had partners who returned data. The larger study included an extensive list of measures to assess the four domains of functioning as identified by Ferrell and

colleagues. [57, 82-85] Only selected measures are used in this study and are listed below in Table 1.

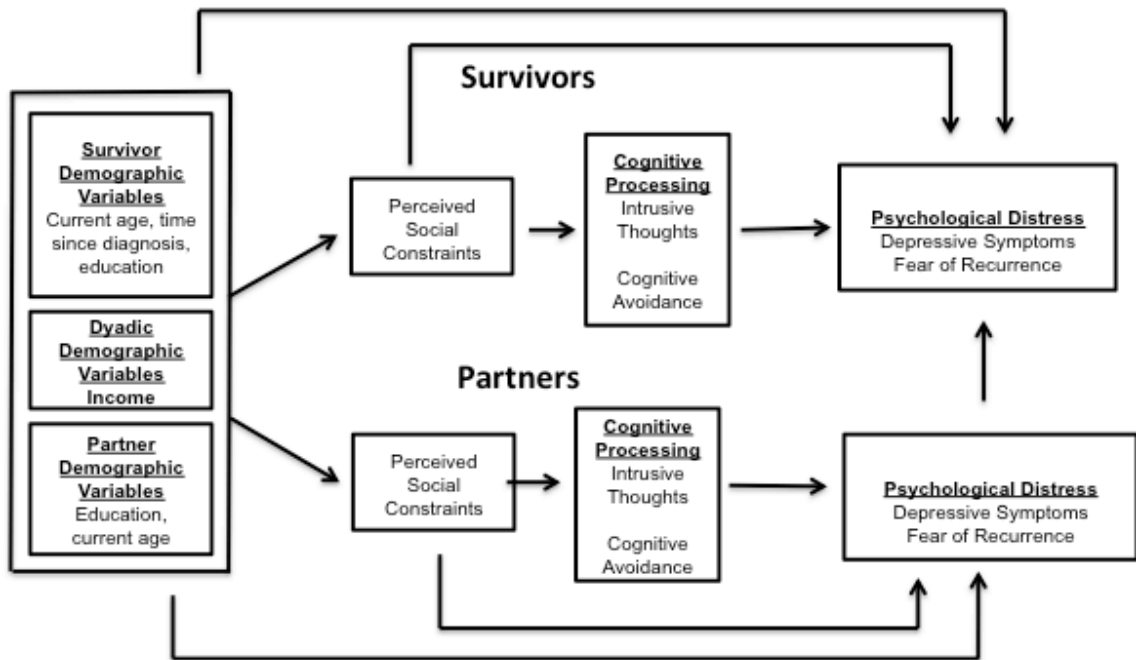
Aims of the Dissertation

This dissertation is divided into three distinct but related articles. The first article will focus on young BCS, the second on partners of young BCS, and the third on the dyad itself, all relating the Social Cognitive Processing Theory to individual outcomes. **The first article** will use structural equation modeling to determine the relationship between depressive symptoms and the Social Cognitive Processing Theory variables- perceived social constraints, intrusive thoughts, and cognitive avoidance- in young BCS. A second aim of this article will be to determine if partners' reported depressive symptoms predict survivors' reported depressive symptoms. **The second article** will focus on depressive symptoms in partners of BCS. This article will use mediation analyses to determine the relationship between social constraints and depressive symptoms and constructs within the Social Cognitive Processing Theory to mediate this relationship. And finally, the purpose of the **third article** will be to determine if the Social Cognitive Processing Theory can be used to predict fear of cancer recurrence in both young BCS and their partners through mediation analyses, relationships that have not been explored previously. This article will test the relationship of each person in the dyad's (survivors and partners individually) fear of recurrence as an outcome of their own perceptions of social constraints, intrusive thoughts, and cognitive avoidance.

Table 1. Summary of Study Measures

Construct	Tool	Items	Scoring	Reliability	Validity
Demographic Information	Time since diagnosis, education level, current age, race, and income	5	Descriptive only	N/A	
Social Constraints	Lepore's Social Constraints Scale	14	Responses range 1-4; summated scores range 14-56, lower score indicates fewer constraints	$\alpha = .88-.92$	High theoretical correlations confirming construct validity [86]
Cognitive Avoidance	Impact of Events Scale-Revised	8	Responses range 0-4; mean scores of all items	$\alpha = .87$	Content, construct, convergent validity [87, 88]
Intrusive Thoughts	Impact of Events Scale-Revised	7	Responses range 0-4; mean scores of all items	$\alpha = .94$	Construct, content, convergent validity [87, 88]
Depressive Symptoms	Centers for Epidemiologic Studies-Depression Scale	20	Responses range 1-4; summed with scores above 16 being consistent with a diagnosis of clinical depression	$\alpha = .85-.90$	Concurrent and construct validity established in oncology population [89]
Fear of Cancer Recurrence	Concerns About Recurrence Scale	4	Responses range 1-6; summed with higher scores indicating more fear	$\alpha = .94$	Good Internal reliability, discriminant/ convergent validity [64]

Figure 1. Conceptual Model for All Articles



CHAPTER TWO

In this chapter, I present the results of the manuscript focusing on breast cancer survivor depressive symptoms, “Predicting Depressive Symptoms in Young Breast Cancer Survivors,” being submitted to *Journal of Cancer Survivorship: Research and Practice*.

Abstract

Objective: Long-term breast cancer survivors (BCS) frequently report depressive symptoms. One theory that has successfully been used to predict distress in BCS is the Social Cognitive Processing Theory (SCPT). The theory proposes that social constraints hinder cognitive processing of the trauma resulting from cancer, resulting in poor psychological outcomes. However, the theory's efficacy in predicting depressive symptoms for long-term BCS has not been established. The effect of partners' depressive symptoms on the long-term BCS' depressive symptoms has also not been established within the context of the SCPT. Previous studies have found relationships between BCS and partner outcomes, warranting further investigation. Therefore, the purpose of this study is to test relationships between BCS depressive symptoms and 1) SCPT variables, and 2) partners' depressive symptoms.

Methods: In a large, cross-sectional descriptive study, BCS (N=505) who were 3-8 years post diagnosis and their partners completed a survey assessing demographic characteristics, social constraints, cognitive processing (intrusive thoughts and cognitive avoidance), and depressive symptoms. Structural equation modeling confirmatory path analyses were conducted to determine significant relationships between BCS depressive symptoms and all other variables.

Results: Our hypothesized model fit the data well (RMSEA=.000, CFI= 1.00, and chi-square=7.963 (df=11) with 19 free parameters). BCS' depressive symptoms were predicted by social constraints (stb=.266, $p<.001$) and intrusive thoughts (stb=.453, $p<.001$). The relationship between BCS' depressive symptoms and partners' depressive symptoms was marginal (stb=.111, $p=.077$). No significant relationships were found between BCS' depressive symptoms and cognitive avoidance or any demographic variable.

Conclusions: As predicted by SCPT, depressive symptoms were predicted by social constraints and intrusive thoughts. However, further research is needed to understand the possible relationship between depressive symptoms and cognitive avoidance and partners' depressive symptoms.

Keywords: breast cancer survivors, depressive symptoms, social constraints, social cognitive processing

Predicting Depressive Symptoms in Young Breast Cancer Survivors

Approximately 92% of women diagnosed with breast cancer live past the 5-year survival mark as a result of earlier diagnosis and treatment [2, 90]. Almost all breast cancer survivors (BCS) experience symptoms resulting from their disease and treatment that last throughout their life [2]. One of the most common symptoms is psychological distress, which often manifests as depressive symptoms after treatment and often has adverse effects on overall QOL [25, 26]. As many as 25% of survivors, 5 years after their breast cancer diagnosis suffer from clinical levels of depressive symptoms [54]. Survivors who are depressed are at risk for higher side-effect burden than those who are not depressed [55], and may experience greater anxiety [56], pain, insomnia, and fatigue [91]. Depression also has consistently been linked to poorer adherence to medical care, longer hospital stays, higher mortality, and reduced overall quality of life [58, 59].

One factor contributing to depressive symptoms in BCS is the inability to discuss cancer with a significant other due to social constraints. Social constraints refer to behaviors from others that discourage open communication, including: avoidance, denial, criticism, and minimizing concerns [32, 33, 40]. In traumatic events such as cancer diagnoses, high social constraints have been associated with greater distress [35, 41]. Without a supportive environment in which to discuss cancer, BCS may not be able to cognitively process the trauma, hindering their psychological adjustment [46]. Unfortunately, there is a dearth of literature focusing specifically on distress in young BCS, who suffer disproportionately compared to their older counterparts [91, 92]

The Social Cognitive Processing Theory (SCPT) has been used within the oncology population to predict depressive symptoms in BCS [45]. Theoretically, depressive symptoms occur when the patient has not been able to cognitively process the cancer experience through short-term cycling of intrusive thoughts (i.e., repetitive, unbidden trauma-related thoughts or images) and cognitive avoidance (i.e., attempts to

distance the individual from trauma-related thoughts and feelings) [32, 46]. While this process may be disruptive while it is occurring, it is imperative for later psychological adjustment [35, 40, 45]. Lepore and Helgeson propose that if a person fails to completely process the traumatic event in a timely manner the experience may remain in active memory, causing “physiological and psychological disturbances,” (p.91) [93]. This disruptive processing becomes harmful if prolonged, leading to distress [46]. Incomplete cognitive processing has been linked to negative psychological adjustment and mediates the relationship between social constraints and psychological adjustment within the cancer experience [32]. Specifically, social constraints from a partner or spouse have been found to increase patient distress [51].

Finally, recent studies have demonstrated a direct relationship between distress (i.e. depressive symptoms, anxiety, negative affect) in BCS and their partners [18, 30]. Distress experienced by either partner has been found to directly affect distress levels in the opposite spouse, and a negative outlook in one partner is associated with a negative outlook and higher psychological distress in the opposite partner [30]. Bigatti et al. (2012) found that survivors are more distressed when their partners are distressed as well [30]. Also, Segrin et. al. (2006) found that survivors were more affected by their partners’ anxiety than vice versa [18]. Considering the effect that partners’ distress has on the BCS’ distress may add predictive power to the SCPT.

Therefore, the purpose of this study was to test the relationship between social constraints and depressive symptoms with the components of cognitive processing (both intrusive thoughts and cognitive avoidance) mediating that relationship in long-term BCS who were 45 years or younger at diagnosis. Confirmatory structural equation path model (SEM) was used to simultaneously test a set of regression equations among the observed variables. Partner’s depression was modeled directly to survivor depression and all relationships were adjusted for demographic variables.

Methods

Sample

Data used for this study were collected through Eastern Cooperative Oncology Group (ECOG) using a 97-site database. Women were eligible if diagnosed with breast cancer stages I-IIIa and were at the time of data collection 3 to 8 years post diagnosis and treatment. Additional criteria included being age 45 years or younger to obtain a sample that was most likely premenopausal at diagnosis. Survivors were not eligible if they had a recurrence. In order to reduce treatment-related variance, participants also had to have been treated with a chemotherapy regimen of Adriamycin, Paclitaxel, and Cyclophosphamide. Partners were eligible if they currently lived with the survivor and identified as a spouse or committed partner.

Measures

Socio-demographic information was collected for survivors, including: household income, education, race, religious affiliation, current age, and time since diagnosis. Bivariate correlations were used to determine significant relationships between demographic and theoretically relevant variables. All demographic variables that were significant were held constant in analyses.

Social Constraints were measured using the Lepore Social Constraints Scale. This summed instrument asks the survivor 14 questions on a 1-4 scale, of “never” to “often” regarding her perception of social constraints from her partner in the last four weeks [86], Total scores ranged from 14 to 56. Questions included, how often did your partner, “avoid you,” “seem to be hiding his/her feelings,” and “tell you not to think about your breast cancer” in the last month. Construct validity has been established previously [86]. The Cronbach alpha coefficient for this sample was $\alpha = .90$.

The components of Cognitive Processing were measured by subscales of the Impact of Events Scale [87, 88], which includes separate subscales for intrusive

thoughts and cognitive avoidance. The Intrusive Thoughts subscale consists of 7 questions, with responses ranging 0-4, with higher scores indicating more intrusions. The Cognitive Avoidance subscale consists of 8 questions, also with responses ranging 0-4. Scores for each scale are summed. For this analysis, intrusive thoughts and cognitive avoidance were analyzed separately. Content, construct, and convergent validity have been previously established for the subscales as well as the total scale [87, 88]. The Cronbach alpha coefficient for survivors in this study was $\alpha = .887$.

Depressive symptoms were measured using the Centers for Epidemiologic Studies-Depression Scale. This 20-item summed scale has responses ranging 0-3 for each item [94]. Scores range from 0 to 60 with scores above 16 being consistent with a diagnosis of clinical depression. Concurrent and construct validity were previously established in an oncology population [89]. The Cronbach alpha coefficients for survivors and partners were $\alpha = .902$ and $\alpha = .886$, respectively.

Recruitment Procedures

The study was approved through the Eastern Cooperative Oncology Group and the National Cancer Institute. Human subjects protection was obtained from the institutional review board of the parent site- a large Midwestern university- and from all ECOG sites. Initially, the statistical office for ECOG identified BCS who met eligibility criteria and forwarded the names to the BCSs' treating physicians. The treating physicians or designees contacted the BCS and asked for permission to forward their names and contact information to the university. If an eligible survivor agreed, the university received her contact information and mailed a brochure explaining the study. After mailing the brochure, a research assistant called the survivor. If verbal consent was obtained, the woman was mailed the questionnaire with the informed consent forms. After agreeing to the study, the survivor was asked if she had a partner who could be contacted about participation. If a partner was available, the same procedure was

followed. BCS were eligible for enrollment even if partners declined. Because these analyses required a partner variable, only survivors whose partners also participated were used for these analyses.

The questionnaire and informed consent forms were returned in a postage-paid envelope. Follow-up reminder phone calls were made if the survey and informed consent were not received within two weeks. Of those who agreed to participate ($n=602$), 84% of BCS returned data ($n=505$), and 227 had partners who returned data, representing 56% of eligible partners.

Data Analytic Plan

Descriptive statistics were used to describe the presence and severity of depressive symptoms in a sample of both young BCS and their partners, and to describe the demographic information, social constraints, and cognitive processing characteristics (cognitive avoidance and intrusive thoughts) of BCS. Once identified as potentially important factors from the literature, bivariate correlations between all demographic factors (current age, household income, years of education, race, religious affiliation, and time since diagnosis) and depressive symptoms were analyzed. Demographic variables that were related to depressive symptoms at $p=.25$ in bivariate analyses were entered as covariates in the model as recommended by Lemenshaw (1989) [95]. We used this conservative parameter in order to retain demographic variables that may significantly effect depressive symptoms because previous literature has been mixed as to their importance in analyses. All demographic and descriptive information was computed using SPSS® statistical software, version 22.

Structural equation modeling (SEM) was used to test a hypothesized model of associations among a set of self-reported measures. Endogenous variables (dependent variables) included cognitive avoidance, intrusive thoughts, and BCS depressive symptoms. Exogenous variables (independent variables) included social constraints,

demographic variables, and partner depressive symptoms. The advantage that SEM provides over linear regression for this study is that all paths are calculated simultaneously, thus all variables contributing to the variance of the outcome variable (survivors' depressive symptoms) are accounted for in the same model. Jackson (2003) suggests a sample size of 20 cases to every model parameter for maximum likelihood analyses [96]. For this study, that would necessitate a sample of 100. Therefore, our sample of N=227 BCS is acceptable. Mplus software was used to evaluate model fit, estimate and test path coefficients, and estimate and test indirect and total effects [97]. The chi-square fit statistic, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) were used as indices of goodness of fit [98, 99]. Indicators of a good model fit include: 1) a non-significant chi-square statistic, 2) RMSEA < .06, and 3) CFI > .95 [100]. The final model is shown in Figure 1.

Results

Complete demographic information can be found in Table 1. Of the demographic and treatment variables assessed, only current age (M=45.35 years, SD=4.7 years); annual income identified as low (<\$50,000), middle (\$50,000-\$100,000), and high (>\$100,000); years of education (M=14.93 years, SD=2.5 years), and time since diagnosis (M=5.83 years, SD=1.51 years) were significantly related to survivor depressive symptoms and thus included in the model. BCS who reported more depressive symptoms were younger ($r=-.128$, $p<.001$), less educated ($r=-.048$, $p<.001$), and fewer years since diagnosis ($r=-.035$).

Descriptive information for all scales can be found in Table 2. In bivariate analyses, survivor depressive symptoms were significantly related to social constraints ($r=.445$, $p<.001$), cognitive avoidance ($r=.297$, $p<.001$), intrusive thoughts ($r=.522$, $p<.001$), and were marginally related to partner depressive symptoms ($r=.130$, $p=.053$). Survivors who reported more depressive symptoms reported more social constraints,

more cognitive avoidance, more intrusive thoughts, and their partners reported more depressive symptoms than survivors who reported fewer depressive symptoms. See Table 3 for a complete correlation matrix.

Figure 1 shows the results of the tests for hypothesized relationships. Standardized beta regression coefficients (stb) are shown with associated p-values. The hypothesized model showed adequate goodness of fit, with RMSEA=.022, CFI=.994, and SRMR=0.037, with a Chi-square of 13.274 (12 DF) and 19 free parameters. The final model contained only two additional paths that were allowed to be estimated on the basis of modification indices and clinical relevance.

The final model demonstrated good fit to the data with RMSEA=.000, CFI= 1.00, and chi-square=8.413 (df=11) with 19 free parameters. Variables entered into the model included: demographic variables described above, social constraints, the avoidance subscale of the IES, the intrusions subscale of the IES, partner depressive symptoms, and survivor depressive symptoms. For this analysis, paths were tested between all variables. Because the avoidance and intrusions subscales of the IES were highly correlated ($r=.603$, $p<.001$) and theoretically related as pieces of cognitive processing, we allowed these subscales to co-vary in the model.

Survivor depressive symptomatology, the main outcome, was regressed on all variables. Significant relationships were found between depressive symptoms and several of the variables, including both direct (stb=.266, $p<.001$) and indirect (stb=.160, $p<.001$) paths to social constraints, as well as intrusions (stb=.453, $p<.001$). The path between partner depressive symptoms and survivors depressive symptoms was marginally significant (stb=.111, $p=.077$). The covariance path between avoidance and intrusions was significant (stb=.495, $p<.001$). Furthermore, paths between social constraints and intrusions (stb=.450, $p<.001$), current age and intrusions (stb=-.130, $p=.031$), and social constraints and avoidance (stb=.438, $p<.001$) were significant. For

demographic variables, only current age was related to intrusions. No other demographic variables were related to any other variable in the model. Additionally, neither the direct nor the indirect path between survivor depressive symptoms and cognitive avoidance was significant. Therefore, experiencing social constraints and intrusive thoughts was associated with survivor depressive symptoms.

Discussion

This, to our knowledge, is the first study to use the SCPT and partner depressive symptoms to predict depressive symptoms of long-term BCS. Our hypotheses were partially confirmed. We hypothesized that SCPT constructs as well as partners' depressive symptoms would predict BCS' depressive symptoms. After adjusting for demographic variables, BCS depressive symptoms were related to intrusive thoughts and to social constraints both directly and indirectly through intrusive thoughts. Furthermore, social constraints were significantly related to both intrusive thoughts and cognitive avoidance. Two hypothesized relationships were not supported by the model. The effect of partners' depressive symptoms on depressive symptoms in survivors was only marginally significant ($p=.077$), but did not meet criteria for significance.. Second, no significant relationship was found between depressive symptoms and cognitive avoidance.

Intrusive thoughts, in our sample, were related to depressive symptoms. The relationship between intrusive thoughts and negative outcomes, such as depressive symptoms, is well documented [101]. A recent study by Dupont, et. al. (2014) found a significant relationship between intrusive thoughts and depressive symptoms, and that those with high intrusive thoughts at baseline had higher rates of depressive symptoms at one year than those with low intrusions at baseline [102]. Within the context of the SCPT, intrusive thoughts have been consistently related to psychological distress (i.e. depressive symptoms, anxiety, negative affect) [45, 103, 104], and mediate the

relationship between social constraints and depressive symptoms [45]. Also, a recent meta-analysis by Adams, et. al. (2015) found a moderate, significant relationship between social constraints and both general (depression and anxiety) and cancer-specific distress in 30 studies from the oncology literature [105].

This study advantageously analyzed intrusive thoughts and cognitive avoidance separately in order to determine a differential influence of these variables on depressive symptoms. While the variables are highly correlated ($r=.604$, $p<.001$), each one's contribution to cognitive processing is unique. Previous studies have found significant relationships between avoidance and depression in both cross-sectional and longitudinal designs [102, 106]. Shand, et. al. (2014) reported a significant relationship between depressive symptoms and cognitive avoidance in a sample of ovarian cancer patients [107]. It is important to note that they framed the same variables that we termed cognitive avoidance within a posttraumatic stress disorder framework. The levels of cognitive avoidance in our study were subclinical if compared to PTSD criteria [108], and may be part of the reason that we did not find a relationship between avoidance and depressive symptoms.

Socio-demographic variables that prior research found to be related to depressive symptoms in BCS were included in all analyses. These variables include current age of the survivor, length of time from diagnosis, education, and income. Whether found to be significant or not, many studies have controlled for a host of socio-demographic and treatment variables [36], including age, race, education [11], treatment type (surgery and chemo, radiation, and tamoxifen), and disease stage [37].

Limitations

While this large-scale study uniquely explored the relationship between depressive symptoms and the SCPT, including the partners' depressive symptoms, in young, long-term BCS, several limitations must be noted. First, data from this study are

cross-sectional from a descriptive, rather than experimental, design. Therefore, our ability to draw causal conclusions is limited. Second, while the majority of demographic variables typically explored in BCS were not significantly related to depressive symptoms in our SEM path analysis, participants in our sample were mostly Caucasian, well educated, and from middle- and high-income homes, and in these ways not representative of the general population. For these reasons, caution should be applied when relating these findings to the larger BCS population.

Implications for Future Research

Our findings provide partial support for using the SCPT to predict depressive symptoms in long-term BCS. Interventions designed to decrease social constraints and promote open communication within couples that have experienced breast cancer may be useful in promoting timely cognitive processing, thus decreasing intrusive thoughts and depressive symptoms. If social constraints are predictive of depressive symptoms, one promising intervention technique is Emotion-Focused Therapy (EFT), a therapeutic intervention grounded in attachment theory [109]. Attachment theory, describes intimate relationships as secure or insecure (i.e. avoidance or anxious) [110, 111], with insecure attachments being the source of harmful behaviors such as social constraints.

EFT interventions aim to restructure insecure attachments into secure attachments [112]. Furthermore, there is some evidence that when faced with a serious illness, individuals may be less likely to access support from an attachment figure (i.e. a spouse) [113]. EFT was recently tested in a pilot study of adults with cancer and their partners, and produced significant and sustained improvements in marital functioning [114]. EFT enables individuals to make sense of their emotions and ask for attachment needs to be met by a partner, fostering a sense of support in the face of trauma, such as cancer. Finally, a pilot study conducted by Dessaulles, et. al. (2004) found that in couples where the female partner was clinically depressed, an EFT intervention and

pharmacotherapy elevated mood equally [115]. Further research is needed to test the efficacy of EFT in reducing social constraints and depressive symptoms by restructuring attachment style.

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Figure 2. Hypothesized Model

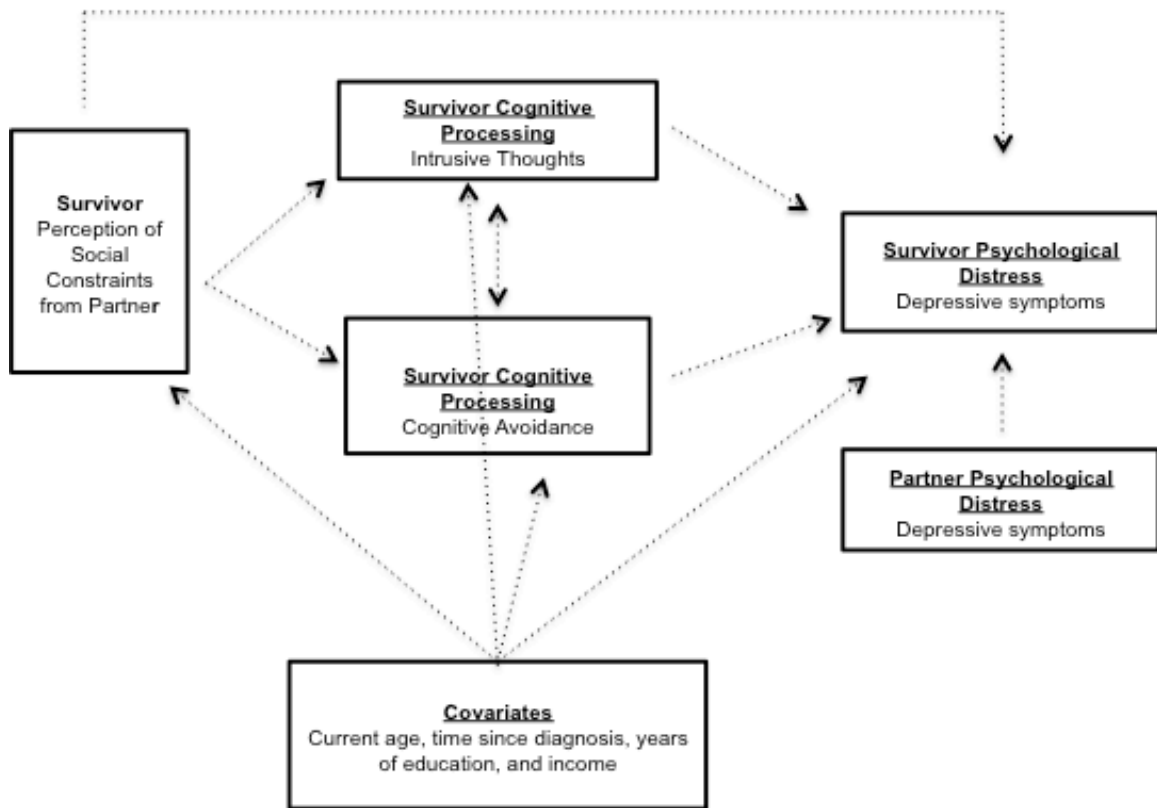


Figure 3. Standard Coefficients for Final Model

All solid lines represent significant relationships. Dashed lines represent hypothesized relationships that were not statistically significant

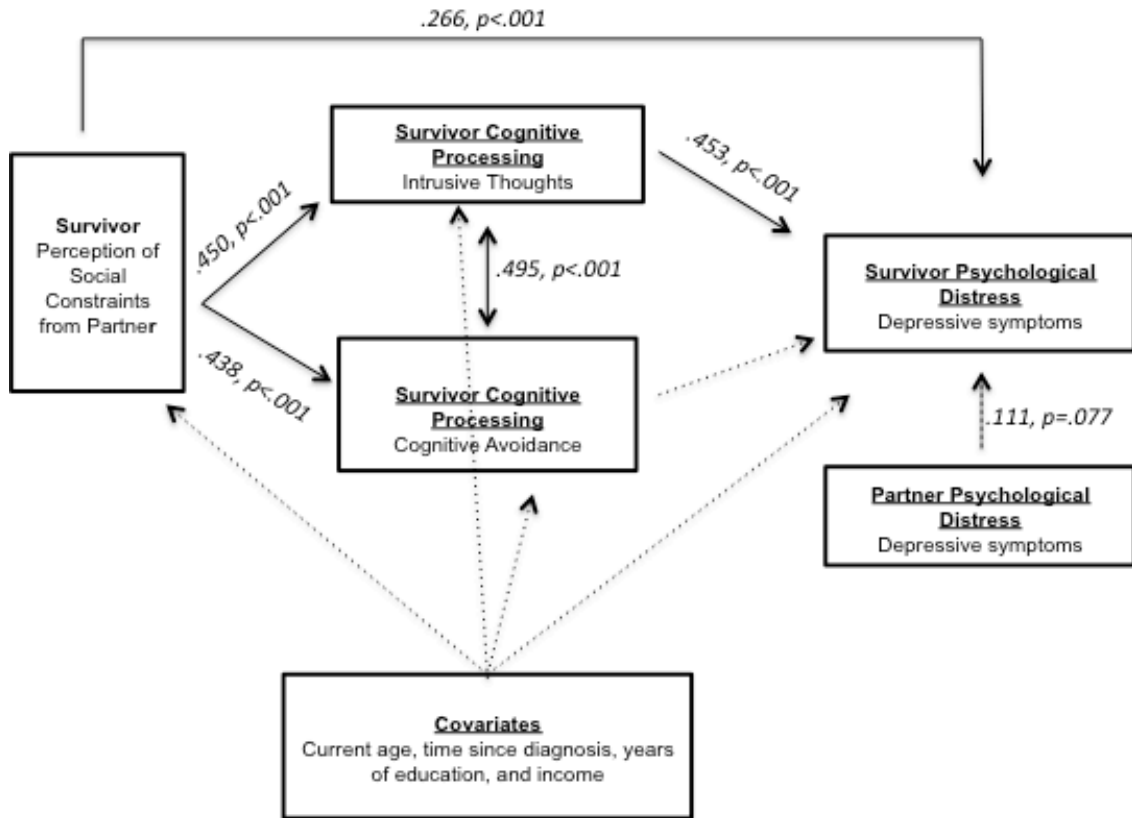


Table 2a. Demographic information for Young Breast Cancer Survivors

Variable	Survivors (<i>n</i> =222)
<hr/>	
Race, No. (%)	
Caucasian	208 (93.7)
Black or African American	5 (2.3)
Asian	2 (0.9)
Other	7 (3.2)
Education (yrs), mean (<i>SD</i>)	14.93 (2.5)
Income, No. of Dyads (%)	
<=\$50,000	30 (13.5)
>\$50,000 and <=\$100,000	109 (49.1)
>\$100,000	83 (37.4)
Religious affiliation, No. (%)	
Christian	194 (87.4)
Jewish	6 (2.7)
Other	3 (1.4)
No religious affiliation	17 (7.7)
Current age, mean (<i>SD</i>)	45.35 (4.7)
Time Since Diagnosis, Years (<i>SD</i>)	5.83 (1.51)
Number of comorbidities	
0	89 (40.1)
1	58 (26.1)
2	33 (14.9)
>/=3	40 (18.9)

Table 2b. Descriptive Information for all Scales

Measure	Mean	SD	Range
Lepore Social Constrains Scale	20.95	7.21	14-55
Intrusive Thoughts (IES)	5.87	5.55	0-30
Cognitive Avoidance (IES)	4.91	5.04	0-23
Combined Intrusions and Avoidance subscales	10.78	9.49	14-55
CES-D Survivor	10.16	8.88	0-47
CES-D Partner	8.80	8.49	0-42

Table 2c. Correlation Matrix

	Survivor Depressive Symptoms	Partner Depressive Symptoms	Cognitive Avoidance	Intrusive Thoughts	Social Constraints
Survivor Depressive Symptoms	1.00				
Partner Depressive Symptoms	.130 p=.053	1.00			
Cognitive Avoidance	.297**	.064 p=.345	1.00		
Intrusive Thoughts	.522**	.057 p=.404	.604**	1.00	
Social Constraints	.445**	.065 p=.342	.438**	.470**	1.00

Table 2d. Indirect Effects from Social Constraints to Young Breast Cancer Survivors' Depressive Symptoms

	Effect	
	Z statistic	p-value
Total indirect		
Social constraints > intrusive thoughts > BCS depressive symptoms	0.204	0.000
Social constraints > cognitive avoidance > BCS depressive symptoms	-0.044	0.185

CHAPTER THREE

In this chapter, I present the results of the article focusing on depressive symptoms in partners, “Testing the Relationship Between Depressive Symptoms and Social Cognitive Processing in Partners of Breast Cancer Survivors,” being submitted to the *Journal of Psychosocial Oncology*.

Abstract

Objective: Partners of breast cancer survivors (BCS) experience similar if not more depressive symptoms than the survivors and research indicates that younger survivors may suffer more depression than their older counterparts. One theory that may aid our understanding of partners' struggles is the Social Cognitive Processing Theory (SCPT), which has been used successfully to predict symptoms in BCS. The theory proposes that social constraints hinder cognitive processing, resulting in poor psychological outcomes. The aim of this study was to determine if the SCPT could be used to predict depressive symptoms in partners of long-term BCS and if partners of younger survivors were affected differently than partners of older survivors.

Methods: In a large cross-sectional study, partners of younger and older long-term BCS (N=227 and N=281, respectively) completed a survey assessing demographic characteristics, social constraints, cognitive processing (intrusive thoughts and cognitive avoidance), and depressive symptoms. Mediation analyses were conducted to determine if cognitive processing would mediate the relationship between social constraints and depressive symptoms.

Results: Cognitive processing did mediate the relationship between social constraints and depressive symptoms for partners ($F(5,498)= 19.385, R^2=.163, p<.001$). Partners of younger BCS reported worse outcomes on all measures. Demographic variables were not significant predictors of depressive symptoms.

Conclusions: As predicted by SCPT, cognitive processing mediated the relationship between social constraints and depressive symptoms. Results provide support for using the SCPT in intervention design with partners of BCS.

Keywords: Partners, breast cancer, depressive symptoms, Social-Cognitive Processing Theory, social constraints

Testing the Relationship Between Depressive Symptoms and Social Cognitive Processing in Partners of Breast Cancer Survivors

Although breast cancer survivors (BCS) and symptoms related to the disease and treatment have been the focus of research for years, outcomes in partners of BCS have only recently been studied [116, 117]. A large and growing population of spousal caregivers of cancer patients has been found to be more distressed than healthy controls and sometimes more than the patients themselves [23, 118, 119]. For example, Nakaya found that partners of BCS had a higher risk of depression than partners whose wives had not been diagnosed with breast cancer [7]. An estimated 20-40% of spouses suffer from mood disturbances, including depression, anxiety, and other affective disorders related to their spouses' illness [7, 22, 120].

Although many studies have not differentiated between partners of younger survivors and partners of older survivors, some literature indicates that distress may be greater for partners of younger survivors. Young BCS often are more distressed than their older counterparts due to decreased fertility following treatment, having young children at home, not expecting to have a serious illness at a young age, and job stressors [91, 121]. Their partners may be distressed differentially for similar reasons. Previous studies reported middle-aged spouses experienced more psychological stress than older spouses [122, 123], making the survivor's age at diagnosis an important variable.

Long-term distress decreases quality of life (QoL) in partners of BCS. Specifically, greater depression is associated with sleep deprivation, fatigue, declines in general physical health [116], and cardiovascular disease among partners of cancer patients [124]. Unfortunately, partners are less likely to receive mental health treatment than survivors [23]. Social Cognitive Processing Theory may increase our understanding of depressive symptoms in partners as well as identifying differences that may exist

between younger and older cohorts. Identifying predictors of depressive symptoms can help us to design appropriate interventions.

According to the Social Cognitive Processing Theory (SCPT) (Lepore, 2001), depressive symptoms may in part result from incomplete cognitive processing [32]. Specifically, Lepore proposes that cognitive processing- or the cycling of intrusive thoughts and cognitive avoidance- of cancer-related concerns (e.g., integration of new stressor-related information into one's existing sense of self), while disruptive in the short term, is necessary for long-term adjustment. SCPT asserts that talking about the traumatic event (i.e. cancer) facilitates cognitive processing. However, the theory proposes that if open discussion of the event is blocked or met with unsupportive responses (social constraints), the person may not be able to adequately process the trauma [33]. Therefore, when open communication is hindered, both survivors and partners may experience a prolonged cycling of intrusive thoughts (i.e., repetitive, unbidden trauma-related thoughts or images) and cognitive avoidance (i.e., attempts to distance the individual from trauma-related thoughts and feelings) that lead to increased distress [46].

However, much of the research conducted on the link between prolonged or incomplete cognitive processing and distress has focused on survivor outcomes [32, 35, 45, 46, 51, 103, 104]. Several studies have incorporated partner data, but partner data were only used to predict survivor outcomes [125, 126]. Given the high rates of depressive symptomatology and its association with poor physical health outcomes [116, 124], predictors of depressive symptoms should also be examined among partners of cancer survivors. Two studies used the SCPT to examine partner outcomes, producing mixed results. The study by Sheridan and colleagues (2010) provided support for using the SCPT among partners of breast cancer survivors undergoing active treatment [24]. This study found the intrusive thoughts mediated negative affect while avoidance

mediated positive affect. [24]. The study by Robbins et al. (2014) examined the effect of patient and partner discussions of cancer on depressive symptoms through natural observation [127]. Rather than focusing on social constraints, this study focused on supportiveness of communication, a counter to social constraints. Furthermore, they did not measure cognitive processing. Instead, the team measured distress at baseline and 3-month follow-up and related distress change to the observed communication openness. Their results were consistent with the SCPT for patients (engagement in emotional disclosure and informational conversations predicted better patient adjustment), but partner results were non-significant. Additionally, the utility of the SCPT for predicting depressive symptoms among partners of long-term BCS has yet to be examined.

The purpose of this study was to test theory-based relationships between demographic variables, social constraints, cognitive processing (intrusive thoughts, cognitive avoidance), and depressive symptoms using mediation analyses in a sample of both partners of younger BCS (YP) and partners of older long-term BCS (OP). The primary purpose of this study was to determine if cognitive processing (avoidance and intrusive thoughts) mediated the relationship between social constraints and depressive symptoms. Before mediation analyses, we sought to determine if significant differences existed between YP and OP on study variables.

Methods

Sample

Data for this study were taken from a larger QOL study of BCS and their partners. Using the Eastern Cooperative Oncology Group (ECOG) database of 97 sites, we identified eligible BCS. Women were eligible if diagnosed with breast cancer stages I-IIIa at age 45 years or younger survivors) or between the ages of 55-70 (older survivors). Additional criteria included being 3-8 years past initial treatment, not having a

breast cancer recurrence, and being treated with a chemotherapy regimen of Adriamycin, Paclitaxel, and Cyclophosphamide to reduce treatment-related variance. A partner was eligible if currently living with the survivor. Data from partners of both younger and older were used.

Measures

Socio-demographic information was collected for both YP and OP, including: current age, household income, education, race, religious affiliation, and the partnered survivor's time since diagnosis. Bivariate correlations were used to determine significant relationships between demographic variables (identified in the literature) and depressive symptoms. All demographic variables that were related at $p=.25$ to depressive symptoms were entered as covariates in all analyses [95]. We used this conservative approach because little is known of the effects of demographic variables on depressive symptoms in partners.

Social Constraints were measured using the Lepore Social Constraints Scale, which asks the partner's perception of the survivor's constraining behaviors in the last four weeks using 14 questions on a 1-4 scale, of "never" to "often" [86]. Total scores range from 14 to 56. Questions include, how often does your partner (survivor), "tell you not to worry so much about her breast cancer," "avoid you," and "change the subject when you tried to discuss her breast cancer." Construct validity has been established previously [86]. Cronbach alpha coefficients were $\alpha= .867$ for YP and $\alpha= .853$ for OP.

Cognitive Processing was measured by the Impact of Events Scale [128], which has separate subscales for the components of cognitive processing: cognitive avoidance and intrusive thoughts. This scale has previously been used as a marker for prolonged or incomplete cognitive processing [32]. The Cognitive Avoidance subscale consists of 8 questions with responses ranging 0-4. A mean score of all items it taken with higher scores indicating more avoidance. The Intrusive Thoughts subscale consists of 7

questions, and is scored the same as the avoidance subscale. The mean score of both subscales produces a total for cognitive processing. Content, construct, and convergent validity have been previously established for the total scale and subscales [87, 88].

Cronbach alpha coefficients were $\alpha = .883$ for YP and $\alpha = .849$ for OP.

Depressive symptoms were measured using the Centers for Epidemiologic Studies-Depression Scale [94], a 20-item scale with scores 0-60 possible. The scale is summed with scores above 16 being consistent with a diagnosis of clinical depression. Concurrent and construct validity were previously established in an oncology population [89]. Cronbach alpha coefficients were $\alpha = .886$ for YP and $\alpha = .786$ for OP.

Recruitment Procedures

Human subjects protection was obtained from the parent site institutional review board (IRB) of a large, Midwestern university and from ninety-seven of the cooperating sites within the Eastern Cooperative Oncology Group (ECOG). Both informed consent and HIPAA compliance forms were approved by each IRB. The study was approved through the ECOG and the National Cancer Institute. After an eligible survivor agreed to the study, she was asked if she had a partner who could be contacted about participation. If a partner was available, a brochure was mailed and phone contact made. Once the partner gave verbal consent, a research assistant mailed the informed consent and questionnaire. Both the questionnaire and consent were returned in a postage-paid envelope. Follow-up reminder phone calls were made if the survey and informed consent were not received within two weeks.

Data Analytic Plan

Descriptive statistics were calculated to determine the presence and severity of depressive symptoms, demographic, social constraints, and cognitive processing characteristics (cognitive avoidance and intrusive thoughts) in a sample of both YP and OP. Bivariate correlations were computed between all demographic factors (current age,

household income, years of education, race, religious affiliation, time since the survivor's diagnosis and depression to test for significant relationships. T-test analyses were conducted to determine if significant differences existed between YP and OP on all study variables.

While the causal steps approach to mediation analysis popularized by Baron and Kenny (1986) is possibly the most widely used method for testing indirect effects, it has fallen out of favor in recent years [129]. There are several reasons for this, including: the causal steps approach is among the lowest in power for testing intervening variable effects, and it is not based on the quantification of the intervening effects. New methods quantify the indirect effects. Among these is the Preacher and Hayes method.

To test the model, bootstrapping can be used. Bootstrapping is an empirical method for estimating and testing indirect effects, as described by Hayes (2009) [129]. It is the preferred method of testing indirect effects due to its high statistical power and lack of assumption of normality in the sampling distribution. Using this method, a random sample of size "n" is drawn with replacement from the original sample. The path coefficients for *a* and *b* are then drawn from each new sample. This process is repeated *k* times, where *k* equal at least 5,000 [129]. The *k* estimates provide an empirical approximation of the sample distribution of the indirect effect. A bias corrected confidence interval (CI) of *k* values of *ab* is generated. If the CI does not include zero, the conclusion can be drawn that the indirect effect is not zero [130].

Therefore, mediation analyses as described by Preacher and Hayes (2004) were conducted to determine if cognitive processing mediated the relationship between social constraints and depressive symptoms in YP and OP [130]. Parameter estimates and CIs of the total and indirect effects for this study were generated based on 5,000 random samples. All analyses were performed using SPSS® statistical software, version 22.

Results

Participants in this study included 226 YP and 281 OP, representing 55.26% and 68.04%, respectively, of those eligible and approached. Being of younger age ($r = -.157$, $p < .001$), having fewer years of education ($r = -.078$, $p = .081$), and being a partner to a younger survivor ($F(1, 507) = 9.776$, $p = .002$) – were related to greater depressive symptoms. These three demographic variables were the only that met inclusion criteria and were entered as covariates in the mediation analysis. See Table 1 for complete demographic information.

Aim 1: Determine Group Differences

T-test analyses found significant differences on all study variables (social constraints, cognitive processing, and depressive symptoms) between YP and OP. The YP reported more depressive symptoms ($t(506) = 3.02$, $p = .003$) with a mean of 8.80 ($SD = 8.50$) compared to OP, who had a mean of 6.78 ($SD = 6.02$). YP reported higher scores ($M = 8.58$, $SD = 8.29$), indicating incomplete cognitive processing than OP, who had a mean of 7.22 ($SD = 6.97$) ($t(505) = 1.96$, $p = .05$). Finally, YP reported more social constraints ($M = 20.33$, $SD = 6.34$) than OP ($M = 19.09$, $SD = 5.53$) ($t(505) = 2.32$, $p = .02$). See Table 2 for descriptive statistics on all scales for both YP and OP.

Aim 2: Mediation Analysis

All partner data were entered into the same model with group identification (YP versus OP) analyzed as a covariate. Entering all partners into one analytic model provided additional power to detect significance, while still accounting for possible group differences. Partners who reported more social constraints, reported more incomplete cognitive processing than those who reported fewer social constraints ($a = 0.60$), which in turn led to more depressive symptoms ($b = 0.222$). Social constraints indirectly influenced depressive symptoms through the mechanism of cognitive processing (point estimate of indirect effect = 0.133, $p < .001$, 95% CI = 0.062 to 0.223). After accounting for this

mechanism, there was still an effect of social constraints on depressive symptoms (direct effect = 0.243, $p < .001$, 95% CI = 0.128 to 0.357), indicating that partners who perceived social constraints from the BCS also experienced more depressive symptoms. None of the demographic variables- years of education, age, remained significant during mediation analysis. Additionally, the category of younger versus older partners was non significant. See Figure 1 for model schema and Table 3 for mediation model coefficients.

Discussion

This study sought to determine if Social Cognitive Processing Theory could be used to predict depressive symptoms in a large sample of both partners of younger, long-term BCS and partners of older, long-term BCS. The SCPT proposes that if one is able to discuss the trauma of cancer in a supportive environment, then he will experience short-term cycling of intrusive thoughts and cognitive avoidance [32] and move beyond this cycle to more positive coping methods. This disruptive experience of cognitive processing in the short-term is a necessary component of overall adjustment and leads to good psychological outcomes. However, if one is not able to discuss the trauma of cancer in a supportive environment, he will experience prolonged cycling of intrusive thoughts and cognitive avoidance [32, 33, 46] not moving beyond this initial negative stage. We refer to this as prolonged or incomplete cognitive processing, which we hypothesized would lead to poor psychological outcomes, such as depressive symptomatology. Our results confirmed these hypotheses. Cognitive processing did mediate the relationship between social constraints and depressive symptoms ($R^2 = .163$, $F(5,498) = 19.385$, $p < .001$) in long-term partners of BCS as illustrated in figure 1. These findings indicate that when partners experience social constraints from survivors, they are unable to cognitively process the trauma of cancer in a timely manner, and thus report more depressive symptoms long-term.

The SCPT has been gaining recognition in the oncology literature for predicting negative outcomes in patients and survivors [105]. The current study is one of only two found in the oncology literature that solely examines partner outcomes. Our results are consistent with work by Sheridan et al. (2010), who tested the components of cognitive processing (intrusive thoughts and cognitive avoidance) separately in partners of women currently undergoing treatment for breast cancer. They found intrusive thoughts mediated the relationship between social constraints and negative affect, and avoidance mediated the relationship between social constraints and positive affect [24]. The current study furthers the literature by supporting the use of the SCPT in partners of long-term survivors to predict depressive symptoms.

The relationship between social constraints and depressive symptoms remained significant in our model even after accounting for cognitive processing, highlighting the direct effect that negative responses from BCS play in the psychological wellbeing of partners. While there was a direct effect, it was reduced from 0.243 to 0.133. Unlike BCS who may communicate their cancer-related fears to a wider circle of supports [131], partners mainly express their cancer-related fears to their spouses [24, 127]. Because partners predominantly express their fears to BCS, social constraints from BCS may have a greater impact on depressive symptoms.

Furthermore, we hypothesized that YP and OP would differ on study variables. YP did report significantly more depressive symptoms, more incomplete cognitive processing, and more social constraints than OP. There may be several reasons for this. First, partners may not expect their younger spouses to be diagnosed with a life-threatening illness. In terms of development, more gains (good health, child rearing, career advancement, etc.) than losses (i.e. breast cancer) are expected in young age and losses can be disruptive [122]. Outside of the oncology literature, one study of partners of Parkinson's patients (Carter, et. al., 2010) also found younger spouses were

at greater risk for distress [132]. Young partners reported more strain due to a lack of personal resources, and lower levels of positive outcomes such as mutuality and derived meaning from the illness [132]. It is important to note that while differences in bivariate analyses were noted in depressive symptoms based on age as well as group identification, neither of these variables remained significant in the mediation analysis. This means that the SCPT yields similar results in partners of both younger and older survivors.

Limitations

While this unique data set did allow us to demonstrate the efficacy of the SCPT in predicting depressive symptoms in a large sample of both YP and OP, there are several limitations. First, it is possible that additional variables not included in the models could add to the understanding of depressive symptoms in partners of BCS. Second, data from this study were taken from a cross-sectional design, limiting our ability to draw causal conclusions. Third, our sample was primarily Caucasian and not representative of the larger population. Despite this fact, race was the only demographic variable significantly related to depressive symptoms for YP, necessitating future studies with greater racial diversity. Fourth, the vast majority of partners in our sample were male, making it impossible to determine if gender of the partner matters in perceptions of social constraints or presence of depressive symptoms.

Conclusion

Findings from this study support the use of the SCPT in predicting depressive symptoms in partners of long-term BCS. As theoretically specified, cognitive processing mediated the relationship between social constraints and depressive symptoms. Additionally, the direct relationship between social constraints and depressive symptoms remained significant in analyses, highlighting the need for interventions to enhance open cancer-related communication within couples. (Although partners who report more

distress are less likely to complete such programs [133].) Finally, YP reported more social constraints, incomplete cognitive processing, and depressive symptoms than OP. These younger men face a unique set of challenges than their older counterparts, such as child-rearing responsibilities, career obligations, and the surprise of a young spouse having a life-threatening illness. Because of these issues, YP may fare worse than OP, necessitating further research into ways of helping them cope with cancer.

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Figure 4. Model with Standardized Path Coefficients

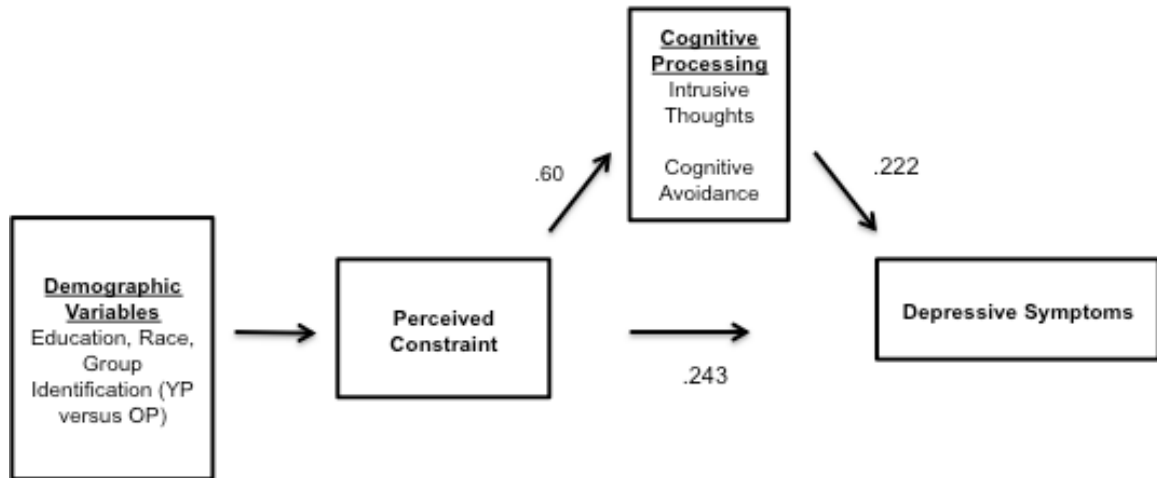


Table 3a. Demographic Information for Partners of Younger Breast Cancer Survivors and Partners of Older Breast Cancer Survivors

Variable	YP (<i>n</i> =226)	OP (<i>n</i> =281)
Race, No. (%)		
Caucasian	209 (92.1)	265 (94.3)
Black or African American	7 (3.1)	3 (1.1)
Asian	2 (0.9)	0
Other	8 (3.5)	13 (4.6)
Education (yrs), mean (<i>SD</i>)	14.88 (2.6)	14.66 (3.0)
Income, No. of Dyads (%)		
<=\$50,000	30 (13.6)	94 (35.3)
>\$50,000 and <=\$100,000	109 (49.3)	116 (43.6)
>\$100,000	82 (37.1)	56 (21.1)
Religious affiliation, No. (%)		
Christian	189 (83.6)	246 (88.8)
Jewish	8 (3.5)	5 (1.8)
Other	3 (1.3)	2 (0.7)
No religious affiliation	26 (11.5)	24 (8.7)
Current age, mean (<i>SD</i>)	48.0 (7.2)	67.8 (6.74)

Table 3b. Mean, Standard Deviation, and Range of All Scales for Partners of Younger Breast Cancer Survivors and Partners of Older Breast Cancer Survivors

Measure	YP	OP	t-test
	Mean (SD)	Mean (SD)	
Lepore Social Constraints Scale	20.33 (6.34)	19.09 (5.53)	2.32*
Intrusive Thoughts (IES)	4.89 (5.15)	3.91 (4.09)	2.33*
Cognitive Avoidance (IES)	3.69 (3.99)	3.31 (3.63)	ns
Combined Intrusion and Avoidance subscales	8.58 (8.29)	7.22 (6.97)	1.96*
CES-D	8.80 (8.49)	6.78 (6.02)	3.02*

* p < .05

Table 3c. Model Coefficients for Mediation Analysis: All Partners

		M (Cognitive Processing)			Y (Depression)		
		Coeff.	SE	<i>p</i>	Coeff.	SE	<i>p</i>
Antecedent							
X (Social Constraints)	<i>a</i>	.60	.051	<.001	<i>c'</i>	.243	.058 .000
M (Cognitive Processing)		-	-	-	<i>b</i>	.222	.046 .000
Constant	<i>i</i> ¹	.652	3.054	.831	<i>i</i> ²	6.731	3.108 .031
		R ² =.250 F(4, 499)= 41.641, <i>p</i> <.001			R ² =.163 F(5, 498)= 19.385, <i>p</i> <.001		

CHAPTER FOUR

In this chapter, I present the results of the article that sought to determine if the relationship between fear of recurrence and social constraints is mediated through cognitive processing in breast cancer survivors and partners. “Testing the Relationship Between Long-Term Fear of Recurrence and Social Cognitive Processing in Young Breast Cancer Survivors and Their Partners,” is current under review in *Psycho-Oncology*.

Abstract

Background: Fear of a breast cancer recurrence is the most prevalent and disruptive source of distress for long-term survivors and their partners. However, few studies have focused on predictors of fear of recurrence. The aim of this study is to test the efficacy of the Social Cognitive Processing Theory (SCPT) in predicting fear of recurrence in long-term breast cancer survivors diagnosed at age 45 or younger and their partners.

Methods: In a large cross-sectional study, breast cancer survivors (N=227) 3-8 years from diagnosis and their partners completed a survey assessing demographic characteristics, fear of recurrence, social constraints, and cognitive processing (intrusive thoughts and cognitive avoidance). Mediation analyses were conducted for survivors and partners separately to determine if cognitive processing would mediate the relationship between social constraints and fear of recurrence.

Results: Cognitive processing mediated the relationship between social constraints and fear of recurrence both for survivors [$F(3,213)= 47.541, R^2=.401, p<.001$] and partners [$F(3,215)= 27.917, R^2=.280, p<.001$]. Demographic variables were not significant predictors of fear of recurrence.

Conclusions: As predicted, cognitive processing mediated the relationship between social constraints and fear of recurrence. Results expand the utility of the SCPT in long-term survivors and their partners by supporting its use in intervention design.

Keywords: breast cancer, oncology, survivor, partner, fear of recurrence, social constraints

Testing the Relationship Between Long-Term Fear of Recurrence and Social Cognitive Processing in Young Breast Cancer Survivors and Their Partners

Breast cancer is the second most common cancer in the world and most frequently diagnosed among women [134]. While breast cancer survivors (BCS) are living longer, disease-free lives, they often have high rates of psychological distress [135]. Of the reported psychological issues resulting from cancer, fear of a breast cancer recurrence (FOR), or the anticipation of present or future danger from breast cancer or treatment [136], is one of the most common and most distressing [63]. FOR is additionally related to diminished health-related quality of life and well-being [137-139], psychiatric morbidity [140], and disruptive symptoms, including sleep disturbance, fatigue, and poor concentration [141]. As many as 55-90% of BCS report FOR throughout survivorship, even many years after treatment [61, 63]. Research has found that those at greatest risk are BCS diagnosed at a younger age [68, 142].

Several personal characteristics have been found to be related to fear of recurrence in BCS, including: younger age [143], greater education [142], shorter time since diagnosis [138], number of additional symptoms, and being Caucasian [144]. Yet, a review of 43 studies found that younger age was the only personal characteristic to consistently predict FOR in BCS [145]. Women diagnosed with breast cancer before age 50 suffer disproportionately from FOR compared to their older counterparts [66, 68-70] and although rarely studied, young BCS account for approximately 25% of breast cancer diagnoses [90, 143].

In addition to the problems faced by younger BCS, many have partners who also experience cancer-related distress. In fact, partners often report similar or greater psychological distress than BCS [30]. Similar to BCS, their partners often experience high levels of FOR even years after the cancer experience [146]. Mellon et al. (2007) found that FOR in partners accounted for the largest variance in their own quality of life

[74]. Despite the striking evidence of their distress in these studies, partners' long-term outcomes are not often studied.

FOR has been linked to many psychosocial symptoms, including: intrusive thoughts, or aversive memories about the cancer [146], cognitive avoidance [147], poor mental health [142], denial [80, 148], social constraints [45], and low social support [68]. Marital status has not been found to consistently predict FOR; however, many women do experience breast cancer within the context of a partnered relationship [74, 75]. Partners' fear of breast cancer recurrence has been correlated with their own emotional distress [18, 21] and family stress [74]. To date, most studies for both BCS and partners have lacked a unifying framework that can be tested and then used to guide intervention development.

One theory that has been used successfully to predict distress in cancer survivors, specifically BCS [149], is the Social Cognitive Processing Theory (SCPT) [32, 46, 105]. The SCPT asserts that talking about a stressful event, such as cancer, in a supportive social environment facilitates cognitive processing [32]. That is—being able to process the traumatic event cognitively is hypothesized to facilitate psychological adjustment to the stressor. Conversely, the theory proposes that social constraints (family or friends blocking open discussions of the trauma by minimizing concerns, avoiding the person, being critical, or expressing discomfort) [33, 51, 86] can have a negative impact on cognitive processing. If cognitive processing is hindered, the survivor or partner may experience greater negative affect [24], lower self-esteem [125], greater distress, and lower overall QOL in long-term survivorship [149]. Either the survivor or her partner can experience social constraints [24, 51] and the associated negative impact on cognitive processing.

Although the SCPT has been used successfully to predict psychological outcomes in cancer populations including BCS [35, 45, 149], the majority of studies have

only examined outcomes within the first three years post diagnosis. Because psychological distress resulting from cancer—including FOR—can last years after diagnosis, this theory may be effective in predicting long-term psychological consequences of cancer.

Additionally, the potential of the SCPT in predicting psychological outcomes in partners has yet to be explored. To our knowledge, only one investigation has examined the impact of social constraints on partners using SCPT. Sheridan and colleagues (2010) found that intrusive thoughts mediated the relationship between social constraints from the BCS and negative affect in a healthy partner [24]. Partners who experienced social constraints reported more intrusive thoughts and greater negative affect than those who did not experience social constraints. Testing this theory further may provide additional insights into the psychological outcomes of both BCS and partners after the cancer experience. Despite the theory's utility in predicting distress such as depression and anxiety, the SCPT has not been used to examine FOR-type distress in either BCS or their partners.

The purpose of this study, therefore, is to test theory-based relationships between demographic variables, social constraints, cognitive processing (intrusive thoughts, cognitive avoidance), and FOR through mediation analysis in a sample of young, long-term survivors of breast cancer and their partners. Our first aim was to test whether cognitive processing mediates the relationship between social constraints and fear of recurrence in young, long-term BCS. Our second aim was to test whether cognitive processing mediates the relationship between social constraints and fear of recurrence in partners of young, long-term BCS.

Methods

Sample

Using the Eastern Cooperative Oncology Group (ECOG) database that included 97 sites, we identified eligible BCS. Eligibility criteria included female BCS who: 1) had been diagnosed with breast cancer stages I-IIIa at age 45 years or younger; 2) were 3-8 years past initial treatment; 3) did not have a breast cancer recurrence; and 4) had been treated with adjuvant chemotherapy regimen that included Adriamycin, Paclitaxel, and Cyclophosphamide to reduce treatment-related variance. Age eligibility was selected to obtain a sample that was most likely premenopausal at diagnosis. Partners were eligible if they currently lived with the survivor.

Measures

Socio-demographic information was collected for both BCS and their partners, including current age, household income, number of co-morbid conditions for BCS, number of chronic conditions for partners, education, race, religious affiliation, and time since diagnosis for BCS. All scales were administered to both BCS and partners.

Social Constraints were measured using the Lepore Social Constraints Scale, which asks participants 14 questions on a 1-4 scale, of “never” to “often” regarding the participant’s perception of constraining behaviors from his/her partner in the last four weeks [86]. Total scores range from 14 to 56, with higher scores reflecting greater overall social constraints. Questions include, how often does your partner “avoid you,” “minimize your problems,” and “act uncomfortable when you talk about cancer.” Construct validity has been established previously [86]. Cronbach alpha coefficient for this sample was $\alpha = .90$.

Cognitive Processing was measured by the Impact of Events Scale [87, 88], which has separate subscales for intrusive thoughts and cognitive avoidance—the components of cognitive processing. Content, construct, and convergent validity have

been previously established for the total scale and subscales [87, 88], and has been used as a marker for incomplete cognitive processing [32]. The Intrusive Thoughts subscale consists of 7 questions, with responses ranging 0-4. A total score of all items is taken with higher scores indicating more intrusions. The Cognitive Avoidance subscale consists of 8 questions and is scored the same as the intrusion subscale. The combined total score of both subscales produces a total for cognitive processing. Cronbach alpha coefficients for this study were $\alpha = .887$ for BCS and $\alpha = .883$ for partners.

Fear of Recurrence was measured using the Concerns About Recurrence Scale (CARS) [138]. The first four items of this scale can be summated to produce an overall fear of recurrence score. While the CARS includes an additional 28 items, divided into 5 subscales (womanhood, health, death, parenting, and role worries), the partners in our sample were not given all subscales. In order to consistently match partners and BCS, the overall score of the first four items was used for both partners and BCS. Additional analyses were conducted to determine if the subscales rendered unique results from the overall score for BCS, and they did not. The Cronbach alpha for the total scale was $\alpha = .94$ for the sample.

Recruitment Procedures

The study was approved by the institutional review board of a large Midwestern university, which served as the coordinating site, and from 97 cooperating sites within the Eastern Cooperative Oncology Group (ECOG). Initially, the statistical office for ECOG identified women who met eligibility criteria and forwarded the names to the women's treating physicians at an ECOG site. The treating physician or designee contacted the women and asked for permission to forward their name and contact information to the coordinating site. If an eligible woman agreed, the university received the contact information and mailed the woman a brochure explaining the study. A research assistant called the survivor and, if verbal consent was obtained, the woman

was mailed the informed consent and questionnaire. After agreeing to the study, the survivor was asked if she had a partner who could be contacted about participation. If a partner was available, a brochure was again mailed and phone contact made. Consent and data collection were identical to that of the survivor.

Both the questionnaire and consent were returned in a postage-paid envelope. Follow-up reminder phone calls were made if the survey and informed consent were not received within two weeks. Of the BCS who agreed to participate, 84% returned data and 227 (56%) of eligible partners returned data. Only BCS whose partners participated were included in the present analyses to directly compare survivor and partner scores.

Data Analytic Plan

BCS and partner data were collected and analyzed separately. Descriptive statistics were calculated to determine the presence and severity of FOR in a sample of BCS who were 45 years or younger at diagnosis and their partners, and to describe the demographic, social constraints, and cognitive processing characteristics (cognitive avoidance and intrusive thoughts). Bivariate correlations between all demographic variables (current age, household income, education, race, religious affiliation, and time since diagnosis for BCS) and FOR were run to test for significant relationships. Demographic variables significantly related to FOR ($p=.25$) in bivariate analyses were entered as covariates in mediation analyses as recommended by Lemenshaw [95]. Mediation analyses as described by Preacher and Hayes (2004) were conducted to determine if cognitive processing mediated the relationship between social constraints and FOR [130]. The method includes bootstrapping—an empirical method for estimating and testing indirect effect. This method generates a confidence interval (CI) and provides high statistical power without the assumption of normality in the sampling distribution, making it the preferable method for testing indirect effects [130]. This method takes a random sample of size n without replacement from the sample then

estimates the indirect effect in this “resample” to be repeated a total of k times [150]. Hayes recommends k equal at least 5,000. Parameter estimates and CIs of the total and indirect effects were generated based on 10,000 random samples with a 95% confidence level. Mediation was demonstrated if the CI did not contain zero.

All analyses were performed using SPSS®, version 22.0 statistical software.

Results

Study participants included two groups, 1) 227 BCS and 2) 227 partners of the BCS. See table 1 for complete demographic information for the samples.

Scores on the overall fear index of the Concerns About Recurrence Scale ranged from 4 to 24 for both BCS and partners with good variability of low, moderate, and high scores, as defined in Vickberg’s original scoring [64]. Also, scores on the Lepore Social Constraints Scale ranged from 14 to 55 for BCS with a total of 80.7% of BCS and 78.8% of partners reporting constraints. Table 2 presents results for all scales.

Aim 1: Mediation Analysis for BCS

For BCS, only current age was significantly correlated with FOR ($r = -.239$, $p = .01$); thus, age was the only demographic variable entered as a covariate in the analysis. BCS who reported greater constraints reported more incomplete cognitive processing than those who reported fewer constraints (path $a = 0.672$), and in turn reported more FOR (path $b = 0.310$). Social constraints demonstrated a significant indirect effect on FOR through the mechanism of cognitive processing (point estimate of indirect effect = 0.208, 95% bootstrap CI = 0.144 to 0.294). After accounting for the mediation effect of cognitive processing, there was no effect of social constraints on FOR (direct effect = 0.075, $p = 0.108$, 95% CI = -0.016 to 0.166). Therefore, as hypothesized, cognitive processing mediated the effect of social constraint on FOR.

Aim 2: Mediation Analysis for Partners

For partners, only years of education correlated with FOR ($r = -.164$, $p = .015$) and was, therefore, the only variable entered as a covariate in the mediation analysis for partners. Partners who reported greater constraints reported more incomplete cognitive processing than those who reported fewer constraints ($a = 0.631$) and, in turn reported more FOR ($b = 0.292$). Social constraints demonstrated a significant indirect effect on FOR through the mechanism of cognitive processing (point estimate of indirect effect = 0.184, 95% bootstrap CI = 0.119 to 0.271). After accounting for this mechanism, there was no effect of social constraints on FOR (direct effect = 0.038, $p = 0.469$, 95% CI = -0.066 to 0.142). Therefore, as hypothesized, cognitive processing mediated the effect of social constraints on FOR.

Discussion

This study was the first to examine whether the Social Cognitive Processing Theory could be used to predict FOR in a sample that uniquely included young, long-term BCS and their partners. As hypothesized, cognitive processing mediated the relationship between social constraints and FOR in young, long-term BCS and separately in their partners. When BCS or their partners feel constrained in talking about breast cancer, they are unable to process the trauma caused by breast cancer [32, 46], resulting in an increase in fear of a breast cancer recurrence. These results are consistent with previous research testing the SCPT [32, 35, 40, 45, 46]. This previous work found that if BCS felt constrained in their communication, then they were unable to cognitively process a trauma such as cancer, resulting in higher levels of distress than in those who did not experience social constraints. Likewise, partners who experienced social constraints from the survivors reported more cancer-related intrusive thoughts and more distress than partners who did not experience social constraints [24].

Our sample included young BCS who had been diagnosed 3-8 years prior at age 45 years or younger, and their partners. As women are typically diagnosed with breast cancer at a later age [90], this sample represents a minority of BCS who are not often studied but who typically report greater FOR [143]. Champion et al. (2014) found that among long-term BCS, young BCS compared to their older counterparts reported greater FOR, with younger BCS scoring nearly one standard deviation higher than older survivors [92]. Additionally, this unique data set allowed us to compare results between BCS and their partners using identical measures and methods. Because BCS and their partners were provided the same questionnaires, we were able to mirror the analyses between BCS and partners in order to see if cognitive processing differentially mediates the relationship between social constraints and FOR, and it did not. These results support inclusion of both BCS and partners in interventions to decrease social constraints because both parties experience social constraints and resulting FOR.

Neither of the demographic variables entered in the models- current age for survivors and years of education for partners- were significant in the mediation models. We found no difference in FOR scores relative to time since diagnosis, which is consistent with a recent review reporting no relationship between time since diagnosis and FOR in the 4 studies that included that information [145]. In the same review, younger age consistently predicted FOR in cancer BCS, while ethnicity, gender, and educational status produced mixed results.

Scores on the CARS varied, with a large proportion of BCS (52.3%) reporting moderate-to-high FOR. This falls within the range of scores reported in other studies [68, 138] and supports the idea that FOR does not decrease with the passage of time [145]. In developing the CARS, Vickberg (2003) sampled women 1-7 years after treatment (mean of 3 years) and found 55% reported moderate-to-high FOR, consistent with our study [138]. Liu et al. (2011) found that even among women who were diagnosed with in

situ and early stage breast cancer, 29% reported moderate-to-high FOR 2 years after treatment [68]. Women in both samples were considered disease free, yet were still reporting notable levels of FOR. The majority of partners in our sample (53.6%) also reported moderate-to-high FOR. The similarity in FOR scores between BCS and partners in our study supports previous research that survivor and partner levels of FOR are comparable [74, 75]. Family caregivers—including partners/husbands—sometimes report higher levels of FOR than BCS [71, 74], suggesting partners need to be offered supportive care services and included in interventions to reduce FOR.

The bivariate relationships between FOR and social constraints, as well as FOR and cognitive processing were strong for both BCS and partners in this sample. Other investigators have also found significant relationships between fear of recurrence and intrusive thoughts, cognitive avoidance, and social constraints [45, 146, 147]. However, without a theoretical model and mediation analyses, the story is incomplete. This analysis identified a strong mediator—cognitive processing—that can be used to frame an intervention to reduce social constraints between BCS and their partners. Past research has found FOR to be most problematic in younger BCS [143], but has failed to identify whether the same process occurs in partners of young BCS. Our analyses confirm that BCS and their partners frequently suffer from FOR and suggest that intervening on social constraints within the dyad might effectively reduce this understandable fear for both.

Limitations

While this study provided the unique opportunity to explore the relationship between FOR and other variables using SCPT in long-term BCS and their partners, there are several limitations. First, the data from this study are cross-sectional under a non-experimental design, limiting our ability to draw causal conclusions. Second, it is possible that other unmeasured variables help to explain the relationships. Third, while

the majority of demographic variables previously reported did not impact levels of FOR, it is important to note our sample differed from that of the general population. The sample in this study was mostly Caucasian and highly educated, with incomes higher than the general population, and may not be a representative sample of the breast cancer population. Fourth and finally, because the scale asks participants to think of instances of social constraints in the last month, our results may be limited. It is possible that social constraints scores might be higher immediately after treatment compared to several years out. If attempts at discussion are blocked, either the survivor or partner might cease making attempts, and the social constraints scores decrease. We do not know if the perception of social constraints, if present, remains stable over time or causes the survivor or partner to cease trying to communicate. Rather, they may stop making requests to discuss cancer if those requests were previously met with constraint. For these reasons, caution should be used when applying these findings to the larger breast cancer population.

Conclusions

Results from these analyses provide important information about predictors of FOR that can be used in the development of interventions to help BCS and their partners cope more effectively with one of the most common, lingering, and disruptive concerns after breast cancer diagnosis and treatment. Partners experienced similar levels of FOR as their loved one with breast cancer in the present study, a comparison that has been neglected in most studies. Including partners in analyses regarding social constraints is essential because constraints involve both people in the relationship. We found the same underlying relationships in both BCS and partners, which supports the use of a couple's intervention.

Implications for Practice and Future Research

Both BCS and their partners must process the trauma of breast cancer and most deal with FOR throughout survivorship. This study provided a framework through which future research can target constructs to develop and test interventions to decrease FOR. Interventions to reduce social constraints and promote open communication about breast cancer within the context of partnered relationships may enhance cognitive processing, ultimately decreasing fear of a breast cancer recurrence. One intervention that holds promise is Emotionally Focused Therapy (EFT), a structured intervention for couples grounded in attachment theory [151]. EFT focuses on intrapersonal (i.e., how partners process their own emotional experiences) and interpersonal processes (i.e., how partners respond to each other's emotions), which may help reduce the social constraints that inhibit effective cognitive and emotional processing of cancer stress for many couples. EFT is well established in non-cancer populations [152], and produced significant and sustained improvements in marital functioning among adults with cancer and their partners in a recent pilot study [114]. Alternately, mindfulness- and acceptance-based behavioral interventions are growing in popularity and availability in many countries and have shown preliminary efficacy in supporting couples coping with cancer [153-155]. Higher levels of mindfulness have predicted higher relationship satisfaction, greater capacities to respond constructively to relationship stress, and positive perceptions of the relationship after conflict, all germane in the context of cancer [156].

Although the results of the present analyses clearly indicate the appropriateness of SCPT in studying FOR, more research is needed to support these results. Future studies should track couples longitudinally to provide the opportunity to examine temporal relationships between social constraints, cognitive processing, and FOR. Additionally, sampling ethnically and economically diverse groups is necessary to determine if the SCPT has utility predicting FOR in the larger BCS population.

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Figure 5. Conceptual Model

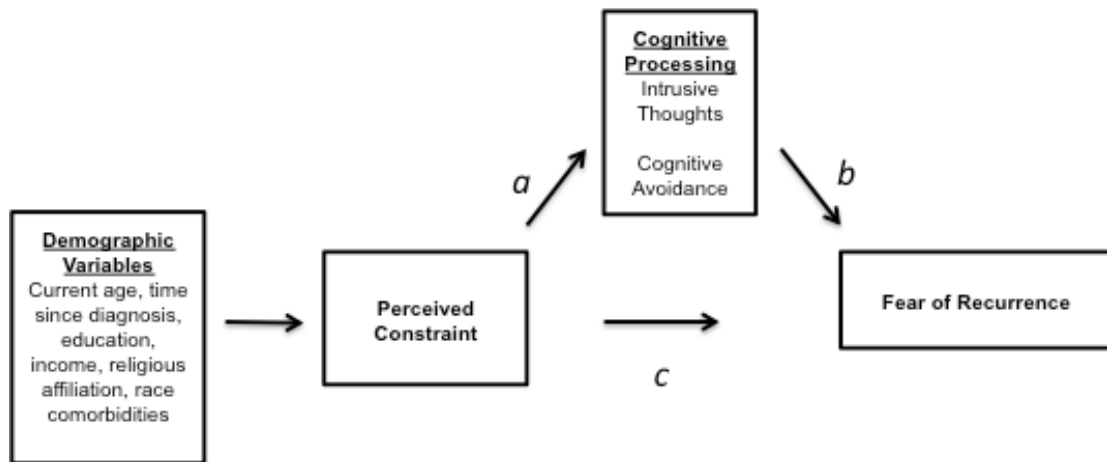


Table 4a. Demographic Information for Breast Cancer Survivors and Partners

Variable	Survivors (<i>n</i> =222)	Partners (<i>n</i> =222)
Race, No. (%)		
Caucasian	208 (93.7)	205 (92.3)
Black or African American	5 (2.3)	7 (3.2)
Asian	2 (0.9)	2 (0.9)
Other	7 (3.2)	8 (3.7)
Education (yrs), mean (<i>SD</i>)	14.93 (2.5)	14.92 (2.6)
Income, No. of Dyads (%)		
<=\$50,000	30 (13.5)	
>\$50,000 and <=\$100,000	109 (49.1)	
>\$100,000	83 (37.4)	
Religious affiliation, No. (%)		
Christian	194 (87.4)	185 (83.4)
Jewish	6 (2.7)	8 (3.6)
Other	3 (1.4)	3 (1.4)
No religious affiliation	17 (7.7)	25 (11.3)
Current age, mean (<i>SD</i>)	45.35 (4.7)	47.98 (7.2)
Time Since Diagnosis, Years (<i>SD</i>)	5.83 (1.51)	
Number of comorbidities for BCS/Chronic Conditions for Partners No. (%)		
0	89 (40.1)	76 (34.2)
1	58 (26.1)	71 (32)
2	33 (14.9)	45 (20.3)

≥ 3

40 (18.9)

30 (13.5)

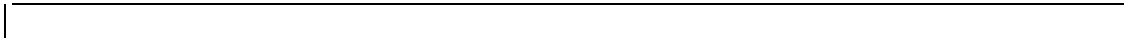


Table 4b. Mean Scores, Standard Deviation, and Range of All Scales for Breast Cancer Survivors and Partners

Measure	Mean (SD), Range Survivors	Mean (SD), Range Partners
Lepore Social Constraints Scale	20.947 (7.213), 14-55	20.331 (6.336), 14-40
Intrusive Thoughts (IES)	4.92 (5.55), 0-30	4.92 (5.18) 0-22
Cognitive Avoidance (IES)	4.91 (5.04), 0-23	3.69 (4.03), 0-23
Combined Intrusion and Avoidance subscales	10.78 (9.49), 0-46	8.61 (8.35), 0-37
Concerns About Recurrence Scale	12.548 (5.380), 4-24	11.794 (5.015), 4-24

|

Table 4c. Model Coefficients for Breast Cancer Survivors and Partners

		Survivors			Partners		
		<i>M</i> (Cognitive Processing)			<i>Y</i> (FOR)		
		Coeff.	SE	<i>p</i>	Coeff.	SE	<i>p</i>
Antecedent X (Social Constraints)	<i>a</i>	.672	.078	<.001	<i>c'</i>	.075	.108
<i>M</i> (Cognitive Processing)		-	-	-	<i>b</i>	.310	<.001
Constant	<i>i</i> ¹	-3.240	1.718	.258	<i>i</i> ²	12.7610	<.001
		R ² =.258 F(1, 215)= 74.72, <i>p</i> <.001			R ² =.401 F(3, 213)= 47.541, <i>p</i> <.001		
		Partners			Partners		
		<i>M</i> (Cognitive Processing)			<i>Y</i> (FOR)		
		Coeff.	SE	<i>p</i>	Coeff.	SE	<i>p</i>
Antecedent X (Social Constraints)	<i>a</i>	.631	.079	<.001	<i>c'</i>	.038	.469
<i>M</i> (Cognitive Processing)		-	-	-	<i>b</i>	.292	<.001
Constant	<i>i</i> ¹	-4.280	1.665	.011	<i>i</i> ²	11.4481	<.001
		R ² =.229 F(1, 217)= 64.498, <i>p</i> <.001			R ² =.280 F(3, 215)= 27.917, <i>p</i> <.001		

CHAPTER FIVE

The purpose of this chapter is to synthesize the findings of the three studies that compose this dissertation, to discuss strengths and weaknesses of the dissertation studies, and to propose future directions. First, this chapter begins with a summary of the findings in using the Social Cognitive Processing Theory to predict depressive symptoms in long-term BCS. Second, the chapter continues with the summary of findings for using the SCPT to predict depressive symptoms of partners of long-term BCS. Third, findings of using the SCPT to predict fear of recurrence in both BCS and partners are summarized. Fourth, we discuss strengths and weaknesses of the dissertation studies. Fifth and finally, the chapter ends with recommendations for future research.

A breast cancer diagnosis incites many long-term psychosocial consequences for both survivors and their partners. Of these, depressive symptoms and fear of recurrence are two of the more prevalent sources of distress cited throughout survivorship literature. Identifying useful frameworks within which to predict depressive symptoms and fear of recurrence is necessary for developing interventions to help these couples. One theory that has proven effect in predicting distress in BCS and partners is the Social Cognitive Processing Theory (SCPT), which proposes negative consequences arise when one is unable to openly discuss their feelings related to the cancer diagnosis with a significant other. Social constraints- or attempts to limit cancer-related discussion- interrupt cognitive processing. If cognitive processing is prolonged due to social constraints, individuals are at risk for poor psychological outcomes. This dissertation was the first study that tested relationships between the SCPT and psychological outcomes in long-term survivors and partners. We tested the SCPT as a predictor of a) depressive symptoms in young, long-term BCS in chapter 2, b) depressive symptoms in partners of BCS in chapter 3, and c) fear of recurrence in BCS and partners in chapter 4.

Summary of Findings from “Predicting Depressive Symptoms in Young Breast Cancer Survivors”

Depressive symptoms in BCS have been well documented, with an estimated 27% of survivors suffering from clinical levels of depressive as long as 8 years after diagnosis [92]. Given the prevalence of this problem in long-term survivors, it is important to identify theoretical frameworks to guide interventions. The SCPT has been used to predict depressive symptoms in BCS but has not, to our knowledge, been used to predict depressive symptoms in long-term BCS. Furthermore, there is some evidence for a link between BCS and partner distress, but a link between BCS and partner depressive symptoms has not been well established in long-term survivorship.

Therefore, we chose to explore the relationships in young, long-term BCS between depressive symptoms and 1) social constraints, 2) intrusive thoughts, 3) cognitive avoidance, and 4) partners' depressive symptoms all while controlling for sociodemographic variables.

Based on the findings of this study, there is some support for using the SCPT to predict depressive symptoms in long-term BCS. Depressive symptoms were related to social constraints and intrusive thoughts. The effect of partners' depressive symptoms on survivors' depressive symptoms was marginal, and the relationship between depressive symptoms and cognitive avoidance was not significant.

Summary of Findings from “Testing the Relationship Between Depressive Symptoms and Social Cognitive Processing in Partners of Breast Cancer Survivors”

Because there was some support for using the SCPT in long-term BCS, we thought it important to test the relationships in partners as well. Partners of breast cancer survivors (BCS) experience similar if not more depressive symptoms than the survivors. We compare the partners of both younger and older BCS but entered the group variable of younger vs older to determine if differences existed. We hypothesized that cognitive processing (intrusive thoughts and cognitive avoidance) would mediate the relationship between social constraints and depressive symptoms in all partners. Furthermore, we hypothesized that partners of younger survivors would generally fare worse than partners of older survivors due to life stage (i.e. competing demands of working and child-rearing, and not expecting their spouses to become ill).

Our hypotheses were confirmed: cognitive processing did mediate the relationship between social constraints and depressive symptoms for partners. Also, partners of younger survivors did report more depressive symptoms, more social

constraints, more intrusions, and more avoidance than partners of older survivors. This finding solidified our rationale for focusing primarily on young BCS and their partners.

Summary of Findings from “Testing the Relationship Between Long-Term Fear of Recurrence and Social Cognitive Processing in Young Breast Cancer Survivors and Their Partners”

Finally, we wanted to determine if the utility of the SCPT could be expanded to predict fear of recurrence in young, long-term BCS and their partners. Fear of a breast cancer recurrence is the most prevalent and disruptive source of distress for long-term BCS and their partners, but few studies have focused on predictors of fear of recurrence. We hypothesized that cognitive processing would mediate the relationship between social constraints and fear of recurrence in both BCS and partners. As hypothesized, cognitive processing mediated the relationship between social constraints and fear of recurrence both for BCS and their partners.

Strengths of the Dissertation

The findings of these three studies contribute to the cancer literature in several important ways. First, all data came from a large-scale descriptive quality of life study for BCS and partners. This unique data set collected a host of information from both survivors and partners, including demographic variables, all components of the SCPT, and psychological outcome variables not previously examined in long-term BCS and partners.

For all three articles, we found significant relationships between psychological outcomes and constructs within the Social Cognitive Processing Theory. In the BCS paper, we found a significant relationship between depressive symptoms and social constraints as well as intrusive thoughts, a relationship not previously tested in long-term BCS.

Partner outcomes have not been extensively tested independent of survivor outcomes. In our partner paper, we found that cognitive processing mediated the relationship between social constraints and depressive symptoms in both partners of older BCS and partners of younger BCS. Our sample also uniquely provided the opportunity to contrast outcomes in partners of younger BCS and partners of older BCS. While age differences have previously been reported for BCS [92], differences in partners' ages and whether differences exist if they are a partner to a younger or older survivor have not been tested.

Third, this was the first study to examine fear of recurrence in both long-term BCS and their partners. Additionally, ours is the first to test fear of recurrence as an outcome within the SCPT framework. For both BCS and their partners, cognitive processing mediated the relationship between social constraints and fear of recurrence.

Challenges and Limitations of the Dissertation

In addition to the many strengths of this study, there are important limitations to note. First, our sample was mostly Caucasian, well educated, and high earners. These factors may limit generalizability of our findings to the diverse population of BCS and their partners. Also, our data were cross-sectional, preventing us from drawing causal conclusions. Furthermore, it is possible that our outcomes- depressive symptoms and fear of recurrence- can be explained by additional variables not included in this dissertation.

Summary of Recommendations for Future Research

There are several opportunities for continued research in the area of BCS and partner outcomes. First, to more accurately reflect the population of BCS and their partners, future studies should use diverse populations. More diversity is needed in racial, economic, and educational background than offered by our data.

Second, longitudinal studies could be used to determine causality between SCPT variables and outcomes such as depressive symptoms and fear of recurrence. While the relationship between depressive symptoms and SCPT variables have been tested in BCS, the relationship has not been studied in partners. Furthermore, fear of recurrence has been assessed longitudinally as an outcome for neither survivors nor their partners.

Third, to our knowledge no intervention trials have been designed to reduce fear of recurrence in BCS and their partners. As discussed in chapters 2 and 4, interventions based on Emotion Focused Therapy (EFT) have shown promise in reducing distress related to cancer. EFT focuses both on how one processes his/her own emotions as well as how one responds to his/her partner's emotions. EFT and the SCPT are a natural fit for an intervention trial to decrease fear of recurrence, which would aim to reduce social constraints, promote timely cognitive processing, and lead to greater psychological adjustment after a cancer experience.

Conclusions

To our knowledge, this is the first study that utilized the SCPT to predict psychological outcomes in long-term BCS and their partners. Our results indicated a strong relationship between fear of recurrence and SCPT variables in both BCS and their partners. While the relationship between depressive symptoms and SCPT variables were strong in partners, our results were mixed with survivors. Because of the strong relationship between SCPT variables and fear of recurrence for both survivors and their partners, future dyadic interventions should focus on ways to reduce social constraints, thus promoting timely cognitive processing and better adjustment to the cancer.

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149. You, J. and Q. Lu, *Social constraints and quality of life among chinese-speaking breast cancer survivors: a mediation model*. Quality of Life Research, 2014: p. 1-8.
150. Hayes, A.F., *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. 2008: Guilford Press.
151. Johnson, S.M., *The practice of emotionally focused marital therapy: Creating connection*. Vol. 11. 1996: Psychology Press.
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154. Lengacher, C.A., et al., *A pilot study evaluating the effect of mindfulness-based stress reduction on psychological status, physical status, salivary cortisol, and interleukin-6 among advanced-stage cancer patients and their caregivers*. Journal of Holistic Nursing, 2012. **30**(3): p. 170-185.
155. Johns, S.A. *Impact of mindfulness training on avoidant coping and advance care planning*. . in American Society of Clinical Oncology Society October 25, 2014. Boston, MA.

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CURRICULUM VITAE

Andrea A. Cohee

EDUCATION:

GRADUATE

Indiana University	Doctor of Philosophy in Nursing Science	05/15
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UNDERGRADUATE

Indiana University	Bachelor of Science in Nursing	05/08
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APPOINTMENTS:

ACADEMIC (i.e. academic appointments, including academic administrative roles)

Indiana University	Adjunct Faculty	January-May 2015, January-May 2014
Indiana University	Research Assistant	2005-2008

NON-ACADEMIC (i.e. administrative, hospital or corporate appointments, consultantships)

Mayo Clinic Blood/Marrow Transplant	Staff Nurse	2008-2009
St. Vincent Hospital	Student Nurse Extern	2008

LICENSURE, CERTIFICATION, SPECIALTY BOARD STATUS (as applicable for discipline):

Registered Nurse, Indiana	2008-2015
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PROFESSIONAL ORGANIZATION MEMBERSHIPS:

Oncology Nursing Society	2010-Present
Midwest Nursing Research Society	2008-Present
Indiana University Alumni Association	2008-Present
Sigma Theta Tau International Honor Society of Nurses, Alpha Chapter	2008-Present
National Student Nurses Association	2006-2008

PROFESSIONAL HONORS AND AWARDS:

RESEARCH

Honorable Mention Poster Award-Doctoral Student	Midwest Nursing Research Society	March 2011
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3 rd Place Poster Award	Midwest Nursing Research Society	March 2008
OTHER		
Martel Plummer Leadership Award	Indiana University School of Nursing	May 2008
Top 100 Undergraduate Students	Indiana University-Purdue University Indianapolis	May 2008
Induction	Sigma Theta Tau International	May 2008
Induction	Phi Eta Sigma, Alpha Lambda Delta	2005
Academic Excellence Scholar	Indiana University-Purdue University Indianapolis	2004

PROFESSIONAL DEVELOPMENT:

Colorado Center for Emotionally Focused Therapy	Colorado EFT	February 28, 2015
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TEACHING:

TEACHING ASSIGNMENTS:

H355	Data Analysis, Practice, and Research	Lecture and online	Co-teacher	Spring 2015, Spring 2014	80
H355	Data Analysis, Practice, and Research	Lecture and online	Teaching assistant	Fall 2014, Fall 2013, Spring 2013	80

INVITED PRESENTATIONS - TEACHING
LOCAL

"Achieving Work-Life Balance During Grad School"	IUPUI- Interpreter Training Program	March 2014
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RESEARCH/CREATIVE ACTIVITY:

GRANTS/FELLOWSHIPS IN RESEARCH:

ACTIVE RESEARCH GRANTS/FELLOWSHIPS

Title	Granting Agency	Role	% Effort	Amount	Dates
The Long-Term Psychosocial Impact of Breast Cancer on Young Survivors and Their Partners”	National Institute of Nursing Research	Co-I	100	\$90,000	2012-2015

COMPLETED RESEARCH GRANTS/FELLOWSHIPS

Research Incentive Funding	IUSON	Fellow		\$10,000 each year	2009, 2010, 2011, 2012, 2013, 2014, 2015
Graduate Scholarship in Cancer Nursing	American Cancer Society			\$20,000	2011-2013
“Training in Research for Behavioral Oncology and Cancer Control Program”	National Cancer Institute	Fellow	100	\$40,000	2011-2012
Pre-Doctoral Training Program	Mary Margaret Walther Program for Cancer Care and Research	Fellow	80	\$40,000	2009-2011
Master Scholarship	Oncology Nursing Society			\$3,000	2011
Iren R. and Nathaniel M. Aycock Scholarship	IUSON			\$6,932	2010, 2011
Graduate Scholarship	Spotlight on Nursing			\$10,000	2010, 2011
Graduate Scholarship	Nursing 2000			\$900	2010
Pre Doctoral Fellowship	IUSON			\$20,000	2009

SUBMITTED BUT NOT FUNDED RESEARCH GRANTS/FELLOWSHIPS

Reducing Fear of Recurrence in Cancer Survivors and Partners	Ladies Auxiliary to the Veterans of Foreign Wars	PI	100%	\$100,000	2015-2017
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INVITED PRESENTATIONS - RESEARCH LOCAL

“The Long-Term Psychosocial Impact of Breast Cancer on Young	IUPUI- Interpreter Training Program				March 2013
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Survivors and Their Partners”

“Women’s Cancer Risk,
Prevention, and Screening”

Avon Christian Church

January 2011

SERVICE:

UNIVERSITY SERVICE:

SCHOOL

Nursing- Dean’s Council	Student Representative	2007-2008
Nursing- Presidents’ Council	President	2007-2008
Nursing	Class President	2005-2008
Nursing- Presidents’ Council	Secretary	2006-2007

PATIENT CARE/CLINICAL SERVICE:

Evidence Based Practice Council	Graduate Student Representative	Indiana University Hospital System	2009-2010
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PUBLICATIONS:

*indicates maiden name

1. ***Maners, A. A.**, & Champion, V. L. (2011). Coping and Quality of Life Outcomes in Younger Breast Cancer Survivors. *Western Journal of Nursing Research*, 33(8), 1106-1107.
2. Champion, V., Wagner, L., Monahan, P., Daggy, J., Smith, L., **Cohee, A.** Ziner, K., Haase, J., Miller, K., Pradhan, K., Unverzagt, F., Cella, D., Ansari, B., & Sledge, G. (2014). Comparison of Younger and Older Breast Cancer Survivors and Age-Matched Controls on Specific and Overall Quality of Life Domains. *Cancer*, 120(15), 2237-2246.
3. Rand, K. L., **Cohee A. A.**, Monahan, P. O., & Champion, V. L. (submitted). Confirmatory Test of Alternative Factor Structures and Measurement Invariance Assessment of the Brief COPE in Younger and Older Breast Cancer Survivors.
4. **Cohee, A.**, Adams, R., Johns, S. A., Von Ah, D., Zoppi, K., Fife, B., Monahan, P.O. Stump, T., Cella, D. & Champion, V. L. (submitted). *Fear of Recurrence in Breast Cancer Survivors and Partners*.
5. **Cohee, A.**, Monahan, P., Stump, T., & Champion, V. (submitted) Predicting Depressive Symptoms in Young Breast Cancer Survivors.
6. **Cohee, A.**, Monahan, P., Stump, T., & Champion, V. (submitted) Dissertation MS #2: *Impact of Each Partner’s Social Constraints on Each Other: Aim 2. Model tested, partner effects*

ABSTRACTS

1. ***Maners, A.A.**, & Champion, V.L. The Effect of Partner Support/Constraint on Younger Breast Cancer Survivors. Conference Proceedings of Midwest Nursing Research Society. Indianapolis, IN, March, 2008.
2. ***Maners, A.A.**, & Champion, V.L. The Impact of Social Support and Constraint on Breast Cancer Survivors and Partners. Conference Proceedings of Oncology Nursing Society. Los Angeles, CA, February 2011.

3. *Bell, C.J., **Maners, A.A.**, Alexander, A., Wagler Ziner, K., Champion, V.L. Understanding Quality of Life and Healthcare Priority Needs during Survivorship in Younger Breast Cancer Survivors. Conference Proceedings for Oncology Nursing Society. Los Angeles, CA, February 2011.
4. ***Maners, A.A.**, & Champion, V.L. Coping and Quality of Life Outcomes in Younger Breast Cancer Survivors. Conference Proceedings for Midwest Nursing Research Society. Columbus, OH, March 2011.
5. **Cohee, A.A.**, Monahan, P., & Champion, V.L. Body Image in Younger and Older Breast Cancer Survivors. Conference Proceedings of Midwest Nursing Research Society. St. Louis, MO, March 2014.
6. Adams, R. N., **Cohee, A. A.**, Stump, T., Monahan, P. O., & Champion, V. L. The Impact of Social Constraints from Health Providers on Breast Cancer Survivors' Symptom Burden. Conference Proceedings of Society of Behavioral Medicine. San Antonio, TX, April 2015.