

Effects of optimism, interpersonal relationships, and distress on psychosexual well-being among women with early stage breast cancer

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Abstract

This study examined associations between optimism, social support, and distress as they relate to psychosexual well-being among 136 women with Stage 0, I, and II breast cancer. Women were assessed immediately post-surgery and 3, 6, and 12 months post-surgery. Results support two cross-sectional mediation models. The first model indicates that patients who are more optimistic experience greater psychosexual well-being (i.e., feel more feminine, attractive, and sexually desirable) partly because they perceive themselves as having more social support available. The second model indicates that patients who are more optimistic experience greater psychosexual well-being partly because they experience less emotional distress related to the disease. When the two models were tested simultaneously, distress no longer contributed uniquely to the model at any time point except for 12 months follow-up.

Keywords: *Breast cancer, optimism, social support, distress, psychosexual well-being*

Introduction

Women who are diagnosed with and treated for breast cancer face many challenges. Among their concerns is how the treatment will affect their physical appearance (Carver et al., 1998; Spencer et al., 1999). Unlike most other diseases, a breast cancer diagnosis carries with it a direct threat to a woman's sense of femininity and attractiveness, due to the loss or disfigurement of the woman's breast(s). How women react to these changes varies with several factors,

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including individual characteristics and aspects of their interpersonal relationships (Ghizzani, Pirtoli, Bellezza, & Velicogna, 1995; Schover, 1991).

One factor known to influence adjustment to breast cancer is the trait of optimism. Scheier and Carver (1985) defined optimism as the expectancy that good outcomes generally occur when confronting problems in important life domains. Research indicates that optimists face adversity and handle challenges more effectively than pessimists and therefore benefit psychologically (Brissette, Scheier, & Carver, 2002; Carver & Gaines, 1987; Cutrona, 1982; Litt, Tennen, Affleck, & Klock, 1992; Scheier et al., 1989; Segerstrom, Taylor, Kemeny, & Fahey, 1998) and physically (Raikkonen, Matthews, Flory, Owens, & Gump, 1999; Scheier & Carver, 1985; Scheier et al., 1989; Segerstrom et al., 1998). In particular, several studies have found that greater optimism among breast cancer patients is associated with lower levels of emotional distress (Abend & Williamson, 2002; Carver et al., 1993, 1994b; Epping-Jordan et al., 1999; Stanton & Snider, 1993).

Interpersonal relationships also play a key role in how people adjust to a life crisis. The perceived availability of social support has consistently been linked to better physiological (Uchino, Uno, & Holt-Lunstad, 1999) and psychological adaptation to major illnesses (Cobb, 1976; Cohen & Hoberman, 1983). In particular, social support is an important predictor of psychological adjustment to breast cancer (Alferi, Carver, Antoni, Weiss, & Duran, 2001; Bloom, 1982; Irvine, Brown, Crooks, Roberts, & Browne, 1991; Nelles, McCaffrey, Blanchard, & Ruckdeschel, 1991; Vachon, 1986). Social support has also been linked to lower body-image disturbance among healthy women (Weller & Dziegielewski, 2004). As body image disturbance is one component of psychosexual adjustment, it is likely that social support can buffer against this type of disruption for women treated for breast cancer.

These two lines of research come together in the idea that one mechanism by which optimism facilitates adaptation to adversity involves social networks. Optimists report having more social support than pessimists (Brissette et al., 2002), they are more accepted by others (Carver, Kus, & Scheier, 1994a), and their friendships are longer in duration (Geers, Reilley, & Dember, 1998). Because optimists function better socially, they function better psychologically. For example, Lepore and Ituarte (1999) found that female breast and colon cancer patients who were optimistic about their illness had better emotional adjustment because they received fewer negative reactions from others when discussing their cancer (as reflected by tests of mediation). These findings as a group suggest that an optimistic attitude attracts others and facilitates stronger friendships, thus resulting in a strong support network. Research has also established perception of social support as a mediator between optimism and distress in breast cancer patients in particular (Abend & Williamson, 2002; Trunzo & Pinto, 2003).

One of the most important aspects of a support network is a person's marriage or other intimate interpersonal relationship (Diener, Suh, Lucas, & Smith, 1999). This relationship is a uniquely beneficial source of support for women who are

coping with breast cancer (Lichtman, Taylor, & Wood, 1987; Smith, Redman, Burns, & Sagert, 1985). As an important source of support, an intimate partner is likely to influence the quality of a woman's adjustment to breast cancer, including her feelings of femininity and attractiveness.

Although a number of studies have examined optimism and social support separately as predictors of adjustment to breast cancer, few have examined how these variables influence each other. One recent study by Abend and Williamson (2002) did so, examining the degree to which breast cancer patients felt physically attractive as a function of their levels of trait optimism and their interpersonal relationships. Optimistic women felt more physically attractive, and this was mediated by the extent of agreement with their partners and their perceptions of social support. Change in sexual functioning was also examined as a mediator variable, but was not significantly related to optimism or feelings of attractiveness.

That study is valuable, but it was limited by its cross-sectional design. The direction of effects could not be examined and it was not possible to track changes in the variables over time. The present study was an attempt to address this limitation by testing the hypothesis of Abend and Williamson (2002) in a prospective design. Our sample contains data from 4 time points over the course of a year. This design allows the possibility of examining the direction of effects. In order to replicate and extend Abend and Williamson's (2002) findings, we examined perceived social support as a mediator of the effect of optimism on women's psychosexual well-being (assessed here as a combined sense of attractiveness, femininity, and sexual desirability).

Given that not all women who confront breast cancer are in an intimate relationship, it is also important to examine whether the relations among optimism, social support, and perceived attractiveness hold for non-partnered as well as partnered women. To test this, we examined relationship status as a moderator of the effect of optimism on psychosexual well-being as well as a moderator of the effect of optimism on social support.

Research also indicates that emotional distress interferes with women's sexual functioning (Ghizzani et al., 1995; Kennedy, Dickens, Eisfeld, & Bagby, 1999) and influences feelings of attractiveness (Kissane et al., 1998) and concerns related to body image (Carver et al., 1998; Petronis, Carver, Antoni, & Weiss, 2003). Because optimists function better emotionally, it may follow that they would also experience less psychosexual disruption. Therefore, this study extends Abend and Williamson's (2002) model by examining emotional distress as another potential mediator of the effect of optimism on psychosexual well-being. We examined this mediation model at four time points.

Method

Procedure

There were 136 participants in this sample, all recruited from practices in greater Miami, Florida. Typically the woman's physician sent a letter introducing the

study and asking her to consider participating; respondents then contacted the research team and completed a brief phone interview with a research assistant from the project. The study was explained to the woman and information was gathered to determine her eligibility. Exclusion criteria were positive psychiatric history, prior cancer (except noninvasive skin cancer), or major concurrent disease. Once a woman was deemed eligible, she was mailed a consent form and questionnaire packet. Roughly 175 women were originally contacted for the study; 138 called for more information; of those who called, 136 met inclusion criteria and participated in the first assessment.

Participants completed questionnaires (by mail) at four time points throughout the course of a year: immediately post-surgery, 3 months post-surgery, 6 months post-surgery and 12 months post-surgery. The first assessment was completed by 136 participants; 11 women dropped out by three months post-surgery (8.1%), 10 additional women failed to complete the 6 months follow-up (7.4% of the starting sample), and 9 women failed to complete the 12 month follow-up (6.6% of starting sample). All measures described here were completed at each assessment.

Comparison between women who did and did not leave the study yielded no difference in regard to stage, number of positive nodes, surgical procedure, age, marital status, or presence versus absence of chemotherapy or radiation (all $ps > 0.20$). There was a significant difference among completers versus non-completers on ethnicity, with non-Hispanic White women being less likely than Hispanic or African American women to drop out ($p < 0.05$). Those who dropped out were also compared with those retained on key variables (i.e., optimism, social support, distress, femininity) at each time point. Those stopping before time 2 reported less social support at baseline ($p < 0.05$), but did not differ from those who stayed on any other baseline variable. Those who left between time 2 and time 3 did not differ on any time 2 variables from those who stayed. Those who left between time 3 and time 4 did not differ on any time 3 variables from those who stayed.

The data reported here came from a project examining effects of an intervention (Antoni et al., 2001).¹ Participants were randomly assigned to either an intervention or control condition. The intervention took place over a 10-week period following the initial assessment. Women assigned to the intervention ($n = 59$) participated in a cognitive behavioral stress management (CBSM) program (for details see Antoni et al., 2001). Women in the control condition ($n = 77$) were offered a day-long seminar (5–6 h) during which they received information on the same issues, but in a greatly abbreviated form.

Participants

Participants were diagnosed with Stage 0 ($n = 16$), Stage I ($n = 64$), or Stage II ($n = 56$) breast cancer. Nodal involvement ranged from 0 to 24 ($M = 1.30$, $SD = 3.96$). The women ranged in age from 29 to 79 ($M = 50.25$, $SD = 9.15$); 96 were married or in marriage-like relationships, with the remaining 40 separated,

divorced, widowed, or single. One hundred women were non-Hispanic White, 12 African American, and 24 Hispanic. The women had an average of 15.23 years of education ($SD = 2.46$); 108 were currently employed and 28 were retired or were not currently working outside the home.

Seventy-three of the women underwent modified radical mastectomies and 63 had lumpectomies. Fifty-eight subsequently underwent radiation therapy, 57 had chemotherapy, and 55 received anti-hormonal therapy. Forty-five of the women had reconstructive surgery, most within the first 3 months.

Measures

Optimism. Optimism was assessed with the six-item (plus 3 fillers) Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994), a newer form of the Life Orientation Test (Scheier & Carver, 1985). Response choices used in this study range from 1 ("I agree a lot") to 4 ("I disagree a lot") on items such as: "I'm always optimistic about my future", and "Things never work out the way I want them to". Responses were summed (after reversals as needed) such that higher scores represent greater optimism. Average α across assessments = 0.81. Optimism was quite stable across time; correlations between adjacent measures averaged 0.79.

Perceived social support. Perceived social support was assessed with the Social Provisions Scale (SPS; Cutrona & Russell, 1987). This scale consists of 25 items designed to assess the extent to which an individual perceives his or her relationships as offering various types of emotional and instrumental support. Response choices range from 1 ("I agree a lot") to 4 ("I disagree a lot") on items such as "There are people I can depend on if I really need it" and "There are people who enjoy the same social activities I do." Scores were summed in this study to create a composite social support score (average α across assessments = 0.90). Social support was quite stable across time; correlations between adjacent measures averaged 0.74.

Emotional distress. We measured general mood disturbance with a series of adjectives, each of which is a mood descriptor (Carver et al., 1993). Respondents indicated the extent to which they had experienced the emotional quality the item portrays during the last week. Responses were made on a 5-point scale that ranged from 1 (*not at all*) to 5 (*extremely*). The items assessed anxiety (tense, nervous, anxious), depression (helpless, unhappy, worthless, hopeless), and anger (angry, resentful, grouchy). Because the variables were highly interrelated, we used a composite distress score that averaged the subscale scores (as did Carver et al., 1993). The average alpha across the four assessments for the 10 items of this scale was 0.83. The correlations between adjacent measures averaged 0.54.

Psychosexual well-being. This measure consisted of a set of items culled by Carver et al. (1998) from previous studies of effects of the extent of surgery (mastectomy *versus* lumpectomy). These items were chosen as displaying differences between

those treatment conditions. The items are self-ratings of physical attractiveness (“How physically attractive do you feel you are?”), sexual desirability (“How sexually desirable do you feel you are?”), and femininity (“How feminine, or how much like a woman, do you feel you are?”), rated on scales ranging from “not at all” (1) to “extremely” (5). These three items were averaged to form what we will refer to here as an index of psychosexual well-being (average α across assessments = 0.87). This index was quite stable across time; correlations between adjacent measures averaged 0.71. This measure differed slightly from the measure of psychosexual well-being used by Abend and Williamson (2002). Their measure contained similar items assessing attractiveness and femininity, plus four additional items pertaining to women’s negative reactions to themselves.²

Results

Preliminary analyses

Preliminary analyses were conducted to determine whether any controls should be employed for demographic or treatment variables. Examined for this purpose were relations between all variables of interest (i.e., optimism, social support, distress, psychosexual well-being) and the following demographic and treatment variables: age, employment status, marital status, education, extent of surgery, stage of disease, number of positive nodes, tamoxifen therapy, radiation therapy, chemotherapy, reconstructive surgery, and experimental condition (intervention *vs.* control). Variables were retained as controls if they related significantly ($p < 0.05$) to any variable of interest. These analyses revealed two significant associations: Education related positively to optimism and chemotherapy treatment related negatively to psychosexual well-being. Education and chemotherapy were used as control variables in all analyses involving these variables. Participants’ involvement in the intervention was not related to any variables under study.

Table I displays means and standard deviations of the primary variables of interest at each assessment point. Repeated measures analyses were performed to examine the stability of these variables over time. Analyses yielded a significant overall effects for optimism, $F(3, 297) = 3.51$, $p < 0.05$. Optimism increased

Table I. Means and standard deviations of variables at each time point.

Variable	Post-surgery		3 months		6 months		12 months	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Optimism	19.78	3.50	19.75	3.65	20.27	3.37	20.37	3.38
Social support	93.21	7.82	94.19	8.18	94.08	8.31	94.52	8.35
Psychosexual Well-being	3.27	0.84	3.18	0.92	3.24	0.94	3.39	0.84
Distress	1.89	0.58	1.76	0.56	1.71	0.62	1.75	0.63

significantly from the 3-month follow-up to the 6-month follow-up, $t(114) = -2.61$, $p < 0.05$, and then stabilized. No significant change over time occurred for social support, distress, or psychosexual well-being.

Table II shows correlations of the LOT-R with psychosexual well-being, both concurrently and prospectively. Optimistic women reported feeling better off on this index than less optimistic women. This relationship was consistent across concurrent assessments, although relatively weak.

In contrast to the consistent concurrent associations, optimism generally did not predict psychosexual well-being prospectively. Baseline optimism predicted psychosexual well-being at 3 months ($r = 0.26$, $p < 0.01$), but prospective associations did not emerge at subsequent time points. The prospective association was further examined by controlling for baseline levels of psychosexual well-being. With this control, even that association ceased to be significant ($\beta = 0.11$, $p = 0.09$).

To test whether the relationship between optimism and psychosexual well-being was different for single *versus* partnered women, we examined relationship status as a moderator of the effect of optimism on psychosexual well-being. Four concurrent regression equations were estimated, one for each time point. Each equation included as predictors education and chemotherapy (as control variables), optimism (centered), relationship status (coded 0 and 1), and an optimism \times relationship status interaction term. No interaction between optimism and relationship status was significant, indicating that the relation between optimism and psychosexual well-being did not differ systematically as a function of relationship status.

Table II. Correlations between optimism and psychosexual well-being, social support, and distress as assessed at each measurement point.

	Optimism			
	Post-surgery	3 months	6 months	12 months
Psychosexual well-being				
Post-surgery	0.18*	–	–	–
3 months	0.26**	0.31***	–	–
6 months	0.16	0.17	0.22*	–
12 months	0.00	0.12	0.11	0.25*
Social support				
Post-surgery	0.28**	–	–	–
3 months	0.29**	0.38***	–	–
6 months	0.31**	0.35***	0.41***	–
12 months	0.24*	0.35***	0.40***	0.49***
Distress				
Post-surgery	-0.39***	–	–	–
3 months	-0.27**	-0.47***	–	–
6 months	-0.44***	-0.55***	-0.57***	–
12 months	-0.33**	-0.44***	-0.35***	-0.50***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table III. Concurrent correlations between psychosexual well-being and social support at each time point.

Post-surgery	3 months	6 months	12 months
0.33***	0.32***	0.42***	0.32**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table II also displays correlations of the LOT with perceived social support, both concurrently and prospectively. Optimism was consistently related to concurrent and subsequent social support. The prospective associations were further examined by using the value of social support at the immediately preceding assessment as a control. With this control, the prospective associations ceased to be significant. However, two associations approached significance: baseline optimism predicting social support at 3 months and optimism at 3 months predicting social support at 6 months ($\beta = 0.13$, $p = 0.07$; $\beta = 0.13$, $p = 0.07$).

To test whether the relationship between these variables was different for single *versus* partnered women, we examined whether relationship status operated as a moderator of the effect of optimism on perceived social support, using regression models similar to those described above. The interaction term between optimism and relationship status was significant at the 3 month assessment only ($\beta = -0.33$, $p = 0.05$). To explore this interaction, we computed separate regression equations for partnered and single women. Regression analyses predicting social support from optimism and education (as a control variable) indicated that there was a stronger association between these variables for single women ($\beta = 0.43$, $p < 0.01$) than for partnered women ($\beta = 0.22$, $p < 0.05$) at the 3-month assessment.

As can be seen in Table III, perceived social support was related to better concurrent psychosexual adjustment at each assessment. A moderation analysis similar to that described above tested whether differences in relationship status moderated the link between social support and psychosexual well-being at each time point. No interaction term was significant, indicating that the relationship between social support and psychosexual well-being does not differ between single and partnered women.

Table II also displays correlations of the LOT with emotional distress, both concurrently and prospectively. Optimism was also consistently associated with both concurrent and subsequent distress. The prospective associations were further examined by using the value of distress at the immediately preceding assessment as a control. With this control, two prospective associations remained significant. Baseline optimism predicted distress at 6 months and optimism at 3 months predicted distress at 6 months ($\beta = -0.29$, $p < 0.01$; $\beta = -0.36$, $p < 0.01$).

Test of concurrent mediation

Mediation analyses were performed by estimating a series of regression models as recommended by Baron and Kenny (1986). Perceived social support and emotional distress were examined as potential mediators. Mediator variables were

first examined individually in separate models. These individual tests were followed by tests of models in which both mediators were tested simultaneously. These analyses established the extent to which the mediator variables made distinct contributions.

In the first step of the necessary regression equations, regressing the concurrent mediator variable (i.e., social support, distress) on optimism and education (as a control variable) confirmed that these relations were significant at each time point (e.g., optimism continues to predict social support and distress after the effect of education is taken into account). Path analyses were then conducted to estimate the direct and indirect effects of optimism on psychosexual well-being (education and chemotherapy were included as control variables in the estimation of these models).

At each time point, when psychosexual well-being was regressed on optimism, optimism was significantly related to psychosexual well-being. At each time point, the mediator variable (i.e., social support, distress) was also significantly related to psychosexual well-being. Finally, at each time point, the addition of the mediator variable to the regression equation resulted in a reduction in the effect of optimism. The direct effect for optimism became non-significant at baseline, 6 months, and 12 months. At the 3 month follow-up, the addition of the mediator variable reduced the direct effect of optimism, although it remained significant. The Sobel test was used to test the significance of the indirect effect at each time point (MacKinnon & Dwyer, 1993). Figure 1 presents the results for the path analyses for social support and Figure 2 presents the results of these path analyses for distress.

Given that all of the associations of optimism with both mediator variables and the outcome variable were concurrent, it was also important to explore other plausible models. Therefore, we considered the possibility of reverse mediation by exploring the role of psychosexual well-being in the relations of optimism to perceived social support. The pattern of data supported this alternative model at the 3-month follow-up only. Figure 3 presents the results of the path analysis at the 3-month follow-up as well as the Sobel test for this model. We also considered a reverse mediation model in which psychosexual well-being mediated the relationship between optimism and distress. This model was not significant at any time point.

We followed the individual mediation models with tests of models in which distress and perceived social support were entered simultaneously. At the 12 month assessment, distress and perceived social support both made independent contributions to the model ($\beta = -0.21, p < 0.05$; $\beta = 0.26, p < 0.05$). At all other time points, perceived social support remained significant, but distress failed to contribute uniquely.

Discussion

This study examined associations between optimism and social support as they relate to psychosexual well-being among early-stage breast cancer patients.

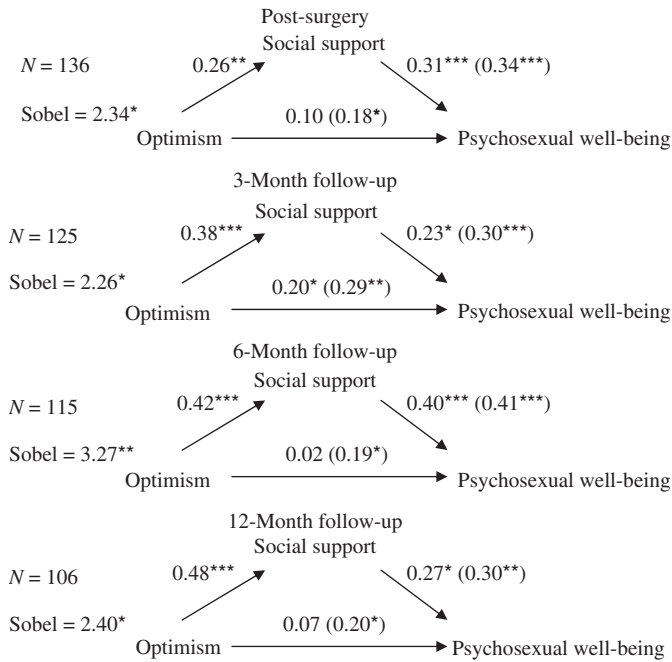


Figure 1. Path models depicting the role of social support in mediating the effects of optimism on psychosexual well-being. Models include education as a control variables in analyses involving optimism and chemotherapy in analyses involving psychosexual well-being. Numbers shown are standardized regression coefficients. Values inside parentheses are betas from analyses in which only the path from optimism or social support to psychosexual well-being was included. Values outside parentheses are betas from analyses in which both paths to psychosexual well-being were included. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

We focused on the extent to which the relations between these variables would replicate those found by Abend and Williamson (2002), how consistent the relations were across subsamples of partnered and single women, and how these relations played out across time. Additionally, we examined emotional distress as another potential mediator of the relationship between optimism and psychosexual well-being.

The findings confirm that women’s psychosexual well-being in the face of diagnosis and treatment of early-stage breast cancer is predicted in part by optimism, replicating past findings (Abend & Williamson, 2002; Carver et al., 1993, 1994b; Epping-Jordan et al., 1999; Stanton & Snider, 1993). We found that greater optimism related to greater psychosexual well-being immediately post-surgery and that this association remained in existence through the next year. Contrary to expectation, however, optimism did not predict subsequent psychosexual well-being. Thus, having an optimistic orientation to life related to psychosexual well-being at a given time, but did not determine those feelings in later months. This lack of a prospective relationship cannot be attributed to the stability of psychosexual well-being over time (though such stability does make prospective prediction difficult). That is, although optimism and psychosexual

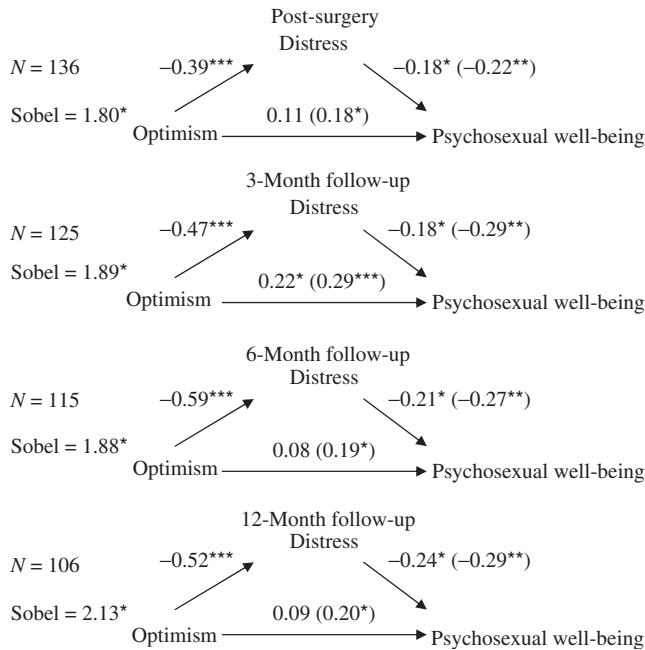


Figure 2. Path models depicting the role of distress in mediating the effects of optimism on psychosexual well-being. Models include education as a control variables in analyses involving optimism and chemotherapy in analyses involving psychosexual well-being. Numbers shown are standardized regression coefficients. Values inside parentheses are betas from analyses in which only the path from optimism or distress to psychosexual well-being was included. Values outside parentheses are betas from analyses in which both paths to psychosexual well-being were included. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

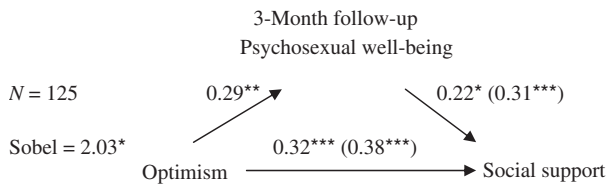


Figure 3. Path models depicting the role of psychosexual well-being in mediating the effects of optimism on social support. Models include education as a control variables in analyses involving optimism and chemotherapy in analyses involving psychosexual well-being. Values inside parentheses are betas from analysis in which only the path from optimism or psychosexual well-being to social support was included. Values outside parentheses are betas from analysis in which both paths to social support were included. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

well-being were both quite stable over time, prospective correlations from the one to the other were generally not significant even at the bivariate level (Table I).

Greater optimism was also associated with women's perceptions of available social support. These findings replicated studies linking optimism to greater social support (Abend & Williamson, 2002; Brissette et al., 2002; Dougall, Hyman,

Hayward, McFeeley, & Baum, 2001). The women in our sample who were more optimistic consistently perceived more availability of social support at concurrent and subsequent assessments. However, optimism did not significantly predict changes in this variable over time. In this case, the failure is more easily attributed to the stability of perceived social support, as prospective bivariate relations were generally significant.

Examination of data from other samples indicates that the relative stability of these measures across time was not particularly unusual in this sample. Using the same measure of psychosexual well-being, Wimberly, Carver, Laurenceau, Harris and Antoni (2005) found that this variable correlated an average of 0.74 across adjacent measurements, consistent with the present findings. A study of prospective relationships between social support, distress, and life disruption among breast cancer patients found that perceived social support from partners (using a different measure) changed from pre- to post-surgery and then remained relatively stable throughout the following year (Alferi et al., 2001). The similarity of these patterns across studies suggests that the stability of these variables in this sample accurately reflects women's experiences over the year following surgery. The importance of this issue for prospective research is that such stability makes prospective prediction quite difficult.

Given previous evidence of the beneficial effects of partner support among breast cancer patients (Lichtman et al., 1987; Smith et al., 1985), a reasonable question was whether the women's relationship status influenced the association between these variables. Contrary to expectation, the presence of an intimate partner did not systematically have such an influence. There was no evidence that relationship status moderated the effects of optimism or social support on psychosexual well-being. Nor was there much evidence that relationship status moderated the relation of optimism to perceived social support. A significant interaction occurred only immediately post-surgery, and the association at that time was stronger for single than partnered women. Therefore, it is appropriate to conclude that the relations among these variables were similar for partnered and single women. Although intimate relationships are beneficial to women during treatment for breast cancer (Wimberly et al., 2005), it appears that the psychosexual benefits women derive from their interpersonal relationships are the result of more general social resources rather than partner specific support.

Greater optimism was also associated with less emotional distress among breast cancer patients. These results replicate previous findings which suggest that an optimistic attitude is related to less emotional distress (Carver et al., 1993; Epping-Jordan et al., 1999). The women in our sample who were more optimistic reported experiencing less emotional distress at both concurrent and subsequent assessments.

Closer examination of the data provided insight into the mechanism by which these variables operate in breast cancer patients. As in the Abend and Williamson study, our results indicate that early-stage breast cancer patients who are sufficiently optimistic feel more feminine and attractive partly because they perceive themselves as having greater social support available. Evidence of

mediation was found at each assessment throughout the course of a year following surgery. We were not able to examine this mediational relationship prospectively, however, due to the absence of prospective associations between optimism and psychosexual well-being.

Of particular interest is the degree to which social support accounts for the effect of optimism on psychosexual well-being. In this sample, the direct effect from optimism to psychosexual well-being became non-significant when controlling for social support at each time point except the 3-month follow-up. Although trait optimism is important for psychosexual well-being, its impact appears to be largely through its relation to the perceived availability of social support. These findings fit the position that optimistic individuals are better able to generate supportive social networks which in turn facilitates better psychosexual adjustment to breast cancer.

Further clarification was gained by exploring a reverse mediation model. There was evidence at the 3-month follow-up that optimistic women perceived increased social support availability partly via increased feelings of femininity, desirability, and attractiveness. Interestingly, this is the same time point that evidence for the original mediation model was weakest, reflecting the strongest association between optimism and psychosexual well-being at this time point. Thus, these variables may have been involved in a reinforcing cycle in which a woman's perception of social support availability led to feelings of femininity, desirability, and attractiveness, which in turn facilitated an increase in perceived social support. In general, however, the evidence was more consistent with the path through social support to psychosexual well-being than the reverse. This conclusion must be seen as tentative, however, given our inability to explore mediation across time.

The present findings might seem to contradict work that failed to find an association between optimism and active use of social support in breast cancer patients (Carver et al., 1993). However, the apparent contradiction may result from differences in constructs measured. The Carver et al. (1993) study examined use of social support as an active coping strategy; the present study, as well as those of Abend and Williamson (2002) and Trunzo and Pinto (2003), examined women's perceptions of social support availability. The importance of this distinction is documented by research that has found that perceived support being more important than received support in predicting adjustment to stressful life events (Wethington & Kessler, 1986).

Our results also extend the findings of Abend and Williamson (2002) by examining emotional distress as a potential mediator variable. Our findings indicate that early-stage breast cancer patients who are sufficiently optimistic feel more feminine and attractive partly because they are experiencing lower levels of distress. Evidence of mediation was found at each assessment throughout the course of a year following surgery. Therefore, an optimistic attitude can temper distress related to the cancer experience, thereby improving women's psychosexual well-being. Although distress appeared to be a significant mediator in the individual models, when it was included in a model with perceived social

support, it did not predict above and beyond social support at any time point other than the 12-month follow-up.

Although our study had a large sample, at least one limitation should be noted. The majority of our sample were non-Hispanic white women who were well educated. This homogeneity (which typifies research in psycho-oncology) places caution on generalizing to more diverse populations. Despite this limitation, the study makes several contributions. The findings further illuminate mechanisms by which optimism is linked to better psychosexual adaptation. Our data suggest that an optimistic orientation to life plays an important role in patients' perceptions of support available to them during this crisis. This perception of social support, in turn, facilitates feelings of femininity and attractiveness. This phenomenon seems to occur consistently over the course of a year and occurs similarly for partnered and single women.

Notes

- [1] Analyses of data from this sample (or subsets of this sample) have been reported by Antoni et al. (2001) and Cruess et al. (2000). Neither of those reports addressed any of the relationships under study here, however.
- [2] We also examined changes in sexual functioning per se as a mediator variable, using the same measures Abend and Williamson (2002) used (a subscale of the Psychological Adjustment to Illness Scale). As did Abend and Williamson, we found that this variable did not significantly relate to optimism or psychosexual well-being. For that reason it is not discussed further.

References

- Abend, T. A., & Williamson, G. M. (2002). Feeling attractive in the wake of breast cancer: Optimism matters, and so do interpersonal relationships. *Personality and Social Psychology Bulletin*, *28*, 427–436.
- Alferi, S. M., Carver, C. S., Antoni, M. H., Weiss, S., & Duran, R. E. (2001). An exploratory study of social support, distress, and life disruption among low-income hispanic women under treatment for early stage breast cancer. *Health Psychology*, *20*, 41–46.
- Antoni, M. H., Lehman, J. M., Kilbourn, K. M., Boyers, A. E., Culver, J. L., Alferi, S. M., et al. (2001). Cognitive-behavioral stress management intervention decreases the prevalence of depression and enhances benefit finding among women under treatment for early-stage breast cancer. *Health Psychology*, *20*, 20–32.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.
- Bloom, J. (1982). Social support, accommodation to stress and adjustment to breast cancer. *Social Science and Medicine*, *16*, 1329–1338.
- Brissette, I., Scheier, M., & Carver, C. S. (2002). The role of optimism in social network development, coping, and psychological adjustment during a life transition. *Journal of Personality and Social Psychology*, *82*, 102–111.
- Carver, C. S., & Gaines, J. G. (1987). Optimism, pessimism, and post-partum depression. *Cognitive Therapy and Research*, *11*, 449–462.
- Carver, C. S., Kus, L. A., & Scheier, M. F. (1994a). Effects of good *versus* bad mood and optimistic *versus* pessimistic outlook on social acceptance *versus* rejection. *Journal of Social and Clinical Psychology*, *13*, 138–151.

- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., et al. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, *65*, 375–390.
- Carver, C. S., Pozo-Kaderman, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., et al. (1994b). Optimism versus pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer*, *73*, 1213–1220.
- Carver, C. S., Pozo-Kaderman, C., Price, A. A., Noriega, V., Harris, S. D., Derhagopian, R. P., et al. (1998). Concerns about aspects of body image and adjustment to early stage breast cancer. *Psychosomatic Medicine*, *60*, 168–174.
- Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*, 300–314.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology*, *13*, 99–125.
- Cruess, D. G., Antoni, M. H., McGregor, B. A., Kilbourn, K. M., Boyers, A. E., Alferi, S. M., et al. (2000). Cognitive behavioral stress management reduces serum cortisol by enhancing benefit finding among women being treated for early-stage breast cancer. *Psychosomatic Medicine*, *62*, 304–308.
- Cutrona, C. E. (1982). Nonpsychotic postpartum depression: A review of recent research. *Clinical Psychology Review*, *2*, 487–503.
- Cutrona, C. E., & Russell, D. (1987). The provisions of social relationships and adaptation to stress. In D. Perlman (Ed.), *Advances in personal relationships* (pp. 37–67). Greenwich: JAI Press.
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*, 276–302.
- Dougall, A. L., Hyman, K. B., Hayward, M. C., McFeeley, S., & Baum, A. (2001). Optimism and traumatic stress: The importance of social support and coping. *Journal of Applied Social Psychology*, *31*, 223–245.
- Epping-Jordan, J. E., Compas, B. E., Osowiecki, D. M., Oppedisano, G., Gerhardt, C., Primo, K., et al. (1999). Psychological adjustment in breast cancer: Processes of emotional distress. *Health Psychology*, *18*, 315–326.
- Geers, A. L., Reilly, S. P., & Dember, W. N. (1998). Optimism, pessimism, and friendship. *Current Psychology: Developmental, Learning, Personality, Social*, *17*, 3–19.
- Ghizzani, A., Pirtoli, L., Bellezza, A., & Velicogna, F. (1995). The evaluation of some factors influencing the sexual life of women affected by breast cancer. *Journal of Sex and Marital Therapy*, *21*, 57–63.
- Irvine, D., Brown, B., Crooks, D., Roberts, J., & Browne, G. (1991). Psychosocial adjustment in women with breast cancer. *Cancer*, *67*, 1097–1117.
- Kennedy, S. H., Dickens, S. E., Eisfeld, B. S., & Bagby, R. M. (1999). Sexual dysfunction before antidepressant therapy is major depression. *Journal of Affective Disorders*, *56*, 201–208.
- Kissane, D. W., Clarke, D. M., Ikin, J., Bloch, S., Smith, G. C., Vitetta, L., et al. (1998). Psychological morbidity and quality of life in Australian women with early-stage breast cancer: A cross-sectional survey. *Medical Journal of Australia*, *169*, 192–196.
- Lepore, S. J., & Ituarte, P. H. G. (1999). Optimism about cancer enhances mood by reducing negative social relations. *Cancer Research Therapy and Control*, *8*, 165–174.
- Lichtman, R. R., Taylor, S. E., & Wood, J. V. (1987). Social support and marital adjustment after breast cancer. *Journal of Psychosocial Oncology*, *5*, 47–74.
- Litt, M. D., Tennen, H., Affleck, G., & Klock, S. (1992). Coping and cognitive factors in adaptation to *in vitro* fertilization failure. *Journal of Behavioral Medicine*, *15*, 171–187.
- MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review*, *17*, 144–158.
- Nelles, W. B., McCaffrey, R. J., Blanchard, C. G., & Ruckdeschel, J. C. (1991). Social supports and breast cancer: A review. *Journal of Psychosocial Oncology*, *9*, 21–34.

- Petronis, V. M., Carver, C. S., Antoni, M. H., & Weiss, S. (2003). Investment in body image and psychosocial well-being among women treated for early stage breast cancer: Partial replication and extension. *Psychology and Health, 18*, 1–13.
- Raikkonen, K., Matthews, K. A., Flory, J. D., Owens, J. F., & Gump, B. B. (1999). Effects of optimism, pessimism, and trait anxiety on ambulatory blood pressure and mood during everyday life. *Journal of Personality and Social Psychology, 76*, 104–113.
- Scheier, M., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*, 219–247.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*, 1063–1078.
- Scheier, M. F., Magovern, G. J., Abbott, R. A., Matthews, K. A., Owens, J. F., Lefebvre, C. R., et al. (1989). Dispositional optimism and recovery from coronary artery bypass surgery: The beneficial effects on physical and psychological well-being. *Journal of Personality and Social Psychology, 57*, 1024–1040.
- Schover, L. R. (1991). The impact of breast cancer on sexuality, body image, and intimate relationships. *Cancer, 41*, 112–119.
- Segerstrom, S. C., Taylor, S. E., Kemeny, M. E., & Fahey, J. L. (1998). Optimism is associated with mood, coping and immune changes in response to stress. *Journal of Personality and Social Psychology, 74*, 1646–1655.
- Smith, E. M., Redman, R., Burns, T. L., & Sagert, K. M. (1985). Perceptions of social support among patients with recently diagnosed breast, endometrial, and ovarian cancer: An exploratory study. *Journal of Psychosocial Oncology, 3*, 65–81.
- Spencer, S. M., Love, N., Lehman, J. M., Wynings, C., Arena, P., Carver, C. S., et al. (1999). Concerns about breast cancer and relations to psychosocial well-being in a multiethnic sample of early-stage patients. *Health Psychology, 18*, 159–168.
- Stanton, A. L., & Snider, P. R. (1993). Coping with a breast cancer diagnosis: A prospective study. *Health Psychology, 12*, 16–23.
- Trunzo, J. J., & Pinto, B. M. (2003). Social support as a mediator of optimism and distress in breast cancer survivors. *Journal of Consulting and Clinical Psychology, 4*, 805–811.
- Uchino, B. N., Uno, D., & Holt-Lunstad, J. (1999). Social support, physiological processes, and health. *Current Directions in Psychological Science, 18*, 145–148.
- Vachon, M. L. S. (1986). A comparison of the impact of breast cancer and bereavement: Personality, social support and adaptation. In S. Hobfall (Ed.), *Stress, social support and women* (pp. 187–205). New York: Hemisphere.
- Weller, J. E., & Dziegielewski, S. F. (2004). The relationship between romantic partner support styles and body image disturbance. *Journal of Human Behavior in the Social Environment, 10*, 71–92.
- Wethington, E., & Kessler, R. C. (1986). Perceived support, received support, and adjustment to stressful life events. *Journal of Health and Social Behavior, 27*, 78–89.
- Wimberly, S. R., Carver, C. S., Laurenceau, J. P., Harris, S. D., & Antoni, M. H. (2005). Perceived partner reactions to diagnosis and treatment of breast cancer: Impact on psychosocial and psychosexual adjustment. *Journal of Consulting and Clinical Psychology, 73*, 300–311.