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Psychooncology. 2017 October ; 26(10): 1691–1699. doi:10.1002/pon.4192.**Spirituality, emotional distress, and post-traumatic growth in breast cancer survivors and their partners: an actor–partner interdependence modeling approach****Amanda N. Gesselman**^{1,2}, **Silvia M. Bigatti**^{2,*}, **Justin R. Garcia**^{1,3}, **Kathryn Coe**², **David Cella**^{4,5}, and **Victoria L. Champion**⁶¹The Kinsey Institute, Indiana University, Bloomington, IN, USA²IU Richard M. Fairbanks School of Public Health at IUPUI, Indianapolis, IN, USA³Department of Gender Studies, Indiana University, Bloomington, IN, USA⁴Northwestern University, Chicago, IL, USA⁵NorthShore University, Evanston, IL, USA⁶School of Nursing, Indiana University, Indianapolis, IN, USA**Abstract**

Background—The association between spirituality and emotional health has been well documented in healthy individuals. A small literature has shown that spirituality plays a role in well-being for some breast cancer (BC) survivors; however, this link is virtually unexplored in partners/spouses of survivors. The current study aimed to assess the relationship between spirituality, emotional distress, and post-traumatic growth for BC survivors and their partners using a dyadic analyses approach.

Methods—A total of 498 couples who were 3–8 years post-BC diagnosis were recruited from the Eastern Oncology Group database.

Results—For BC survivors and their partners, greater levels of spirituality were associated with increases in their own post-traumatic growth. There was no relation between BC and partner spirituality and their own emotional distress, but partner’s spirituality was associated with reduced occurrence of intrusive thoughts in the BC survivor. In contrast, BC survivors’ spirituality was found to be wholly unrelated to partner’s mental health and adjustment.

Conclusions—Following diagnosis and treatment, spirituality appears to associate with positive growth in BC survivors and their partners. However, BC survivor and partner spirituality seem to be ineffective at impacting the other’s post-traumatic growth or emotional distress, with the exception of intrusive thoughts. Dyadic analysis takes into account the reciprocal influence of close relationships on health and is an important and under-utilized methodology in behavioral oncology research and clinical practice.

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Introduction

Globally, breast cancer (BC) is believed to be the most common cancer among women [1]. In 2014, approximately 232,670 women were diagnosed with BC in the USA. Because of both the prevalence of BC and advances in treatment, these women join the estimated 2.8 million women who have experienced this disease and are currently living as BC survivors [2]—the largest group of cancer survivors in the USA [3].

Breast cancer diagnosis, treatment, and survivorship can come with sizeable emotional distress for both survivors and for their spouses or partners, which leads to depression, anxiety, and a host of other negative psychological outcomes [4–10]. In the present study, emotional distress was operationally defined with the Impact of Events Scale [11], one of the mostly widely used measures of distress. The instrument measures intrusive thoughts and avoidant behavior and, in this study, assessed distress specifically in relation to being diagnosed and treated for BC.

However, literature on the aftermath of traumatic or challenging life events shows the potential for psychological benefits as well: over time, cancer survivors may experience positive psychological changes apparent in areas such as their approach to life, relationships, and spirituality. These positive changes following traumatic events are known as *post-traumatic growth* [12]. Research on cancer survivors has suggested that between 60% and 90% report positive changes following diagnosis and treatment. For instance, in a review of 10 studies, researchers found that most BC survivors perceive their quality of life to be high 5 years post-diagnosis [13]. In one study, disease-free 10-year BC survivors reported greater life satisfaction than did healthy controls and reported positive changes in their appreciation of life, relationships with others, and personal strength [14]. Additionally, in a longitudinal study, BC survivors' post-traumatic growth increased after BC treatment—with increasing scores on four of the five subscales measured by the Post-traumatic Growth Inventory [15] including Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life. Importantly, this study also included partners of BC survivors, who were found to experience post-traumatic growth just as BC survivors did.

In the current study, we investigated long-term emotional distress and post-traumatic growth in female BC survivors and their partners, 3–8 years post-diagnosis, from a dyadic perspective. Research using the systemic-transactional stress model [16] to examine couples functioning under times of stress emphasizes that partners are interdependent in their experiences of and reactions to stress, with one partner's experience strongly linked to, affecting, and affected by the other partner's experience [17]. This is supported by a meta-analysis of 21 studies that found that psychological distress was similar between and correlated among patients and carers [18]. Another meta-analysis of distress in couples coping with cancer found that couples react as an emotional system rather than as individuals and highlighted the need to understand factors that influence distress in couples [19].

We examined how emotional distress and post-traumatic growth may be affected by spirituality—an important source of support and guidance for those who consider

themselves to be spiritual [20]. Spirituality is generally described as holding beliefs about the sacred and includes the existence of a human spirit or soul as distinct from the physical body [21]. Conceptually, spirituality is broader than religiosity, although both spirituality and religiosity have been examined as potential adaptive resources for cancer patients and survivors [21,22].

Three meta-analyses showed that religiosity and spirituality were associated with greater physical health [23], mental health [24], and social health [25] in cancer survivors. In a review focusing only on those with BC, spirituality was related to lower levels of stress, fewer depressive symptoms, decreased mood disturbance, better quality of life, and a fighting spirit. Although the sample of quantitative studies found and reviewed was small ($N = 8$), the authors concluded that ‘it is apparent that spirituality plays a role in the well-being of some breast cancer survivors’ [p. 92; 22]. While a few studies empirically examine the effects of spirituality on mental health for BC survivors, research examining this association in *partners* of BC survivors—or partners of cancer survivors in general—is nearly non-existent. In the only study examining a proxy of spirituality on psychological outcomes in partners of BC survivors, Hasson-Ohayon *et al.* [26] surveyed women with advanced BC and their spouses about sources of support, including support received from their spiritual community. Their results suggested that while perceived support from family and friends protected survivors and spouses against psychological distress, support from the spiritual community correlated *positively* with distress for both partners. This finding is surprising given that spirituality has been meta-analytically shown to be beneficial for cancer survivors [23–25]; however, this study focused only on support given by other people of the same spirituality/faith rather than on the internalized effect of the belief system and only on negative psychological outcomes. Thus, it is not clear how *feelings* of spirituality may affect survivors and their partners following diagnosis and treatment or how they may differentially affect positive and negative outcomes such as post-traumatic growth and emotional distress.

In the current study, we examined the relationship between spirituality, emotional distress, and post-traumatic growth. We examined these associations in both BC survivors and in their partners. Further, using dyadic analysis (actor–partner interdependence modeling) [27], we also examined how BC survivors and their partners may impact one another with their spiritual views and practices. We developed three hypotheses for this research:

- H1** Spirituality will be negatively related to emotional distress in BC survivors and their partners.
- H2** Spirituality will be positively related to post-traumatic growth in BC survivors and their partners.
- H3** Spirituality of BC survivors and their partners will affect one another’s psychological outcomes.

Findings from this research can help increase our understanding of the links that may exist between health, response to serious illness, and spirituality and how partners impact each other. By further bridging the gap between spirituality and health research, findings may inform interventions aimed at improving the mental health and quality of life of couples affected by the trauma of BC.

Method

Participants and procedures

The current study utilized cross-sectional survey data from the Eastern Cooperative Oncology Group (ECOG) database from a larger study focused on long-term effects of BC on quality of life. Eligible BC survivors previously treated on ECOG clinical trials were identified from 97 sites located throughout the USA. ECOG sites also identified potentially eligible BC survivors who were not treated on a clinical trial but received a similar treatment regimen. The ECOG Statistical Center generated a list of potentially eligible patients through identifying BC survivors who were treated on one of five clinical trials (C9741, E1199, E2197, E2198, and N9831) and who were 3–8 years post-diagnosis. The 3- to 8-year range was chosen as an inclusion criterion because it provided enough time since active treatment for BC survivors to assimilate back into their lives and assume roles previously held and enough time that recurrence of the cancer would be unlikely. Additionally, many studies do not collect survivorship data past the 3-year mark, so this allowed for focusing on an understudied demographic in the literature.

The ECOG identified potentially eligible BC survivors from 97 ECOG sites throughout the USA. Once sites had provided ECOG with confirmation of local Institutional Review Board (IRB) approval, the ECOG Statistical Center provided ECOG sites with study participant IDs for potentially eligible BC survivors. The treating oncologist or their designee initiated first contact with the BC survivors to gain permission for investigators to contact potential participants. If BC survivors gave permission for contact, the identifying information for each survivor was sent to researchers. A brochure explaining the study was mailed to the potential participant prior to being contacted by a research assistant. Research assistants called BC survivors approximately 1 week following this initial mailing to answer any questions and determine interest in study participation. For BC survivors who agreed to be enrolled, an information packet, informed consent, and Health Insurance Portability and Accountability Act (HIPAA) form were mailed with postage paid return envelope. If consents were not returned within 2 weeks, participants were called and, if necessary, mailed a second consent. If contact was not made at the first attempt, 10 subsequent attempts were made at varying times of day. If a participant could not be reached by phone and did not return the consent, she was deleted from the database. Each survivor who enrolled in the study was asked whether they had a live-in spouse/partner and, if so, was asked for permission to contact this partner for participation in the study.

A total of 1123 BC survivors agreed to participate and complete the surveys; of which, 707 provided information on and permission to contact live-in partners. Of these 707 partners, 546 enrolled in the study (77%). Full survivor and partner data were available for 498 couples (996 individuals). Note that in all couples the BC survivor was female, but no gender information was collected for partners, making it impossible to explore effects of gender or sexual orientation. The only inclusion criterion for partners was that they currently lived with the BC survivor.

Survivors were between 26 and 70 years old at their initial BC diagnosis ($M = 51.08$, $SD = 11.19$), and were on average 5.86 years from that initial diagnosis ($SD = 1.46$; range = 3–8

years). At time of survey, age for BC survivors ranged from 30 to 78 years ($M = 56.94$, $SD = 11.31$). Most identified as White (95.6%), 1.2% as Black/African American, 0.6% as Asian, and 2.6% categorized themselves as belonging to more than one race. Less than 2% identified as Hispanic/Latina. Most identified their religious background as Christian (non-Catholic; 57.9%), 32.4% were Catholic, 2.8% were Jewish, 0.2% were Buddhist, 5.9% had no religious affiliation, and 0.8% categorized themselves as 'Other'. The majority of survivors (97.6%) reported having been with the same partner since the cancer diagnosis. Most survivors had had stage II BC (64.5%), followed by stage I (21.3%), stage III (11.4%), and stage IV (2.8%).

Age for partners ranged from 20 to 96 years ($M = 58.97$, $SD = 12.07$). Most identified as White (93.6%), 2.0% as Black/African American, 0.4% as Asian, 0.2% as Native Hawaiian/Pacific Islander, and 3.8% categorized themselves as belonging to more than one race. Less than 2% identified as Hispanic/Latino. Most identified their religious background as Christian (non-Catholic; 58.0%), 28.6% were Catholic, 2.6% were Jewish, 9.7% had no religious affiliation, and 1.0% categorized themselves as 'Other'.

Measures

Participants completed measures of demographics, including age and information on their cancer diagnosis. They also completed measures of spirituality, emotional distress, and post-traumatic growth. See bottom of Table 1 for means, standard deviations, and reliability estimates for each instrument.

Spirituality

Reed Spiritual Perspectives Scale [29]: While this assessment has not been used with BC survivors in prior literature, we chose this 10-item questionnaire because it assesses multiple aspects of spirituality, rather than just one facet as prior research has carried out [26]. The Reed Spiritual Perspectives Scale assesses the importance of spirituality in an individual's life, the extent to which they hold certain spiritual views, and their engagement in spiritual activities. Participants were instructed to think about what spirituality means to them personally. Responses for the first four items on spiritual engagement (e.g., 'In talking with your family or friends, how often do you mention spiritual matters?') were made on 6-point Likert scales (1 = *not at all*, 6 = *about once a day*). The remaining six items on the importance of and views about spirituality (e.g., 'Seeking forgiveness is an important part of my spirituality' and 'My spirituality is a significant part of my life.') were also made on 6-point Likert scales (1 = *strongly disagree*, 6 = *strongly agree*). Items were averaged together to provide one spirituality score each for BC survivors ($M = 4.67$, $SD = 1.15$) and partners ($M = 3.97$, $SD = 1.39$). Note that we mean centered BC survivor and partner spirituality scores before entering them as predictors in our models.

Emotional distress

Impact of Events—Revised [11]: As the Impact of Events—Revised has been commonly used to assess emotional distress in BC survivors [28], we used this 20-item tool to assess emotional distress in our participants. Instructions were modified to be relevant to BC; specifically, participants were asked to indicate how distressing each item had been with

respect to being diagnosed and treated for BC. Each item lists a difficulty that some people experience following a stressful life situation. Participants rated how distressing each item had been during the past 4 weeks. Example items included, ‘Any reminder brought back feelings about breast cancer’ and ‘I felt as if breast cancer hadn’t happened or wasn’t real.’ Items were the same for BC survivors and spouses and were averaged into three subscales: avoidance, intrusive thoughts, and hyperarousal. Responses were made on Likert scales ranging from 0 = *not at all* to 4 = *extremely*.

Post-traumatic growth

The Post-traumatic Growth Inventory [12]: The Post-traumatic Growth Inventory is a 21-item inventory that assesses positive outcomes reported by those who have experienced traumatic events and has been used to assess post-traumatic growth in BC survivors and partners [15]. It includes five subscales: Relating to Others (e.g., ‘I learned a great deal about how wonderful people are’), New Possibilities (e.g., ‘I established a new path for my life’), Personal Strength (e.g., ‘I discovered I’m stronger than I thought I was’), Spiritual Change (e.g., ‘A better understanding of spiritual matters’), and Appreciation of Life (e.g., ‘An appreciation for the value of my own life’). Items for each subscale were averaged together for a mean score. Responses were made on Likert scales ranging from 0=*Did not experience this change* to 5 =*Experienced this change to a very great degree*. Instructions specifically asked participants to respond to changes that may have occurred as a result of the BC.

Analyses

Although not all couples in our sample were legally married, we refer to partners as *spouses* in all sections below to avoid confusion between ‘partners’ and ‘partner effects’ (a statistical term discussed later). In the next section, we first present zero-order correlations between spirituality scores, emotional distress, and post-traumatic growth for BC survivors and spouses. Second, we present actor–partner interdependence models (APIMs) to observe dyadic effects of spirituality on BC survivors and their spouses. APIMs allow for testing actor and partner effects simultaneously [27]. *Actor effects* describe the typical associations seen in prior research—they are the association between a target’s scores on the independent and outcome variables (e.g., BC survivor’s spirituality predicting her own post-traumatic growth). *Partner effects* describe the association between a target’s score on the independent variable and their partner’s score on the outcome variables (e.g., BC survivors’ spirituality predicting *their spouse’s* post-traumatic growth and spouse’s spirituality predicting *BC survivor’s* post-traumatic growth). Testing actor and partner effects simultaneously allows us to take into account the non-independence of data from individuals nested within couples. All APIMs were conducted using the AMOS 23 software package for SPSS [30].

Results

Correlations of spirituality with emotional distress and post-traumatic growth

Inter-item correlations and descriptive statistics for all variables can be found in Table 1. For BC survivors, spirituality was positively correlated with all post-traumatic growth variables (all p s < 0.01), and negatively associated with the avoidance subscale of the Impact of Events Scale (assessing emotional distress; p < 0.05). Spouse spirituality was positively correlated

with all forms of post-traumatic growth (all p s <0.01) but did not correlate with any form of emotional distress (all p s >0.05).

Dyadic effects of spirituality on emotional distress and post-traumatic growth

We conducted two separate APIMs, one for emotional distress and one for post-traumatic growth. Prior to building these models, we examined whether demographic variables—including age of either partner, stage of initial diagnosis, and years since initial diagnosis—were significantly correlated with any of our outcomes. BC survivor age (r s = -0.10–0.27), years since initial diagnosis (r s = -0.09–0.13), and spouse age (r s = -0.10–0.19) were significantly related; thus, we included these in both models to control for their effects. All control variables were mean centered. All regression coefficients can be found in Table 2. Standardized parameter estimates are presented in Figures 1 and 2.

Dyadic effects of spirituality on emotional distress—No *actor effects* were found with emotional distress (all p s = 0.16), such that one's spirituality was not associated with one's scores on the Impact of Events Scale. One *partner effect* emerged however: higher levels of spirituality in spouses were associated with lower levels of intrusive thoughts in BC survivors (p <0.01). No other partner effects were found (all p s = 0.06).

Dyadic effects of spirituality on post-traumatic growth—More spiritual BC survivors reported greater post-traumatic growth overall: there was a positive association between spirituality and scores on all subscales (all p s <0.001). This pattern was also true for spouses (all p s <0.001). No *partner effects* were found, such that spirituality in BC survivors did not relate to post-traumatic growth for spouses (all p s = 0.38) nor vice versa (all p s = 0.21).

Discussion

Health science research has shown that spirituality and religiosity can buffer against the psychological trauma of health problems, including cancer [21–25]. Holding spiritual attitudes and beliefs may allow individuals to conceptualize their experiences as part of a larger cosmic plan and thus focus on positive thoughts such as faith and survivorship and diminish negative thoughts such as blame and death. In the current research, we examined the relations between spirituality, emotional distress, and post-traumatic growth for BC survivors and their spouses while controlling for both partners' current age and time since the BC survivor's initial diagnosis. We expected that spirituality would reduce emotional distress (Hypothesis 1) and increase post-traumatic growth (Hypothesis 2) for both BC survivors and their spouses. Additionally, following research emphasizing interdependence in couples' experiences of stressful life events, we expected BC survivors and their spouses to impact one another's positive and negative psychological outcomes with their spirituality (Hypothesis 3).

For BC survivors, emotional distress was wholly unrelated to spirituality. The absence of this effect is surprising given the robust evidence linking spirituality with lower distress [21–25]. However, the sample averages for each of the three Impact of Events subscales were quite low. Because our sample was 3–8 years post-diagnosis, it may be the case that feelings

of distress have dissipated over time. In fact, some studies have indicated that with increasing time after a traumatic life event—such as BC diagnosis and treatment—emotional distress will give way to post-traumatic growth [31]. In the current study, this was the case for more spiritual BC survivors, who experienced more post-traumatic growth across all five sub-scales—Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation of Life—than did BC survivors with lower reported levels of spirituality.

The current research is unique in that we also assessed these associations for the partners/spouses of BC survivors, who have thus far received relatively little empirical examination, especially in the long term. Partners' spirituality did not impact their own emotional distress. This finding falls contrary to those of Hasson-Ohayon *et al.* [26], who found increases in distress, anxiety, and depression in partners who relied more heavily on support from their spiritual community. As with the BC survivors, partners' scores on the emotional distress assessment were low, indicating little distress in the measured domains. It may be that symptoms of emotional distress have declined with time in partners as well, giving way to more positive psychological changes. Our study provides evidence of this possibility. As was seen for BC survivors, more spiritual partners experienced more post-traumatic growth across all five subscales.

These differences between our findings and the extant literature could be due to the specific assessment used: we adapted the emotional distress scale to be a measure of distress specifically stemming from the BC experience, rather than assessing general distress, anxiety, or depression as was carried out by Hasson-Ohayon *et al.* It may be that spirituality is unrelated to BC-related stress specifically, but relates negatively to global emotional distress following trauma. Additionally, Hasson-Ohayon *et al.* [26] assessed support from people in one's spiritual community, whereas in the current study, we assessed the impact of spiritual attitudes, beliefs, and activities.

Using actor–partner interdependence modeling for analyses, spirituality among BC survivors was found to be relatively unimportant for the mental health of their partners: BC survivors' spirituality was unrelated to the post-traumatic growth or emotional distress of their partners. On the other hand, greater spirituality in partners was associated with less intrusive thoughts—one of the three subscales measuring emotional distress—for BC survivors but was unrelated to BC survivors' post-traumatic growth. Although a large body of research shows that couples greatly impact one another in their dealings with stress [18,32–34], it seems that spirituality does not have this crossover effect. While couples influence each other's stress responsivity as a matter of social contagion and interdependence, it is possible that in the context of significant adversity, such as cancer, this effect is trumped by individual responses to stressors. Further, while public worship and attendance at spiritual and religious events may outwardly mark spirituality, it is otherwise a somewhat private psychological relationship affecting an individual, perhaps intrinsically less amenable to social diffusion.

The current research takes a unique perspective into dyadic influences after BC treatment; however, it is not without limitations. First, because no information was collected on partner gender, we cannot know whether our observed effects are driven by the role of each participant (i.e., being a BC survivor or a partner) or by the participant's gender. Future

studies should attempt to tease apart these effects. Second, the addition of other dyadically focused variables would provide a clearer view into the processes we have examined. Specifically, future research would benefit from examining the quality of the relationship between the BC survivor and partner. It may be the case that couples who feel emotionally closer experience less distress because of feelings of support from one another and also influence one another more because of their shared closeness. On the contrary, couples who feel less emotionally close to one another may rely more heavily on spirituality to guide them through such a challenging experience. The current study included a sample that is somewhat homogenous in terms of race and ethnicity (predominantly White/Caucasian) and religious affiliation (predominantly Christian or Catholic); thus, future work should seek to explore how variation in these socio-demographic factors impact the effects explored here. Last, the cross-sectional nature of our study makes inferences of causation difficult; we cannot know whether spirituality causes post-traumatic growth or increased spirituality is a consequence of post-traumatic growth. Future researchers should aspire to examine this association longitudinally. Because our sample included survivors 3 or more years beyond diagnosis and extant literature shows consistent decrease in distress of survivors over time, it is not possible to generalize these findings to women at earlier points in their survivorship [35,36].

The current study focused on the relationship between spirituality, emotional distress, and post-traumatic growth among BC survivors and their partners. The current methodology highlights the complex patterns unveiled when evaluating both cancer survivors and their partners with dyadic analyses, in order to better understand facilitators and barriers to spousal/partner support. The current findings show that spirituality is positively associated with more post-traumatic growth in BC survivors and their partners (actor effects). We also examined how the spirituality of BC survivors and partners affected each other's psychological outcomes. Surprisingly, effects were nearly non-existent, with one exception: partners' higher levels of spirituality were related to less intrusive thoughts in BC survivors. Our results suggest that one's spirituality is important for one's own psychological progress, but may not be impactful beyond the self. These findings extend the existing literature on the role of spirituality in cancer survivorship for BC survivors and partners of survivors and also on the psychosocial factors associated with more positive psychological and emotional outcomes throughout the experience of BC.

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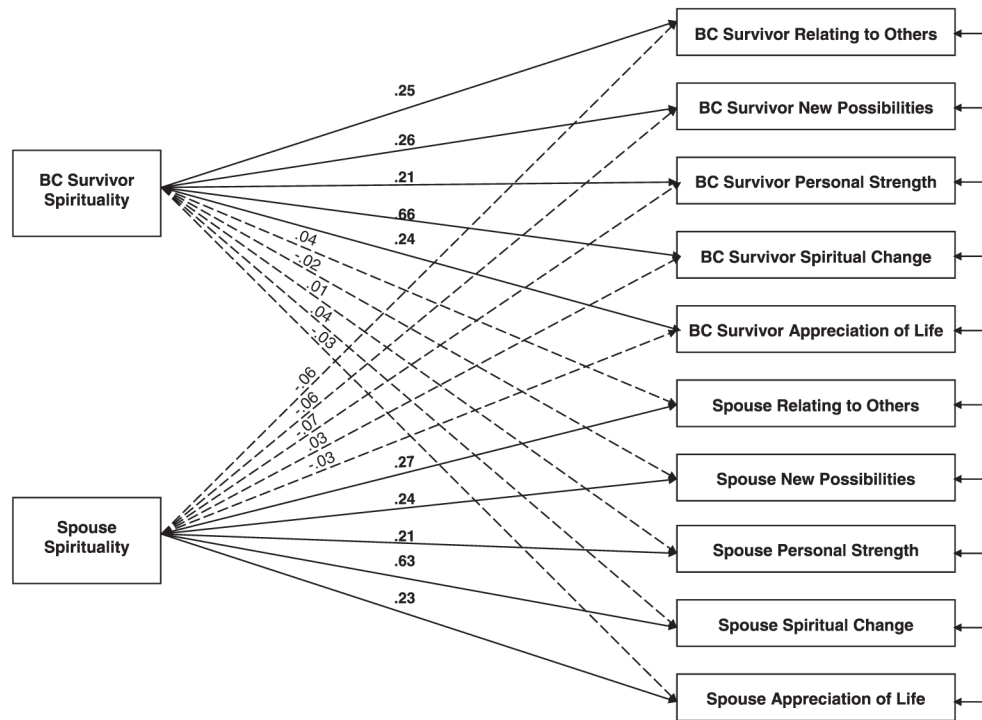


Figure 1. Actor-partner interdependence model of spirituality and post-traumatic growth. Actor effects are solid lines. Partner effects are dashed lines. Values shown are standardized parameter estimates, with bold values representing significant effects. For simplicity, control variables included in the model (breast cancer (BC) survivor and spouse age and time since initial diagnosis) are not pictured

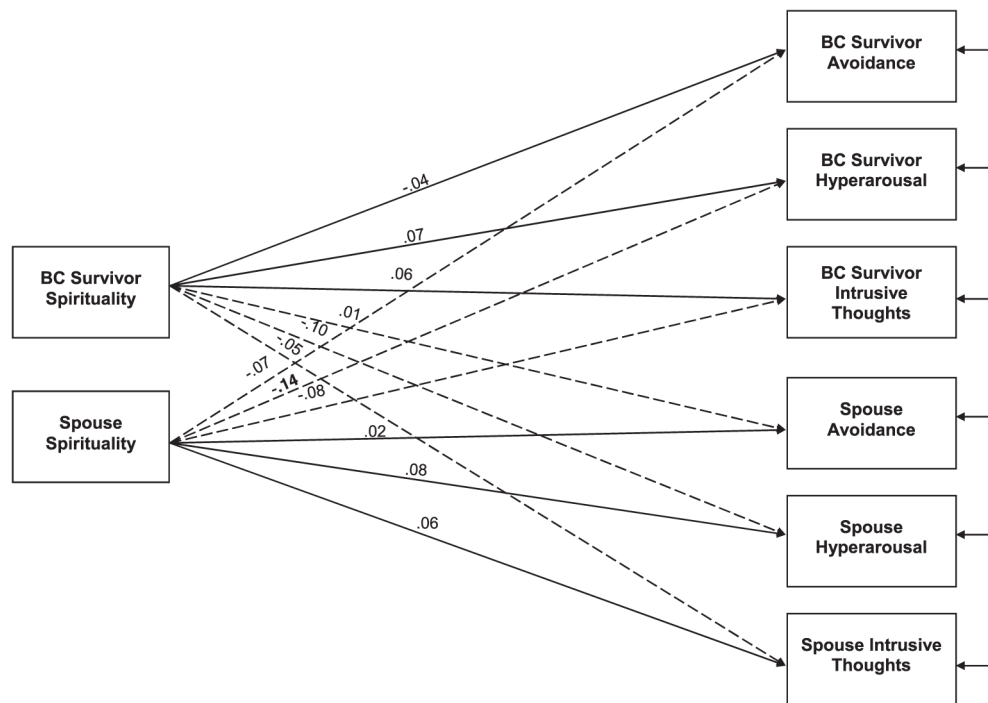


Figure 2. Actor-partner interdependence model of spirituality and emotional distress. Actor effects are solid lines. Partner effects are dashed lines. Values shown are standardized parameter estimates, with bold values representing significant effects. For simplicity, control variables included in the model (breast cancer (BC) survivor and spouse age and time since initial diagnosis) are not pictured

Table 1

Inter-item correlations and descriptive statistics for BC survivors and spouses

Variable	Spouses																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
BC survivors																			
1. Spirituality	—																		
<i>Post-traumatic growth</i>																			
2. Relating to Others	0.22 ^{**}	—																	
3. New Possibilities	0.21 ^{**}	0.68 ^{**}	—																
4. Personal Strength	0.16 ^{**}	0.75 ^{**}	0.65 ^{**}	—															
5. Spiritual Change	0.67 ^{**}	0.60 ^{**}	0.54 ^{**}	0.57 ^{**}	—														
6. Appreciation of Life	0.20 [*]	0.72 ^{**}	0.64 ^{**}	0.68 ^{**}	0.62 ^{**}	—													
<i>Emotional distress</i>																			
7. Avoidance	-0.10 [*]	0.05	0.07	0.03	0.02	0.10 [*]	—												
8. Intrusive thoughts	-0.05	0.05	0.09 [*]	0.04	0.05	0.17 ^{**}	0.59 ^{**}	—											
9. Hyperarousal	-0.02	0.06	0.13 ^{**}	0.03	0.06	0.16 ^{**}	0.52 ^{**}	0.73 ^{**}	—										
Spouses																			
10. Spirituality	0.62 ^{**}	0.10 [*]	0.09	0.05	0.43 ^{**}	0.10 [*]	-0.10 [*]	-0.13 ^{**}	-0.07	—									
<i>Post-traumatic growth</i>																			
11. Relating to Others	0.20 ^{**}	0.24 ^{**}	0.17 ^{**}	0.18 ^{**}	0.24 ^{**}	0.22 ^{**}	0.07	0.02	0.02	0.29 ^{**}	—								
12. New Possibilities	0.12 ^{**}	0.18 ^{**}	0.21 ^{**}	0.15 ^{**}	0.21 ^{**}	0.21 ^{**}	0.14 ^{**}	0.10 [*]	0.10 [*]	0.22 ^{**}	0.76 ^{**}	—							
13. Personal Strength	0.13 ^{**}	0.18 ^{**}	0.15 ^{**}	0.17 ^{**}	0.19 ^{**}	0.21 ^{**}	0.12 ^{**}	0.10 [*]	0.09 [*]	0.21 ^{**}	0.80 ^{**}	0.74 ^{**}	—						
14. Spiritual Change	0.43 ^{**}	0.20 ^{**}	0.18 ^{**}	0.16 ^{**}	0.42 ^{**}	0.23 ^{**}	-0.01	-0.02	-0.01	0.65 ^{**}	0.69 ^{**}	0.61 ^{**}	0.61 ^{**}	—					
15. Appreciation of Life	0.10 [*]	0.19 ^{**}	0.15 ^{**}	0.14 ^{**}	0.18 ^{**}	0.22 ^{**}	0.11 [*]	0.09 [*]	0.10 [*]	0.20 ^{**}	0.73 ^{**}	0.68 ^{**}	0.68 ^{**}	0.56 ^{**}	—				
<i>Emotional distress</i>																			
16. Avoidance	0.02	0.09	0.10 [*]	0.09 [*]	0.12 ^{**}	0.07	0.27 ^{**}	0.26 ^{**}	0.21 ^{**}	0.02	0.20 ^{**}	0.24 ^{**}	0.24 ^{**}	0.19 ^{**}	0.25 ^{**}	—			
17. Intrusive thoughts	-0.06	0.03	0.02	0.02	0.05	0.05	0.17 ^{**}	0.25 ^{**}	0.22 ^{**}	0.01	0.17 ^{**}	0.18 ^{**}	0.18 ^{**}	0.17 ^{**}	0.24 ^{**}	0.63 ^{**}	—		

Variable	BC survivors										Spouses							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
18. Hyperarousal	-0.03	0.06	0.10*	0.04	0.07	0.06	0.23**	0.25**	0.29**	0.02	0.11*	0.22**	0.20**	0.14**	0.19**	0.59**	0.73**	—
Descriptive stats																		
<i>M</i>	4.67 [†]	3.35	2.31	3.29	3.10	3.73	0.65	0.58	0.50	3.97 [†]	2.31	1.38	2.08	1.96	2.79	0.50	0.55	0.37
<i>SD</i>	1.15	1.10	1.27	1.12	1.64	1.11	0.68	0.61	0.67	1.39	1.23	1.12	1.23	1.66	1.33	0.55	0.58	0.57
α	0.95	0.89	0.87	0.81	0.90	0.82	0.78	0.78	0.85	0.96	0.92	0.87	0.82	0.90	0.83	0.78	0.79	0.85

BC, breast cancer; SD, standard deviation.

Shaded section shows correlations between survivors and spouses for each variable.

[†]BC survivor and partner spirituality scores were mean centered ($M = 0.00$) before entering them as predictors.

** $p < 0.01$.

* $p < 0.05$.

Table 2

APIM results for BCS and spouse spirituality on post-traumatic growth and emotional distress, controlling for age of both partners and time since diagnosis

Outcomes	Predictor variables														
	BCS				Spirituality				Spouse						
	Current age		Time since diagnosis		Spirituality		Current age		Spirituality		Spouse				
	<i>b</i>	<i>t</i>	<i>SE</i>	<i>b</i>	<i>t</i>	<i>SE</i>	<i>b</i>	<i>t</i>	<i>SE</i>	<i>b</i>	<i>t</i>	<i>SE</i>			
BCS post-traumatic growth															
Relating to Others	0.01	0.92	0.01	-0.01	-0.42	0.03	0.24	4.51***	0.05	-0.00	-0.49	0.01	-0.05	-1.10	0.04
New Possibilities	-0.03	-2.57**	0.01	0.05	1.24	0.04	0.28	4.67***	0.06	0.01	0.93	0.01	-0.06	-1.09	0.05
Personal Strength	-0.00	-0.45	0.01	-0.03	-0.90	0.03	0.20	3.68***	0.06	0.00	0.12	0.01	-0.06	-1.22	0.05
Spiritual Change	-0.01	-1.03	0.01	0.00	0.09	0.04	0.94	15.57***	0.06	0.00	-0.03	0.01	0.04	0.73	0.05
Appreciation of Life	-0.01	-1.49	0.01	-0.02	-0.70	0.03	0.23	4.35***	0.05	0.00	0.02	0.01	-0.03	-0.67	0.04
Spouse post-traumatic growth															
Relating to Others	0.01	1.27	0.01	-0.07	-1.80	0.04	0.04	0.65	0.06	-0.01	-1.31	0.01	0.24	4.97***	0.05
New Possibilities	0.00	0.14	0.01	-0.06	-1.89	0.03	-0.02	-0.30	0.05	-0.01	-1.46	0.01	0.19	4.35***	0.04
Personal Strength	0.00	0.32	0.01	-0.05	-1.24	0.04	0.01	0.12	0.06	-0.01	-1.13	0.01	0.19	3.84***	0.05
Spiritual Change	0.01	0.51	0.01	-0.06	-1.48	0.04	0.06	0.99	0.06	-0.01	-1.04	0.01	0.75	14.71***	0.05
Appreciation of Life	0.01	0.65	0.01	-0.04	-0.90	0.04	-0.04	-0.60	0.06	-0.02	-1.84	0.01	0.22	4.12***	0.05
BCS emotional distress															
Avoidance	-0.01	-2.40*	0.01	-0.03	-1.64	0.02	-0.03	-0.74	0.03	0.01	1.80	0.01	-0.03	-1.18	0.03
Intrusive thoughts	-0.02	-4.80***	0.01	-0.04	-2.04*	0.02	0.04	1.30	0.03	0.01	2.28*	0.01	-0.06	-2.62**	0.02
Hyperarousal	-0.03	-5.28***	0.01	-0.03	-1.60	0.02	0.03	1.00	0.03	0.02	3.40***	0.01	-0.04	-1.49	0.03
Spouse emotional distress															
Avoidance	0.01	1.08	0.01	-0.02	-1.38	0.02	0.01	0.22	0.03	-0.01	-1.86	0.00	0.01	0.30	0.02
Intrusive thoughts	-0.01	-0.35	0.01	-0.05	-2.55*	0.02	-0.05	-1.71	0.03	-0.00	-0.92	0.01	0.04	1.50	0.02
Hyperarousal	-0.01	-1.21	0.01	-0.01	-0.66	0.02	-0.03	-0.89	0.03	-0.00	-0.75	0.00	0.03	1.11	0.02

BCS, breast cancer survivor; APIM, actor-partner interdependence models; SE, standard error.

$p < 0.0001$

 $p < 0.01$
**
 $p < 0.05$
*

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