Is the link between posttraumatic growth and anxious symptoms mediated by marital

intimacy in breast cancer patients?

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Abstract

Purpose: This study aimed to determine whether marital intimacy mediates the association between posttraumatic growth (PTG) and anxious symptoms in women who had recently completed breast cancer treatments and breast cancer survivors. **Methods:** Forty-eight patients who had completed their treatment six months prior to the study and 46 disease-free survivors who had completed their treatments at least one year prior to the study completed the Posttraumatic Growth Inventory, the Personal Assessment of Intimacy Scale, and the Hospital Anxiety and Depression Scale. **Results:** Recently off-treatment patients reported higher levels of intimacy than survivors did. Path analyses showed that higher levels of the Appreciation of Life dimension of PTG were associated with less anxious symptoms through higher levels of marital intimacy. The type of group did not moderate these associations.

Conclusion: Regardless of the disease phase, the experience of positive changes after breast cancer in terms of an enhanced appreciation of life seems to be associated with an increased perception of intimacy in the context of a dyadic relationship, which, in turn, is associated with less anxiety.

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Introduction

The diagnosis and treatment of breast cancer, which is one of the most the most common cancers in women worldwide and the most common in Portugal (Ferlay et al., 2013), threatens patients' life as well as their well-being and quality of life (Montazeri, 2008). Several studies have evidenced that women's emotional distress is particularly high during the first 12 months after the diagnosis (Manne et al., 2004; Millar et al., 2005; Saboonchia et al., 2014; Schroevers et al., 2006), a period during which about one-quarter of women present criteria for a psychological disorder, including an anxiety disorder (Hewitt et al., 2004; Knobf, 2007; Moorey and Greer, 2002). In addition, some studies have shown that approximately half of the women who receive the diagnosis of cancer perceive it as traumatic experience (Cordova et al., 2007; Silva et al., 2011).

The prevalence estimates of abnormal anxiety in cancer patient populations range from 10% to 30% (Stark et al., 2002) and are particularly high during the initial phases of cancer (Saboonchia et al., 2014). For instance, Schwarz et al. (2008) found that levels of anxious and depressive symptoms were significantly high in the diagnosis phase, decreasing 6 and 12 months after surgery. Notwithstanding this normative decrease over time, we cannot neglect the importance of the emotional distress. High levels of anxiety may affect the woman's ability to cope with the diagnosis and treatment of breast cancer and may intensify or lead to the development of physical symptoms such as nausea, vomiting, and sleep problems, consequently

interfering with the woman's psychological adjustment and quality of life. In addition, although anxiety is typically a transient response, some patients may exhibit enduring anxiety, requiring specialized treatment (Saboonchia et al., 2014).

It is well established that the struggle to cope with breast cancer can lead to negative outcomes, such as anxiety, but it can also lead to positive outcomes or to the perception of benefits or positive changes in the woman's perception of herself, her relationships and her life priorities (Tedeschi et al., 1998). According to Tedeschi and Calhoun (2004), these benefits or positive experiences constitute what these authors named Posttraumatic Growth (PTG) and defined as "the positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (p.1). PTG tends to occur in five general areas, including a greater appreciation of life, increased personal strength, enhanced interpersonal relationships, strengthened spirituality and revised life priorities or goals (for a review see Tedeschi and Calhoun, 1996).

In the last years, several studies have evidenced that most patients experience at least one positive change after the diagnosis of cancer (Sears et al., 2003; Stanton et al., 2006; Taylor, 1983). For instance, Petrie et al. (1999) and Sears et al. (2003) found that the most frequently reported positive change after cancer is the strengthening of interpersonal relationships, which is a change characterized by a greater sense of closeness and connection to others, including an increased satisfaction with the marital relationship (Cordova et al., 2001; Fromm et al., 1996; Gritz et al., 1990; Klauer, 1998; Sears et al., 2003). Many patients also report a greater appreciation of life and a shift in life priorities and goals resulting from a revision of one's attitudes toward life. Additionally, some patients report strengthened spirituality (Cordova et al., 2001; O'Connor et al., 2008) and perceive themselves as

being stronger and more capable to cope with life adversities (Fritz and Williams, 1988; Fromm et al., 1996).

Experiencing positive changes or PTG has been shown to influence the psychological adjustment of women with breast cancer. Despite the lack of consensus on this topic, various studies reveal that PTG is associated with lower levels of emotional distress or better psychological adjustment (for a review see Stanton et al., 2006). Sears et al. (2003) found that 12 months after the end of treatment, higher levels of PTG were associated with increased levels of vigor and positive mood. In a longitudinal study, Carver and Antoni (2004) observed that finding benefits from the experience of cancer during the first 12 months after the diagnosis predicted a significant reduction in emotional distress and depression five to eight years later. A stress-buffering effect of PTG on psychological adjustment was also found in other studies (Morrill et al., 2008; Silva et al., 2012b).

With regard to the amount of time needed to experience PTG after a traumatic event, research has provided some inconsistent results. Most studies reveal that the longer the time since the event, the greater the opportunity to process cognitive and emotional information, find an adaptive meaning and discover positive changes (McMillen et al., 1997; Park et al., 1996). Therefore, the effect of PTG on the individual's psychological adjustment seems to be strengthened with more time since the diagnosis (Bower et al., 2005; Carver and Antoni, 2004; Sears et al., 2003). In fact, in a literature review, Stanton et al. (2006) suggested that PTG is usually higher in the first and second years after the diagnosis; subsequently, the discovery of positive changes tends to stabilize and the improvement that was initially achieved tends to decrease over time. However, other studies have shown that people may also report positive changes soon after a traumatic event (Frazier et al., 2001; Manne et al.,

2004). Nevertheless, it is important to note that it has been suggested that the positive changes that occur a short time after the event can in fact be an avoidance strategy that prevents the development of more active coping efforts and, consequently, constrains the individual's psychological adjustment (Tomich and Helgeson, 2004).

Another factor that is known to play a significant role in the individual's psychological adjustment to cancer is the perception of social support provided by the individual's social network (Northouse, 1988). Among women with breast cancer, the majority identify their partner as their main source of emotional support (Kaiser, 2008). Therefore, it is reasonable to suppose that the perception of marital intimacy may play an important role in women's adjustment. Marital intimacy has been defined as an interpersonal and transactional process through which a partner shares with the other intimate feelings, thoughts and information, consequently feeling validated and cared for as a result of the partner's responsiveness (Reis and Patrick, 1996; Reis and Shaver, 1988). In the context of breast cancer, several studies have shown that higher levels of intimacy are associated with better adjustment in women (Moreira et al., 2011; Talley et al., 2010) and their partners (Moreira and Canavarro, 2013).

Although the relationships between psychological adjustment and PTG or intimacy have been strongly supported in the literature, studies on the link between PTG and intimacy are still scarce. In addition, the few investigations exploring this relationship have not focused specifically on intimacy but have examined other variables, including marital condition (Carpenter et al., 1999), marital satisfaction (Kausar and Saghir, 2010) and relationship-specific positive and negative qualities, such as an emotionally comforting marital environment (Pierce et al., 1996). Furthermore, other studies have not found a significant association between PTG and these dyadic variables (Lechner et al., 2003; Sears et al., 2003; Tomich and Helgeson,

2004; Urcuyo et al., 2005). For instance, Manne et al. (2004) found that marital quality did not predict a couple's sense of growth, which led the authors to suggest that marital quality may suffer the impact of psychological growth rather than being a predictor of PTG. Because empirical studies are inconclusive regarding the associations between marital relationship and PTG, more research is needed to more thoroughly understand this relationship.

The present study had two objectives. First, we intended to investigate whether the association between the five dimensions of PTG and anxious symptoms was mediated by marital intimacy. Second, because most data on the prevalence of PTG have been collected long after the cancer experience, we aimed to explore whether these associations were significant shortly after the end of treatment or whether they only became significant after a longer period of time. Therefore, we included two distinct groups of patients and explored the moderating role of the type of group on the proposed mediating model: (1) a group that had completed cancer treatment approximately six months before the study and (2) a group of survivors who had completed cancer treatment at least one year before the study. We hypothesized that higher levels of PTG would be associated with higher levels of marital intimacy, which, in turn, would be associated with lower levels of anxiety. With regard to the moderating role of the type of group, we did not propose a hypothesis because of the scarce and inconsistent results in the literature.

Methods

Participants and Procedure

The sample included 94 women diagnosed with breast cancer. Of these, 48 were recently off-treatment patients (G1) and 46 were disease-free breast cancer

survivors (G2). Recently off-treatment patients should had completed their treatment six months prior to the study and should not have undergone neo-adjuvant chemotherapy prior to the primary surgery; disease-free breast cancer survivors should have completed their treatments at least one year prior to the study. Other criteria for inclusion in this study were: (1) a diagnosis of non-metastatic breast cancer; (2) no other major medical or psychiatric conditions; (3) being in a committed relationship; and (4) being at least 18 years old. The sociodemographic and clinical characteristics of the sample are presented in Table 1.

The sample was collected in the gynecologic department of the main university hospital of the central region of Portugal after approval from the hospital Research Ethics Committee. Recently off-treatment patients were invited to participate in the study approximately 6 months after the completion of cancer treatments at a follow-up medical appointment or by telephone. Breast cancer survivors were contacted during the hospitalization period for a breast reconstruction surgery or oophorectomy or at a follow-up medical appointment. Women completed the self-reported questionnaires at the hospital or at home and returned them either by mail or directly to the researcher at the hospital. All participants signed the informed consent form.

Measures

Posttraumatic growth. The Portuguese version of the Posttraumatic Growth Inventory (PTGI; Silva et al., 2009; Tedeschi and Calhoun, 1996) is a 21-item questionnaire that was used to assess the experience of positive changes after the diagnosis of breast cancer in five different domains: (1) appreciation of life; (2) new possibilities; (3) relating to others; (4) personal strength; and (5) spiritual change. The

participants indicated on a 6-point Likert scale, ranging from 0 (*I did not experience this change*) to 5 (*I experienced this change to a very great degree*), the degree to which they experienced each change as a consequence of breast cancer. In the present sample, Cronbach's alphas ranged from .71 (Appreciation of Life, G2) to .89 (Personal Strength, G1).

Marital intimacy. The Portuguese version of the Personal Assessment of Intimacy in Relationships (PAIR; Moreira et al., 2009; Schaefer and Olson, 1981) was used to assess women's perception of intimacy in the relationship with their partner. This measure contains 36 items answered in a 5-point Likert scale ranging from 0 (*Strongly disagree*) to 4 (*Strongly agree*). In this study, the 6-item conventionality scale, which assesses social desirability, was not used. Cronbach's alphas were .94 (G1) and .95 (G2).

Anxiety. The anxiety subscale of the Portuguese version of the Hospital Anxiety and Depression Scale (HADS; Pais Ribeiro et al., 2007; Zigmond and Snaith, 1983) was used to assess levels of anxious symptoms (during the previous week), using a 4-point scale ranging from 0 to 3. In this sample, Cronbach's alpha coefficients were .85 for both groups.

Data Analysis

Data analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 20.0; IBM SPSS, Chicago, IL) and the PROCESS computation tool (Hayes, 2013). First, the sociodemographic and clinical characterization of each sample group was conducted through the descriptive statistics of the sociodemographic and clinical variables. Differences between groups in these variables were analyzed using chi-square tests and ANOVAs. Second, differences

between groups in the study variables were analyzed through ANCOVAs (intimacy and anxious symptoms) and MANCOVAs (PTG dimensions), controlling for sociodemographic/clinical variables that differed significantly between groups. When a multivariate effect was found, subsequent ANCOVAs were performed for each dependent variable. Effect-size calculations were performed for ANOVAs and chi-square tests (small: $d \geq 0.20$, $V \geq 0.01$; medium: $d \geq 0.50$, $V \geq 0.03$; large: $d \geq 0.80$, $V \geq 0.05$).

Before testing the hypothesized moderated mediation models, correlations between sociodemographic and study variables were examined to identify potential variables that should be included as covariates in the models. Sociodemographic variables were dummy coded (Education: 0 = high school; 1 = college or post-graduate degree; Type of surgery: 0 = conservative; 1 = mastectomy; Type of treatment: 0 = other than chemotherapy; 1 = chemotherapy; axillary node dissection: 0 = no; 1 = yes) and correlations were interpreted according to Cohen's (1988) guidelines (small: $r=.10$; medium: $r=.30$; large: $r=.50$). Subsequently, moderated mediation analyses were performed to examine whether the five dimensions of PTG were associated with anxious symptoms through marital intimacy and whether the direct and indirect effects varied according to the two clinical groups. Therefore, we tested a moderated mediation model (Model 59; Hayes, 2013) in which the moderator (clinical group) was hypothesized to affect the path linking the PTG dimensions and marital intimacy (path *a*), the path linking marital intimacy and anxious symptoms (path *b*), and the direct effect of PTG dimensions on anxious symptoms (path *c'*). Accordingly, three interactions were tested in each model (PTG x group in paths *a* and *c'*; intimacy x group in path *b*). If no interaction was found in one or more paths, the models were re-estimated excluding the nonsignificant interactions. The indirect

effects were assessed through a bootstrapping procedure (using 10000 resamples). This procedure creates 95% bias-corrected and accelerated confidence intervals (BCaCIs), with an indirect effect considered to be significant if zero is no contained within the lower and upper CIs. Preacher and Kelly's kappa-squared (k^2) was used as an estimate of the effect size of the indirect effects (Hayes, 2013).

Results

Comparison Analyses

Differences between clinical groups on sociodemographic and clinical variables were examined. Although there were no significant differences in women's age and education, the two groups differed significantly in the time since diagnosis, type of cancer, type of surgery, type of treatment, and the performance of axillary node dissection (see Table 1). Therefore, these variables were entered as covariates in the subsequent comparison analyses, with the exception of type of cancer (because of the large amount of missing information in the G2 (n=19)) and the time from diagnosis to assessment (because this variable characterizes the type of group).

With regard to the comparison analyses on the five dimensions of PTG, the multivariate effect was not significant, Wilk's Lambda = .98, $F(5,83) = 0.38$, $p = .86$. Likewise, no significant differences were found for anxious symptoms, $F(2,87) = 0.12$, $p = .73$. In contrast, a significant difference was found for intimacy, $F(1,87) = 4.13$, $p = .045$, with recently off-treatment patients reporting higher levels of marital intimacy than survivors.

(Insert Table 1 about here)

The Indirect Effect of PTG on Anxious Symptoms Through Marital Intimacy

Prior to conducting the main analyses, bivariate relationships between the main sociodemographic/clinical characteristics and the study variables were examined to identify potential controls (see Table 2). Because education was significantly correlated with spiritual change (r=-.25, p=.017), this variable was included as a covariate in the mediation models of spiritual change.

Insert Table 2 about here

To examine whether the indirect effect of PTG on anxious symptoms through intimacy varied across the two clinical groups, five moderated mediation models were estimated, one for each dimension of PTG. These analyses revealed that the paths from each of the five dimensions of PTG to intimacy (path *a*) and from intimacy to anxious symptoms (path *b*) were not moderated by the clinical group because no significant interactions were found between the clinical group and each of the PTG dimensions and between the clinical group and intimacy in each of the five estimated models. Likewise, no significant interactions were found between the clinical group and each of the five dimensions of PTG in the direct effect (data not shown).

Because no significant interactions were found, the conditional indirect effects were not analyzed, and simple mediation models (without the clinical group as the moderator) were estimated. The model coefficients for the direct and indirect effects in the simple mediation models are presented in Table 3. A significant indirect effect was found in the model including the appreciation of life dimension of PTG (point estimate = -0.14, 95%BCaCI = -.310/-.016). As shown in Table 3, higher levels of appreciation of life were associated with higher perception of intimacy ($b = 1.42, p = .011$), explaining 6.90% of its variance. In turn, higher levels of intimacy were

associated with less anxious symptoms ($b = -0.10$, $p < .001$), explaining 23.11% of the variance.

(Insert Table 3 about here)

Discussion

The present study examined the indirect effect of PTG on women's anxious symptoms through the perception of marital intimacy in two different phases of breast cancer: approximately six months after the completion of cancer treatments and at least one year after the completion of treatments. This is one of the few studies on breast cancer-related growth using different samples of women in two distinct phases of the disease. From the data reported here, important results and conclusion emerge.

First, no differences were found in the levels of PTG in women who had completed treatment in the last six months and longer-time survivors. This result suggests that women may experience positive changes in several domains of their life relatively soon after the end of treatment as well as during survivorship. This is in line with previous studies that have found positive psychological changes soon after diagnosis (Manne et al., 2004) or similar levels of PTG regardless of the time that had passed since the cancer diagnosis (Danhauer et al., 2013; Lelorain et al., 2010; Manne et al., 2004; Silva et al., 2012a). However, it is important to note that the cross-sectional nature of our data does not allow us to determine whether the discovery of positive changes tends to stabilize over time. Therefore, longitudinal studies are needed to further investigate this hypothesis.

Second, with regard to marital intimacy, we found that recently off-treatment patients presented higher levels of marital intimacy than survivors. The period that

follows the conclusion of cancer treatment has been shown to be emotionally challenging (Costanzo et al., 2007; Veach et al., 2002). During this period, women struggle to reestablish their pre-disease life patterns and routines in several domains (e.g., social relationships, work, marital relationship, sexual life) but several physical symptoms (e.g., secondary symptoms that remain or develop during this phase), fears and worries (e.g., of cancer recurrence) are typically present (Stanton et al., 2007). Therefore, women may feel an increased need to reveal their concerns and most intimate emotions and thoughts to someone and, particularly, to their partner, which may explain the heightened levels of perceived intimacy. In contrast, during survivorship, women tend to attain a stable level of adaptation and to be less worried about the consequences of cancer and, consequently, the need for a partner's support is presumably lower, which may explain a decreased perception of intimacy.

Our results evidenced that the appreciation of life domain of PTG was indirectly associated with anxiety through marital intimacy. This finding suggests that the more women reassess their values and life priorities, make an effort to live each day in a meaningful way, and deeply appreciate every moment (e.g., time spent with their family), the more intimate the women perceives the relationship with her partner, which, in turn, positively influences her psychological adjustment. These results corroborate previous studies showing the positive effect of PTG in women's psychological adjustment (Carver and Antoni, 2004; Morrill et al., 2008; Sears et al., 2003). Despite the lack of studies analyzing the specific associations between PTG and marital intimacy, our findings extend previous studies on the positive associations between the experience of growth and marital satisfaction (Kausar and Saghir, 2010; Pierce et al., 1996; Weiss, 2004). Moreover, these findings reinforce Manne et al.'s (2004) assumption that not only do the characteristics of the marital relationship, such

as intimacy, promote PTG, but identifying positive life changes in some areas of life after an adverse event might also improve the marital relationship. Other studies have highlighted that a frequent result of the experience of cancer is the strengthening of relationships (Dorval et al., 2005; Hinnen et al., 2008) or an increase in marital intimacy (Weiss, 2004), which may reflect or result from the complex process of PTG. We believe that by increasing awareness of the value of one's own life and of each day, no longer taking life for granted, and having an improved sense of life priorities, people may be more likely to feel connected with their partners. This connection may result in a closer relationship in which the woman feels more comfortable communicating and sharing her thoughts and intimate feelings, which, in turn, may facilitate a reduction in anxious symptomatology.

The evidence that higher levels of marital intimacy were associated with lower levels of anxious symptoms reinforces the importance of the intimate relationship with one's partner for the psychological adjustment to breast cancer. This is in line with previous investigations that demonstrated that a satisfying marital relationship and the perception of support from the partner tends to facilitate and promote a better adaptation to breast cancer (Figueiredo et al., 2004; Giese-Davis et al., 2000; Manne and Glassman, 2000; Moreira et al., 2011). These findings are also coherent with Manne and Badr's (2008) model of intimacy, which postulates that higher levels of intimacy when a couple confronts cancer may lead to a better relationship and better psychological adjustment. In fact, in the context of an intimate relationship, it is expected that patients have more opportunities to reveal their innermost thoughts, feelings and concerns, mainly those related to the disease and treatment (Manne and Badr, 2008; Reis and Patrick, 1996). Because this process of sharing and revealing intimate issues to the other are believed to facilitate the patient's cognitive processing

(e.g., through mental activities that assist the integration and interpretation of traumatic events in personally meaningful terms (Lepore et al., 2000)), it is understandable that it may also promotes the patients' psychological adjustment.

Limitations and Strengths

Several limitations should be mentioned. The first and most important limitation of this study is its cross-sectional design, which impedes the establishment of causal relationships between variables and limits the complete understanding of the dynamic process of the women's psychological adjustment. It is possible that the associations found between variables are bidirectional (e.g., higher levels of marital intimacy can lead to higher levels of PTG; higher levels of anxiety can lead to lower levels of marital intimacy). Second, this study includes a small number of participants. Therefore, future studies should include larger samples to examine the same moderation and mediation effects. Third, other potential sampling bias is related to the fact that breast cancer survivors were recruited when they returned to the hospital for breast reconstruction surgery or oophorectomy or to a follow-up appointment, which are stressful events that may increase anxiety. In addition, these patients may not represent the entire population of survivors and some caution is needed in generalizing the results to other survivors. Fourth, the absence of the partner's perspective in this study limited our understanding of the impact of breast cancer on marital intimacy. Despite these limitations, this study presents important strengths and innovative contributions, both theoretically and empirically. One of the main strengths is the inclusion of two distinct phases of breast cancer and, therefore, the examination of whether being in different phases of the cancer's trajectory may influence the proposed associations between variables. Few studies have examined separately different phases of cancer; in fact, the majority of studies has examined

together patients experiencing very different aspects of cancer's trajectory. In addition, this study is particularly innovative by providing insight into a mechanism by which PTG is associated with an important aspect of psychological adjustment. Our study has important implications for the clinical practice: (1) it emphasizes the importance of screening for anxiety (particularly at the end of treatments) and of follow-up monitoring; (2) it highlights the relevance of PTG to the psychological adjustment of the women with breast cancer, hence suggesting that the discovery of positive changes after this potentially traumatic experience should be facilitated and even promoted in clinical practice; and (3) it reinforces the role of the partner, who should be involved in this process so that PTG can better promote psychological adjustment and reduce anxious symptomatology.

References

Bower, J.E., Meyerowitz, B.E., Desmond, K.A., Bernaards, C.A., Rowland, J.H., Ganz, P.A., 2005. Perceptions of positive meaning and vulnerability following breast cancer: Predictors and outcomes among long-term breast cancer survivors. Annals of Behavioral Medicine 29, 236-245.

Carpenter, J.S., Brockopp, D.Y., Andrykowski, M.A., 1999. Self-transformation as a factor in the self-esteem and well-being of breast cancer survivors. Journal of Advanced Nursing 29, 1402-1411.

Carver, C.S., Antoni, M.H., 2004. Finding benefit in breast cancer during the year after diagnosis predicts better adjustment 5 to 8 years after diagnosis. Health Psychology 23, 595-598.

Cohen, J., 1988. Statistical power analysis for the behavioral sciences 2nd ed. Lawrence Earlbaum Associates, Hillsdale, NJ.

Cordova, M.J., Cunningham, L.L., Carlson, C.R., Andrykowski, M.A., 2001. Posttraumatic growth following breast cancer: A controlled comparison study. Health Psychology 20, 176-185.

Cordova, M.J., Giese-Davis, J., Golant, M., Kronenwetter, C., Chang, V., Spiegel, D., 2007. Breast cancer as trauma: Posttraumatic stress and posttraumatic growth. Journal of clinical psychology in medical settings 14, 308-319.

Costanzo, E.S., Lutgendorf, S.K., Mattes, M.L., Trehan, S., Robinson, C.B., Tewfik, F., Roman, S.L., 2007. Adjusting to life after treatment: Distress and quality of life following treatment for breast cancer. British Journal of Cancer 97, 1625-1631.

Danhauer, S.C., Case, L.D., Tedeschi, R., Russell, G., Vishnevsky, T., Triplett, K., Edward, H., Avis, N.E., 2013. Predictors of posttraumatic growth in women with breast cancer. Psycho-oncology 22.

Dorval, M., Guay, S., Mondor, M., Mâsse, B., Falardeau, M., Robidoux, A., Deschênes, L., Maunsell, E., 2005. Couples Who Get Closer After Breast

Cancer: Frequency and Predictors in a Prospective Investigation. Journal of Clinical Oncology 23, 3588-3596.

Ferlay, J., Steliarova-Foucher, E., Lortet-Tieulent, J., Rosso, S., Comber, H., Forman, D., Bray, F., 2013. Cancer incidence and mortality patterns in Europe: Estimates for 40 countries in 2012. European Journal of Cancer 49, 1374– 1403.

Figueiredo, M., Fries, E., Ingram, K.M., 2004. The role of disclosure patterns and unsupportive social interactions in the well-being of breast cancer. Psycho-oncology 13, 96-105.

Frazier, P., Conlon, A., Glase, T., 2001. Positive and negative life changes following sexual assault. Journal of consulting and clinical psychology 69, 1048-1055.

Fritz, G.K., Williams, J.R., 1988. Issues of adolescent development for survivors of childhood cancer. Journal of the American Academy of Child and Adolescent Psychiatry 27, 712-715.

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

Giese-Davis, J., Hermanson, K., Koopman, C., Weibel, D., Spiegel, D., 2000. Quality of couples' relationship and adjustment to metastatic breast cancer. The Journal of Family Psychology 14, 251-266.

Gritz, E.R., Wellish, D.K., Siau, J., Wang, H.J., 1990. Long-term effects of testicular cancer on marital relationships. Psychosomatics 31, 301-312.

Hayes, A.F., 2013. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. Guilford Press, New York.

Hewitt, M., Herdman, R., Holland, J.C., 2004. Meeting psychosocial needs of women with breast cancer. The National Academies Press, Washington, D. C.

Hinnen, C., Hagedoorn, M., Ranchor, A.V., Sanderman, R., 2008. Relationship satisfaction in women: A longitudinal case-control study about the role of breast

cancer, personal assertiveness, and partners' relationship-focused coping. British journal of health psychology 13, 737-754.

Kaiser, K., 2008. The meaning of the survivor identity for women with breast cancer. Social Science & Medicine 67, 79-87.

Kausar, S., Saghir, R., 2010. Posttraumatic Growth and Marital Satisfaction After Breast Cancer: Patient and Spouse Perspective. . Pakistan Journal of Social and Clinical Psychology 8, 3-17.

Klauer, T., 1998. "Still Stable after all This...?": Temporal comparison in coping with severe and chronic disease. International Journal of Behavioral Develpoment 22, 339-355.

Knobf, M.T., 2007. Psychosocial responses in breast cancer survivors. Seminars in Oncology Nursing 23, 71-83.

Lechner, S.C., Zakowski, S.G., Antoni, M.H., Greenhawt, M., Block, K., Block, P., 2003. Do sociodemographic and disease-related variables influence benefit-finding in cancer patients? Psycho-oncology 12, 491-499.

Lelorain, S., Bonnaud-Antignac, A., Florin, A., 2010. Long-term posttraumatic growth after breast cancer: prevalence, predictors and relationships with psychological health. Journal of clinical psychology in medical settings 17, 14-22.

Lepore, S.J., Ragan, J.D., Jones, S., 2000. Talking facilitates cognitive-emotional processes of adaptation to an acute stressor. Journal of personality and social psychology 78, 499-508.

Manne, S., Badr, H., 2008. Intimacy and relationship processes in couples' psychosocial adaptation to cancer. Cancer 112, 2541–2555.

Manne, S., Glassman, M., 2000. Perceived control, coping efficacy, and avoidance coping as mediators between spouses' unsupportive behaviors and cancer patients' psychological distress. Health Psychology 19, 155-164.

Manne, S., Ostroff, J., Winkel, G., Goldstein, L., Fox, K., Grana, G., 2004. Posttraumatic growth after breast cancer: Patient, partner, and couple perspectives. Psychosomatic medicine 66, 442-454.

McMillen, J.C., Smith, E., Fisher, R.H., 1997. Perceived benefit and mental health after three types of disaster. Journal of consulting and clinical psychology 65, 733-739.

Millar, K., Purushotham, A.D., McLatchie, E., George, W.D., Murray, G.D., 2005. A 1-year prospective study of individual variation in distress, and illness perceptions, after treatment for breast cancer. Journal of psychosomatic research 58, 335-342.

Montazeri, A., 2008. Health-related quality of life in breast cancer patients: A bibliographic review of the literature from 1974 to 2007. Journal of Experimental & Clinical Cancer Research 27.

Moorey, S., Greer, S., 2002. Cognitive Behaviour Therapy for people with cancer. Oxford University Press, New York.

Moreira, H., Amaral, A., Canavarro, M.C., 2009. Adaptação do Personal Assessment of Intimacy in Relationships Scale (PAIR) para a população Portuguesa: Estudo das suas características psicométricas. Psychologica 50, 353-373.

Moreira, H., Canavarro, M.C., 2013. Psychosocial adjustment and marital intimacy among partners of breast cancer patients: A comparison study with partners of healthy women. Journal of psychosocial oncology 31, 282-304.

Moreira, H., Crespo, C., Paredes, T., Silva, S., Canavarro, M.C., Dattilio, F., 2011. Marital relationship, body image and quality of life among breast cancer patients at the treatment and survivorship phases. Journal of Contemporary Family Therapy 33, 161-178.

Morrill, E.F., Brewer, N.T., O'Neill, S.C., Lillie, S.E., Dees, E.C., Carey, L.A., Rimer, B.K., 2008. The interaction of posttraumatic growth and posttraumatic stress symptoms in predicting depressive symptoms and quality of life. Psycho-oncology 17, 948-953.

Northouse, L.L., 1988. Social support in patients' and husbands' adjustment to breast cancer. Nursing Research 2, 91-95.

O'Connor, S.M., Jardine, A.G., Millar, K., 2008. The prediction of self-care behaviors in end-stage renal disease patients using Leventhal's Self-Regulatory Model. Journal of psychosomatic research 65, 191-200.

Pais Ribeiro, J.L., Silva, I., Ferreira, T., Martins, A., Meneses, R., Baltar, M., 2007. Validation study of a Portuguese version of the Hospital Anxiety and Depression Scale. Psychology, Health & Medicine 12, 225-237.

Park, C.L., Cohen, L.H., Murch, R.L., 1996. Assessment and prediction of stress-related growth. Journal of Personality 64, 71-105.

Petrie, K.J., Buick, D.L., Weinman, J., Booth, R.J., 1999. Positive effects of illness reported by myocardial infarction and breast cancer patients. Journal of psychosomatic research 47, 537-543.

Pierce, G.R., Sarason, I.G., Sarason, B.R., 1996. Coping and social support., in: Zeidner M, E.N. (Ed.), Handbook of Coping: Theory, Research, Applications. Wiley, New York.

Reis, H.T., Patrick, B., 1996. Attachment and intimacy: Component processes., in: Kruglanski, T.H.A. (Ed.), Social psychology: Handbook of basic principles. Guilford Press, New York, pp. 523–563.

Reis, H.T., Shaver, P., 1988. Intimacy as an interpersonal process., in: Duck, S. (Ed.), Handbook of personal relationships. Wiley, Chichester, UK, pp. 367–389.

Saboonchia, F., Petersson, L., Wennman-Larsen, A., Alexanderson, K., Brännström, R., Vaez, M., 2014. Changes in caseness of anxiety and depression in breast cancer patients during the first year following surgery: Patterns of transiency and severity of the distress response. European Journal of Oncology Nursing 18, 598-604.

Schaefer, M., Olson, D., 1981. Assessing Intimacy: The Pair Inventory. Journal of Marital and Family Therapy 7, 47-60.

Schroevers, M., Ranchor, A.V., Sanderman, R., 2006. Adjustment to cancer in the 8 years following diagnosis: A longitudinal study comparing cancer survivors with healthy individuals. Social Science & Medicine 63, 598-610.

Schwarz, R., Kraussa, O., Höckelb, M., Meyerb, A., Zengerc, M., Hinzc, A., 2008. The course of anxiety and depression in patients with breast cancer and gynaecological cancer. Breast Care 3, 417-422.

Sears, S.R., Stanton, A.L., Danoff-Burg, S., 2003. The yellow brick road and the emerald city: benefit finding, positive reappraisal coping and posttraumatic growth in women with early-stage breast cancer. Health Psychology 22, 487-497.

Silva, S., Moreira, H., Canavarro, M.C., 2011. Growing after breast cancer: A controlled comparison study with healthy women. Journal of Journal of Loss and Trauma: International Perspectives on Stress and Coping 16, 323-340.

Silva, S., Moreira, H., Pinto, S., Canavarro, M.C., 2009. Cancro da mama e desenvolvimento pessoal e relacional: Estudo das características psicométricas do Inventário de Desenvolvimento Pós-Traumático (*Posttraumatic Growth Inventory*) numa amostra de mulheres da população Portuguesa. Revista Iberoamericana de Diagnóstico e Avaliação Psicológica 28, 105-133.

Silva, S.M., Crespo, C., Canavarro, M.C., 2012a. Pathways for psychological adjustment in breast cancer: A longitudinal study on coping strategies and posttraumatic growth. Psychology & Health 27, 1323-1341.

Silva, S.M., Moreira, H.C., Canavarro, M.C., 2012b. Examining the links between perceived impact of breast cancer and psychosocial adjustment: the buffering role of posttraumatic growth. Psycho-oncology 21, 409-418.

Stanton, A.L., Bower, J.E., Low, C.A., 2006. Posttraumatic growth after cancer, in: Calhoun, L.G., Tedeschi, R.G. (Eds.), Handbook of Posttraumatic Growth. Lawrence Erlbaum Associates, Mahwah, New Jersey, pp. 138-175.

Stanton, A.L., Revenson, T.A., Tennen, H., 2007. Health psychology: Psychological adjustment to chronic disease. Annual Review of Psychology 58, 565-592.

Stark, D., Kiely, M., Smith, A., Velikova, G., House, A., Selby, P., 2002. Anxiety Disorders in Cancer Patients: Their Nature, Associations, and Relation to Quality of Life. Journal of Clinical Oncology 20, 3137-3148.

Talley, A., Molix, L., Schlegel, R.J., Bettencourt, A., 2010. The influence of breast cancer survivors' perceived partner social support and need satisfaction on depressive symptoms: A longitudinal analysis. Psychology & Health 25, 433-449.

Taylor, S.E., 1983. Adjustment to threatening events: A theory of cognitive adaptation. American Psychologist 38, 1161-1173.

Tedeschi, R., Calhoun, L., 1996. The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. Journal of traumatic stress 9, 455-471.

Tedeschi, R., Calhoun, L., 2004. Posttraumatic growth: Conceptual foundations and empirical evidence. Psychological Inquiry 15, 1-18.

Tedeschi, R., Park, C., Calhoun, L., 1998. Posttraumatic growth: Positive changes in the aftermath of crisis. Lawrence Erlbaum Associates, Mahwah, NJ.

Tomich, P.L., Helgeson, V.S., 2004. Is finding something good in the bad always good? Benefit finding among women with breast cancer. Health Psychology 23, 16-23.

Urcuyo, K.R., Boyers, A.E., Carver, C.S., Antoni, M.H., 2005. Finding benefit in breast cancer: Relations with personality, coping, and concurrent well-being. Psychology & Health 20, 175-192.

Veach, T.A., Nicholas, D.R., Barton, M.A., 2002. Cancer and the family cicle: A practitioner´s guide. Brunner-Routledge, New York.

Weiss, T., 2004. Correlates of posttraumatic growth in married breast cancer survivors. Journal of Social and Clinical Psychology 23, 733-746.

Zigmond, A.P., Snaith, R.P., 1983. The Hospital Anxiety and Depression Scale. Acta Psychiatrica Scandinavica 67, 361-370.

Table 1. Sociodemographic, clinical, and study variables

	Recently off-treatment patients (G1) $N = 48$	Breast cancer survivors (G2) $N = 46$	Comparison analysis
Age (years) mean (*SD*); observed range	50.83 (8.09); 30-67	50.79 (7.37); 39-68	$F(1, 89) = .001, p = .979, d = .01$
Time from diagnosis to assessment (months) mean (*SD*); observed range	9.51 (2.16); 7-12.5	56.85 (24.82); 15-98	$F(1, 85)=173.44, p<.001, d = 2.69$
Education n (valid %)			
High school	33 (68.8)	32 (69.6)	$\chi^2(1)=.007, p=.932, V = 0.01$
College or post-graduate degree	15 (31.2)	14 (30.4)	
Type of cancer n (valid %)			
Invasive ductal carcinoma	38 (79.2)	22 (47.8)	
Lobular carcinoma *in situ*	0 (0.0)	1 (2.2)	
Ductal carcinoma *in situ*	5 (10.4)	0 (0.0)	$\chi^2(5)=23.07, p<.001, V = 0.50$
Invasive lobular carcinoma	2 (4.2)	3 (6.5)	
Inflammatory breast cancer	0 (0.0)	1 (2.2)	
Not specified	3 (6.2)	19 (41.3)	
Type of Surgery n (valid %)			
Conservative	29 (60.4)	7 (15.2)	$\chi^2(1)=20.31, p<.001, V = 0.47$
Mastectomy	19 (39.6)	39 (84.8)	
Type of treatment n (valid %)			
Chemotherapy	25 (52.1)	35 (79.5)	$\chi^2(1)=7.63, p=.006, V = 0.29$
Other than chemotherapy	23 (47.9)	9 (20.5)	
Axillary node dissection n (valid %)			
Yes	13 (27.1)	24 (52.2)	$\chi^2(1)=4.33, p=.038, V = 0.21$
No	35 (72.9)	22 (47.8)	
Posttraumatic growth mean (*SD*)			
Relating to others	22.81 (7.33)	23.00 (8.06)	$F(1, 87) = 0.04, p = .837, d = .02$
New possibilities	12.58 (6.57)	12.80 (6.79)	$F(1, 87) = 0.45, p = .505, d = .03$
Personal strength	13.42 (4.59)	13.63 (4.72)	$F(1, 87) = 0.03, p = .874, d = .05$
Spiritual change	6.17 (2.91)	6.00 (3.59)	$F(1, 87) = 0.10, p = .753, d = .05$
Appreciation of life	10.48 (3.35)	9.93 (3.74)	$F(1, 87) = 0.23, p = .632, d = .15$
Anxious symptoms mean (*SD*)	6.77 (3.89)	7.09 (4.53)	$F(1, 87) = 0.12, p = .733, d = .08$
Intimacy mean (*SD*)	2.55 (0.60)	2.32 (0.66)	$F(1, 87) = 4.13, p = .045, d = .36$

Table 2. Correlations among sociodemographic, clinical, and study variables

Variables		1	2	3	4	5	6	7	8	9	10
1	Relating to others	---									
2	New possibilities	.77**	---								
3	Personal strength	.75**	.69**	---							
4	Spiritual change	.52**	.41**	.46**	---						
5	Appreciation of life	.47**	.65**	.61**	.17	---					
6	Marital intimacy	.09	.15	.10	-.10	.26*	---				
7	Anxious symptoms	-.14	-.13	-.22*	-.10	-.20*	-.48**	---			
8	Age	-.01	-.16	-.05	.20	-.16	-.18	-.08	---		
9	Education [a]	-.17	-.13	-.02	-.25*	-.00	.09	-.01	-.31**	---	
10	Length of disease	.04	.07	.06	-.07	.06	-.14	.06	-.02	-.04	---
11	Type of surgery [b]	-.02	.08	.04	-.08	-.02	.09	.11	-.18†	.01	.43**
12	Type of treatment [c]	.04	.10	.03	-.10	-.12	-.14	.05	-.20†	.00	.23*
13	Axillary node dissection [d]	-.01	.15	-.02	.00	-.10	-.10	.01	-.15	.06	.17

[a] Education: 0 = high school; 1 = college or post-graduate degree; [b] Type of surgery: 0 = conservative; 1 = mastectomy; [c] Type of treatment: 0 = other than chemotherapy; 1 = chemotherapy; [d] Axillary node dissection: 0 = no; 1 = yes

†p<.10 *p < .05. **p < .01.

Table 3. Summary of simple mediation analyses (10000 bootstraps).

Independent variable	Effect of IV on intimacy (path *a*)	Effect of intimacy on anxiety (path *b*)	Direct effect (path *c'*)		Indirect effect (a*b)		Total effect (path *c*)
PTG	*b* (SE)	*b* (SE)	*b* (SE)	*b* (boot SE)	95% CI (LLCI; ULCI)	k^2; (LLCI; ULCI)	*b* (SE)
Relating to Others	.23 (.26)	-.10 (.02)***	-.05 (.05)	-.02 (.03)	-.086; .040	.046 (.001; .131)	-.08 (.06)
New Possibilities	.43 (.30)	-.10 (.02)***	-.04 (.06)	-.04 (.03)	-.112; .014	.074 (.006; .171)	-.09 (.07)
Personal Strength	.40 (.43)	-.10 (.02)***	-.16 (.08)†	-.04 (.05)	-.146; .057	.047 (.001; .138)	-.20 (.09)*
Spiritual Change	-.46 (.63)	-.11 (.02)***	-.19 (.12)	.05 (.07)	-.090; .211	.056 (.003; .173)	-.14 (.14)
Appreciation of Life	1.42 (.54)**	-.10 (.02)***	-.10 (.11)	-.14 (.08)	-.310; -.016	.122 (-.020; .240)	-.24 (.12)*

Note. IV = independent variable; M = mediator; DV = dependent variable; SE = standard interval; ULCI = upper limit confidence interval. All coefficients are unstandardized. Because process provides effect sizes for indirect effects only in simple mediation models with no covariates, the k^2 values reported for spiritual change were obtained in models excluding education as a covariate.

†p<.10 *p* < .05. **p* < .01. ***p* < .001.