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The Benefits of Goal Adjustment Capacities for Well-being among Women with Breast Cancer: Potential Mechanisms of Action

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Abstract

Objective—Breast cancer can seriously disrupt a person’s important life goals. As such, the ability to adjust one’s goals may be critical for well-being. The present study investigated the relationships between disengagement/re-engagement capacity and well-being among women with breast cancer, as well as several potential mechanisms (intrusive thoughts, life purpose, and physical activity) that could explain these relationships.

Method—The sample consisted of 230 women with early stage (N = 172) or late stage (N = 58) breast cancer, who were followed prospectively for 8 months. Well-being measures consisted of global mental health, perceived physical health, positive/negative affect, and sleep efficiency.

Results—Disengagement capacity did not predict any outcome variable. In contrast, re-engagement capacity prospectively predicted changes in global mental health, positive affect, negative affect, sleep efficiency, life purpose, and physical activity. Life purpose mediated the prospective relationship between re-engagement capacity and multiple aspects of well-being. The relationships between purpose and positive/negative affect were reciprocal over time. Results also suggested that physical activity is not a mediator, but is in fact a result of the effect of re-engagement capacity on well-being.

Conclusions—The results demonstrate that re-engagement capacity is important for well-being among women with breast cancer.

Keywords

Goal Adjustment; Breast Cancer; Re-engagement Capacity; Disengagement Capacity; Purpose in Life

Introduction

The pursuit and attainment of personally meaningful goals is essential for achieving positive well-being and for developing successfully across the lifespan (Heckhausen, 1999; Ryff,

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Declaration of Conflicting Interest

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1989), but individuals only have a finite amount of time and resources with which to achieve their goals. According to theories of lifespan development, this limited capacity creates a fundamental self-regulatory challenge: people must select which goals to devote their resources to and when (Heckhausen, Wrosch, & Schulz, 2010; Heckhausen, 1999; Freund & Baltes, 1998; Heckhausen & Schulz, 1995; Baltes & Baltes, 1990; Brandtstädter & Renner, 1990).

Selecting certain goals often means that other goals must be let go. Some goals will simply not be feasible to pursue because they overtax resources, jeopardize long-term outcomes, or interfere with the attainment of other, perhaps more important, goals (Heckhausen et al., 2010). Furthermore, over time, individuals may encounter obstacles, which render certain life goals permanently blocked or chronically disrupted. Such unattainable goals are not uncommon (Bauer, 2004) and are particularly prevalent in the context of negative life events (e.g. development of a disease, death of a spouse, loss of a job).

Researchers have proposed that letting go of unrealistic goals and replacing them with more appropriate alternative goals is the most adaptive self-regulatory strategy (Wrosch, Scheier, Carver, & Schulz, 2003a). Although letting go of an unattainable goal may be adaptive, giving up a highly valued goal is not an easy task and may not occur spontaneously (Brandtstädter & Schüler, 2013; Klinger, 1977). Likewise, developing commitment and interest in new, alternative goals can be an effortful and lengthy process (Hidi & Renninger, 2006; Renninger, 2000). Given the difficulties inherent in adaptive self-regulation in the context of unattainable goals, researchers have begun to investigate individual differences in how people respond when unachievable goals are confronted (Wrosch, Scheier, & Miller, 2013; Brandtstädter, 2007; Rothermund & Brandtstädter, 2003; Wrosch, Scheier, Carver, & Schulz, 2003b).

One line of this research has focused on individual differences in the capacity to adjust one's goals. Goal adjustment capacity involves two distinct components: the ability to both withdraw effort and commitment in an unattainable goal, collectively referred to as disengagement capacity, and the ability to identify, commit to, and exert effort towards alternative goals, collectively referred to as re-engagement capacity (Wrosch et al., 2003a). These goal adjustment capacities are thought to reflect a generally stable disposition in how people react to goal blockage across life domains (for further information on measurement and correlates of goal adjustment capacities, see, Mens, Wrosch & Scheier, in press; Wrosch et al., 2003a).

Research has demonstrated that disengagement and re-engagement capacity predict multiple aspects of well-being, both cross-sectionally and prospectively across time (for a review see, Mens, Wrosch, & Scheier, in press; Wrosch, Scheier, & Miller, 2013). As yet, though, little research has examined the mechanisms that might underlie the benefits of goal adjustment capacities. Research into mechanisms could serve to confirm existing theoretical accounts of goal adjustment capacities and could help to further refine and elaborate upon these accounts. One of the primary purposes of the present study was to examine several potential mechanisms that might underlie the established links between goal adjustment capacities and well-being.

Potential Mechanisms

Existing theoretical accounts suggest several potential mechanisms that may underlie the benefits of goal adjustment capacities. With respect to disengagement capacity, researchers (Mens, Wrosch, & Scheier, in press) have proposed that this capacity is beneficial, at least in part, because it reduces negative intrusive thoughts concerning an unattainable goal. In general, thoughts about non-attained goals are more prone to intrude into consciousness, as information related to incomplete goals is more accessible and easily cued (Martin, Strack, & Stapel, 2001; Higgins, Rholes, & Jones, 1977; Bruner, 1957; Zeigarnik, 1938). These intrusive thoughts will likely be much more repetitive and negative if the non-attained goal is permanently blocked. Indeed, multiple theories of rumination suggest that these negative intrusive thoughts stem from blocked goals (Matthews & Wells, 2004; Martin & Tesser, 1989; Klinger, 1977; for a non-goal based view on the origins of rumination see: Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). As people high in disengagement capacity are able to let go of unattainable goals, they may be less likely to experience intrusive thoughts concerning these goals. In support of this idea, research has demonstrated that disengagement capacity is associated with fewer general intrusive thoughts, and fewer intrusive thoughts about negative life events, such as cancer (Thompson, Stanton, & Bauer, 2013; Wrosch, Scheier, Miller, Schulz, & Carver, 2003b). However, no study has directly tested if intrusive thoughts do in fact mediate the association between disengagement capacity and well-being.

With respect to re-engagement capacity, this ability is presumed to promote well-being by fostering purpose in life, or the perception that one's goals/activities are valuable and worthwhile (Wrosch et al., 2003a). Researchers proposed that the ability to engage in alternative goals should allow a person to continue to have meaningful activities to pursue apart from any unattainable goals that the person is currently confronting. These alternative goals could be completely novel goals, existing goals that have been scaled back to make them more attainable, or previously held goals that are reprioritized as more important (Carver & Scheier, 1990). Subsequent studies have confirmed that re-engagement capacity is associated with life purpose (Thompson et al, 2013; Wrosch, Amir, & Miller, 2011), but no study has directly investigated whether the association between re-engagement capacity and well-being is in fact mediated by life purpose.

Goal adjustment Capacities and Women with Breast Cancer

The present study examined goal adjustment capacities and the mechanisms underlying the benefits of these capacities in a sample of women with breast cancer. Women with breast cancer were chosen because these individuals experience significant goal disruption and are thus especially likely to encounter unattainable goals (Carver, Lehman & Antoni, 2003; Moyer, & Salovey, 1996). For example, many women experience debilitating side effects from breast cancer treatment, such as pain, fatigue, sexual dysfunction, and infertility (American Cancer Society, 2007). Two previous studies have investigated goal adjustment capacities among women with breast cancer (Thompson et al., 2013; Wrosch & Sabiston, 2013). Although these studies provided interesting information about goal adjustment processes in this group of women, several questions emerged that went unanswered. Another purpose of the present study was to address these remaining questions.

The first remaining question concerns the prospective relationship between goal adjustment capacities and well-being among women with breast cancer. As previously mentioned, research has clearly demonstrated that goal adjustment capacities predict positive changes in well-being over time (O'Connor, O'Carroll, Ryan, & Smyth, 2012; Wrosch, Miller, Scheier, & De Pontet, 2007; Miller & Wrosch, 2007; Wrosch et al., 2003b). However, this prospective relationship has not been unequivocally demonstrated among women with breast cancer. Across these two prior studies to investigate a breast cancer sample, only one prospective relationship was found between goal adjustment capacities and well-being (between re-engagement capacity and positive affect, Wrosch & Sabiston, 2013). This was the case despite the fact that goal adjustment capacities were associated with multiple measures of well-being at baseline, including depressive symptoms, negative affect, life satisfaction, and physical symptoms (Thompson et al., 2013; Wrosch & Sabiston, 2013).

Both prior studies followed participants for a relatively short period of time (i.e. three months). Perhaps this time frame was insufficient for significant changes in well-being to occur. In support of this idea, one of the studies explicitly noted little change in their outcome variables over time (Thompson et al., 2013). In the present research, we sought to investigate whether a longer follow-up period would reveal stronger prospective relationships between goal adjustment capacities and well-being among women with breast cancer.

The second remaining question raised by prior research concerns the possibility that additional mechanisms might underlie the benefits of re-engagement capacity in certain situations. Specifically, Wrosch and Sabiston (2013) raised the possibility that physical activity levels might mediate some of the benefits of re-engagement capacity in women with breast cancer. Many women gain weight during and after breast cancer treatment (Demark-Wahnefried et al., 2001; Rock et al., 1999; Wahnefried, Rimer, & Winer, 1997). As such, new and renewed goals relating to physical activity may become highly salient. As persons high in re-engagement capacity are better able to take up alternative goals, they may be more likely to take up new physical activity pursuits and exhibit a better profile of physical activity than persons low in re-engagement capacity. Given the positive relationship between physical activity and well-being (Penedo & Dahn, 2005), physical activity levels could, in part, explain the benefits of re-engagement capacity.

The results of Wrosch and Sabiston (2013) partially supported this reasoning. They found that physical activity mediated the association between re-engagement capacity and positive affect at baseline, but this mediational pathway did not emerge prospectively. The authors noted that their lack of prospective findings could have been due to the nature of their sample, which consisted of women who had already completed treatment. Such women would have had ample time to make lifestyle adjustments prior to study entry, and changes in physical activity levels may no longer have been evident. The present study afforded the opportunity to test this mediational hypothesis in a sample of women with breast cancer, most of whom were still undergoing treatment.

Current study

The present study utilized data from a sample of women who participated in a larger investigation of psychosocial interventions for women with breast cancer (Mens, Helgeson, Lembersky, Baum, & Scheier, in press). The sample consisted of women with either early stage (Stage I or II) or late stage breast cancer (Stage IV). The data from this parent study allowed us to investigate the relationships between goal adjustment capacities and several aspects of well-being over an 8-month period. We also examined the role of three potential mediator variables: intrusive thoughts concerning cancer, life purpose, and physical activity levels.

Several different aspects of well-being were assessed. The primary outcomes of the parent study were global mental health, perceived physical health, and depressive symptoms. Global mental health and perceived physical health were retained as outcomes in the present study. Although a measure of depressive symptoms was available, for the present analyses we decided instead to utilize separate measures of positive and negative affect. We opted for separate measurements because research has suggested that re-engagement and disengagement capacity may be differentially associated with positive and negative affect (for review, see Wrosch et al., 2013). As depression involves both the absence of positive affect, and the presence of negative affect (American Psychiatric Association, 2013), a measure of depressive symptoms would not allow us to detect any separable effects on positive and negative affect. We also included an assessment of sleep quality in our analyses, as a further measure of physical health.

We hypothesized that both disengagement and re-engagement capacity would prospectively predict well-being over the 8-month study period. In regard to mechanisms, we hypothesized that re-engagement capacity would have a positive impact on life purpose and physical activity levels over time, and these positive changes in purpose/physical activity would mediate the prospective relationship between re-engagement and well-being. Similarly, we hypothesized that disengagement would be associated with decreased intrusive thoughts over time, and this decrease would mediate the prospective relationship between disengagement capacity and well-being.

It is worth noting that all of our proposed mediators (life purpose, physical activity, and intrusive thoughts) are important outcomes in and of themselves, and could be products of well-being, as well as predictors of well-being. For example, previous research has found that priming positive affect increases perceptions of meaning in life (King et al., 2006, Study 4), and it may be that affect and purpose have a reciprocal relationship across time. Similarly, the previous finding (Wrosch & Sabiston, 2011) that physical activity mediated the association between re-engagement capacity and positive affect at baseline, but not prospectively, could suggest that physical activity is the product of positive affect, not the cause. To address this issue, we tested for alternative mediation pathways, in addition to the hypothesized mediation pathways. Specifically, we examined reverse-causality pathways in which change in well-being over time predicted the prospective relationship between goal adjustment capacities and the proposed mediators.

Methods

Participants

The participants were originally recruited for a study investigating the effects on well-being of two psychosocial interventions (an education intervention and a peer support intervention). Participants were randomly assigned to one of the two 8-week interventions or to a control condition, in which they received usual care. The interventions consisted of weekly meetings, in which participants met in small groups of 6–9 women (for details of the intervention and intervention effects, see Mens, et al., in press).

Eligible participants were English speaking women who were 25 years of age or older, living within a 60 mile radius of Pittsburgh, PA. Participants were eligible to enroll in the study if they had (a) a first time diagnosis of Stage I or II breast cancer, (b) received an initial diagnosis of Stage IV cancer, or (c) a distal recurrence of breast cancer. Patients with early stage cancer must have been diagnosed within 6 months of study entry. There was no window for enrollment for patients with late stage disease. Participants were recruited from the offices of local oncologists. We contacted 915 eligible patients, of whom 245 provided informed consent (180 patients with early stage and 65 patients with late stage disease). One participant was excluded from the present analyses as she did not complete all baseline measures, and 14 participants were lost to attrition, leaving a total sample of 230 participants. At baseline, participants who were lost to attrition had lower-levels of perceived physical health, but they did not differ on any other well-being variable, medical variable, or self-reported goal adjustment capacities. Demographic information characterizing consented participants can be found in Table 1.

Procedure

At baseline (T1), participants completed measures of: goal adjustment capacities, the potential mediator variables, and the well-being variables. Eight months later (T2), participants completed the same measures of the putative mediators and well-being variables. Most participants (66%) completed the measures during a face-to-face interview at a location of their choice, usually their home. The remaining participants completed the measures via a mailed self-report questionnaire. At baseline, participants who completed the mailed questionnaire did not significantly differ from participants who completed the face-to-face interview in terms of demographics, breast cancer stage, goal adjustment capacities, mediators, or well-being variables.

Measures

Goal adjustment capacities—Individual differences in goal adjustment capacities were measured with the 10-item Goal Adjustment Scale (Wrosch et al., 2003b). Four of the items measure goal disengagement capacity (e.g., “If I have to stop pursuing an important goal in my life, I find it difficult to stop trying to achieve the goal.”), $\alpha = 0.73$ in present sample at baseline. Six of the items measure goal re-engagement capacity (e.g., “If I have to stop pursuing an important goal in my life, I convince myself that I have other meaningful goals to pursue.”), $\alpha = 0.87$ in present sample at baseline. Individuals rated their agreement with the items on a 1–5 Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Well-being outcomes—Global mental health and general perceived physical health were measured, respectively, with the mental health component scale (MCS) and the perceived physical health component scale (PCS) of the SF-36 Scale (Ware & Sherbourne, 1992). Each component scale is composed of four (differentially weighted) subscales that measure various facets of global mental health (vitality, social functioning, role limitations due to emotional problems, and mental health, measured with 14 items) and perceived physical health (physical functioning, role limitations due to physical problems, bodily pain, and general health, measured with 22 items). The individual SF-36 scales had high reliability (α 's ranged from 0.81 to 0.89 at baseline). Of note, the MCS reflects a broad definition of mental health focused on psychosocial functioning, which encompasses affect. As such, some subscales overlap to a certain extent with measures of affect. In particular, the mental health subscale is closely related to negative affect, while the vitality subscale reflects some high-activation positive emotions.

Positive affect and negative affect were measured with a reduced 18-item version of the Profile of Mood States Scale (Usala & Hertzog, 1989). The abbreviated scale consisted of 9 positive affect items (e.g., happy) and 9 negative affect items (e.g., sad), which participants rated according to how frequently they felt the emotion in the past week on a 1–5 scale (1 = Never, 5 = Always), at baseline $\alpha = 0.92$ and $\alpha = 0.90$, respectively.

Sleep quality was measured with the Pittsburgh Sleep Quality Index (PSQI, Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI measures several facets of sleep quality. The present study focused specifically on sleep efficiency, as this aspect of sleep quality has been associated with goal adjustment capacities in prior research (Wrosch et al., 2007). The PSQI asks respondents to estimate their average sleep habits during the past month. Sleep efficiency is computed as a ratio of the amount of time respondents estimate they spend sleeping on an average night divided by the average amount of time they spend in bed, multiplied by 100.

Mediators—Life purpose was measured with the Life Engagement Test (LET, Scheier et al., 2006). The scale consists of 6 items (e.g., “To me, the things I do are worthwhile.”), which participants rate on a 1–5 scale (1 = Strong Disagree, 5 = Strong Agree), $\alpha = 0.87$ at baseline.

Physical activity was measured with the Paffenbarger Physical Activity Questionnaire (Paffenbarger, Wing, & Hyde, 1978), which asks participants to list the type and duration of their physical activities for the average week. Kilocalories expended per week are then estimated based on these activities.

Intrusive thoughts were measured with the Intrusive Thoughts Subscale from the Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979). The scale contained 7 items, which asked participants to indicate how frequently they experienced intrusive thoughts concerning their cancer (e.g., “Other things kept making me think of it.”). Respondents rate items on a 1–4 scale (1 = Not At All, 4 = Often), $\alpha = 0.88$ at baseline.

Statistical analyses

Since patients in the present study participated in the interventions by attending small group meetings, initial analyses were conducted with Hierarchical Linear Modeling (HLM), nesting individuals within meeting groups. However, none of the null HLM models for the outcomes indicated significant variance between meeting groups, so hierarchical regression was used to assess the relationships between goal adjustment capacities and well-being.

The hierarchical regression model consisted of two steps. Step 1 included several control variables. Control variables consisted of both medical and demographic variables, which were significantly associated with at least one of the outcome variables. In order to prevent the possibility of hidden interactions, we formally tested whether any control variable interacted with either goal adjustment capacity prior to including the variable in the model (e.g. interaction between cancer stage and goal adjustment capacities). Control variables included: two dummy-coded variables indicating intervention group status (education intervention vs. control group and peer support intervention vs. control group), and variables indicating cancer stage (early vs. late), chemotherapy receipt (yes vs. no), extent of lymphedema (# of lymphedema symptoms), age, marital status (married vs. not married), income, ethnicity (Caucasian vs. other ethnicity), and body mass index (BMI). The baseline measure of the outcome variable was also included at Step 1 to enable prospective assessment of change in the outcome variable over time. At Step 2, standardized measures of disengagement and re-engagement capacity were included.

Mediation—In order to examine whether the mediator variables explained the relationship between goal adjustment capacities and well-being, we tested the significance of the indirect effects, as outlined by Preacher & Hayes (2008), using the PROCESS macro in SPSS. Unstandardized estimates of the indirect effects were calculated based on 10,000 bootstraps and the significance of the indirect effects were determined based on 95% bias-corrected confidence intervals (95% BCI). Indirect effects are considered significant if the confidence interval does not include zero.

The model used to test mediation included the same control variables as the original model: intervention group, cancer stage, chemotherapy, lymphedema, age, marital status, income, ethnicity, BMI, and the baseline measure of the outcome variable. Eight-month change in the proposed mediator was included as the mediator variable, and the T1 measure of the proposed mediator was also included as a covariate. Reverse-causality mediation analyses consisted of the same model, but change in the outcome variable was included as the mediator.

Results

Disengagement Capacity

Disengagement capacity did not prospectively predict any outcome: global mental health, $\beta = 0.02$, $p = 0.74$, perceived physical health, $\beta = 0.04$, $p = 0.57$, positive affect, $\beta = -0.05$, $p = 0.43$, negative affect, $\beta = -0.04$, $p = 0.49$, and sleep efficiency, $\beta = -0.03$, $p = 0.64$.

Disengagement capacity was also not associated with its putative mechanism, intrusive thoughts, $\beta = -0.05$, $p = 0.43$.

Re-engagement Capacity

Re-engagement capacity prospectively predicted global mental health, $\beta = 0.15$, $F(1,189) = 4.17$, $p = 0.04$, positive affect, $\beta = 0.20$, $F(1,189) = 10.24$, $p < 0.01$, negative affect, $\beta = -0.17$, $F(1,189) = 7.05$, $p = 0.01$, and sleep efficiency, $\beta = 0.18$, $F(1,189) = 6.41$, $p = 0.01$, but it did not predict perceived physical health, $\beta = -0.03$, $p = 0.71$. Of note, the relationship between re-engagement capacity and global mental health was largely driven by the mental health subscale, $\beta = 0.19$, $p < 0.01$; re-engagement capacity was not significantly associated with any other subscale of the MCS. In regards to mechanisms, re-engagement capacity prospectively predicted both proposed mediator variables: physical activity, $\beta = 0.14$, $F(1,189) = 3.80$, $p = 0.05$, and life purpose, $\beta = 0.11$, $F(1,189) = 3.83$, $p = 0.05$.

To better understand the direction of these relationships across time, individuals one standard deviation above and below the mean in re-engagement capacity were plotted at T1 and T2 for all the outcome variables (see Figure 1). The same general pattern was found across all outcomes. Individual low in re-engagement capacity appeared to exhibit a negative trajectory in well-being across time, whereas individuals high in re-engagement capacity exhibited an increase in well-being across time.

(See Supplementary Materials for means and SDs of predictor and outcome variables, correlations between predictor variables, and correlations between outcome variables. As depressive symptoms were a primary outcome in the parent study, results for depressive symptoms are also reported in the Supplementary Materials, these results largely paralleled the findings for negative affect.)

Mediation

As disengagement was not associated with any outcome variable, or its proposed mechanisms, we did not conduct mediation analyses in regards to intrusive thoughts and disengagement capacity.

Life purpose

Eight-month change in life purpose significantly mediated the prospective relationship between re-engagement capacity and global mental health, $b = 0.42$, 95% BCI [0.06, 1.03], positive affect, $b = 0.20$, 95% BCI [0.01, 0.47], and negative affect, $b = -0.29$, 95% BCI [-0.68, -0.03]. Life purpose did not mediate the association between re-engagement capacity and sleep efficiency, 95% BCI [-0.41, 0.29]. For a visual depiction of these indirect effects, see Figure 2a–c.

Reverse-Causality Life purpose

Neither global mental health nor sleep efficiency mediated the prospective relationship between re-engagement capacity and life purpose, 95% BCI [-0.05, 0.31] and 95% BCI [-0.09, 0.08], respectively. However, 8-month change in positive affect mediated the prospective relationship between re-engagement capacity and life purpose, $b = 0.17$, 95%

BCI [0.03, 0.37], as did 8-month change in negative affect, $b = 0.16$, 95% BCI [0.02, 0.37] (see Figure 2d and Figure 2e).

Physical activity

Physical activity did not mediate any of the relationships between re-engagement capacity and well-being: global mental health, 95% BCI [-0.08, 0.40], positive affect, 95% BCI [-0.002, 0.24], negative affect, 95% BCI [-0.17, 0.05], and sleep efficiency, 95% BCI [-0.05, 0.94].

Reverse-causality Physical activity

Neither global mental health nor negative affect mediated the association between re-engagement capacity and physical activity, 95% BCI [-10.08, 69.79] and 95% BCI [-17.72, 58.73], respectively. However, both 8-month change in positive affect and 8-month change in sleep efficiency mediated the prospective relationship between re-engagement capacity and physical activity, $b = 39.67$, 95% BCI [0.11, 113.38], $b = 50.51$, 95% BCI [7.60, 127.22], respectively. See Figure 3a and Figure 3b for a visual depiction of these indirect effects.

Discussion

The results of the present study demonstrate that re-engagement capacity prospectively predicts well-being among women with breast cancer. Across the 8-month study period, individuals high in re-engagement capacity exhibited an increase in global mental health, positive affect, negative affect, sleep efficiency, life purpose, and physical activity, while individuals low in re-engagement capacity tended to exhibit a decrease in these same outcomes across time. Unlike re-engagement capacity, disengagement capacity did not prospectively predict any well-being variable, or its putative mechanism, intrusive thoughts.

These prospective findings are in contrast to prior research (Thompson et al., 2013; Wrosch & Sabiston, 2013), which failed to provide consistent evidence that goal adjustment capacities prospectively predict well-being among women with breast cancer. This suggests that the failure to find prospective relationships in earlier research may have been due to the shorter follow-up periods utilized in these prior studies. Future studies with a denser number of assessment points, extending further into time, will be needed to determine more definitively when relationships between goal adjustment capacity and well-being emerge and how they vary across treatment and long-term survivorship periods.

Demonstrating these prospective relationships is an important contribution to the goal adjustment literature. Goal adjustment capacities are theorized to be stronger predictors of well-being among populations experiencing more significant goal disruption (Wrosch et al., 2003b). As women with breast cancer experience substantial goal disruption (Carver et al., 2003), failure to find prospective effects of goal adjustment capacities in this population would have been a serious challenge to current theory regarding goal adjustment capacities, and would have raised questions as to the adequacy of present measurement techniques.

These prospective findings also strongly point to the importance of re-engagement capacity, as compared to disengagement capacity, for women with breast cancer. In the present study, re-engagement capacity was associated with multiple aspects of well-being, while disengagement capacity did not predict any outcome. It is worth noting that previous correlational findings in breast cancer samples could also be interpreted as reflecting the relative importance of re-engagement, as opposed to disengagement capacity (Thompson et al., 2013; Wrosch & Sabiston, 2013;). The relative importance of re-engagement capacity is in contrast to prior research with cancer-free samples, which has consistently found that both capacities predict well-being, albeit different aspects of well-being (for review, see Wrosch et al., 2013). In this regard, it is particularly noteworthy that re-engagement capacity predicted negative affect and sleep efficiency, as previous research has found that re-engagement capacity is mostly associated with positive aspects of well-being (e.g. positive affect, life satisfaction), while it shows little to no association with negative aspects of well-being and physical health.

This raises the possibility that re-engagement and disengagement capacity operate somewhat differently in the context of breast cancer. Breast cancer poses a unique set of challenges for individuals, and there are many potential reasons why the ability to re-engage might be especially useful for coping with these challenges. For example, several researchers have proposed that a critical facet of adapting to the stress of cancer is finding meaning in the experience (Davis, Nolen-Hoeksema, & Larson, 1998; Park & Folkman, 1997; Taylor & Armor, 1996). The process of finding meaning often involves reappraising one's priorities and changing one's activities and life goals. The ability to find meaningful alternative goals seems especially likely to facilitate this adaptive process.

Although plausible, this explanation is nevertheless speculative. Current conceptualizations of goal adjustment capacities emphasize their uniform benefits across situations. As such, these conceptualizations offer little theoretical rationale for why situation-specific findings might emerge. Going forward, researchers may need to develop more nuanced conceptualizations of goal adjustment capacities, which could account for their situation-specific costs and benefits. Some researchers have already begun this process, investigating situations in which re-engagement capacity may be costly (Wrosch, Amir & Miller, 2011). Another fruitful direction may be to identify mechanisms that underlie the relationship between goal adjustment capacities and well-being. Such mechanisms could suggest situations in which each goal adjustment capacity will be most helpful. For example, if life purpose underlies some of the benefits of re-engagement capacity, this would suggest that re-engagement may be especially beneficial in populations who have difficulty maintaining purpose in life, such as older adults and people of low socio-economic status (Ryff & Singer, 2008; Greenfield & Marks, 2004; Ryff, Keys, & Hughes, 2003; Marmot et al., 1998; Riley et al., 1994).

In regards to these mechanisms, we found that re-engagement capacity was associated with both its putative mechanisms, but these mediational relationships were more complicated than originally hypothesized. The present research is the first study to confirm that life purpose mediates the association between re-engagement capacity and well-being. As suggested by prior theory (Mens, Wrosch, & Scheier, in press), we found that 8-month

change in life purpose mediated the prospective relationship between re-engagement capacity and positive affect, negative affect, and global mental health. However, the results suggested that the relationship between purpose and affect is not one-directional. Reverse-causality mediation analyses revealed that 8-month change in positive/negative affect mediated the prospective association between re-engagement capacity and life purpose, as well. This suggests that the link between purpose and affect is reciprocal across time. This reciprocal relationship is not surprising, considering prior research has found that life purpose both predicts positive affect (Ryff & Keyes, 1995) and is predicted by positive affect (King et al., 2006). Nevertheless, this reciprocal relationship will be important to bear in mind in regard to goal adjustment theory, and in the future more fine-grained longitudinal studies will be necessary to model this relationship fully.

Mediation aside, the emerging evidence that re-engagement capacity predicts increased life purpose is of considerable interest in its own right (Thompson et al., 2013; Wrosch et al., 2011). Life purpose is an integral facet of eudaimonic well-being, a construct that is receiving increased attention in the literature. The construct of eudaimonic well-being was developed in opposition to prevalent measures of well-being, which emphasize affective experience and life satisfaction (Huta & Waterman, 2013; Delle Fave, Brdar, Freire, Vellla-Brodrick, & Wissing, 2011; Deci & Ryan, 2008; Waterman, 2008). In contrast, eudaimonic well-being emphasizes the fulfillment of personal potential and engagement in meaningful pursuits (Ryff & Singer, 2008; Ryan & Deci, 2001). Since its conceptualization, research has demonstrated that eudaimonic well-being uniquely contributes to both physical and mental health (Fredrickson et al., 2013; Huta & Ryan, 2010; Steger, Kashdan, & Oishi, 2008; Matthews et al., 2006; Ryff, Singer, & Love, 2004; Ryff & Singer, 1998). Thus, it is important to identify factors that predict components of eudaimonic well-being, as well as more traditional measures of well-being.

Beyond life purpose, the current research shed more light on the role of physical activity in the goal adjustment process. We had originally hypothesized that physical activity would mediate the relationship between re-engagement capacity and well-being, but our analyses did not support this hypothesis. Instead, we found that both 8-month change in positive affect and 8-month change in sleep efficiency mediated the prospective relationship between re-engagement capacity and physical activity. This suggests that increased physical activity does not underlie the benefits of re-engagement capacity, but is instead a product of individuals high in re-engagement capacity experiencing more positive affect and sleeping more efficiently. This could explain the finding in prior research (Wrosch & Sabiston, 2013) that physical activity mediated the association between re-engagement capacity and positive affect at baseline, but not prospectively, as cross-sectional data do not speak to the issue of direction of causality. Considering the effect of physical activity on health/mortality (Warburton, Nicol, & Bredin, 2006; Paffenbarger et al., 1986), the relationship between re-engagement capacity and physical activity could have long-term health benefits, and future research should explore this possibility.

In contrast to re-engagement capacity, disengagement capacity was not associated with its putative mechanism, intrusive thoughts. This is contrary to previous correlational research among women with breast cancer, which found that disengagement capacity was associated

with fewer intrusive thoughts concerning cancer (Thompson et al., 2013). It is of note that disengagement capacity was marginally correlated with intrusive thoughts at baseline in the present study ($p = 0.08$), which partially replicates the previous correlational findings. It may be that the relationship between disengagement capacity and intrusive thoughts simply diminishes over time.

Alternatively, the type of intrusive thoughts measured in the present study may have contributed to the failure to find effects. Participants were asked to indicate their level of intrusive thoughts specifically with respect to their cancer. It is likely that intrusive thoughts concerning one's cancer are most prevalent shortly after cancer diagnosis. Over time, though, a person may come to terms with their cancer diagnosis, and intrusive thoughts may shift to revolve around important life goals that the cancer experience has rendered unattainable. Thus, the measure utilized in the present study may have been insufficient to capture the kinds of intrusive thoughts participants were experiencing at the time of the follow-up. In the future, it may be fruitful to use a measure of intrusive thoughts that assesses a broader range of thoughts concerning disrupted life goals and daily activities.

There are several limitations to the current study that should be mentioned. First, the refusal rate for the present study was high, which was likely due to the substantial burden associated with participating in the psychosocial interventions. This may have contributed to selection bias for participants, particularly since individuals who volunteer for psychosocial interventions tend to be younger, healthier, and more affluent than general patient populations. In this regard, the present sample did consist largely of Caucasian women of higher socio-economic status, who were significantly younger than median age for women with breast cancer. We would expect that goal adjustment capacities are even more beneficial for people with fewer resources than the individuals in our sample, as people with few resources are liable to experience more severe goal disruption. However, it is possible that people with very few resources may be too overwhelmed to engage in effective goal adjustment, even if they have the dispositional capacity. As such, it will be important in future research to replicate these findings among more diverse samples.

A second limitation involves the fact that goal adjustment capacities were measured via the Goal Adjustment Scale, which asks persons how they normally respond when they encounter a goal they must give up. We did not measure goal adjustment behavior and processes directly. Therefore, we can only infer that individuals who scored high in re-engagement capacity actually took up alternative goals in this specific context. The association between re-engagement capacity and life purpose suggests that individuals high in re-engagement capacity did indeed take up alternative goals. However, we believe that online measurement of actual changes in people's important life goals, augmented with the use of more situation-specific goal adjustment measures (Thompson et al., 2013; Thompson, Woodward, & Stanton, 2010), will be one important direction for future research.

In sum, the results from the present study demonstrate that re-engagement capacity predicts beneficial changes in well-being over time. Results also show that life purpose mediates some of the benefits of re-engagement capacity, although the relationship between affect and purpose appears to be reciprocal across time. The association between re-engagement

capacity and life purpose is of particular interest, as life purpose is receiving increased attention in the literature as a neglected facet of eudaimonic well-being. The findings of the present study point to the relative importance of re-engagement capacity (compared to disengagement capacity) for women with breast cancer. The differential impact of these two goal adjustment capacities suggests that more situation-specific conceptualizations of goal adjustment processes should be developed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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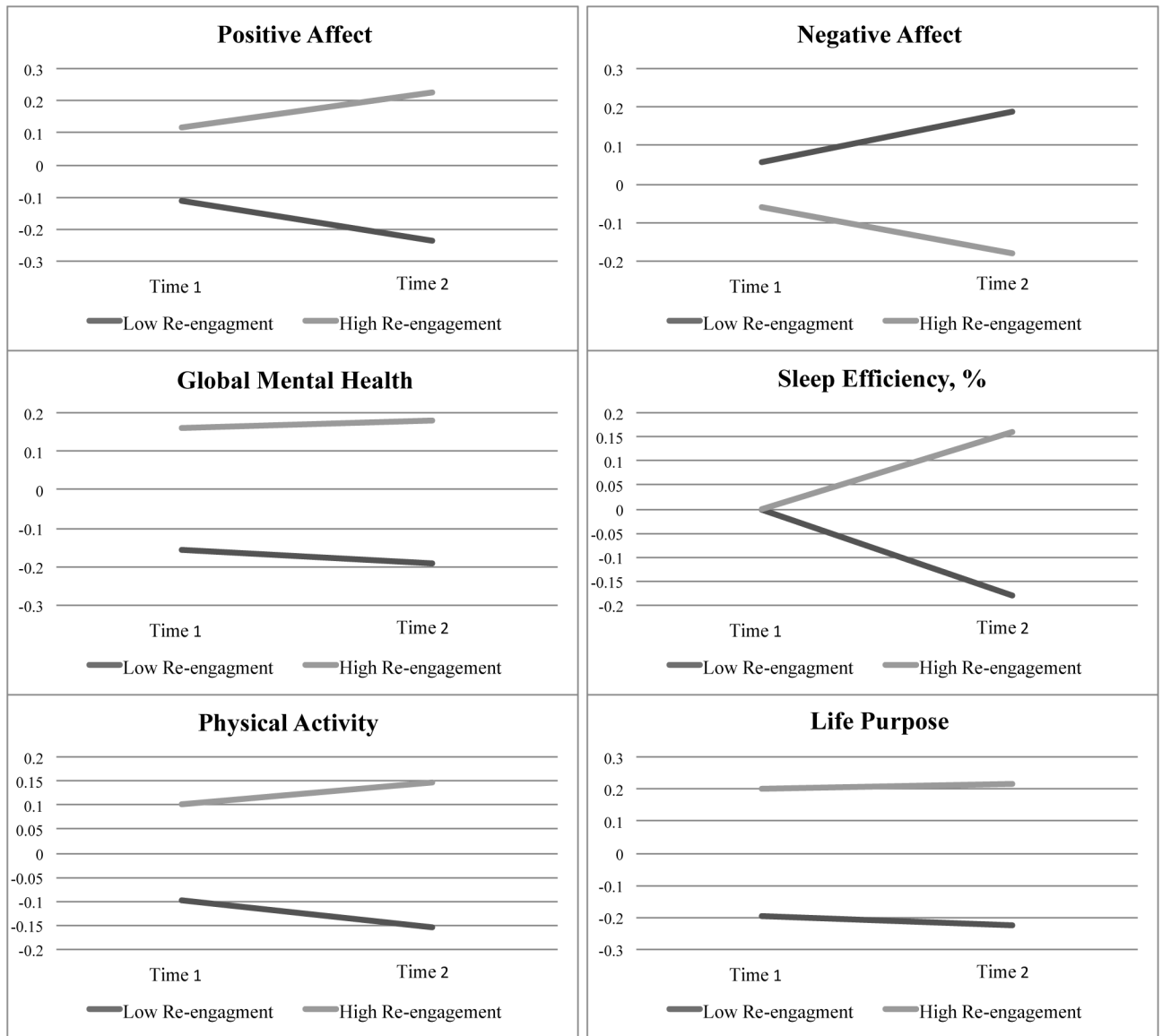


Figure 1. The Association between Re-engagement Capacity and Well-being across Time

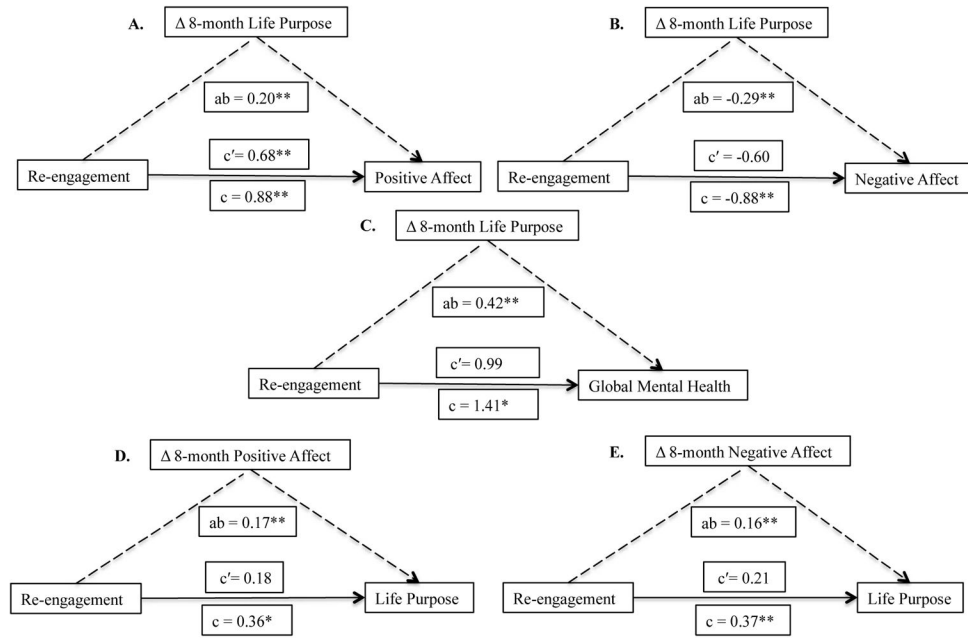


Figure 2. Path Diagrams for Life Purpose Mediation Analyses

A. The prospective relationship between re-engagement capacity and positive affect, as mediated by 8-month change in life purpose. **B.** The prospective relationship between reengagement capacity and negative affect, as mediated by 8-month change in life purpose. **C.** The prospective relationship between re-engagement capacity and global mental health, as mediated by 8-month change in life purpose. **D.** The prospective relationship between re-engagement capacity and life purpose, as mediated by 8-month change in positive affect. **E.** The prospective relationship between re-engagement capacity and life purpose, as mediated by 8-month change in negative affect.

** $p < 0.05$, * $p < 0.10$

All coefficients represent unstandardized betas as estimated by boot strapping analyses conducted with the PROCESS macro in SPSS.

C corresponds to the total effect of re-engagement capacity on the outcome variable. C' corresponds to the direct effects of re-engagement capacity on the outcome variable, removing the indirect effect, via the mediator. AB corresponds to the indirect effect of re-engagement capacity on the outcome variable, via the mediator.

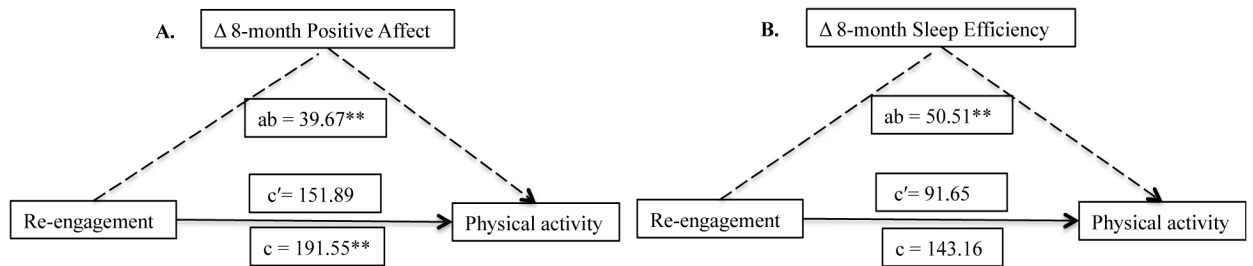


Figure 3. Path Diagrams for Physical Activity Mediation Analyses

A. The prospective relationship between re-engagement capacity and physical activity, as mediated by 8-month change in positive affect. **B.** The prospective relationship between reengagement capacity and physical activity, as mediated by 8-month change in sleep efficiency.

** $p < 0.05$, * $p < 0.10$

** $p < 0.05$, * $p < 0.10$

All coefficients represent unstandardized betas as estimated by boot strapping analyses conducted with the PROCESS macro in SPSS.

C corresponds to the total effect of re-engagement capacity on the outcome variable. C' corresponds to the direct effects of re-engagement capacity on the outcome variable, removing the indirect effect, via the mediator. AB corresponds to the indirect effect of re-engagement capacity on the outcome variable, via the mediator.

TABLE 1

Age, years	Range = 26–78 <i>M=51</i>
Family income, \$	
<20,000	7%
20–39,999	15%
40–59,000	25%
60–99,999	26%
>100,000	20%
Refused to answer	6%
Marital Status	
Married/Living with partner	65%
Divorced	14%
Single	13%
Widowed	5%
Separated	4%
Race	
Caucasian	89%
African-American	9%
Other	2%
Stage	
Stage I	39%
Stage II	30%
Stage IV	30%
Neo/Adjuvant therapy	
Chemotherapy	68%
Radiation	74%
Hormone therapy	72%

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