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Linking Dispositional Mindfulness and Positive Psychological Processes in Cancer Survivorship: A Multivariate Path Analytic Test of the Mindfulness-to-Meaning Theory

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Abstract

Background—Research indicates that dispositional mindfulness is associated with positive psychological functioning. Although this disposition has been linked with beneficial outcomes in the broader mental health literature, less is known about dispositional mindfulness in cancer survivors and how it may be linked with indices of psychological and physical health relevant to cancer survivorship.

Methods—We conducted a multivariate path analysis of data from a heterogeneous sample of cancer patients ($N = 97$) to test the *Mindfulness-to-Meaning Theory*, an extended process model of emotion regulation linking dispositional mindfulness with cancer-related quality of life via positive psychological processes.

Results—We found that patients endorsing higher levels of dispositional mindfulness were more likely to pay attention to positive experiences ($\beta = .56$), a tendency which was associated with positive reappraisal of stressful life events ($\beta = .51$). Patients who engaged in more frequent positive reappraisal had a greater sense of meaning in life ($\beta = .43$) and tended to savor rewarding or life affirming events ($\beta = .50$). In turn, those who engaged in high levels of savoring had better quality of life ($\beta = .33$) and suffered less from emotional distress ($\beta = -.54$).

Conclusions—Findings provide support for the *Mindfulness-to-Meaning Theory*, and help explicate the processes by which mindfulness promotes psychological flourishing in the face of cancer.

Keywords

cancer; oncology; mindfulness; reappraisal; savoring; Mindfulness-to-Meaning

BACKGROUND

Among persons without a cancer diagnosis, research indicates that dispositional mindfulness is linked with positive psychological outcomes [1]. Dispositional mindfulness is defined as the tendency to exhibit nonjudgmental and nonreactive awareness of one's thoughts, emotions, and present moment sensory-perceptual experience [2]. This disposition is held to

be an innate psychological trait that is normally distributed across the population [3]. Yet, recent studies demonstrate that dispositional mindfulness may also be developed over time through the practice of mindfulness meditation [4]. Although mindful disposition has been linked with salutary outcomes in the broader mental health literature, less is known about dispositional mindfulness in cancer survivors and how it may be linked with indices of psychological and physical health relevant to cancer survivorship. Moreover, studies that explore the association between dispositional mindfulness and its psychological correlates are needed to guide treatment development efforts for psychological interventions that may positively impact not only individual coping, but may also positively impact clinical outcomes among cancer survivors.

Despite the ubiquity of medical and psychological research on mindfulness, there is a dearth of studies detailing the predictors, consequences, and correlates of dispositional mindfulness in cancer survivorship. The few extant studies reveal significant associations between dispositional mindfulness and indices of cancer-related mental and physical functioning. Tamagawa et al. evaluated a population of 272 women in post treatment for stage I, II, or III breast cancer and found that dispositional mindfulness was positively correlated with vitality and inversely correlated with negative mood, stress symptoms, and suppression [5]. Similarly, in a validation study of a measure of dispositional mindfulness, the Mindfulness Attention Awareness Scale (MAAS), Carlson and Brown assessed 122 adults with various types of cancer (primarily prostate or breast cancer) and found that MAAS scores corresponded with fewer stress and mood disturbances [6]. Garland, Campbell, Samuels, & Carlson [7] assessed 111 patients with non-metastatic cancer and found that facets of dispositional mindfulness were associated with enhanced sleep and stress-related outcomes. Another study of 74 adults with unspecified cancers found that dispositional mindfulness was cross-sectionally correlated with positive mood and inversely correlated with depressive symptoms and avoidant coping, but did not predict these outcomes over time [8]. In contrast, in a study of 57 cancer patients with sleep disturbances, Garland, Beck, Lipschitz, and Nakamura found that baseline levels of dispositional mindfulness predicted changes in salivary cortisol over time that were correlated with well-being [9]. The broader body of research in non-cancer conditions linking dispositional mindfulness to positive functioning is congruent with these few cancer-related findings, and though little research illuminates the relationship of dispositional mindfulness to well-being in cancer survivors specifically, the available data indicates a positive psychological impact of dispositional mindfulness among this population.

Even less is known about the specific mechanisms through which dispositional mindfulness might influence the well-being of individuals with cancer. To fill this lacuna, Garland and colleagues recently advanced the *Mindfulness-to-Meaning Theory* to explicate the processes by which mindfulness decreases stress and promotes psychological flourishing in the face of adversity [10]. To summarize this model, the non-evaluative, metacognitive features of mindfulness are thought to disrupt automatic negative emotional reactions and subsequently expand attention to encompass previously unattended information relevant to the stressor and its broader socio-environmental context. Because mindfulness may induce positive emotions like contentment and joy [11], by virtue of the emotional tuning of the attentional system [12,13], mindful awareness may expand the scope of attention to detect positive

features of the social and natural environment. Next, by gaining access to a broader set of information from which new, more adaptive situational appraisals may be generated, mindfulness is theorized engender positive reappraisals of stressful life events [14,15]. For example, a cancer diagnosis may initially be interpreted as a death sentence, but later may be reappraised as the catalyst for healthy lifestyle changes and a source of gratitude for one's loved ones. In this theoretical model, positive reappraisal is held to stimulate the sense of meaning in life, while at the same time also promoting savoring of positive everyday experiences – the process whereby one appreciates the pleasurable features of an event as well as positive emotions that arise from encountering it [16]. Ultimately, these positive psychological processes may instantiate a cognitive-emotional feedback loop, or “upward spiral” which may lead to reduced emotional distress and enhanced quality of life [1].

The purpose of the present study was to provide an initial test of the *Mindfulness-to-Meaning Theory* in a heterogeneous sample of cancer survivors by evaluating the association of dispositional mindfulness with positive reappraisal, savoring, and attention to positive information, and to ascertain how these positive psychological factors are linked with outcomes including meaning in life, emotional distress, and quality of life. We had three hypotheses: 1) dispositional mindfulness will be positively correlated with quality of life and meaning in life, and negatively correlated with emotional distress; 2) dispositional mindfulness will be positively correlated with attention to positive information, positive reappraisal, and savoring; and 3) patients with high levels of dispositional mindfulness will report enhanced quality of life and meaning in life, and attenuated emotional distress, by virtue of their heightened propensity towards positive reappraisal, savoring, and attention to positive information. Given the complexity of this latter hypothesis, we employed multivariate path analysis for simultaneous estimation of the multiple pathways proposed in the *Mindfulness-to-Meaning Theory*.

METHODS

Procedures

Following informed consent, in a single assessment session participants completed a battery of validated self-report questionnaires (see *Measures* below). Participants' electronic medical records were queried to obtain cancer diagnosis data. Study procedures were approved by the University of Utah Institutional Review Board.

Measures

Dispositional mindfulness—The Five Facet Mindfulness Questionnaire (FFMQ), comprised of 39 Likert-type items, was used to measure dispositional mindfulness. The FFMQ yields a validated total score based on the following five facets: nonreactivity to inner experience, tapped by items such as “I watch my feelings without getting lost in them”), observing and attending to experience (e.g., “I pay attention to sensations, such as the wind in my hair or the sun on my face”), describing and discriminating emotional experiences (e.g., “I’m good at finding words to describe my feelings”), nonjudging of experience (e.g., “I tell myself I shouldn’t be feeling the way that I am feeling”), and acting with awareness

(e.g., “I find myself doing things without paying attention”) [2]. Present study hypotheses and analyses focused solely on the total dispositional mindfulness score ($\alpha = .92$).

Reappraisal—Reappraisal was measured with the 4-item positive reappraisal subscale of the Cognitive Emotion Regulation Questionnaire (CERQ) [17], an internally-consistent subscale ($\alpha = .85$) which asks the respondent how often they “think I can become a stronger person as a result of what has happened” or “look for positive sides to the matter” to cope with stressful events. In prior research, scores on this reappraisal scale were prospectively predictive of lower levels of future affective symptoms [17], and changes in CERQ reappraisal scores have been shown to mediate the stress-reductive effects of increasing dispositional mindfulness [14].

Meaning in life—Meaning in life was measured with the Meaning in Life Questionnaire (MLQ) [18]. The 10-item MLQ measures two dimensions of perceived purpose in life: current sense of purpose and meaning, and active engagement in pursuing a sense of purpose and meaning. MLQ subscales positively correlate with measures of satisfaction with life and optimism. In the present study, we utilized the current sense of purpose factor ($\alpha = .81$).

Attention to positive information—Attention to positive information was measured with the 11-item subscale ($\alpha = .89$) of the same name on Attention to Positive and Negative Information Scale (APNIS), which measures individual differences in the tendency to attend to, think about, and focus on positive information with respect to the self, others, and past and future events, or positive attentional bias [19]. APNIS scores have been shown to correlate with posttraumatic growth in cancer patients [20].

Savoring—Savoring was measured with the Savoring Beliefs Inventory (SBI), a 24-item that measures an individuals’ perceptions of their ability to derive pleasure from life experiences [15]. SBI scores are positively correlated with affect intensity, optimism, life satisfaction, and frequency of happiness, and negatively correlated with hopelessness and depression. For the present analysis, we computed a total savoring score ($\alpha = .95$).

Quality of life—Quality of life was measured with the Functional Assessment of Cancer Therapy – General 7 (FACT-G7), a 7-item general questionnaire ($\alpha = .70$) that measures indices of physical, emotional, and functional well-being relevant to cancer survivorship. This is a well-validated scale that demonstrates good psychometric properties [21].

Emotional distress—Emotional distress was measured with the well-validated Depression Anxiety Stress Scale-21 (DASS-21), comprised of items tapping negative mood, anxiety, and stress arousal symptoms [22]. A total psychological distress score is computed by summing the items on this scale ($\alpha = .93$).

Statistical analyses

First, Pearson product-moment correlations were used to examine zero-order correlations between study variables. Next, multivariate path analysis within a structural equation modeling framework, which provides simultaneous estimation of multiple linear equations, was conducted to test our model of the *Mindfulness-to-Meaning Theory* (Figure 1). Path

analysis has advantages over multiple regression analysis in that it allows the researcher to simultaneously estimate specific associations between multiple independent and dependent variables. In path analysis a variable can be represented as both a predictor and a criterion variable in the same model – unlike regression analysis where in any given model a variable must be either a predictor or criterion variable [23]. Conducting separate regression analyses may also omit or ignore important intercorrelations among the criterion variables. AMOS 17.0 was used to calculate model parameters, and missing data were handled using full-information maximum likelihood estimation. Model fit was determined comparing fit indices to widely accepted cut-offs [22], including nonsignificant χ^2 ($p > .05$), comparative fit index (CFI) and incremental fit index (IFI) > 0.90 , and the root-mean square error of approximation (RMSEA) < 0.08 .

Lastly, because our hypothetical model, like all theoretical causal models, may be misspecified, an alternative model was assessed to ensure that significant path coefficients identified were not artifactual. To that end, we engaged in a data-driven process of model building guided by our inspection of zero-order correlations to test additional pathways that were not specified in our hypothetical model. Then a chi-square difference test was employed for model comparison [22].

RESULTS

Participant characteristics

A heterogeneous sample of cancer patients receiving chemotherapy was recruited for this study ($N = 97$). The most prevalent form of cancer in the sample was breast cancer (26%), followed by prostate (9%), colon cancer (7%), lymphoma (7%), lung cancer (7%), melanoma (6%), ovarian (3%), and a variety of other cancers (including neurological cancers, other hematological cancers, etc.). The majority of participants had Stage IV cancer (49%), with the remainder diagnosed with Stage III (17%), Stage II (9%), Stage I (7%), and Stage 0 (18%) cancers. The majority of participants were white, married, middle aged females (mean age 56 ± 14 years, 57% female). About half of participants were college graduates and had annual family incomes of more than \$60,000/year. More detailed sociodemographic characteristics are presented in Table 1.

Zero-order correlations

In support of our first hypothesis, dispositional mindfulness was significantly positively associated with cancer-related quality of life ($r = .31, p = .007$) and inversely associated with emotional distress ($r = -.40, p < .001$). However, contrary to our hypothesis, dispositional mindfulness was not significantly associated with meaning in life ($r = .18, p > .10$).

In support of our second hypothesis, dispositional mindfulness was significantly positively correlated with attention to positive information ($r = .57, p < .001$), positive reappraisal ($r = .42, p < .001$), and savoring ($r = .43, p < .001$). These factors, in turn, were differentially associated with quality of life and emotional distress. Attention to positive information was positively correlated with quality of life ($r = .34, p = .002$) and meaning in life ($r = .40, p < .001$), and was negatively correlated with emotional distress ($r = -.56, p < .001$). Reappraisal

was positively correlated with quality of life ($r = .27, p = .012$) and meaning in life ($r = .44, p < .001$), and negatively correlated with emotional distress ($r = -.35, p = .002$). Savoring was positively correlated with quality of life ($r = .36, p < .001$) and negatively correlated with emotional distress ($r = -.54, p < .001$), but was not significantly associated with meaning in life ($r = .16, p > .10$).

Path analyses

The multivariate path model of our conceptual framework (see Figure 1) exhibited good empirical fit, $\chi^2/df = 1.58, p = .09$; CFI = .95; IFI = .96; RMSEA = .07 (.00, .14). Patients endorsing higher levels of dispositional mindfulness had a greater tendency to pay attention to positive information, a propensity which was associated with positive reappraisal as a means of coping with stress and life adversity. Patients who engaged in more frequent positive reappraisal had a greater sense of meaning in life and tended to savor rewarding or life affirming events. In turn, those who engaged in high levels of savoring had better quality of life and suffered from less emotional distress.

Because other model specifications are possible, we engaged in a data-driven process of model building that was guided by our inspection of zero-order correlations. We generated a more complex model in which each of the four positive psychological processes (dispositional mindfulness, attention to positive information, reappraisal, and savoring) had direct paths to emotional distress, meaning in life, and cancer-related quality of life in addition to the indirect paths specified in our hypothesized model. This model had less than adequate model fit, $\chi^2/df = 2.82, p = .04$; CFI = .96; IFI = .96; RMSEA = .14 (.03, .25). A chi-square difference test was employed for comparison of nested models, $\chi^2_{diff} = \chi^2_{(model\ 1)} - \chi^2_{(model\ 2)}$, with $df_{diff} = df_{(model\ 1)} - df_{(model\ 2)}$, where a non-significant χ^2_{diff} value indicates that the more complicated model is not parsimonious and should therefore be rejected for the simpler model (Kline, 1998). The non-significant chi-square value obtained ($p = .30$) indicated that simpler model based on the *Mindfulness-to-Meaning Theory* (Figure 1) was most parsimonious and should be retained. Including cancer stage in the model reduced model fit to unacceptably poor levels, $\chi^2/df = 4.20, p < .001$; CFI = .74; IFI = .76; RMSEA = .18 (.14, .23), and given that cancer stage was uncorrelated with any of the study variables, it was not included in the final model.

CONCLUSIONS

Study findings in this heterogeneous sample of cancer patients provide preliminary support for the *Mindfulness-to-Meaning Theory* as it applies to psychological flourishing in the face of cancer [9]. Consistent with our hypotheses, dispositional mindfulness was positively associated with quality of life and inversely associated with emotional distress through a chain of positive psychological processes, including attention to positive information, positive reappraisal, and savoring. In turn, these factors were interrelated and linked with enhanced quality of life and reduced emotional distress.

Although cross-sectional in nature, these results offer suggestive evidence for hypothetical linkages between dispositional mindfulness and positive psychological processes among cancer survivors. Dispositional mindfulness appears to be associated with broadening

attention from a myopic focus on illness to encompass previously unattended positive features of the social and natural environment. By accessing this broader set of information from which new, more adaptive situational appraisals may be generated, mindfulness may engender positive reappraisals of stressful life events and promote sense of meaning in life. As a consequence of this expanded mindset, the individual may become more free to savor and appreciate positive experiences and relationships in spite of (or perhaps because of) the presence of cancer. When sustained over time, these processes may propel an upward spiral of positive cognition-emotion interactions with salutary consequences for cancer survivorship.

This conceptual model addresses important questions about mindfulness and its relationship to positive emotional states in cancer patients. Many benefits of mindfulness practice have previously been described in cancer patients, including improved quality of life and reduction in symptoms such as anxiety, depression, and emotional distress [23]. However, the relationship between dispositional mindfulness and these salutary psychological outcomes has not been clearly understood in the context of cancer survivorship. This study on dispositional mindfulness is consistent with previous literature in finding an association between mindfulness and positive psychological states in cancer patients, and adds important insight into the nature of this relationship. The observed data conform reasonably well to the tenets of the *Mindfulness-to-Meaning Theory*, and suggest that attention to positive information, positive reappraisal, and savoring are factors that might mediate the association between dispositional mindfulness and cancer survivorship outcomes.

The diagnosis and treatment of cancer is an extremely stressful experience for most people. Sequelae of cancer can be deeply distressing, including physical symptoms such as pain, nausea and fatigue; loss of bodily integrity and normal social, occupational, and physical function; and fear of death and dying. In spite of these stressors, a significant subset of individuals experience psychological flourishing while coping with cancer [24]. The *Mindfulness-to-Meaning Theory* may help to explicate the processes by which such flourishing may occur in context of cancer survivorship. According to our model, dispositional mindfulness represents the tendency to experience a naturally-occurring state of non-judgmental, non-reactive awareness that allows for the recognition of positive aspects of having cancer, even in the midst of a stressful illness. For example, through mindful awareness, patients might be more likely to recognize positive aspects of cancer such as the promotion of intimacy and growth in relationships; finding joy in the mundane, “small” things in life that might previously have been taken for granted; and a re-focusing of one’s priorities in life. Through non-reactive awareness of the full spectrum of emotions and experiences related to cancer, patients can then selectively focus their attention on the positive aspects of cancer, while disengaging from rumination on the negative aspects of the experience. Through this process of selective positive attention, patients can reframe their perspective on the illness. Such cognitive reappraisal can facilitate a deeper sense of savoring and appreciation of life, and might even lead some patients to view cancer as a catalyst for an increased sense of appreciation. Moreover, these salutary factors may synergize one another to enhance quality of life and reduce emotional distress.

Comprehensive oncology treatment includes a focus on maintaining the optimal quality of life and minimizing emotional distress. Dispositional mindfulness is associated with both of these goals. One potential clinical application of this study is that measuring dispositional mindfulness might help guide supportive oncology care by identifying patients that have low dispositional mindfulness and thus are at higher risk of psychological distress and impaired quality of life. Because dispositional mindfulness can be developed through mindfulness practice [4], high-risk patients might then be offered mindfulness-based interventions to enhance this disposition and thereby potentiate the downstream positive psychological processes outlined in our model. Interventions such as Mindfulness-Based Cancer Recovery [25] might be offered proactively for those patients to help prevent the development of distress and impaired quality of life. Alternatively, novel behavioral therapies that integrate mindfulness training with techniques designed to promote attention to positive information, reappraisal, and savoring (e.g., Mindfulness-Oriented Recovery Enhancement, see [26,27]) might yield especially robust effect sizes by directly stimulating the various components of our model. While large scale, well-controlled, methodologically rigorous trials of mindfulness-based interventions have demonstrated clear efficacy for cancer patients [23], comparative effectiveness, non-inferiority, and dismantling trials are needed to examine the differential effects of various therapeutic techniques (including mindfulness training) on quality of life and emotional distress in cancer survivors.

The study was limited by its cross-sectional nature and reliance on self-report measures. To be clear, the literature is mixed with regard to whether or not positive psychological processes definitively enhance psychological health among cancer survivors [28]; the causality may indeed be reversed such that having better psychological health may lead to increased use of positive psychological processes. That said, recent longitudinal research suggests that mindfulness training may stimulate upward spirals of positive emotion-cognition interactions by strengthening autoregressive and cross-lagged interactions between positive affect and cognition over time [29]. Future studies should employ longitudinal, experimental designs and psychophysiological measures to provide a more rigorous test of this model. In addition, the sample was comprised of mostly white individuals, the majority of whom were diagnosed with Stage IV cancers. Insofar as individuals with Stage IV disease may have qualitatively different experiences with respect to coping and meaning making than patients with earlier stage cancers, the nature of the sample may limit generalizability of study findings to some degree.

Despite these limitations, study results lend support to the *Mindfulness-to-Meaning Theory*, a novel theoretical framework that seeks to elucidate the downstream positive emotion regulatory consequences of mindfulness. Further investigation is needed to better refine our understanding of the complex relationships between dispositional mindfulness, emotional distress, and quality of life in cancer survivors. Identifying patients with low dispositional mindfulness might guide the provision of early psychosocial intervention in an effort to improve quality of life and minimize distress as part of comprehensive cancer care.

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References

1. Garland EL, Fredrickson BL, Kring AM, Johnson DP, Meyer PS, Penn DL. Upward spirals of positive emotions counter downward spirals of negativity: Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clin Psychol Rev.* 2010; 30:849–864. [PubMed: 20363063]
2. Baer RA, Smith GT, Hopkins J, Krietemeyer J, Toney L. Using self-report assessment methods to explore facets of mindfulness. *Assessment.* 2006; 13:27–45. [PubMed: 16443717]
3. Walach H, Buchheld N, Buttenmullerc V, Kleinknecht N, Schmidta S. Measuring mindfulness - the Freiburg Mindfulness Inventory. *Pers Indiv Differ.* 2006; 40:1543–1555.
4. Carmody J, Baer RA. Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *J Behav Med.* 2008; 31:23–33. [PubMed: 17899351]
5. Tamagawa R, Giese-Davis J, Specia M, Doll R, Stephen J, Carlson LE. Trait Mindfulness, Repression, Suppression, and Self-Reported Mood and Stress Symptoms Among Women With Breast Cancer. *J Clin Psychol.* 2013; 69:264–277. [PubMed: 23280695]
6. Carlson LE, Brown KW. Validation of the Mindful Attention Awareness Scale in a cancer population. *J Psychosom Res.* 2005; 58:29–33. [PubMed: 15771867]
7. Kersting K. Dispositional Mindfulness in People Diagnosed with Cancer: The Relationship to Depressive Symptoms and Well-being. 2012 [cited 2015 Jul 1] Available from: <http://scholarscompass.vcu.edu/etd/2665/>.
8. Garland SN, Campell T, Samuels C, Carlson LE. Dispositional mindfulness, insomnia, sleep quality and dysfunctional sleep beliefs in post-treatment cancer patients. *Pers Ind Differ.* 2013; 55:306–311.
9. Garland EL, Beck AC, Lipschitz DL, Nakamura Y. Dispositional mindfulness predicts attenuated waking salivary cortisol levels in cancer survivors: a latent growth curve analysis. *J Cancer Surviv.* 2014:1–8.
10. Garland EL, Farb NA, Goldin PR, Fredrickson BL. Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychol Inq.* in press.
11. Geschwind N, Peeters F, Drukker M, van Os J, Wichers M. Mindfulness training increases momentary positive emotions and reward experience in adults vulnerable to depression: A randomized controlled trial. *J Consult Clin Psych.* 2011; 79:618.
12. Fredrickson BL, Branigan C. Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition Emotion.* 2005; 19:313–332. [PubMed: 21852891]
13. Friedman RS, Förster J. Implicit affective cues and attentional tuning: An integrative review. *Psychol Bull.* 2010; 136:875. [PubMed: 20804240]
14. Garland EL, Gaylord SA, Fredrickson BL. Positive reappraisal coping mediates the stress-reductive effect of mindfulness: An upward spiral process. *Mindfulness.* 2011; 2:59–67.
15. Garland EL, Gaylord SA, Park J. The role of mindfulness in positive reappraisal. *Explore (NY).* 2009; 5:37–44. [PubMed: 19114262]
16. Bryant F. Savoring Beliefs Inventory (SBI): A scale for measuring beliefs about savouring. *J Ment Health.* 2003; 12:175–196.
17. Garnefski N, Kraaij V. The cognitive emotion regulation questionnaire: Psychometric features and prospective relationships with depression and anxiety in adults. *Eur J Psychol Assess.* 2007; 23:141–149.
18. Steger MF, Frazier P, Oishi S, Kaler M. The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *J Couns Psychol.* 2006; 53:80.

19. Noguchi K, Gohm CL, Dalsky DJ. Cognitive tendencies of focusing on positive and negative information. *J Res Pers.* 2006; 40:891–910.
20. Chan MW, Ho SM, Tedeschi RG, Leung CW. The valence of attentional bias and cancer-related rumination in posttraumatic stress and posttraumatic growth among women with breast cancer. *Psycho-Oncol.* 2011; 20:544–552.
21. Yanez B, Pearman T, Lis CG, Beaumont JL, Cella D. The FACT-G7: a rapid version of the functional assessment of cancer therapy-general (FACT-G) for monitoring symptoms and concerns in oncology practice and research. *Ann Oncol.* 2012:mds539.
22. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychol Assessment.* 1998; 10:176–181.
23. Kline, RB. Principles and practice of structural equation modeling. New York: Guilford Press; 1998.
24. Carlson LE, Doll R, Stephen J, Faris P, Tamagawa R, Drysdale E, et al. Randomized Controlled Trial of Mindfulness-Based Cancer Recovery Versus Supportive Expressive Group Therapy for Distressed Survivors of Breast Cancer (MINDSET). *JCO.* 2013; 31:3119–3126.
25. Park CL, Edmondson D, Fenster JR, Blank TO. Meaning making and psychological adjustment following cancer: the mediating roles of growth, life meaning, and restored just-world beliefs. *J Consult Clin Psych.* 2008; 76:863.
26. Carlson, LE., Speca, M., Segal, ZV. Mindfulness-based cancer recovery. Oakland, CA: New Harbinger; 2010. [Internet], Available from: <http://www.mbcertaining.com/mindfulness-based-cancer-recovery/> [cited 2015 Jul 1]
27. Garland, EL. Mindfulness-Oriented Recovery Enhancement for Addiction, Stress, and Pain. Washington, D.C.: NASW Press; 2013.
28. Garland EL, Manusov EG, Froeliger B, Kelly A, Williams JM, Howard MO. Mindfulness-oriented recovery enhancement for chronic pain and prescription opioid misuse: Results from an early-stage randomized controlled trial. *J Consult Clin Psych.* 2014; 82:448–459.
29. Aspinwall LG, Tedeschi RG. The Value of Positive Psychology for Health Psychology: Progress and Pitfalls in Examining the Relation of Positive Phenomena to Health. *Ann Behav Med.* 2010; 39:4–15. [PubMed: 20091429]
30. Garland, EL., Geschwind, N., Peeters, F., Wichers, M. [cited 2015 Jul 1] Mindfulness training promotes upward spirals of positive affect and cognition: multilevel and autoregressive latent trajectory modeling analyses; *Front Psychol.* 2015. p. 6[Internet] Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4313604/>

Implications for Cancer Survivorship

Cancer survivors may benefit from enhancing mindfulness, reappraisal, and savoring.

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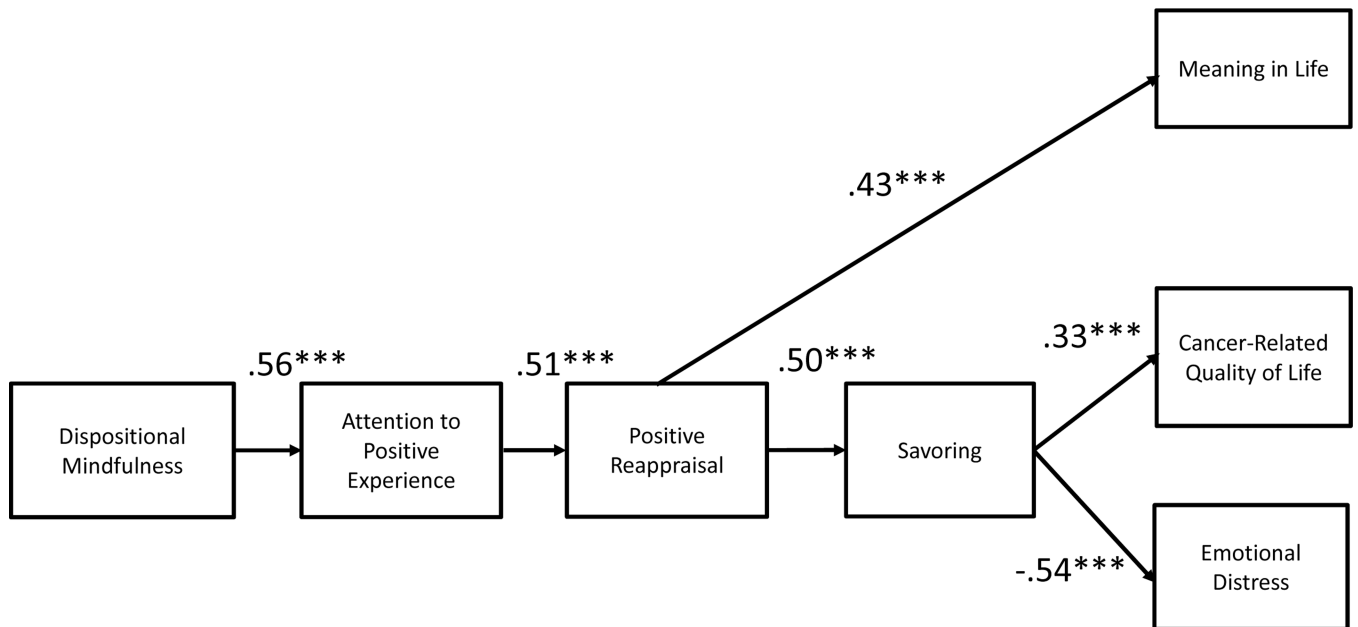


Figure 1. Multivariate path model of the Mindfulness-to-Meaning Theory in a sample of cancer survivors (N = 97). * $p < .05$, ** $p < .01$, *** $p < .001$

Table 1

Sample characteristics of cancer survivors (N = 97) who completed a battery of validated, positive psychological measures.

Variable	Mean (SD) or N (%)
Age (years)	55.8 (14.3)
Gender (women, %)	54 (55.6%)
Race	
White	89 (91.7%)
Latino	3 (3.1%)
Black	2 (2.1%)
Other	3 (3.1%)
Income	
< \$20,000	14 (14.4%)
\$20,001 – 39,999	20 (20.6%)
\$40,000 – 59,999	14 (14.4%)
\$60,000 – 79,999	13 (13.4%)
\$80,000 – 100,000	12 (12.4%)
> \$100,000	20 (20.6%)
Not answered	4 (4.1%)
Marital Status	
Single, never married	9 (9.3%)
Cohabiting	4 (4.1%)
Married	65 (67.0%)
Divorced/separated	13 (13.4%)
Windowed	5 (5.2%)
Not answered	1 (1.0%)
Education Level	
Elementary school	1 (1.0%)
Junior high school	4 (4.1%)
High school	45 (46.4%)
College	29 (29.9%)
Graduate school	18 (18.6%)
Cancer Diagnosis	
Breast	25 (25.8%)
Prostate	9 (9.3%)
Colon	7 (7.2%)
Lymphoma	7 (7.2%)
Lung	7 (7.2%)
Melanoma	6 (6.2%)
Ovarian	3 (3.1%)
Other	33 (34.0%)

Table 2

Psychological characteristics of cancer survivors with high and low levels of dispositional mindfulness.

Variable	Mean (SD)
Dispositional Mindfulness	114.0 (16.2)
Attention to Positive Information	44.5 (7.1)
Reappraisal	7.6 (2.0)
Savoring	126.4 (21.6)
Meaning in Life (Presence)	26.3 (5.1)
Cancer-related quality of life	18.3 (5.5)
Emotional distress	14.7 (11.5)

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