Post-traumatic growth: finding positive meaning in cancer survivorship moderates the impact of intrusive thoughts on adjustment in younger adults

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Abstract

Objective: We examined whether post-traumatic growth would moderate the impact of intrusive thoughts on a range of dimensions of well-being in a sample of younger adult survivors of various types of cancer.

Methods: 167 participants completed questionnaires regarding intrusive thoughts, post-traumatic growth, mental and physical health-related quality of life, positive and negative affect, life satisfaction, and spiritual well-being. Multiple regression analyses controlling for relevant background and cancer-related variables tested the interaction effects of post-traumatic growth and intrusive thoughts.

Results: Intrusive thoughts were related to poorer adjustment on all indices except physical health-related quality of life. However, post-traumatic growth moderated the effects of intrusive thoughts on positive and negative affect, life satisfaction, and spiritual well-being in a protective fashion. That is, for those higher in post-traumatic growth, higher levels of intrusive thoughts were related to better adjustment.

Conclusions: The positive meaning that individuals assign to their cancer experience as reflected in their reports of post-traumatic growth appears to be important in determining the impact of intrusive thoughts on post-cancer adjustment.

Keywords: psycho-oncology; post-traumatic growth; intrusive thoughts; health-related quality of life; spiritual well-being; survivorship

Intrusive thoughts, often experienced by survivors of traumatic events, are also common among cancer patients and survivors [1–3]. Intrusive thoughts involve unbidden images, thoughts, or feelings regarding a specific stressful event or circumstance (e.g. thinking about it when one did not mean to, having reminders pop unbidden into one’s mind). Researchers have generally found intrusive thoughts to be negatively related to myriad indicators of well-being and adjustment in survivors of traumatic events (e.g. [4,5]). Specifically for cancer survivors as well, intrusive thoughts have been associated with a variety of negative consequences [6,7], such as poorer psychological adjustment and health-related quality of life [8,9].

Intrusive thoughts may be a mechanism through which cancer continues to impact survivors’ levels of psychological distress by continuously or intermittently introducing reminders of the cancer. These intrusions may signify incomplete cognitive processing or a failure to make meaning of one’s experience with cancer [10]. Although PTSD symptomatology comprises multiple aspects in addition to intrusive thoughts (e.g. avoidance, hyperarousal), intrusive thoughts have received the bulk of individual attention given that they seem to be particularly related to cognitive processing and efforts to make meaning from stressful experiences [11]. Thus, the frequency with which thoughts or reminders of cancer intrude on one’s consciousness may reflect rumination, signaling inadequate processing and determining the extent of cancer-related distress.

However, intrusive thoughts are not necessarily distressing (see [12] for a review). Rather, intrusive thoughts refer only to the emergence into consciousness of cognitions or images that vary in their intensity and valence as well as their content [12]. Thus, while intrusive thoughts are generally regarded as correlates of distress (e.g. [3–15]) the extent to which intrusions are related to adverse outcomes is actually variable (e.g. [16,17]) and dependent on a number of other factors (e.g. [17,18]). This variability is consistent with researchers’ proposals that the
extent to which survivors of traumatic events have adequately processed their traumatic experiences or found some positive meaning in them may minimize or ‘detoxify’ the impact of the trauma (and therefore the adverse impact of intrusive thoughts about the event) [19].

In support of this contention, several constructs have been found to moderate the intrusive thoughts–distress link in cancer survivors. For example, Quartana, Laubmeier, and Zakowski [20] found that for survivors of multiple types of cancer who had been diagnosed within the past 5 years, emotional expression was not only associated with better psychological adjustment, but also buffered the relationship between intrusive thoughts and depressive symptoms. Similarly, in a sample of breast cancer survivors 2–15 years post-diagnosis, Vickberg, Bovbjerg, DuHamel, and Redd [7] found that a sense of meaning in life was not only associated with better well-being but also buffered the negative impact of intrusions on survivors’ levels of psychological distress.

A recent study suggested that post-traumatic growth may also buffer the impact of post-traumatic stress symptoms on adjustment to cancer [21]: in a sample of recently diagnosed breast cancer survivors, higher levels of perceived growth from the cancer experience moderated the impact of post-traumatic stress disorder (PTSD) symptoms on overall health-related quality of life and depression. These authors suggested that post-traumatic growth may help survivors to reinterpret and accept the threatening aspects of the experience and restore a sense of security, thus lessening the impact of PTSD symptoms on well-being. This study was important in examining a pathway through which post-traumatic growth might influence well-being in cancer survivors, an area that has received increasing attention (e.g. [22]), but remains poorly understood [23]. Findings regarding the relations between post-traumatic growth and well-being in cancer survivors have been inconsistent, with studies often finding positive correlations with adjustment indices (e.g. [24]) but sometimes finding negative relations (e.g. [25]). It may be that the impact of post-traumatic growth on adjustment is influenced by the particular context in which that growth is experienced (e.g. [23]).

While provocative, several features of the earlier study by Morrill et al. [21] limited its ability to fully illuminate the role of post-traumatic growth in buffering the impact of intrusions. First, that study used an omnibus measure of PTSD that included not only intrusive thoughts, but also symptoms of hyperarousal, avoidance, irritability, and numbness. While all of these aspects of PTSD may have important relations with well-being, we were particularly interested in the effects of intrusive thoughts so that we could more explicitly test the assertion that having positive views of one’s cancer would effectively neutralize the impact of intrusive thoughts about it. Second, we wanted to examine the potential moderating impact of post-traumatic growth when it was assessed in a more nuanced way by allowing for the reporting of negative as well as positive change, better isolating the experience of positive change [26,27]. Finally, the earlier study examined only two adjustment indices, depression and overall health-related quality of life. We were interested in examining whether growth would buffer the impact of intrusive thoughts on a broader range of dimensions of well-being, including not only physical and mental health-related quality of life but also positive and negative affect, life satisfaction, and spiritual well-being. Previous research has suggested the importance of assessing adjustment broadly to include both positive and negative aspects as well as encompassing psychological, physical, and spiritual domains, all of which may be differentially affected by cancer diagnosis and treatment (e.g. [28]). In the present study, we hypothesized that when specifically examining the effects of intrusive thoughts, post-traumatic growth would act as a buffer against their negative effects on a broad range of indicators of psychological well-being and health-related quality of life.

**Method**

The present analyses are part of a larger investigation of quality of life in young to middle-aged adults previously diagnosed with cancer. Potential participants (those aged 18–55, diagnosed 1–3 years prior) were identified through the Cancer Registry at Hartford (CT) Hospital. 600 questionnaires were mailed at Time 1; 250 completed questionnaires were returned. One year later (Time 2), follow-up packets were mailed to all Time 1 participants; 167 were returned. Only one attempt at contact was made at each time point. Because information on intrusive thoughts was only assessed at Time 2, the present analyses use only variables assessed at Time 2. The study was conducted in accordance with ethical guidelines and approval from the Institutional Review Boards of the University of Connecticut and Hartford Hospital.

**Measures**

The measures used in the present study are psychometrically sound and widely used assessment tools for the constructs of interest, and nearly all have been used in previous psycho-oncology studies.

**Background variables**

Demographic and health status variables were obtained by self-report measures. Current age, age at cancer diagnosis, and length of time since primary treatment ended were considered continuous variables. Household income was reported on a 5-point
scale (1 = ‘less than $10,000’, 2 = ‘$10,000–$24,999’, 3 = ‘$25,000–$49,999’, 4 = ‘$50,000–$99,999’, 5 = ‘$100,000 or more’). Highest completed education was reported on a 5-point scale (1 = ‘some high school’ to 5 = ‘graduate degree’). For analysis, dummy codes were used for marital status (1 = ‘married’; 0 = ‘not married’) and ethnicity (1 = ‘White’; 0 = ‘non-White’). A sum of comorbid conditions endorsed other than cancer (e.g. congestive heart failure, diabetes, arthritis, hypertension) was calculated and analyzed as a continuous variable.

**Intrusive thoughts**

Intrusive thoughts were assessed with the eight-item subscale of the Impact of Event Scale [IES; [30], assessing frequency of distressing cancer-specific intrusive thoughts over the past week from 0 (not at all) to 4 (often). Internal consistency reliability was good ($\alpha = 0.86$).

**Post-traumatic growth**

Post-traumatic growth was assessed with items from the Perceived Benefits Scale [25,31], a commonly used measure of positive life changes reported by cancer survivors. Each of 15 items (e.g. ‘My relationships with family’) was rated in terms of change since having cancer on a scale from 1 (much worse now) to 7 (much better now). Scores for perceived positive change were calculated from recoded items (i.e. 0 ‘for much worse to no change’) along with the sum of ratings of 1, 2, and 3 ‘much better now’) (per [26,30,32]) for a total growth score ($\alpha = 0.88$). Negative change scores were not used in the present analyses.

**Well-being outcomes** included measures of mental and physical health-related quality of life (HRQOL), positive and negative affect, life satisfaction, and spiritual well-being. The SF-12 [33] assessed HRQOL. Participants rated perceptions of their physical and mental health status on yes/no and numeric scales. A computational algorithm yields component scores for physical (PCS) and mental (MCS) HRQOL, with higher scores indicating better HRQOL. The Positive and Negative Affect Schedule [34] produces scores for positive and negative affect. Participants indicated the extent to which each of 20 adjectives (e.g. inspired, scared) described how they generally feel from 1 (very slightly) to 5 (extremely). Internal consistency reliabilities were very good ($\alpha$’s = 0.82 and 0.89, respectively). The Satisfaction with Life Scale [35] summarizes five items regarding life satisfaction rated from 1 (strongly disagree) to 7 (strongly agree). Internal consistency reliability in the present sample was excellent ($\alpha = 0.94$). The FACIT-Sp [36] asks participants to rate the extent to which they experienced 12 aspects of spiritual well-being (e.g. ‘I feel a sense of purpose in my life’) from 0 (not at all) to 4 (very much), which are summed for a total score. Internal consistency was good ($\alpha = 0.87$).

**Statistical analysis**

Using descriptive statistics, we first characterized our sample and compared it to the larger Cancer Registry from which it was drawn. We then conducted bivariate correlations to examine relations of cancer-related and demographic variables with intrusive thoughts, post-traumatic growth, and the six outcome well-being variables to identify potential covariates. Covariates in each regression analysis included all demographic and cancer-related variables significantly correlated ($p < 0.05$) with that outcome along with those correlated with intrusive thoughts and post-traumatic growth. Six multiple regression analyses were conducted, one per each of the six outcomes (mental and physical HRQOL, positive and negative affect, life satisfaction, and spiritual well-being). Each regression equation consisted of relevant covariates, intrusive thoughts (mean-centered), post-traumatic growth (mean-centered), and their interaction term [37].

**Results**

The Time 2 sample comprised 108 women and 59 men. Mean age was 46.34 (SD = 6.29), with a mean of 3.5 (SD = 1.7) years since cancer diagnosis and 2.6 (SD = 1.6) years since completing primary treatment. The sample was largely White (89%), married or cohabiting (73%), college educated or higher (71%), and financially secure, with a household income of at least $50,000 (83%). The most common cancer sites were breast (47%), prostate (12%), colorectal (6%), lymph nodes (5%), and cervix/uterus (4%). Primary treatment included surgery only (49%), chemotherapy only (5%), combination of surgery and radiation (15%), combination of chemotherapy, surgery and radiation (22%), and other treatments (9%). Levels of both PTG and intrusive thoughts in the sample were modest, with item means of 0.7781 (SD = 0.63) on a 0–3 scale and 0.18 (SD = 0.21) on a scale ranging from 0 to 4, respectively, although both variables had a fairly wide spread of scores.

To evaluate whether our sample was representative of the population from which it was drawn, we compared demographic and cancer characteristics of our sample to all persons of the same age range in the Cancer Registry during the period in which the sample was drawn. The sample appeared similar to the population on all characteristics except for somewhat lower minority percentage. For example, in the population, the gender ratio was exactly the same, and similar to our sample,
43% received only surgery, 20% a combination of surgery, radiation, and chemotherapy, and similar percentages to the sample on other combinations. Eighty-five percent of the population was White/non-Hispanic, 6.5% Hispanic, and 6% African-American; mean age at diagnosis was approximately 43 years.

Bivariate analyses

Bivariate correlations among intrusions, post-traumatic growth, and the six outcome variables are shown in Table 1. Results indicated that the six well-being outcomes were moderately or strongly correlated with one another in expected ways. For example, mental HRQOL was positively related to physical HRQOL, positive affect, life satisfaction, and spiritual well-being, and inversely related to negative affect. Post-traumatic growth was unrelated to mental or physical HRQOL, negative affect, and life satisfaction, but was modestly related to positive affect and fairly strongly related to spiritual well-being. Intrusive thoughts were related to lower levels of all of the well-being outcomes with the exception of physical HRQOL, to which it was unrelated.

Results of bivariate correlations between the demographic and cancer-related variables and intrusive thoughts, post-traumatic growth and the six outcome variables are shown in Table 2. Results indicated that the demographic variables were not significantly related to most of the outcome variables. As expected, time since treatment was significantly positively associated with both mental and physical health. Time since treatment was negatively related to intrusive thoughts, as was minority status. Marital status and income were positively correlated with satisfaction with life.

Multivariate regression analyses

Results for each of the six multiple regression analyses are shown in Table 3. Analyses included the demographic and cancer-related variables and including the effects of intrusive thoughts, relations with negative affect were no longer significant. Intrusive thoughts were related to the outcomes similarly as in the bivariate analyses.

In addition, the interaction term for intrusive thoughts by post-traumatic growth predicted positive and negative affect as well as life satisfaction and spiritual well-being. These results are depicted in Figures 1–4, showing regression plots for 1 standard deviation above and 1 standard deviation below the mean for post-traumatic growth. The pattern across all four figures is consistent in showing that the relationship between intrusive thoughts and each outcome is moderated by level of post-traumatic growth. In particular, when individuals had higher perceptions of PTG, intrusive thoughts were more strongly related to better adjustment, while for those with lower perceptions of growth, intrusive thoughts were more strongly related to poorer adjustment. The pattern varied somewhat across the four outcomes and appeared most dramatic for spiritual well-being.

Discussion

Expanding beyond Morrill et al.’s [21] research on PTSD symptoms and post-traumatic growth, this is, to our knowledge, the first study to specifically test the moderating effects of cancer survivors’ post-traumatic growth on the link between intrusive thoughts and adjustment. As predicted, similar to previous studies (e.g. [38]), intrusive thoughts were significantly negatively related to most dimensions of well-being measured. However, those who evidenced more growth after cancer were protected against the negative impact of intrusions. In fact, in the context of higher levels of growth, intrusive thoughts were related to lower levels of negative affect, more positive affect, and higher levels of spiritual well-being and satisfaction with life. These findings are consistent with conceptualization of intrusive or repetitive thoughts and more strongly related to positive affect, life satisfaction, and spiritual well-being, but controlling for the demographic and cancer-related variables and including the effects of intrusive thoughts, relations with negative affect were no longer significant. Intrusive thoughts were related to the outcomes similarly as in the bivariate analyses.

Table 1. Bivariate correlations between background and cancer-related variables and well-being outcomes

<table>
<thead>
<tr>
<th></th>
<th>Mental HRQOL</th>
<th>Physical HRQOL</th>
<th>Positive affect</th>
<th>Negative affect</th>
<th>Satisfaction with life</th>
<th>Spiritual well-being</th>
<th>Post-traumatic growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical HRQOL</td>
<td>0.24**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive affect</td>
<td>0.37***</td>
<td>0.26**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative affect</td>
<td>-0.54***</td>
<td>-0.10</td>
<td>-0.51***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with life</td>
<td>0.38***</td>
<td>0.23**</td>
<td>0.57***</td>
<td>-0.47***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spiritual well-being</td>
<td>0.40***</td>
<td>0.09</td>
<td>0.56***</td>
<td>-0.52***</td>
<td>0.62***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-traumatic growth</td>
<td>-0.00</td>
<td>-0.10</td>
<td>0.19*</td>
<td>-0.10</td>
<td>0.13</td>
<td>0.45***</td>
<td>-0.26***</td>
</tr>
<tr>
<td>Intrusive thoughts</td>
<td>-0.38***</td>
<td>-0.08</td>
<td>-0.26**</td>
<td>0.65***</td>
<td>-0.35***</td>
<td>-0.34***</td>
<td>-0.26***</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001.
thoughts as varying in their impact depending on their valence (e.g. [12]). That is, for those who have found positive meaning in their cancer experience, thinking about them more frequently was related to better well-being. However, it must be noted that we did not assess the content of the intrusive thoughts reported in this study, meaning that we cannot determine whether the valence of those thoughts was indeed positive. A potentially fruitful direction for future research would be to assess not only the frequency but the content of intrusive thoughts.

Findings to date regarding cancer survivors’ post-traumatic growth have been quite inconsistent regarding relationships with well-being; post-traumatic growth is sometimes shown to be positively related to adjustment to cancer, but sometimes inversely, and often with little relationship at all (see [22,39] for reviews). The present results indicate that post-traumatic growth may

### Table 2. Bivariate correlations among well-being variables, intrusive thoughts, and post-traumatic growth

<table>
<thead>
<tr>
<th></th>
<th>Mental HRQOL</th>
<th>Physical HRQOL</th>
<th>Positive affect</th>
<th>Negative affect</th>
<th>Satisfaction with life</th>
<th>Spiritual well-being</th>
<th>Post-traumatic growth</th>
<th>Intrusive thoughts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-0.09</td>
<td>-0.08</td>
<td>0.02</td>
<td>0.10</td>
<td>0.00</td>
<td>0.12</td>
<td>0.18*</td>
<td>0.03</td>
</tr>
<tr>
<td>Age</td>
<td>-0.07</td>
<td>0.04</td>
<td>0.01</td>
<td>0.02</td>
<td>-0.13</td>
<td>0.09</td>
<td>0.09</td>
<td>0.06</td>
</tr>
<tr>
<td>Minority status</td>
<td>0.02</td>
<td>0.10</td>
<td>0.08</td>
<td>-0.07</td>
<td>0.07</td>
<td>-0.25***</td>
<td>-0.01</td>
<td>-0.16*</td>
</tr>
<tr>
<td>Marital status</td>
<td>0.06</td>
<td>0.15</td>
<td>0.11</td>
<td>-0.08</td>
<td>0.24**</td>
<td>0.09</td>
<td>-0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>Income</td>
<td>-0.04</td>
<td>0.08</td>
<td>0.11</td>
<td>0.01</td>
<td>0.21**</td>
<td>0.01</td>
<td>-0.10</td>
<td>0.04</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>-0.11</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.12</td>
<td>0.10</td>
<td>0.12</td>
<td>0.11</td>
<td>0.08</td>
</tr>
<tr>
<td>Time since treatment end</td>
<td>0.20*</td>
<td>0.21*</td>
<td>0.07</td>
<td>-0.21*</td>
<td>0.12</td>
<td>0.06</td>
<td>0.01</td>
<td>-0.28**</td>
</tr>
<tr>
<td>Comorbidities</td>
<td>-0.14</td>
<td>-0.11</td>
<td>-0.17*</td>
<td>0.09</td>
<td>-0.08</td>
<td>0.01</td>
<td>0.05</td>
<td>0.09</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001.

### Table 3. Results of multiple regression analyses of intrusive thoughts, post-traumatic growth, and intrusive thoughts by post-traumatic growth interactions (standardized β’s)

<table>
<thead>
<tr>
<th></th>
<th>Mental HRQOL</th>
<th>Physical HRQOL</th>
<th>Positive affect</th>
<th>Negative affect</th>
<th>Satisfaction with life</th>
<th>Spiritual well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrusive thoughts</td>
<td>-0.40***</td>
<td>-0.09</td>
<td>-0.26**</td>
<td>0.65***</td>
<td>-0.34***</td>
<td>-0.31***</td>
</tr>
<tr>
<td>Post-traumatic growth</td>
<td>-0.04</td>
<td>-0.08</td>
<td>0.22**</td>
<td>-0.13</td>
<td>0.21**</td>
<td>0.45***</td>
</tr>
<tr>
<td>Intrusions × growth</td>
<td>0.15</td>
<td>-0.03</td>
<td>0.15*</td>
<td>-0.21**</td>
<td>0.18*</td>
<td>0.14***</td>
</tr>
<tr>
<td>Interaction</td>
<td>0.19</td>
<td>0.02</td>
<td>0.13</td>
<td>0.49</td>
<td>0.24</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Demographic and cancer-related variables that were significantly correlated with each outcome at the bivariate level are included as covariates for that outcome. These include minority status, marital status, income, months since treatment end, and comorbidities.

*p < 0.05; **p < 0.01; ***p < 0.001.

![Figure 1](image-url)  

**Figure 1.** Post-traumatic growth moderated the relationship of intrusive thoughts and positive affect. Depicted are slopes for 1 standard deviation above and 1 standard deviation below the mean for PTG.
play a significant role in well-being after cancer, but that its effects are most apparent when considered in the context of intrusive thoughts. Consistent with previous research identifying buffers against the harmful effects of intrusions on psychological distress and quality of life [7,20,21], post-traumatic growth interacted with intrusions to predict multiple dimensions of well-being. These findings suggest that intrusive thoughts may indeed represent continued efforts toward making meaning of one’s cancer, the consequences of which are more positive interpretations of one’s cancer experience [23].

Our study is important in further illuminating one pathway through which post-traumatic growth might influence adjustment and well-being in cancer survivors. The present study, along with previous findings (e.g. [21]), suggests that perceptions of growth may signify the identification of some positive aspects of the illness experience [27]. These perceptions of growth may vary in their impact on well-being based, in part, on how frequently one thinks about one’s illness or incorporates the illness experience into one’s ongoing life and sense of identity [40,41]. Of course it is important to note that perceptions of positive changes often coexist with perceptions of negative change as well (e.g. [26]). Future research should continue to examine these phenomenological aspects of cancer survivorship—that is, the lived or felt experience of the survivors themselves—as our findings suggest that multiple subjective dimensions of the experience of survivorship combine to influence survivors’ psychological adjustment [42].
One important divergence of our findings from those of Morrill et al. [21] is that growth did not moderate the relationship between intrusive thoughts and mental or physical quality of life. This difference may be due to several factors having to do with sample and measures. For example, our sample was more heterogeneous in terms of cancer and gender, and the participants were also much younger. They were also much closer to diagnosis, and it is possible that the meaning of intrusions earlier and later in the process of readjustment following cancer may be somewhat different [43]. In addition, Morill et al. [21] used an omnibus measure of PTSD symptoms rather than isolating the effects of intrusive thoughts; PTG might differentially moderate various aspects of PTSD symptomatology. For example, one could speculate that avoidance of reminders of one’s cancer could serve to diminish the impact of positive perceptions of growth. Such possibilities point to the need to conduct further research that takes into account the seasons of the cancer survivorship experience and the heterogeneity of that experience as well as other potentially important aspects such as the severity of the cancer and treatment and the extent to which participants perceived their cancer experience as traumatic. In addition, given our finding of a small but statistically significant effect for minority status on the PTG-adjustment link as well as previous research showing differences by minority status (e.g. 25), future research should further probe the effects of sociodemographic characteristics such as race and ethnicity.

Limitations of this study must be noted. We examined only a single time point in a trajectory of post-cancer living. Our response rate was modest (167 respondents at Time 2 out of an initial recruitment attempt at 600 potential participants), introducing potential biases into our results. Our sample had experienced various types of cancer, limiting generalization of these findings to any specific cancer type. In addition, like much of the research on cancer, our sample was predominantly White, female, and skewed toward higher socioeconomic status. Further, as with any cross-sectional study, causal relationships must remain speculative. In addition, we were unable to control for potentially important variables that might affect adjustment, such as psychiatric comorbidity, as well as those that might affect reports of growth, such as social desirability and self-enhancement.

In spite of these limitations, these results add important knowledge regarding the complex ways that post-traumatic growth may interact with intrusive thoughts, buffering their deleterious effects. Finding positive meaning in one’s cancer, as reflected in post-traumatic growth, may be particularly adaptive when considered in the context of the frequency with which one thinks about their cancer experience. Gaining a better understanding of how growth can moderate symptoms such as intrusive thoughts may have important clinical implications. For example, post-traumatic growth may be a potential focus of clinical work for those who are having continued intrusive thought about their cancer. The buffering effects of growth also suggest fruitful avenues for research examining the development and consequence of post-traumatic growth. In addition, some types of growth may be particularly helpful for survivors, especially as they reflect on their cancer experience and incorporate it into their post-cancer identity. Future research should continue to examine the meaning of post-traumatic growth for survivors in the broader contexts of their lives and the ways in which they process their experiences.

Figure 4. Post-traumatic growth moderated the relationship of intrusive thoughts and spiritual well-being. Depicted are slopes for 1 standard deviation above and 1 standard deviation below the mean for PTG.
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