





# Reappraising personal values in cancer: Meaning-in-life adaptation, meaningfulness, and quality of life

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## Abstract

**Objective:** This study explores the reappraisal of personal values among people with cancer post-diagnosis and its connections to meaningfulness, encompassing personal meaning and sense of meaning, and various dimensions of quality of life.

**Methods:** A total of 144 patients with diverse cancer types and a control group comprising 158 healthy adults with similar demographic characteristics completed the Valued Living Questionnaire-Perceived Change, the Personal Meaning Profile-Brief, the Portrait Values Questionnaire, and the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being.

**Results:** Cancer patients displayed a substantial values reappraisal compared to healthy adults. They reported an increased significance of social areas and self-transcendental values, including close relationships (family, partner, and friends), spirituality, citizenship, and universalism, as well as an increased importance of self-care and self in general. Conversely, cancer patients assigned less importance to work and self-enhancement values such as stimulation, power, and achievement. Cluster analysis revealed that patients who reappraised their values exhibited higher meaningfulness and better indicators of quality of life, including spiritual and physical well-being, compared to patients who did not modify their value system.

**Conclusions:** These findings underscore the importance of assessing and promoting meaning-in-life adaptability among people with cancer, with potential applications in meaning-centered therapies and interventions aimed at enhancing psychological flexibility.

## KEYWORDS

cancer, meaning in life, meaning-in-life adaptability, oncology, personal values, psychological flexibility, quality of life, self-transcendence, spiritual well-being

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## 1 | BACKGROUND

A cancer diagnosis usually has a profound impact on various aspects of an individual's existence and inherently brings about an increased awareness of one's mortality. Existential concerns, including the search for meaning, relationship, dignity, and spirituality, have been extensively documented in the literature through both qualitative and quantitative studies among cancer patients.<sup>1,2</sup> This study delves into a less-explored domain within this context: the impact of the cancer experience on personal values and the sources of meaning in life.

Traditionally, values are deemed stable, yet they can undergo shifts due to factors such as socialization, self-confrontation, cultural upheaval, therapy, or emotionally significant events.<sup>3</sup> A cancer diagnosis often represents such an event, as it engenders an existential plight for many people, challenging their meaning in life, identity, and worldview.<sup>4</sup> Consequently, individuals confronted with this existential crisis may not only attempt to assimilate or integrate cancer into their preexisting meaning in life, which is more closely associated with "situational meaning-making" and may not necessarily entail fundamental alterations in their meaning in life. They may also engage in a process of accommodation<sup>5</sup> or adaptation of their meaning in life in response to the cancer experience, where they make deliberate shifts in the core elements of their life's meaning, including their sources of meaning, personal goals, and self-perception, among others.

This psychological phenomenon has recently been termed "meaning-in-life adaptability."<sup>1</sup> It is understood as the psychological ability to either modify or preserve one's meaning in life to suit new life conditions or situations. Therefore, meaning adaptability encompasses both the "assimilation" of cancer into existing meaning structures and deliberate "accommodations" or "adaptations" of meaning in life to align with the cancer experience. This paper investigates the process of meaning accommodation/adaptation and its impact on mental adjustment within the oncological population.

A pivotal facet of meaning adaptation lies in the reappraisal of personal values, where individuals revise and make alterations to what holds importance and provides meaning to their life (sources of meaning). While some individuals revise and choose to maintain their value system unchanged because it allows them to continue living meaningfully (assimilation), others may find it beneficial to adapt/accommodate their personal values to harmonize with the cancer experience.

Meaning adaptability can be considered a key aspect of psychological flexibility, defined as "the ability to contact the present moment more fully as a conscious human being, and to either change or persist when doing so serves valued ends."<sup>6</sup> Practical approaches to psychological flexibility emphasize establishing a flexible relationship with negative thoughts and emotions to lead a meaningful life.<sup>7</sup> Nonetheless, developing a flexible system of personal values may be equally crucial, especially when confronting significant life changes.

Insights into values reappraisal and its health implications can enrich our understanding of cancer patients' psychological adjustment and enhance existing psychological treatments for cancer, particularly meaning-centered therapies<sup>8-10</sup> and Acceptance and Commitment Therapy.<sup>11,12</sup> Despite its significance, very few studies have explored the extent of values reevaluation and its clinical potential among people with cancer.

For instance, Sharpe et al.<sup>13</sup> observed that around half of the patients with metastatic cancer changed their life priorities during their illness, with family and health assuming greater importance over time. This shift in priorities was associated with improved adjustment to the illness. Furthermore, literature highlights that many cancer survivors experience post-traumatic growth (PTG), marked by increased personal strength, appreciation of new possibilities, improved relationships with others, a reappraisal of life priorities, and a positive spiritual change.<sup>14,15</sup> However, there is limited knowledge regarding the specific process of values reappraisal and the mechanisms underlying meaning adaptation in the context of PTG, beyond the general improvement in relationships and spirituality.

Challenges such as ethical concerns and the unpredictable nature of cancer diagnoses hinder longitudinal studies assessing values before and after diagnosis. Consequently, research in this realm primarily relies on retrospective methods. Quantitative studies investigating shifts in individuals' value system following a cancer diagnosis are notably rare. One such study, conducted by Greszta and Siemińska,<sup>16</sup> was identified in the literature. This study revealed that post-diagnosis, patients attached greater importance to values like religious morality, personal orientation, self-constriction, family security, and delayed gratification, while values related to immediate gratification, self-expansion, and competence declined in significance. Nonetheless, this study had limitations, including a small sample size ( $n = 50$ ), the absence of a control group, and the lack of a psychometrically validated instrument to assess perceived changes in values. Therefore, further research is essential to deepen our comprehension of values adaptability and its psychological benefits among cancer patients. A quantitative approach employing validated measures would be particularly valuable in quantifying this facet of meaning adaptability and its associations with other pertinent variables.

In light of these considerations, this study aimed to examine the perceived impact of the cancer experience on personal values, while also investigating the connections between values reappraisal, meaningfulness (both personal meaning and global subjective judgment of life as meaningful), and quality of life through rigorous quantitative analysis. Participants included a heterogeneous group of patients with cancer and a healthy control group with similar demographic characteristics. Additionally, the study sought to identify distinct patient profiles based on their levels of values reappraisal and overall valued living. Subsequently, it was explored whether patients displaying higher levels of values reappraisal experience greater levels of meaningfulness and quality of life compared to those who maintain their value system unchanged.

## 2 | METHOD

### 2.1 | Participants

A total of 382 Spanish individuals voluntarily participated in this study, comprising two groups: patients with cancer ( $n = 210$ ) and a healthy control group ( $n = 172$ ). Cancer patients were diagnosed with various types of primary cancer at different stages (see Table 1) and were recruited from the oncology unit of the public Hospital of Torrecardenas in Almeria, Spain. The control group was drawn from the local community. Both groups did not statistically differ in sociodemographic characteristics (see Table 1). Inclusion criteria included being over 18 years old, absence of a mental disorder that could significantly hinder their ability to respond to questionnaires,

such as schizophrenia or other psychotic disorders, and adequate language proficiency. Exclusions comprised cancer diagnoses less than 1 month or over 5 years ago, as well as individuals in extremely poor physical condition or with notable cognitive impairments (as determined by their oncologist).

### 2.2 | Measures

*Valued Living Questionnaire-Perceived Change (VLQ-PC)*. A modified version of the original VLQ<sup>17</sup> was employed to assess valued living and perceived changes across 11 life domains: (1) Family (other than parenting and intimate relations), (2) Partner/intimate relations, (3) Parenting, (4) Friends/social life, (5) Work, (6) Education/training, (7)

TABLE 1 Descriptive statistics of the sample.

	Cancer patients ( $n = 144$ )	Community sample ( $n = 158$ )
Gender (female; $n, \%$ )	88 (61.1)	93 (58.9)
Age (mean, $SD$ )	48.56 (10.36)	48.50 (12.94)
Marital status (married/couple; $n, \%$ )	102 (70.8)	108 (68.4)
Socioeconomic status (middle class; $n, \%$ )	132 (91.6)	147 (93.0)
Education ( $n, \%$ )		
Elementary/High school	66 (45.8)	64 (40.6)
Associate degree, BA or higher	78 (54.2)	90 (57.0)
Diagnosed with non-severe mental disorder ( $n, \%$ )	10 (6.9)	11 (7.0)
Active psychological/psychiatric treatment ( $n, \%$ )	33 (22.9)	11 (7.0)
Religious ( $n, \%$ )	113 (78.5)	111 (70.2)
Weekly/daily religious practice ( $n, \%$ )	44 (30.5)	16 (10.1)
Primary cancer ( $n, \%$ )		
Breast	53 (36.8)	n/a
Colorectal/Intestinal	24 (16.6)	n/a
Lung	15 (10.4)	n/a
Hematological	12 (8.4)	n/a
Gynecological	9 (6.3)	n/a
Testicular	8 (5.6)	n/a
Sarcoma	4 (2.8)	n/a
Other	19 (13.2)	n/a
Stage		
In situ	3 (2.1)	n/a
I	20 (13.9)	n/a
II	35 (24.3)	n/a
III	43 (29.9)	n/a
IV	37 (25.7)	n/a
Time since diagnosis (months, $SD$ )	18.31 (17.89)	n/a
In active treatment ( $n, \%$ )	102 (70.8)	n/a

Leisure, (8) Spirituality, (9) Citizenship/community life, (10) Physical self-care, and (11) Myself. The VLQ-PC comprises four sections. The first section measures the *importance* attributed to each domain using a 10-point Likert scale. The second section evaluates behavioral aspects of values by assessing *personal involvement* in each domain during the last week. A composite score is computed by combining these two sections, providing an overall valued living score, indicating the degree of commitment to valued life areas. In addition to the original two subscales, two additional subscales were introduced to measure *perceived changes* in both importance and involvement in each domain since the cancer diagnosis (for cancer patients) or the past year (for the control group). Participants used a 9-point Likert scale, ranging from  $-4$  (*much less important or involved now*) to  $+4$  (*much more important or involved now*), with zero indicating no perceived change in importance or involvement (see Supplementary Material S1). The VLQ-PC has demonstrated favorable psychometric properties (unpublished data, available upon request to the authors) with Cronbach's alphas in this study ranging from 0.73 to 0.88.

**Portrait Values Questionnaire (PVQ).** The Spanish version<sup>18</sup> of the PVQ (40-item)<sup>19</sup> was used to assess 10 cross-cultural human values: Universalism, Benevolence, Conformity, Tradition, Security, Power, Achievement, Hedonism, and Self-Direction. Each item describes a person in two sentences, and respondents rate their similarity to the depicted person using a 6-point Likert scale ranging from 1 (*not similar at all*) to 6 (*very similar*). To gauge perceived differences in PVQ values, a retrospective version was created by modifying all items to the past tense. Participants were asked to indicate their similarity to the described person "before receiving the cancer diagnosis" (for cancer patients) or "1 year ago" (for the control group). Subsequently, present and past values were compared. Cronbach's alphas ranged from 0.46 to 0.77.

**Personal Meaning Profile-Brief (PMP-B).** The Spanish version<sup>20</sup> of the PMP-B<sup>21</sup> was utilized, which consists of 21 items assessing perceptions of meaning in life across seven sources: Achievement, Relationship, Religion, Self-transcendence, Self-Acceptance, Intimacy, and Fair Treatment. The total score on this scale provides a comprehensive evaluation of one's meaning in life, which is called "personal meaning", rather than a global subjective assessment of life as meaningful. In this sample, Cronbach's alpha of PMP-B total was 0.85, and for the subscales they ranged from 0.60 to 0.90.

**Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being (FACIT-Sp).** The FACIT-Sp is a widely adopted instrument for evaluating the quality of life and spiritual well-being among individuals with cancer and other chronic diseases.<sup>22,23</sup> Respondents indicate their agreement with 39 items on a 4-point Likert-type scale ranging from 0 (*not at all*) to 4 (*very much*). The measure encompasses five subscales: Physical well-being, Social/Family well-being, Emotional well-being, Functional well-being, and Spiritual well-being. Spiritual well-being is assessed through two components: Sense of Meaning/Peace (global subjective judgment of life as meaningful together with peace of mind) and Faith. The FACIT-Sp yields two total scores: a) FACT-G, indicating general quality of life, and b)

FACIT-Sp total score, encompassing quality of life alongside spiritual well-being. In this study, Cronbach's alphas of the subscales ranged from 0.74 to 0.88. Cronbach alpha for the overall FACIT-Sp was 0.91.

## 2.3 | Procedure

This study followed a cross-sectional design. Initially, a list of eligible cancer patients visiting the hospital for treatment or follow-up was provided by the oncologist and psycho-oncologist at the hospital. Personal contact was established with all these patients at the hospital. Those who agreed to participate provided informed consent and completed the paper questionnaires individually in a designated hospital room. The questionnaire completion took approximately 30 min. The patients' medical histories were obtained from the hospital's database, with explicit permission from the patients, their physicians, and the hospital administration.

Upon completing data collection from the cancer patients, the control group was recruited from the local community within the same Spanish region, using non-probability quota sampling. The recruitment of control participants aimed to ensure statistical comparability with the cancer group in terms of mean age, standard deviation of age, and gender distribution. Four researchers distributed questionnaires to individuals within their personal network (blind to the study objectives). These participants provided informed consent, completed the same questionnaires as the cancer group (excluding the FACIT-Sp, which is not aimed to this population), and returned them in sealed envelopes without including personal identifying information. To facilitate retrospection among control group participants, a 1-year time frame was used, in contrast to the cancer group's average time since diagnosis, which was 18 months. This choice was based on the simplicity of recalling and contemplating life change over the past year compared to navigating the complexities of a year and a few months. Importantly, the influence of the time elapsed since diagnosis on values reappraisal was subsequently controlled for in the statistical analyses. The study received prior approval by the Ethical Committee of the Andalusian Health Service (SAS, 0802-N-16) and strictly adhered to the ethical principles outlined in the Declaration of Helsinki 2008.

## 2.4 | Data analysis

Statistical analyses were performed using SPSS, version 24.0. Missing data were minimal, accounting for 1.66% in the cancer patient sample and 1.04% in the community sample. Little's Missing Completely at Random Tests were not significant (cancer patient sample:  $\chi^2 = 161.90$ ,  $df = 19,106$ ,  $p = 1.00$ ; community sample:  $\chi^2 = 2095.22$ ,  $df = 19,178$ ,  $p = 1.00$ ), indicating that data were missing completely at random. Missing data were replaced with the Expectation-Maximization algorithm for each subscale, except for the items of the VLQ-PC, as they all measure separate areas. No outliers were removed.

Descriptive statistics were calculated and tests of normality, kurtosis, and skewness were conducted. Violations of normality led to the use of Mann-Whitney's *U* tests and Chi-square tests to assess differences between cancer patients and healthy adults. Intra-group changes for present and past PVQ and VLQ-PC were assessed with Wilcoxon signed ranks tests. Effect sizes (*r*) were computed for Mann-Whitney's *U* tests and Wilcoxon signed ranks tests,<sup>24</sup> with values of 0.10, 0.20, and 0.30 considered as small, medium, and large effect sizes, respectively.<sup>25</sup>

Spearman's rank correlation coefficients were utilized to examine correlations within the cancer group. Linear regression analyses were performed to determine the predictive strength of variables on well-being measured by FACIT-Sp. Patients at stage 0 were excluded from the comparisons based on the stage of cancer due to a small sample size of only three individuals.

Two-step cluster analyses, employing the log-likelihood distance measure, were conducted using VLQ-PC total scores of importance, personal involvement, perceived changes in importance, and perceived changes in involvement as classification variables. One participant was excluded due to insufficient involvement difference data. This analysis is robust to possible violations of normality, and multicollinearity was not detected as all variance inflation factors were below two. All variables were z-standardized. Cluster solutions 2, 3, 4, and 5 were evaluated by Akaike's Information Criterion (AIC)<sup>26</sup> and by the average silhouette coefficient. The smallest AIC value and the largest AIC change accompanied by an average silhouette coefficient equal to or above 0.50 indicated good model fit.<sup>27</sup> The stability of the chosen solution was assessed using the hierarchical method. Cluster comparisons were made using the Chi-square test for categorical variables and Kruskal-Wallis *h* tests for continuous variables. Kruskal-Wallis tests were followed by Dunn's nonparametric comparisons with Bonferroni adjustments. Chi-square post hoc analyses also employed the Bonferroni correction. In all remaining multiple comparisons, *p*-values were adjusted using the Benjamini-Hochberg procedure with a false discovery rate of 0.05. For group comparisons (a total of 84 tests), this procedure resulted in an adjusted *p*-value cutoff of 0.021. In the case of intra-group comparisons, *p* below 0.035 was significant, and for intragroup correlations, *p* cutoff was 0.018. For cluster comparisons, using the same procedure, only *p*-values below 0.032 were deemed significant.

The data is accessible in the institutional repository of the University of Almeria (<http://hdl.handle.net/10835/14362>).

### 3 | RESULTS

#### 3.1 | Sample characteristics

Out of the 210 contacted cancer patients, 144 (68.57%) returned questionnaires with sufficient demographic data, devoid of unanswered tests or visible response errors. For the community sample, 158 (91.86%) out of the 172 individuals contacted provided valid data for analysis.

In the cancer patient group, 61.1% were female, with a mean age of 48.56 (SD = 10.36). The average time since diagnosis was 18.31 months (SD = 17.89), and more than half of the patients were diagnosed with either breast or colorectal/intestinal cancer, with varying stages of cancer. Detailed demographic and clinical characteristics of the final sample are presented in Table 1.

No significant differences emerged between the two groups in terms of sociodemographic variables, including gender, age, education level, marital, and socioeconomic status, with a corrected *p* value cutoff for multiple testing set at > 0.021. The cancer group did not have a higher prevalence of individuals diagnosed with mental disorders, specifically depression, anxiety, sleeping, and eating disorders. However, more of them had received psychological/psychiatric treatment,  $\chi^2(1, N = 302) = 15.41, p < 0.001$ . The number of religious participants did not differ between the groups, but a larger proportion of respondents in the cancer group practiced their religion on a weekly/daily basis,  $\chi^2(1, N = 298) = 19.34, p < 0.001$ .

#### 3.2 | Group comparisons on personal meaning and current personal values

For the PMP-B and the PVQ, the cancer group scored higher on Religion ( $U = 8800.5, p < 0.001, r = 0.20$ ), Self-acceptance ( $U = 8818.5, p < 0.001, r = 0.20$ ), Benevolence ( $U = 9880.5, p = 0.047, r = 0.11$ ), and Tradition ( $U = 8965.5, p = 0.001, r = 0.18$ ) compared to the control group. No other significant differences were observed in comparisons involving these two scales (corrected  $p > 0.021$ ).

Concerning the VLQ-PC, the cancer group exhibited higher levels of importance and personal involvement in Spirituality and greater involvement in Physical self-care compared to the control group ( $p < 0.021$ , see Table 2). Conversely, importance and involvement in Work were lower in the cancer group. Furthermore, cancer patients displayed higher involvement in the domain of Myself. However, no significant differences were identified between the groups in the VLQ-PC composite.

#### 3.3 | Intragroup changes and group comparisons on perceived change in personal values

Intragroup change analyses revealed that when assessing the retrospective version of PVQ, cancer patients reported placing higher value on Universalism in the present compared to their pre-diagnosis situation,  $Z = -2.71, p = 0.007, r = 0.23$ . In contrast, they assigned less importance to Stimulation ( $Z = -2.44, p = 0.015, r = 0.20$ ) and Power ( $Z = -2.14, p = 0.032, r = 0.18$ ). These values did not exhibit significant intra-group differences among healthy adults (Benjamini-Hochberg adjusted  $p < 0.035$ ). In the control group, Self-direction ( $Z = -2.25, p = 0.025, r = 0.18$ ), Hedonism ( $Z = -2.91, p = 0.004, r = 0.23$ ), and Security ( $Z = -3.99, p = 0.015, r = 0.32$ ) were significantly higher in the present compared 1 year ago.

TABLE 2 Descriptive statistics and group comparisons of the VLQ-PC scores.

	Cancer patients M (SD); Mdn	Control group M (SD); Mdn	U	p	r
VLQ importance family	9.13 (1.57); 10	8.96 (1.77); 10	10,674.0	0.345	0.05
VLQ importance partner/intimacy	8.69 (2.26); 10	8.59 (2.44); 10	10,818.0	0.982	0.00
VLQ importance parenting	9.24 (1.90); 10	9.23 (2.05); 10	9427.0	0.502	0.04
VLQ importance friends/social	7.70 (1.90); 8	7.56 (1.85); 8	10,416.5	0.425	0.05
VLQ importance work	7.53 (2.41); 8	8.18 (2.00); 9	9283.5	0.018	0.14
VLQ importance education	7.85 (2.05); 8	8.27 (1.65); 9	10,051.5	0.134	0.09
VLQ importance leisure	7.62 (2.05); 8	7.51 (1.65); 8	9970.0	0.218	0.07
VLQ importance spirituality	6.69 (2.82); 7	5.82 (2.74); 6	8924.0	0.004	0.17
VLQ importance citizenship	7.15 (2.05); 7	6.84 (1.84); 7	9783.0	0.140	0.09
VLQ importance physical self-care	7.79 (2.02); 8	7.33 (2.04); 8	9389.5	0.027	0.13
VLQ importance myself	8.02 (1.98); 8	7.96 (1.94); 8	10,853.0	0.70	0.02
VLQ import. Change family	2.24 (2.09); 4	0.64 (1.49); 0.0	6261.5	<0.001	0.43
VLQ import. Change partner/intimacy	1.78 (2.30); 3	0.56 (1.60); 0.0	7295.5	<0.001	0.29
VLQ import. Change parenting	2.17 (2.09); 4	0.71 (1.46); 0.0	6185.0	<0.001	0.38
VLQ import. Change friends/social	1.37 (2.06); 1	0.40 (1.31); 0.0	7473.0	<0.001	0.31
VLQ import. Change work	-0.26 (2.40); 0.00	0.46 (1.64); 0.0	8971.5	<0.001	0.16
VLQ import. Change education	0.61 (2.06); 0.00	0.60 (1.37); 0.0	10,856.5	0.769	0.02
VLQ import. Change leisure	1.35 (2.00); 2	0.43 (1.32); 0.0	7661.5	<0.001	0.27
VLQ import. Change spirituality	1.36 (2.06); 1	0.08 (1.29); 0.0	6696.0	<0.001	0.38
VLQ import. Change citizenship	0.72 (1.78); 0.0	0.36 (1.12); 0.0	9347.0	0.010	0.15
VLQ import. Change physical self-care	1.80 (1.97); 2	0.89 (1.53); 0.0	7631.5	<0.001	0.27
VLQ import. Change myself	2.12 (1.92); 2	0.89 (1.49); 0.0	6533.0	<0.001	0.37
VLQ involvement family	8.15 (2.01); 9	7.84 (2.37); 8	10,762.5	0.466	0.04
VLQ involvement partner/intimacy	7.47 (2.89); 8	7.27 (3.10); 8.5	10,156.5	0.731	0.02
VLQ involvement parenting	8.21 (2.65); 9	7.84 (3.12); 9	9252.0	0.680	0.03
VLQ involvement friends/social	6.72 (2.52); 7	6.44 (2.11); 7	9884.5	0.107	0.09
VLQ involvement work	4.81 (3.19); 5	7.59 (2.68); 8	5421.0	<0.001	0.43
VLQ involvement education	5.38 (3.06); 5	6.48 (2.62); 7	8742.0	0.002	0.18
VLQ involvement leisure	6.00 (2.74); 6	6.04 (2.11); 6	10,559.0	0.628	0.03
VLQ involvement spirituality	5.79 (3.11); 6	4.59 (3.03); 5	8751.5	0.001	0.19
VLQ involvement citizenship	5.54 (2.67); 5	5.44 (2.50); 5	10,566.5	0.775	0.17
VLQ involvement physical self-care	7.28 (2.43); 8	6.20 (2.57); 7	8320.0	<0.001	0.22
VLQ involvement myself	7.88 (2.33); 9	6.79 (2.43); 7	7745.0	<0.001	0.25
VLQ involv. Change family	1.99 (1.90); 2	0.63 (1.62); 0.0	6743.0	<0.001	0.36
VLQ involv. Change partner/intimacy	1.55 (2.14); 1.5	0.55 (1.71); 0.0	7250.5	<0.001	0.28
VLQ involv. Change parenting	1.69 (1.99); 2	0.68 (1.61); 0.0	6685.5	<0.001	0.29
VLQ involv. Change friends/social	0.82 (1.97); 0	0.26 (1.29); 0.0	8935.5	0.002	0.18
VLQ involv. Change work	-0.86 (2.21); 0	0.51 (1.76); 0.0	7016.0	<0.001	0.29
VLQ involv. Change education	-0.01 (2.16); 0	0.43 (1.46); 0.0	10,025.0	0.190	0.08
VLQ involv. Change leisure	0.52 (2.31); 0	0.24 (1.35); 0.0	9566.0	0.031	0.13



TABLE 2 (Continued)

	Cancer patients M (SD); Mdn	Control group M (SD); Mdn	U	p	r
VLQ involv. Change spirituality	0.73 (2.20); 0	-0.21 (1.48); 0.0	7197.0	<0.001	0.33
VLQ involv. Change citizenship	0.26 (1.95); 0	0.19 (1.02); 0.0	9975.5	0.175	0.08
VLQ involv. Change physical self-care	1.66 (2.10); 2	0.67 (1.43); 0.0	7025.0	<0.001	0.32
VLQ involv. Change myself	2.00 (1.87); 2	0.59 (1.53); 0.0	6042.5	<0.001	0.41
VLQ importance (total)	7.92 (1.25); 8	7.84 (0.95); 7.9	10,377.0	0.187	0.08
VLQ importance change (total)	1.39 (1.36); 1.6	0.58 (1.08); 0.2	6703.0	<0.001	0.36
VLQ involvement (total)	6.65 (1.65); 6.9	6.55 (1.64); 6.7	10,942.0	0.638	0.03
VLQ involvement change (total)	0.94 (1.26); 1.0	0.42 (0.97); 0.0	7769.5	<0.001	0.27
VLQ composite	56.50 (17.90); 57.6	55.63 (16.19); 55.5	10,874.5	0.575	0.03

Note: Only *p* values below 0.021 are significant.

Regarding group comparisons (Benjamini-Hochberg adjusted  $p < 0.021$ ), the cancer group showed significantly larger inter-group differences for Stimulation ( $U = 9417.5$ ,  $p = 0.008$ ,  $r = 0.15$ ) and Power ( $U = 9655.5$ ,  $p = 0.020$ ,  $r = 0.13$ ) when comparing past and present values. Specifically, cancer patients tended to value these areas less in the present than in the past, while the control group tended to value them more over time. Nonetheless, the effect sizes were small.

Regarding perceived changes in the VLQ-PC, cancer patients demonstrated significant increases in importance and involvement in various areas, including Family, Partner/intimate relationships, Parenting, Friends/social life, Leisure, Spirituality, Physical self-care, and Myself, following their diagnosis compared to healthy adults (see Table 2). They also increased the importance of Citizenship/community life. Notably, the importance and involvement in Work significantly decreased among cancer patients, while healthy adults exhibited an increase of their involvement in this area over the past year. Additionally, the perceived changes in the importance and involvement in Education/training were similar in both groups. Medium size effects were observed for the perceived change in the importance of Family, Parenting, Friends/social life, Spirituality, and Myself, while the effect sizes for the remaining areas were small. In general, cancer patients reported a greater overall increase in the importance and involvement in the life areas measured by the VLQ-PC compared to the control group, with medium effect sizes (see Table 2).

### 3.4 | Values reappraisal, time since diagnosis, cancer stage, and quality of life

Time since diagnosis displayed no significant relationship with most study variables, except for the importance and the perceived increase in the importance of Spirituality ( $r = 0.214$ ,  $p = 0.014$ ;  $r = 0.227$ ,  $p = 0.009$ , respectively). Similarly, cancer stage did not show a significant relationship with most study variables. However, more advanced stages of the illness were negatively correlated with Self-

acceptance ( $r = -0.172$ ,  $p = 0.046$ ), Benevolence ( $r = -0.212$ ,  $p = 0.013$ ), global quality of life (FACIT-SP total,  $r = -0.209$ ,  $p = 0.017$ ), Spiritual well-being ( $r = -0.206$ ,  $p = 0.016$ ), Sense of Meaning/peace (a component of Spiritual Well-being), and Functional well-being ( $r = -0.193$ ,  $p = 0.025$ ).

When all subscales of PMP-B, PVQ, and VLQ-PC were combined in the cancer group, they collectively explained 38.1% of the variance in the FACIT-SP total score. The VLQ-PC composite and the total perceived change in involvement emerged as the subscales with the strongest predictive value for quality of life ( $\beta = 0.294$ ,  $p = 0.001$ ;  $\beta = 0.436$ ,  $p < 0.001$ , respectively). Furthermore, the PMP-B total score showed significant associations with perceived increases in the importance of Spirituality ( $r = 0.319$ ,  $p < 0.001$ ), Physical self-care ( $r = 0.310$ ,  $p < 0.001$ ), Partner/intimate relationships ( $r = 0.306$ ,  $p < 0.001$ ), Leisure ( $r = 0.282$ ,  $p = 0.001$ ), Friends/social life ( $r = 0.260$ ,  $p = 0.002$ ), and Myself ( $r = 0.246$ ,  $p = 0.003$ ). In contrast, FACIT-SP total scores were only correlated with a perceived increase in the importance of Myself ( $r = 0.235$ ,  $p = 0.005$ ). According to the Benjamini-Hochberg procedure, all other correlations were statistically nonsignificant, with *p* values exceeding 0.018.

### 3.5 | Cluster analysis among cancer patients based on meaning adaptation

Cluster analysis based on VLQ-PC scores yielded a three-cluster solution, which demonstrated the most favorable characteristics among the tested solutions (2, 3, 4, and 5) (full procedure available upon request). Personal involvement emerged as the most discriminative predictor variable (importance = 1.00), followed by perceived change in involvement (importance = 0.74), perceived change in importance (importance = 0.67), and total importance to the life areas (importance = 0.67).

The characteristics of the three clusters are presented in Table 3. Cluster 1 (34.3%) was labeled "unchanged low meaning". This group displayed low mean values for all four variables, indicating minimal

TABLE 3 Classification of variables in the three clusters of cancer patients.

	Cluster 1 (n = 51) M (SD); Mdn	Cluster 2 (n = 43) M (SD); Mdn	Cluster 3 (n = 49) M (SD); Mdn	Kruskal-Wallis <i>h</i>	<i>p</i>
VLQ-PC importance	6.76 (1.17); 7.00	8.44 (0.70); 8.36	8.58 (0.81); 8.73	68.47	<0.001
VLQ-PC importance change	1.07 (1.26); 1.18	0.35 (0.90); 0.18	2.55 (0.82); 2.40	72.48	<0.001
VLQ-PC involvement	4.88 (1.04); 4.81	7.57 (1.00); 7.36	7.56 (1.12); 7.45	86.17	<0.001
VLQ-PC involvement change	0.36 (1.15); 0.64	0.21 (0.70); 12	2.12 (0.80); 2.00	78.94	<0.001

perceived changes in personal values, low importance, and limited personal involvement in the life areas covered by the VLQ-PC. Participants in Cluster 2 (31.10%), referred to as “unchanged moderate meaning”, reported very minimal changes in personal values but demonstrated a stronger sense of importance and involvement in valued areas in the present. Finally, Cluster 3 (35.7%), termed “adapted high meaning”, reported significant perceived changes in both the importance and involvement in their valued areas, alongside high levels of importance and involvement in the present. All evaluation variables displayed significant differences between the three groups (see Table 3).

Table 4 presents means, medians, standard variations, and overall differences among the three groups using the Benjamini-Hochberg adjusted *p* value cutoff of 0.034, while Table 5 shows Post-hoc Dunn tests for significant tests. Taken together, these results indicate that clusters did not differ in sociodemographic characteristics, apart from religious status. The group with “unchanged low meaning” had significantly fewer religious participants compared to the “unchanged moderate meaning” group ( $p = 0.012$ ) and the “adapted high meaning” group ( $p = 0.004$ ).

Significant differences were observed between the three groups across various measures, including PMP-B total scores, most PMP-B subscales (excluding Fair Treatment), PVQ subscales of Benevolence, Self-Direction, Stimulation, Hedonism, Security, FACIT-Sp total scores, Physical well-being, Social well-being, Functional well-being, and Spiritual well-being including sense of meaning/peace. Notably, no differences were found based on cancer stage, type, time since diagnosis, or whether participants had received psychological treatment or not.

Post-hoc pair-wise group comparisons further revealed that patients with “unchanged moderate meaning” scored higher than those with “unchanged low meaning” in the FACIT-SP total, FACT-G, Social well-being, Functional well-being, and the PMP-B subscale of Relationship (see Table 5). No significant differences were found in personal meaning and sense of meaning/peace between these two groups. In contrast, patients with “adapted high meaning” achieved higher scores than those in the “unchanged low meaning” group in measures such as FACIT-Sp total, FACT-G, Social well-being, Functional well-being, Spiritual well-being, sense of meaning/peace, personal meaning (PMP-B total and all its subscales), Benevolence, Stimulation, Hedonism, and Security. Additionally, in comparison to individuals with “unchanged moderate meaning”, people with

“adapted high meaning” reported higher scores in personal meaning, Physical well-being, Self-transcendence, Achievement, Self-direction, and Stimulation (see Table 5).

## 4 | DISCUSSION

This study explored the perceived impact of the cancer experience on personal values and their association with meaningfulness and quality of life. The primary objective was to understand how individuals adapt their meaning in life by reappraising their personal values following a cancer diagnosis. The results showed that cancer patients displayed a substantial reappraisal of their personal values compared to healthy adults with similar demographic characteristics. People with cancer placed more importance on universalism values while reducing emphasis on values related to stimulation, power, and achievement. These shifts in value orientations were accompanied by significant increases in the importance and involvement in family, partner/intimate relationships, parenting, friendship, leisure, and spirituality, with a corresponding decrease in the significance of work. In contrast, the control group did not demonstrate such changes in their value systems.

These findings illustrate the profound transformation that many individuals with cancer undergo, becoming more attuned with interpersonal connections and self-transcendental values (emphasizing care for the welfare of others, equality, and disengagement from selfish concerns), while diminishing the importance of self-enhancement values (pursuit of one's own interests, relative success, and dominance over others) such as power and career success. Notably, perceived changes in social relationships and spirituality showed significant positive associations with personal meaning, underscoring the relational and self-transcendental dimensions of meaning in life.<sup>20,21</sup>

An intriguing observation was the simultaneous increase in the significance attributed to self among cancer patients, directly linked to overall quality of life. This suggests that cultivating a socially orientated, self-transcendental life goes hand in hand with a bolstered self-esteem. Consistent with our findings, it becomes apparent that this fortified self-esteem is more firmly anchored in the sense of mattering, characterized by feeling significant and valued by others, rather than in the pursuit of self-enhancement through self-centeredness and individual success.



TABLE 4 Descriptive statistics and comparisons of meaning, values, and well-being between the three clusters of cancer patients.

	Cluster 1 Unchanged low meaning (n = 49) M (SD); Mdn	Cluster 2 Unchanged moder meaning (n = 43) M (SD); Mdn	Cluster 3 Adapted high meaning (n = 51) M (SD); Mdn	Kruskal-Wallis/ Chi square	p
Age	50.10 (9.54); 53	50.40 (11.07); 49	45.86 (9.88); 45	7.26	0.027
Gender (female; n, %)	28 (57.1)	23 (53.5)	36 (70.6)	3.29	0.193
Religious (n, %)	32 (65.3)	35 (81.4)	45 (88.2)	9.29	0.010
Religious practice (n, %)	38 (77.6)	26 (60.5)	35 (68.6)	3.17	0.205
Time since diagnosis	18.38 (17.64); 11	17.23 (17.14); 13	19.32 (19.18); 9	0.09	0.957
In active treatment (n, %)	35 (71.4)	33 (76.7)	33 (64.7)	1.52	0.468
No psychological treatment (n, %)	38 (77.6)	36 (83.7)	36 (70.6)	2.28	0.319
PMP-B self-transcendence	12.09 (3.8); 12	11.92 (3.78); 12	14.58 (3.54); 15	13.12	0.001
PMP-B achievement	12.59 (4.38); 12	12.63 (3.51); 13	15.19 (3.39); 16	14.10	0.001
PMP-B relationship	13.97 (3.92); 14	16.19 (3.24); 16	17.53 (3.36); 18	25.89	<0.001
PMP-B religion	8.23 (5.53); 6	9.91 (5.45); 9	11.73 (4.79); 12	12.33	0.002
PMP-B self-acceptance	14.90 (3.65); 15	14.78 (3.35); 15	16.49 (2.81); 17	7.95	0.019
PMP-B intimacy	14.51 (5.60); 16	16.80 (5.00); 19	17.60 (4.63); 20	12.31	0.002
PMP-B fair treatment	13.27 (3.40); 13	14.10 (3.30); 14	14.55 (4.03); 15	3.60	0.165
PMP-B total	89.55 (18.03); 86	96.33 (18.62); 95	107.66 (13.66); 106	28.04	<0.001
PVQ conformity	16.61 (3.88); 17.9	16.33 (3.49); 17	17.69 (3.73); 19	4.89	0.087
PVQ tradition	14.44 (3.17); 15	15.67 (3.46); 16	16.35 (3.87); 17	6.57	0.037
PVQ benevolence	18.76 (3.09); 19	19.59 (2.89); 20	20.69 (3.18); 22	11.48	0.003
PVQ universalism	29.21 (4.12); 29.7	28.69 (4.51); 29	30.69 (4.38); 31	5.67	0.059
PVQ self-direction	18.53 (3.93); 19	18.15 (3.44); 19	20.01 (3.43); 21	8.09	0.018
PVQ stimulation	10.11 (3.58); 10	9.42 (3.33); 9	12.30 (3.09); 12	17.62	<0.001
PVQ hedonism	11.028 (3.61); 11	12.44 (3.15); 12	13.83 (3.34); 14.2	15.60	<0.001
PVQ achievement	11.37 (5.78); 11	11.33 (3.98); 12	13.64 (5.26); 13	5.97	0.051
PVQ power	7.17 (3.15); 7	6.44 (2.49); 6	7.58 (3.38); 7	2.51	0.286
PVQ security	20.61 (5.05); 21	21.72 (5.21); 23	23.67 (4.43); 24	9.60	0.008
Physical well-being	17.47 (7.30); 19	21.16 (5.77); 23	20.73 (6.15); 22	7.72	0.021
Social well-being	18.82 (4.87); 18	22.43 (3.21); 23	22.15 (3.55); 21	17.48	<0.001
Emotional well-being	15.02 (5.49); 17	14.98 (4.43); 15	16.59 (4.41); 17	3.27	0.195
Functional well-being	14.28 (5.36)	18.01 (4.95); 19	18.64 (5.65); 19	16.73	<0.001
Sense of meaning-peace	22.18 (5.95); 23	24.07 (4.46); 25	25.33 (4.73); 26	7.78	0.020
Faith	7.00 (4.45); 6	8.21 (4.22); 8	10.07 (4.15); 11	13.57	0.001
Spiritual well-being	29.17 (8.52); 29	32.28 (7.32); 32	35.40 (6.91); 36	15.24	<0.001
FACT-G	65.58 (15.93); 68	76.57 (13.42); 80	78.11 (15.19); 80	16.96	<0.001
FACIT-SP	94.76 (20.51); 95	108.8 (18.7); 110	113.51 (18.7); 114	20.54	<0.001

Note: Only *p* values below 0.034 are significant. For continuous variables, Kruskal-Wallis tests, for categorical variables, chi square tests were applied.

Interestingly, changes in personal involvement demonstrated a stronger association with quality of life compared to changes in value importance, emphasizing the behavioral aspect of meaning in life and well-being, beyond cognitive and emotional facets.<sup>1,17,28,29</sup> Moreover,

there were no significant associations between values reappraisal, time since diagnosis, and cancer stage. Patients who received a recent diagnosis reported similar values reappraisal as patients diagnosed with cancer a few years ago, and the severity of the

TABLE 5 Post-hoc Dunn tests for continuous variables in cancer.

	Unchanged low meaning versus unchanged moder meaning		Unchanged low meaning versus adapted high meaning		Unchanged moder. meaning versus adapted high meaning	
	Std. test statistic	Adj. Sig.	Std. test statistic	Adj. Sig.	Std. test statistic	Adj. Sig.
Age	-0.08	1.00	2.31	0.063	2.31	0.062
PMP-B self-transcendence	0.17	1.00	-3.08	0.006	-3.14	0.005
PMP-B achievement	0.01	1.00	-3.27	0.003	-3.17	0.005
PMP-B relationship	-2.82	0.014	-5.07	<0.001	-2.06	0.119
PMP-B religion	-1.60	0.328	-3.51	0.001	-1.77	0.228
PMP-B self-acceptance	0.01	1.00	-2.45	0.042	-2.38	0.051
PMP-B intimacy	-2.03	0.128	-3.49	0.001	-1.33	0.554
PMP-B total	-2.10	0.081	-5.28	<0.001	-2.87	0.012
PVQ benevolence	-1.31	0.569	-3.37	0.002	-1.93	0.161
PVQ self-direction	0.73	1.00	-2.04	0.124	-2.70	0.020
PVQ stimulation	0.98	0.986	-3.09	0.006	-3.97	<0.001
PVQ hedonism	-1.72	0.254	-3.94	<0.001	-2.07	0.116
PVQ security	-1.11	0.801	-3.07	0.006	-1.84	0.196
Physical well-being	0.26	1.00	-2.32	0.062	-2.47	0.040
Social well-being	-3.74	0.001	-3.46	0.002	0.43	1.00
Functional well-being	-3.19	0.004	-3.79	<0.001	-0.44	1.00
Sense of meaning-peace	-1.22	0.670	-2.79	0.016	-1.46	0.431
Faith	-1.40	0.481	-3.66	0.001	-2.12	0.103
Spiritual well-being	-1.79	0.220	-3.91	<0.001	-1.96	0.149
FACT-G	-3.18	0.004	-3.83	<0.001	-0.49	1.00
FACIT-SP	-3.17	0.005	-4.37	<0.001	-1.02	0.921

Note: In case of nonsignificant Kruskal-Wallis test, post-hoc tests were not performed.

diagnosis did not emerged as a significant factor either. This suggests that the primary adjustment in meaning sources may occur soon after diagnosis, regardless of its severity, although further research is needed to confirm this phenomenon. Overall, these results advance our understanding of how the values system adapts to the cancer experience in many individuals.<sup>13-16,30</sup>

To explore the clinical implications of meaning adaptation, a cluster analysis was conducted within the cancer group, resulting in three distinct profiles based on VLQ-PC scores: patients with unchanged low meaning, patients with unchanged moderate meaning, and patients with adapted high meaning. The group with unchanged moderate meaning presented a higher quality of life, particularly in terms of social and functional well-being, compared to the group with unchanged low meaning. However, the group with adapted high meaning, those who reported a significant reappraisal of values, displayed the strongest indicators of well-being and meaningfulness. These individuals not only shared the advantages of those with unchanged moderate meaning but also demonstrated higher levels of personal meaning, sense of meaning, physical well-being, spiritual well-being, and various values compared to those with unchanged

low meaning. Moreover, patients who reappraised their personal values reported higher scores in personal meaning, self-transcendence, achievement, self-direction, stimulation, and physical well-being compared to those who did not change their personal values but still exhibited valued living. These findings highlight the intrinsic connection between meaning adaptation, meaningfulness, quality of life, and personal growth, aligning with previous studies emphasizing the role of meaning in life in PTG.<sup>31</sup>

Importantly, meaning adaptation was also associated with physical well-being. Many cancer patients placed increased emphasis on physical self-care as part of their adapted values, potentially leading to improved physical well-being. Recent research has supported the causal link between meaning in life and physical health.<sup>32</sup>

Contrary to the notion that meaning adaptation arises solely from avoidance mechanisms triggered by death anxiety,<sup>33</sup> the results suggest a proactive, growth-oriented search for meaning in the face of cancer, as proposed by Meaning Management Theory.<sup>1,34</sup> Confronting death with denial and avoidance has been associated with psychological maladjustment and loss of meaning in life,<sup>35,36</sup> while responding with acceptance and viewing cancer as an opportunity is

associated with less existential distress, less anxiety, and better health-related quality of life.<sup>37,38</sup> These findings collectively contribute further support to the principles of existential positive psychology.<sup>39</sup>

Lastly, this study parallels previous research documenting a response shift in the self-evaluation of quality of life among individuals facing life-threatening or chronic diseases.<sup>13</sup> The reappraisal of personal values may play a significant role in this observed shift.

#### 4.1 | Limitations

Despite the promising findings, certain limitations must be acknowledged. The study had an overrepresentation of females, encompassed a diverse range of cancer types and stages, and employed a cross-sectional design, limiting causal inference. Recall bias may affect retrospective measures of values changes. Furthermore, the average time since diagnosis in the cancer group partially differed from the time frame adopted for the control group. Nevertheless, time since diagnosis did not have a significant impact on the study variables. Additionally, the study focused on assessing “perceived” meaning-making processes rather than objectively measuring “true” changes in personal values. These ongoing processes are typically conscious and can be evaluated at any given moment.

The method used in this study does not allow for measuring how many patients with unchanged moderate meaning indeed reevaluated their value system but did not need to make any changes to cope meaningfully with cancer. Finally, the study noted that more individuals in the cancer group received psychological treatment than in the control group. Future research should further analyze the roles of initial value system<sup>13</sup> and psychological treatment on values reappraisal and quality of life.

#### 4.2 | Clinical implications

The study underscores the importance of values reappraisal in oncological populations, offering insights into the prediction and enhancement on meaningfulness and quality of life. Evaluating and promoting values reappraisal in psychological treatments for individuals coping with cancer can be particularly beneficial,<sup>8,40</sup> specially for those struggling to find meaning or integrate their cancer experience into their lives. This evaluation can pave the way for future research on meaning adaptability among cancer patients and various populations experiencing significant life changes.

### 5 | CONCLUSIONS

In summary, this study sheds light on the dynamics of meaning-in-life adaptability among individuals facing cancer. It reveals a strong link between values reappraisal, meaningfulness, and well-being.

Individuals who adapt their personal values, particularly towards a socially orientated, self-transcendental perspective in response to cancer, tend to experience enhanced self-esteem, increased meaningfulness, and an improved quality of life. In contrast, while some individuals may live meaningfully without altering their values significantly, our findings demonstrate that those who maintain their value system unchanged statistically report lower levels of meaningfulness, personal growth, and physical and spiritual well-being. These findings underscore the crucial importance of assessing and nurturing meaning adaptability within therapeutic interventions focused on meaning in life and psychological flexibility.

#### AUTHOR CONTRIBUTIONS

**David F. Carreno:** Conceptualization (lead), data curation (supporting), funding acquisition, investigation (lead), methodology (lead), project administration, writing—original draft preparation (equal), writing—review and Editing (equal). **Nikolett Eisenbeck:** Conceptualization (supporting), data curation (lead), formal analysis, methodology (supporting), visualization, writing - original draft preparation (equal), writing—review and editing (equal). **Rubén Uclés-Juárez:** Conceptualization (supporting), investigation (supporting), writing—review and editing (supporting). **José Manuel García-Montes:** Supervision, resources, writing—review and editing (supporting).

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#### CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in Repositorio Institucional de la Universidad de Almería at <http://hdl.handle.net/10835/14362>.

#### ETHICS STATEMENT

The study received prior approval by the Ethical Committee of the Andalusian Health Service (SAS, 0802-N-16) and adhered to the ethical principles outlined in the Declaration of Helsinki 2008.

#### CONSENT FOR PUBLICATION

All authors contributed to the article and approved the submitted version.

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#### SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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