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REGULAR ARTICLE

Trajectories of Current and Predicted Satisfaction With One's Life Following a Cancer Diagnosis

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Abstract

Background Poor physical and mental health is common among cancer survivors, but little is known about how cancer influences life satisfaction and expectations about one's future, both of which may subsequently influence health decisions and outcomes.

Purpose The current study examined how a cancer diagnosis influences current and predicted future life satisfaction in seven domains, including family, finances, work, and health.

Methods We leveraged data from three waves of the Midlife in the United States study (N = 6,389) and examined the relation between new and past cancer diagnoses on satisfaction using generalized estimating equations. We also compared participants' predicted satisfaction to the actual satisfaction they reported at later waves of data collection, and examined whether concordance between the two differed by cancer history.

Results A cancer diagnosis was associated with a decline in satisfaction about one's present health and sex life, ps < .05, but satisfaction with all other domains remained steady or improved. In contrast, predictions about the future became and remained less optimistic than the predictions of those without cancer across all life domains except relationships with children, ps < .05. Within-subjects comparisons of predicted and actual satisfaction suggest those without a cancer history were optimistic in their predictions across all life domains except health whereas survivors were more accurate in their predictions.

Conclusions Given the many ways in which expectations about the future can influence decision making, behavior, and health, survivors' attenuated optimistic outlooks may influence their health and well-being.

Keywords Cancer • Survivor • Life satisfaction • Expectations/predictions

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Introduction

By 2022, there will be nearly 18 million cancer survivors in the USA [1]. Cancer survivors report poorer health and greater psychological distress and functional limitations than people without a cancer history [2], but little is known about how a cancer history influences overall life satisfaction in the years and decades following a diagnosis. Life satisfaction is an important measure of quality of life and is prospectively related to physical and mental health [3–7]. This study leveraged longitudinal data from a national survey to examine both current life satisfaction and predictions about future life satisfaction following a cancer diagnosis.

Cancer's Effect on Current Life Satisfaction

Life satisfaction is a cognitively based subjective judgment of the overall value, worth, or completeness of one's life [8]. Major life events can influence life satisfaction, in both short and long term [6, 9]. However, the extant evidence of whether a cancer diagnosis positively or negatively influences life satisfaction remains equivocal.

Life events that are perceived as negative (e.g., divorce, failing an exam [10]), unanticipated [11, 12], unmodifiable, and threatening to one's identity or goals [13] can have particularly strong adverse effects on life satisfaction [6, 9]. For instance, longitudinal studies suggest physical disabilities have sustained negative effects on satisfaction [14, 15], and several studies have challenged the evidence supporting the disability paradox, which is the tendency for

individuals with physical disabilities or chronic illness to report higher quality of life than those without them [16].

However, other studies suggest life satisfaction actually improves following a cancer diagnosis [17–19], at least in some life domains, such as social relationships [18]. This is consistent with the disability paradox, several adaptation theories [20], including set-point theory [7] and hedonic adaptation [12], as well as evidence of post-traumatic growth [21, 22]. This work posits that life satisfaction remains relatively stable over time, individuals tend to recover faster than they anticipate [12, 23], and they may even find new meaning in life following a negative event [21]. People may also recalibrate their standards or reference points after a cancer diagnosis or other major life event to account for changes in their life circumstances [24, 25]. Recognizing what they have faced, they may consider their quality of life to be quite high. From this perspective, cancer survivors may, over time, report life satisfaction that is relatively similar or superior to those without cancer.

Cancer's Effect on Predictions About Future Life Satisfaction

If cancer survivors' life satisfaction does indeed recover over time, presumably, their predictions about how satisfied they will be in the future ought to also recover. However, being diagnosed with cancer may evoke pessimistic predictions about the future that exceed developmentally normal declines in such predictions [4, 26] because of psychological biases, such as immune neglect and impact bias. Immune neglect, or the tendency to underestimate one's psychological coping resources, can lead individuals to overestimate how long it will take to recover from adverse events, such as a cancer diagnosis [27]. Impact biases reflect overestimations in the duration, intensity, and overall influence of negative events and the emotions they evoke [28]. Evidence suggests that these biases persist, even when individuals have considerable experience with related events [23]. Therefore, even cancer survivors who have adapted or recovered from their diagnosis and report relatively high current satisfaction may nonetheless report less optimistic predictions about their future.

Although there is evidence that the age-related declines in predictions about the future may be adaptive [4, 26, 29, 30], negative predictions about future well-being can become self-fulfilling prophecies; overly pessimistic predictions can increase the likelihood of experiencing negative events in the future [5] and reduce the likelihood of experiencing positive ones [31]. On the other hand, aspects of an optimistic outlook, such as lower perceived risk of disease, have been linked to lower disease risk [32, 33], and positive expectations for recovery following an illness are associated with better health outcomes [34–36]. Research also suggests that individuals have implicit theories about how they will change across the lifespan and that these can be biased in self-enhancing ways [37, 38], thus making individuals' predictions about their future positively biased [38].

The optimism of one's predictions may be consequential for health to the extent that these predictions are used to make decisions about one's current health behaviors [39, 40]. For many reasons (e.g., fear of recurrence or death), a cancer diagnosis may attenuate these optimistic outlooks. Therefore, it is important to examine not only cancer patients' current life satisfaction, but also their predictions about how satisfied they will be in the future.

The Current Study

The current study examined how a diagnosis of cancer influences life satisfaction across several domains, as well as how it influences predictions about future satisfaction. Given the evidence that cancer survivors experience meaning making, adaptation, and post-traumatic growth following their diagnosis [18, 21, 22, 41, 42], we hypothesized that survivors would be less satisfied with their current health than those without a cancer history, but equally satisfied with other life domains. In contrast, based on the evidence of immune neglect, impact biases, and fear of recurrence, we hypothesized that survivors' predictions about the future would be less optimistic than nonsurvivors. Given the equivocal literature informing these hypotheses, we conducted two-tailed tests of significance. We also compared participants' predicted satisfaction to the actual satisfaction they reported at later waves of data collection, and examined whether concordance between the two differed by cancer history.

In addition to these main analyses, we conducted preliminary analyses to examine whether current and predicted life satisfaction was prospectively associated with measures of physical and mental health, as well as sensitivity analyses to examine possible alternative explanations for our findings.

Methods

The current study leveraged data from The Midlife in the United States (MIDUS) study, a longitudinal study of a national (U.S.) sample of adults aged 25–74 at baseline. MIDUS aimed to investigate the role of behavioral, psychological, and social factors underlying age-related physical and mental health outcomes. Data collection occurred in three waves over an approximately 20-year period from 1995 to 2014. Each wave consisted of two mailed, self-report questionnaires, and a telephone

interview. Some scales were not administered to all participants.

Participants were recruited in 1995–1996 via random digit dialing using working telephone banks (response rate = 70%). Noninstitutionalized English-speaking U.S. adults were eligible, and five metropolitan areas were oversampled. Age-eligible respondents were randomly selected from each household using an algorithm that oversampled for males and older adults. Full details on the MIDUS protocol are available at http://www.midus.wisc.edu/.

Participants

These analyses include the subset of participants to whom the scales of interest were administered. Wave 1 (n = 6,325) was collected from 1995 to 1996; Wave 2 (n = 4,936) was collected from 2004 to 2006; and Wave 3 (n = 3,294) was collected from 2013 to 2014 [43, 44]. This study analyzed data from all waves, and participants did not need to have completed all waves to be included in analyses. However, 65 participants (1%) were omitted from analyses because they were missing data at all waves on their cancer history and/or life satisfaction.

Participants' mean age was 46.38 years (SD = 13.00) at Wave 1, 55.21 years (SD = 12.42) at Wave 2, and 63.64 years (SD = 11.35) at Wave 3. The proportion of female respondents across waves ranged from 51.7% to 54.9%, and the proportion of White participants ranged from 89.5% to 91.9% across waves. Approximately two-thirds of participants were married (67.2%–70.7%). Across waves, median education level was some college or a vocational 2-year degree, and median annual household income increased from $55,000 at Wave 1 to $75,000 at Wave 3. The proportion of participants who had cancer increased across waves from 7.0% (n = 498) at Wave 1, to 13.3% (n = 498) at Wave 2, and 20.1% (n = 662) at Wave 3.

Measures

Evaluations of present life satisfaction

At each of the three waves, participants rated their life overall (i.e., *overall life satisfaction*) these days on an 11-point scale from (0) *worst possible* to (10) *best possible* [13, 45]. Using the same scale, they also rated their satisfaction with seven specific life domains: (i) health, (ii) contributions to the welfare and well-being of other people, (iii) relationship with children, (iv) marriage or close relationship, (v) sexual aspect of life, (vi) financial situation, and (vii) work situation. These domains were distributed throughout the survey to minimize correlated error, and respondents did not rate domains that were not relevant to them (e.g., respondents without children did not rate the quality of their relationship with their children; individuals without children at MIDUS 1: n = 274). The eight items (overall satisfaction plus seven life domains) were examined separately. Cronbach's reliability (α) for all eight items ranged from .69 to .70 across the three waves.

Predictions about future life satisfaction

At each wave, participants also provided their predictions about what their life would be like in 10 years. Using the same 11-point scale (*worst possible* to *best possible*), they made a prediction about life overall ("Looking ahead ten years into the future, what do you expect your life overall will be like at that time?") and about the same seven domains. The eight items were examined separately. Cronbach's reliability (α) for all eight items ranged from .70 to .78 across waves.

Cancer diagnosis

At each of the three waves, participants indicated whether they had ever been diagnosed with cancer (yes/no). This item was used to create two dichotomous variables, reflecting a cancer diagnosis that was newly reported at that wave of data collection ("new cancer") and a diagnosis that was present at a prior wave ("past cancer"). For example, a participant who first indicated having cancer at Wave 2 would be coded as having a "new cancer" at Wave 2, and a "past cancer" at Wave 3. This allowed us to separately test the short- and longer-term effects of having a cancer diagnosis.

Follow-up questions asked participants to identify the type(s) of cancer diagnosed; we used these responses to create a dichotomous variable representing a diagnosis of skin cancer only, as opposed to diagnosis with another type of cancer.

Depression

Presence and severity of depressive episodes in the past year was assessed at every wave using a multistep screener based on the major depression section of the World Health Organization's Composite International Diagnostic Interview [46]. Seven items identified participants who had experienced a 2-week period during the past 12 months that was characterized by persistent depressed affect (i.e., often feeling sad, blue, or depressed, or losing interest in most things). Follow-up questions asked participants who met these criteria about their symptoms of depressed affect and anhedonia during that 2-week period (e.g., "Did you have a lot more trouble concentrating than usual?"). A measure of depression was calculated as the number of symptoms of depressed affect and anhedonia, with participants who reported no 2-week period of depressed affect receiving a score of zero (range: 0–7).

Health status

Three items assessed self-rated health at each wave: (i) physical health: "In general, would you say your physical health is excellent, very good, good, fair, or poor?" with a scale ranging from (1) *excellent* to (5) *poor*; (ii) mental health: In general, "Would you say your mental or emotional health is excellent, very good, good, fair, or poor?" with a scale ranging from (1) *excellent* to (5) *poor*; and (iii) comparative health: "In general, Compared to most men/women your age, would you say your health is much better, somewhat better, about the same, somewhat worse, or much worse?" with a scale ranging from (1) *much better* to (5) *much worse.* Items were reverse coded so that higher numbers reflected better health.

Analysis Strategy

All analyses were conducted using Stata 14 (StataCorp, College Station, TX). Unless otherwise noted, all analyses controlled for age, sex, education level, marital status (unmarried vs. married), and White/other race. Preliminary analyses examined whether current and predicted life satisfaction was associated with self-rated health at the subsequent wave using generalized estimating equations (GEE) specifying robust variance estimators. The GEE models accounted for the nested nature of the data, with waves of data collection nested within participants. Both current and predicted life satisfaction was included in the same model to test whether they were associated with self-rated health at the following wave once adjusting for the other. We also tested whether cancer status moderated these associations by including interaction terms (Satisfaction × Cancer Status) in each model [47].

GEE models were then used to examine our primary research purpose: to examine differences between those with and without cancer in current and predicted life satisfaction across different life domains. We then used Hotelling's T^2 tests to compare predicted satisfaction at Wave 1 and Wave 2 with actual satisfaction at Wave 2 and Wave 3, respectively. As these analyses were within-subjects comparisons, they were not adjusted for participant characteristics.

We then conducted two sets of sensitivity analyses. First, we adjusted all models for depression to ensure that any observed differences between survivors and nonsurvivors could not be explained by higher rates of depression among survivors [48]. This was important, given depression's prevalence among cancer survivors [48] and its potential to influence the accuracy and optimistic biases of self-relevant evaluations and predictions about the future [49–51]. In the second set of analyses, we conducted all analyses excluding participants who reported a diagnosis of skin cancer only (Wave 1: n = 188; Wave 2: n = 238; Wave 3: n = 270), as has been done in prior studies [36, 48, 52]. Skin cancer and the treatment for it is often less severe than for other cancers, potentially resulting in different effects on current and predicted life satisfaction. Excluding skin cancer patients ensured the pattern of results was not driven by the unique nature of skin cancer.

Results

Demographic Predictors of Life Satisfaction

Evaluations of the present

Most participant characteristics were associated with both present satisfaction and predictions about the future (see Table 1). Married individuals had higher ratings of present satisfaction across all life domains, ps < .05, as did more highly educated individuals, with the exception of satisfaction with relationships with one's children. Women evaluated their current contributions to others, relationships with their children, and work life more highly than men, but men rated their marriage, sex life, and financial situation more highly, ps < .05. The association between age and life domain satisfaction was also mixed, with ratings about overall life, relationships with children, work, and finances increasing with age, whereas satisfaction with health, contributions to others' welfare, and sex life declined with age, ps < .05. The only life domain in which White participants did not have higher satisfaction was the sexual aspect of life.

Evaluations of the future

Overall ratings about the future were higher among women, younger, married, and higher educated participants, ps < .05 (Table 1). Across specific life domains, predictions generally declined with age and were higher among married and more educated participants. Gender and race had mixed effects.

Life Satisfaction as Predictor of Future Health

Both current and predicted life satisfaction was positively associated with self-rated physical health at the subsequent wave, once adjusting for the other, current: b = 0.051, p < .001, 95% CI (0.032, 0.069); predicted: b = 0.074, p < .001, 95% CI (0.057, 0.092). The same pattern emerged for mental health; both current, b = 0.096, p < .001, 95% CI (0.079, 0.11), and predicted, b = 0.056, p < .001, 95% CI (0.040, 0.072), life satisfaction was positively associated with mental health at the subsequent wave. Current, but not predicted, life satisfaction was associated with comparative health at the subsequent wave, current: b = 0.10, p < .001, 95% CI (0.083, 0.12);

Table 1 Participant characteristics associated with ratings of current life satisfaction and predictions about future satisfaction

	Life overall	Health	Contribution to others' welfare	Relationship with children	Marriage relationship	Sex life	Work situation	Financial situation
How would you rate these aspects of your life right now?								
Female (male)	0.047	0.01	0.65***	0.27***	–0.40***	–0.52***	0.14**	–0.19***
Age	0.013***	–0.010***	–0.0062***	0.010***	<.001	–0.061***	0.019***	0.029***
White (non-White)	0.15**	0.066	–0.093	-0.055	0.26***	–0.22*	0.46***	0.46***
Married (unmarried)	0.57***	0.19***	0.21***	0.19***	1.09***	1.41***	0.58***	0.81***
Education	0.042***	0.10***	0.11***	–0.011	–0.031*	0.062***	0.12***	0.19***
Looking ahead 10 years into the future, what do you expect these aspects of your life will be like at that time?								
Female (male)	0.12**	0.11*	0.51***	0.22***	–0.28***	–0.20**	0.056	–0.082
Age	–0.032***	–0.041***	–0.050***	<.001	–0.00028	–0.11***	–0.039***	–0.021***
White (non–White)	–0.049	–0.022	–0.26***	–0.079	0.055	–0.37***	0.21***	–0.13*
Married (unmarried)	0.42***	0.23***	0.25***	0.17***	0.78***	0.48***	0.43***	0.38***
Education	0.077***	0.20***	0.19***	–0.016	–0.019	0.17***	0.24***	0.14***

Reference groups are indicated in parentheses. Coefficients represent unstandardized slopes from multilevel generalized estimating equation models. N = 6,384–6,389 across models.

*p < .05, **p < .01, ***p < .001.

predicted: b = 0.015, p = .089, 95% CI (–0.0022, 0.032). Cancer status did not moderate any of these associations, ps > .17.

Evaluations of the Present Life Satisfaction

Overall current life satisfaction was no different between cancer survivors and those without a cancer history, regardless of whether survivors' status began at that wave of data collection or an earlier one, ps > .05. Satisfaction with current health was lower among those with cancer, as was satisfaction with the sexual aspect of their lives, ps < .001 (see Table 2 for inferential statistics, Fig. 1 for adjusted means). Reporting a new cancer (i.e., cancer diagnosis first reported at that wave of data collection) was associated with greater work satisfaction and satisfaction with one's financial situation, ps < .05. Having a past cancer (i.e., a diagnosis that was reported at an earlier wave) was associated with lower satisfaction with one's contributions to the welfare of others, but more satisfaction with current relationships with children, one's marriage, and financial situation, ps < .05.

Predictions About Future Life Satisfaction

Unlike ratings of the present, ratings of the future were strongly influenced by both new and past cancer diagnoses (Table 2, Fig. 1). Those with cancer (either new or past) had less optimistic predictions about their overall life in 10 years relative to those without cancer, ps < .01. They also had less optimistic predictions about their health, contributions to the welfare of others, their marriage, sex life, work situation, and finances, ps < .05. The only life domain for which cancer did not influence predictions was their relationship with their children, ps > .05.

Predictions Relative to Actual Satisfaction

Table 3 compares survivors' and nonsurvivors' predicted satisfaction at Wave 1 and Wave 2 with their actual satisfaction at Wave 2 and Wave 3, respectively. The Wave 1 to 2 comparison suggests participants without cancer were optimistic in their predictions relative to their actual satisfaction in all life domains except health, with differences ranging from 0.28 points on the 11-point scale for one's work situation to 1.27 points for one's sex life, ps < .05.

In contrast, survivors' predicted and experienced overall life satisfaction was not significantly different, nor were there differences for their contributions to others, relationships with children, marriage, work, and finances. Survivors were pessimistic about their health, and optimistic about their sex lives, ps < .05. The Wave 2 to 3 comparison replicated these findings, except for survivors' predictions about their marriage and contributions to the welfare of others, both of which reflected an optimism not evident in the Wave 1 to 2 comparison.

Table 2 New and past cancer diagnosis as predictor of satisfaction with one's present life, and predictions about future satisfaction

	Life overall	Health	Contribution to others' welfare	Relationship with children	Marriage relationship	Sex life	Work situation	Financial situation
How would you rate these aspects of your life right now?								
"New" cancer	–0.049	–0.47***	–0.0020	–0.028	0.090	–0.80***	0.18*	0.14*
"Past" cancer	0.095	–0.60***	–0.20*	0.16*	0.27**	–1.17***	–0.0026	0.43***
Looking ahead 10 years into the future, what do you expect these aspects of your life will be like at that time?								
"New" cancer	–0.52***	–0.67***	–0.50***	–0.065	–0.16*	–1.22***	–0.42***	–0.31***
"Past" cancer	–0.93**	–1.27***	–1.06***	–0.085	–0.18*	–1.99***	–0.97***	–0.28***

Coefficients represent unstandardized slopes from multilevel generalized estimating equation models. Models adjusted for age, sex, marital status, education, and race (White/non-White). n = 6,381.

*p < .05, **p < .01, ***p < .001.

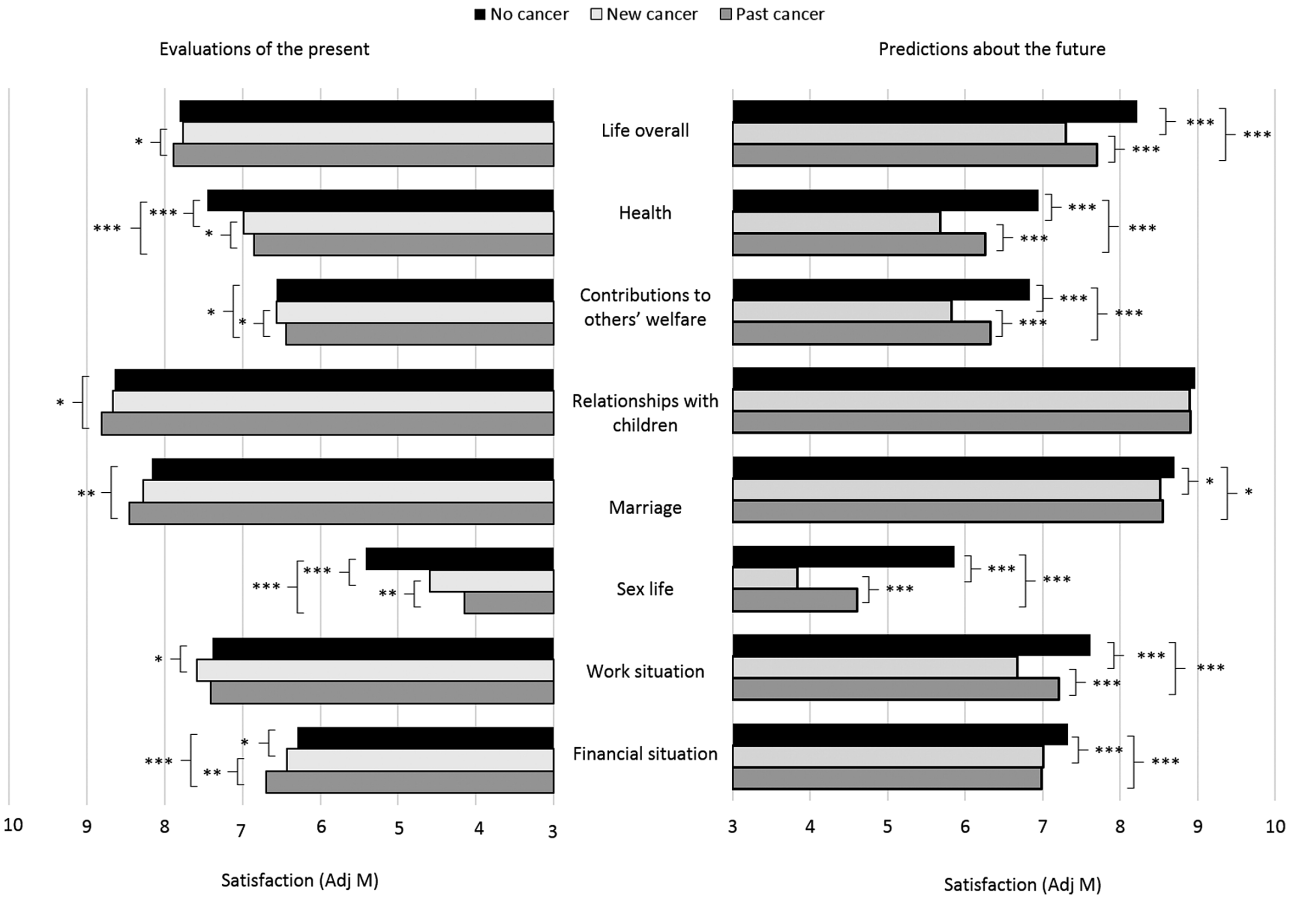

Fig. 1. Adjusted mean differences in ratings of present and future predictions among those with and without cancer. *p < .05; **p < .01; ***p < .001.

Sensitivity Analyses

The inclusion of depression as a covariate in the above analyses did not change any results; all statistically significant findings remained, and no nonsignificant findings became significant. When we excluded participants with skin cancer, differences in current satisfaction between new survivors and nonsurvivors with finances and work became nonsignificant, finances: b = 0.054, p = .51, 95% CI (–0.11, 0.21); work: b = 0.15, p = .12, 95% CI (–0.038, 0.33). All other results remained unchanged.

Discussion

In the current analyses, both current and predicted life satisfaction was prospectively associated with physical

Table 3 Comparison of predicted and actual satisfaction 10 years later among those with and without cancer

	MIDUS 1–MIDUS 2 comparison			MIDUS 2–MIDUS 3 comparison		
	Predicted	Actual	Hotelling's T^2	Predicted	Actual	Hotelling's T^2
No cancer						
Life overall	8.36	7.88	307.62***	8.14	7.93	70.51***
Health	7.11	7.41	45.70***	6.83	7.41	104.48***
Contribution to others' welfare	7.05	6.50	209.07***	6.68	6.47	46.80***
Relationship with children	9.00	8.65	148.77***	8.96	8.72	39.70***
Marriage relationship	8.77	8.20	266.68***	8.66	8.40	67.52***
Sex life	6.39	5.12	647.80***	5.46	4.59	223.58***
Work situation	7.75	7.46	54.31***	7.64	7.58	12.13***
Financial situation	7.47	6.49	595.04***	7.21	6.77	115.92***
Cancer						
Life overall	7.86	7.93	1.72	7.56	7.91	0.61
Health	6.47	6.99	5.26*	5.98	6.97	27.33***
Contribution to others' welfare	6.58	6.57	2.76	6.21	6.50	4.08*
Relationship with children	8.98	8.72	3.28	8.88	8.71	3.96*
Marriage relationship	8.45	8.45	1.73	8.62	8.59	1.61
Sex life	5.13	4.55	14.74***	4.34	4.14	7.23**
Work situation	7.34	7.69	0.35	7.16	7.21	2.88
Financial situation	6.81	6.75	0.89	6.70	6.78	0.46

Predicted and actual life satisfaction measured on 11-point scale (0–10). "No cancer" sample size: M1-M2 comparison: n = 4,249; M2-M3 comparison: n = 2,572; "Cancer" sample size: M1-M2 comparison: n = 286; M2-M3 comparison: n = 356.

MIDUS Midlife in the United States.

*p < .05, **p < .01, ***p < .001.

and mental health, supporting prior evidence of the importance of life satisfaction and predictions about the future as predictors of health [3–7]. A cancer diagnosis was associated with less satisfaction about one's present health status, as well as one's sex life. These findings are consistent with the evidence of cancer and its treatments' long-term adverse health effects [52–54]. Despite being less satisfied with their health, overall life satisfaction and satisfaction with most nonhealth domains were either unaffected by a cancer diagnosis or saw a slight increase in satisfaction.

On the other hand, survivors were consistently less optimistic than those without cancer in their predictions about their future life satisfaction, reporting lower predicted satisfaction in every life domain except for relationships with children. Although predictions for some life domains rebounded, with "past" survivors having higher ratings than "new" survivors, these predictions remained significantly lower than noncancer participants' predictions. Even participants who had been diagnosed with cancer prior to the first wave of data collection in 1995 reported less optimistic predictions than those without a cancer history nearly 20 years later in 2014. When participants' predicted satisfaction was compared with their actual satisfaction 10 years later, those without a cancer history were consistently optimistic in their predictions across every life domain except health. In contrast, survivors' predictions in nearly all domains except health and one's sex life were relatively consistent with their experienced satisfaction 10 years later, suggesting an attenuation among survivors in the optimism that characterizes the predictions of those without a cancer history.

Current Satisfaction

Both positive and negative major life events can influence life satisfaction and other aspects of subjective well-being [9], especially if they threaten important goals. Thus, it is not surprising that these longitudinal analyses suggest current and predicted satisfaction with one's health and sex life decline following a cancer diagnosis. However, in this study, current satisfaction with nonhealth domains remained relatively unaffected by a cancer diagnosis. Overall satisfaction also did not differ by cancer status, perhaps reflecting the relative unimportance of health in determining overall life satisfaction. An analysis of the first wave of MIDUS data suggests health is less important than marriage, finances, and children in determining overall satisfaction, and many individuals led satisfying lives despite being in poor health [45].

Beyond that, a vast amount of work suggests that people adapt to their new life circumstances, often faster than they predict they will and that many aspects of well-being recover. Some negative life events, including being diagnosed with cancer, may actually improve life satisfaction if they evoke meaning making, personal growth, and active coping techniques, such as positive reframing [41, 50, 55]. Because cancer and other negative life events often force people to seek out and rely on others for help, relationships with family and friends are often perceived to improve following these events [56, 57]. An earlier analysis of MIDUS cancer survivors in Waves 1 and 2 supports this; participants with a cancer history exhibited resilient functioning in their relationships with others, social well-being, and personal growth, despite having greater psychological distress [48]. This is consistent with the current findings of an increase in current satisfaction with relationships with one's children and spouse. It may also help explain why relationships with children remained the only life domain for which survivors' future predictions did not differ from nonsurvivors.

These findings may also reflect differences in the internalized standards or reference points on which survivors and those without cancer base their satisfaction ratings (despite the survey's encouragement to use relatively standard "possible ideals" as a reference point) [24, 25, 58]. The reference point principle holds that events, such as a cancer diagnosis, change the reference point to which one's situation is compared. In the current study, a survivor considering her current work situation may have implicitly compared her own situation to that of other cancer patients and appreciated her ability to work part-time despite her illness, whereas a participant without cancer may have compared her situation to the broader healthy working population. Thus, the survivor may have been more satisfied than the nonsurvivor with an objectively similar working situation.

When participants with skin cancer were excluded from analyses, current satisfaction with work and finances no longer differed between noncancer participants and those newly diagnosed. Given that most results (22 out of 24) were significant with and without skin cancer patients, this change may reflect a small attenuation of statistical power. However, it may also be that a skin cancer diagnosis has less of an immediate effect on work and finances because its severity and treatment modalities necessitate a less drastic change in one's work status and incur fewer direct and indirect costs.

Predicted Satisfaction

Unlike current satisfaction, survivors predicted they would be less satisfied with life overall in the future compared with those without cancer. Survivors also reported lower predicted satisfaction with nonhealth life domains, including their ability to contribute to others' welfare, their marriage, work, and financial situation. A comparison of predicted life satisfaction to actual satisfaction at subsequent waves revealed that these differences reflected an attenuation of optimistic biases among survivors, such that survivors were generally accurate in their predictions, whereas noncancer participants were optimistic in all life domains except health.

Survivors' less optimistic predictions occurred despite the minimal adverse effects of a cancer diagnosis on present life satisfaction, suggesting a cancer diagnosis may attenuate optimistic mindsets about one's future regardless of their present circumstances. This may reflect survivors' strong and persistent fear of recurrence [59, 60], as well as immune neglect and impact biases that cause survivors to underestimate their future coping abilities and resilience. People remain susceptible to these biases even in domains where they have considerable experience [23, 61]. Another possibility is that survivors change their reference point when evaluating their current situation, but retain a more idealized reference point when making predictions about the future.

The greater accuracy of future predictions among survivors may also reflect shifts in values and life outlooks [52, 55], which often arise in response to stressful life events, particularly those that are life threatening [55]. Cancer patients experiencing health declines may have placed higher value on nonhealth life domains, such as one's work or marriage [62]. As these other domains increase in importance, previously trivial or inconsequential frustrations (e.g., not getting a raise, a micromanaging boss) may become more influential in their predictions about future satisfaction, resulting in less optimism about the future. Alternatively, being diagnosed with cancer leads to a greater consciousness of one's mortality and vulnerability [63, 64], possibly resulting in a more realistic life outlook, which may be highly adaptive, but result in an attenuation of optimistic biases about the future [65].

Given our findings that predictions about future life satisfaction are prospectively positively associated with physical and mental health, as well as the evidence that optimistic predictions can benefit well-being by becoming self-fulfilling prophecies [5, 31], contributing to self-enhancement [37, 38], improving recovery following an illness [34–36], and potentially reducing disease risk [32, 33], an attenuation of this optimism among survivors may have adverse consequences for their health. Alternatively, for cancer survivors, an attenuation of optimism about one's future may reflect an adaptive change in one's outlook on life, and/or a strategic means of bracing for the worst. When bracing for bad news, such as recurrence or second primary cancer, evidence suggests a healthy amount of pessimism can lead to better psychological outcomes than unrealistic optimism

[66, 67]. Future research is needed to examine the long-term health implications of survivors' predictions about the future and the extent to which a reduction in these optimistic biases reflects an adaptive component of the illness adjustment process.

Limitations

Several limitations should be considered when interpreting these findings, particularly with respect to the generalizability of the MIDUS sample. Most participants were White and reported incomes and education levels that were higher than national averages. Thus, although MIDUS survivors were not demographically different from MIDUS participants without cancer, they may have more resources to manage their cancer compared with the general population of survivors. This may make MIDUS survivors more satisfied with their current lives, particularly their financial and work situations, than the general population of survivors and may help explain the positive or nonsignificant effects of a cancer diagnosis on work and financial satisfaction, which contradicts the evidence that a cancer diagnosis often causes extreme financial strain [68, 69]. However, MIDUS survivors had less optimistic predictions about their future satisfaction than nonsurvivors, suggesting an attenuation of optimism even among this high-resourced survivor population, and the possibility that low-resourced populations may show an even larger attenuation. More research is needed to examine these relations in more economically diverse samples. Relatedly, survivors' health may have influenced their ability to complete the waves of data collection, resulting in a sample of survivors who may have been healthier or had better prognoses than the general population of survivors.

Participants were also older, especially by Wave 3, and the experiences of young survivors may be quite different. For instance, Costanza et al. (2009) found important differences between young and old survivors in psychosocial distress following a cancer diagnosis, with young individuals reporting more distress [48]. Another limitation is the lack of clinical data about participants' cancers. Disease stage, treatment history, and other factors that may have influenced patients' cancer experience were not assessed, nor were types of skin cancer. Thus, we could not distinguish between types that had better (e.g., basal or squamous cell carcinomas) or worse (e.g., melanoma) prognosis in our sensitivity analyses.

It is also important to consider the clinical meaning of these findings. Given the study's large sample size and multiple statistical comparisons, the overall pattern of results should be considered above the statistical significance of any one test. The consistency of our findings that current life satisfaction did not differ, but future predictions were consistently lower among survivors, suggests our findings represent a rather robust phenomenon. Also, the life satisfaction scales were arbitrary in that it is difficult to envision what a specific point on the scales represents in the real world. However, at the population level and across the nearly 20 million cancer survivors expected by 2022, it is entirely possible that a 1-point difference in life satisfaction could represent meaningful differences between survivors and those without a cancer history, particularly given the prospective relation between predicted life satisfaction and self-rated health. Future work is needed to further assess the implications of these findings using clinically meaningful metrics.

These limitations are offset by several strengths, including the large sample of survivors and longitudinal design, in which some survivors provided ratings of satisfaction both before and after their diagnosis. Additionally, a comprehensive range of life domains was assessed, and together these findings offer a unique window into the survivorship experience.

Conclusions

The current longitudinal analyses spanning pre- and post-cancer diagnosis suggest that while satisfaction with one's current life remains steady or improves after a cancer diagnosis, predictions about one's future satisfaction reflect an attenuation of the optimism that characterizes the predictions of individuals without a cancer history. Given the many ways in which expectations about the future can influence decision making, behavior, and health [32–36], these relatively pessimistic predictions may have consequential effects on survivors' health and well-being and warrant closer examination in future studies and interventions aimed at improving the lives of cancer survivors.

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Compliance with Ethical Standards

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards There are no conflicts of interest to report. All procedures, including the informed consent process, were conducted in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Authors' Contribution All authors have reviewed and approved the manuscript.

Ethical Approval The research reported was conducted in accordance with the ethical guidelines of the American Psychological Association, has not been published previously, and is not currently under review at any other journal.

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