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Bracing for the Worst? Real-Time Scanxiety and Uncertainty Management During Cancer Surveillance

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Objectives: "Scanxiety" is a common and distressing experience that can negatively impact quality of life after completing cancer treatment, yet little research has investigated risk factors for scanxiety as it emerges in real time. This study used an ecological momentary assessment design to examine how uncertainty management strategies predict the experience of "scanxiety," operationalized via self-reported fear of cancer recurrence (FCR) in the days before, on, and after a routine surveillance scan or test. ***Method:*** Adolescent and young adult survivors of childhood cancer ($N = 55$, $M_{\text{age}} = 17.31$ years, $M = 2.90$ years off treatment) self-reported how they manage uncertainty surrounding surveillance scans, including strategies of bracing for the worst, hoping for the best, and remaining optimistic. Daily FCR was captured via a smartphone app for 11 days surrounding a surveillance scan. ***Results:*** In the days before the scan, bracing for bad news predicted greater overall fear of recurrence and a sharper increase in daily fear of recurrence. Bracing also predicted greater fear of recurrence on the day of the scan and a steeper decrease in fear of recurrence after receiving reassuring scan results. Findings held while controlling for baseline fear of recurrence. Hope and optimism did not predict daily fear of recurrence. ***Conclusion:*** Adolescent and young adult cancer survivors who brace for bad news may experience worse FCR while awaiting surveillance scans, yet this fear largely resolves following good news. Positive uncertainty management strategies (hope and optimism) do not appear to buffer against scanxiety. Findings can inform scanxiety intervention development.

Public Significance Statement

This study shows that adolescent and young adult cancer survivors who brace for bad news experience greater fear of cancer recurrence around routine surveillance scans. The findings underscore the importance of developing strategies to help survivors manage scanxiety during stressful waiting periods, potentially reducing the emotional burden associated with cancer survivorship.

Keywords: scanxiety, uncertainty management, ecological momentary assessment, cancer survivors, fear of cancer recurrence

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While most cancer survivors experience some degree of fear, worry, or concern that their cancer may return, an estimated 49% report moderate to severe levels of fear of cancer recurrence (FCR) that are associated with impaired emotional and cognitive functioning, and lower quality of life (Simard et al., 2013). Managing FCR is a primary unmet need for cancer survivors of all ages, including for adolescents and young adults (AYAs; Jones et al., 2020; Simard et al., 2013). Surveillance scans, although often necessary in comprehensive survivorship care, can evoke negative emotions, including stress, anxiety, and severe FCR (Derry-Vick et al., 2023).

In 2011, the term "scanxiety" was coined to describe the fear experienced by cancer survivors undergoing cancer scans and awaiting results (Feiler, 2011). High levels of scanxiety can be debilitating and are associated with worse emotional well-being, somatic symptoms, and quality of life (Bauml et al., 2016; Bui, Blinman, et al., 2021; Bui, Liang, et al., 2021; Custers et al., 2021; Derry-Vick et al., 2023; Thompson et al., 2010). Qualitative studies have indicated that scanxiety is greatest in the days leading up to the scheduled scan, peaks on the day of the scan, and decreases after receiving reassuring results (Bui, Blinman, et al., 2021; Custers et al., 2021). Yet, few studies have captured scanxiety as it emerges in real time around a surveillance scan (Dunsmore & Neupert, 2025). Identifying risk factors associated with heightened FCR in the days surrounding a routine surveillance scan will enable the provision of tailored support and resources during these stressful waiting periods, to reduce scanxiety and mitigate its impact on quality of life.

Studies in psychological science have shed light on the coping strategies individuals use to manage emotions during stressful waiting periods. Studied populations include law students anticipating results of the bar exam, voters awaiting an election outcome, PhD students searching for academic jobs, and women awaiting breast biopsy results (e.g., Sweeny & Andrews, 2014; Sweeny et al., 2016). These studies have revealed that several uncertainty management strategies are commonly employed during stressful waiting periods to mitigate anxiety by altering one's perspective on the probability of receiving good and bad news (Sweeny & Falkenstein, 2017). One such strategy is "bracing for the worst," wherein individuals prepare themselves for unfavorable outcomes with the goal of reducing the emotional impact of bad news. Alternatively, individuals can embrace hope or optimism during moments of uncertainty–these strategies have been termed positive expectation or uncertainty management strategies (Sweeny & Cavanaugh, 2012; Sweeny et al., 2006). Studies in the abovementioned populations show that individuals vary in their use of bracing, hope, and optimism to manage uncertainty during stressful waiting periods, and these differences are related to levels of distress (Sweeny et al., 2016). In one study, Sweeny and colleagues found that individuals who experience more distress while anticipating results from a cancer biopsy are more likely to adopt the strategy of bracing for the worst (Sweeny et al., 2019). Bracing may offer protective benefits when employed immediately prior to receiving results, but it can lead to prolonged worry and distress when used prematurely during the waiting period (Sweeny, 2018; Sweeny & Shepperd, 2010). On the other hand, those who adopt positive uncertainty management strategies, particularly hope and optimism, can have a more pleasant waiting period marked by less anxiety, but respond less productively in the face of bad news and less joyfully to good news (Sweeny et al., 2016). Uncertainty management strategies may be related to levels of scanxiety experienced during cancer surveillance scans and while awaiting results. However, uncertainty management strategies have not been well studied within the context of vulnerable health populations such as those with a history of cancer, which present additional complexities due to the potentially life-changing implications of diagnostic, prognostic, or risk information (Sweeny & Cavanaugh, 2012).

In this study, we aimed to assess uncertainty management strategies and their relationship with FCR in AYA survivors of childhood cancer undergoing routine surveillance scans and tests, to inform novel scanxiety intervention strategies. AYA cancer survivors may be particularly vulnerable to experiencing scanxiety around surveillance scans as they report high levels of fear of recurrence (Vandraas et al., 2021; Yang et al., 2019) and they can undergo years of surveillance testing, thus spending a considerable amount of time waiting for uncertain health-related news. Based on previous findings, we first hypothesized that childhood cancer survivors with generally higher levels of FCR (assessed using a comprehensive self-report measure at baseline) would be more likely to brace for the worst in advance of surveillance scans. Moreover, we hypothesized that those who brace more would experience more daily FCR, while those who are more hopeful and optimistic would report less daily FCR, in the days before a surveillance scan. We did not have a priori hypotheses regarding the impact of uncertainty management strategies on FCR in the days after the surveillance scan, as this postscan period, particularly after receiving good news, is less well studied.

Method

Feasibility of using ecological momentary assessment (EMA) to capture scanxiety in AYA cancer survivors was previously reported on a subsample of the current sample, demonstrating acceptability of the study method (Heathcote et al., 2022). The full study presented here was approved by the Institutional Review Board at Stanford University School of Medicine (IRB-55183).

Participants

AYA survivors of childhood cancer were recruited from a paediatric cancer centre in the United States and were eligible to participate if they were 11–25 years old, had been diagnosed with cancer and completed treatment, were proficient in English, and owned or had access to a smartphone. Fifty-five survivors ($M_{age} = 17.31$ years, $M = 2.9$ years off treatment, 54.5% male) participated in the study. Two participants had technical issues with the lifedata app, and thus, $N = 53$ had usable EMA data. In addition, $N = 51$ provided full baseline data. As seen in Table 1, participants had a variety of previous diagnoses and therefore underwent a range of scans and tests, including X-ray, computed tomography, magnetic resonance imaging, and laboratory tests (e.g., complete blood count). For most patients, their results were provided on the same day as the scan, but in some cases, additional routine scans and tests were conducted either the day before or the day after the oncology appointment. Two patients had their oncology appointments rescheduled to a later date; both participants restarted the surveys 5 days before their new appointment.

Procedure

Upon enrollment, participants completed baseline surveys of sociodemographic factors, medical history, and psychosocial functioning; data pertaining to FCR and uncertainty management strategies are reported here. Participants downloaded the LifeData

Table 1
Demographic and Clinical Characteristics of the AYA Survivor Sample

$N = 55$	Frequency (%)	*M* (*SD*)
Age		17.3 (3.2)
Gender		
Boy/man	30 (54.5)	
Girl/woman	22 (40.0)	
Nonbinary or transgender	2 (3.6)	
Not reported	1 (1.8)	
Race		
White/Caucasian	25 (45.5)	
African American or Black	2 (3.6)	
Asian or Asian American	16 (29.1)	
Hawaiian Native or Pacific Islander	1 (1.8)	
Mixed race	7 (12.7)	
Other	1 (1.8)	
Not reported	3 (5.5)	
Ethnicity		
Hispanic, Latino/a, or Spanish origin	10 (18.2)	
Non-Hispanic, Latino/a, or Spanish origin	43 (78.2)	
Not reported	2 (3.6)	
Medical history		
Age at diagnosis (years)		13.5 (3.7)
Time since treatment (months)		34.8 (24.0)
Treatment intensity		
Least intensive	1 (1.8)	
Moderately intensive	24 (43.6)	
Very intensive	23 (41.8)	
Most intensive	7 (12.7)	

Note. AYA = adolescent and young adult.

experience sampling app[1] onto their smartphone at least 6 days before a routine surveillance scan. The LifeData app prompted participants to complete brief surveys for 11 days: 5 days before (prescan phase), on the day of (scan day), and 5 days following (postscan phase) a routine surveillance scan. Participants self-reported their FCR during an evening survey administered at a randomized time between 6 and 9 p.m. Up to three reminder notifications were sent 20 min apart. Surveys closed 2 hr after the first notification, thus ensuring that surveys were not completed retrospectively. Participants were compensated $20 for completing the baseline questionnaires, $2.50 for each completed EMA survey, and $25 additional for completing all surveys. Data pertaining to the other EMA assessments captured during morning and afternoon surveys (mood, somatic symptoms, social engagement) were outside the scope of this study. Participants were informed they could stop participating at any time if procedures caused distress or if they experienced a recurrence of their cancer, but no participants received scan results indicating a recurrence during the study.

Measures

Baseline Surveys

Medical Factors. Cancer diagnosis, time since treatment completion, and treatment information were extracted from patients' electronic medical records. The intensity of treatment rating scale 3.0 was used to categorise previous treatment intensity based on the previous diagnosis, stage or risk level of disease, and treatment modality (Level 1 = *least intensive*, Level 4 = *most intensive*; Kazak et al., 2012).

Uncertainty Management. Participants completed four items that were adapted from other studies of stressful waiting (Sweeny & Andrews, 2014; Sweeny & Howell, 2017; Sweeny et al., 2016), orienting them to report how they manage uncertainty around surveillance scans ("People sometimes adopt strategies for dealing with stressful life events. Please indicate how true each statement was for you leading up to your most recent scan or cancer check-up"). Two items (summed) captured the extent to which they were bracing for the worst ("I was bracing myself for the worst possible outcome" and "I tried to keep expectations low for the outcome"; $M = 3.36$, $\alpha = .82$ in this sample). Two items (summed) captured positive uncertainty management ("I was hoping for the best possible outcome" and "I tried to be optimistic about the outcome"; $M = 5.36$, $\alpha = .80$ in this sample; Sweeny & Howell, 2017). All items were rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*).

FCR. General levels of FCR in the preceding month were assessed at baseline via the Fear of Cancer Recurrence Inventory—Child Version (Tutelman et al., 2022). This nine-item measure evaluates the presence, frequency, intensity, and duration of FCR-related thoughts. Items were rated on a 5-point Likert scale (0 = *not at all like me* to 4 = *a great deal like me*). Scores range from 0 to 36, with higher scores indicating greater FCR ($\alpha = .77$ in this sample).

EMAs

FCR was assessed every evening using a mean score of two items adapted from the Fear of Cancer Recurrence Inventory—Child Version that captured the number of times participants thought about cancer that day ("How many times today did you think about cancer?" *no times*, *one time*, *two times*, *three times*, *four or more times*) and to what extent they worried about cancer that day ("How much did you worry about cancer today?" 0 = *not at all*, 4 = *a whole lot*).

Data Analysis

Bivariate Pearson's correlations were performed to assess the relationship between baseline FCR, uncertainty management strategies, sociodemographic and medical factors. Multilevel modeling (generalized linear mixed effects), implemented in Matlab (R2022a), was used to estimate within-person random slopes of FCR before (prescan phase), the day of (peak), and after (postscan phase) the surveillance scan. Due to the skewed distribution of fear of recurrence data, a gamma distribution with log link function was used. All models controlled for participants' time since treatment completion and treatment intensity. Model estimates are reported with an inverse log transformation for ease of interpretation. Day was centered on the day of the scan, such that random intercepts captured individual differences in peak FCR. First, to assess overall levels and changes in daily FCR, two base models were tested; $M_{\text{base phase}}$ included a fixed effect for phase centered on scan day to compare mean levels of fear of recurrence during the prescan phase and the postscan phase; $M_{\text{base day}}$ included random slopes for the prescan days and the postscan days also centered on scan day. Then, to assess individual differences, additional models were conducted, including bracing for the worst ($M_{\text{bracing phase}}$; $M_{\text{bracing day}}$) and positive expectation management ($M_{\text{posExpMan phase}}$; $M_{\text{posExpMan day}}$) as grand mean-centered between-person predictors. Sensitivity analyses were conducted to

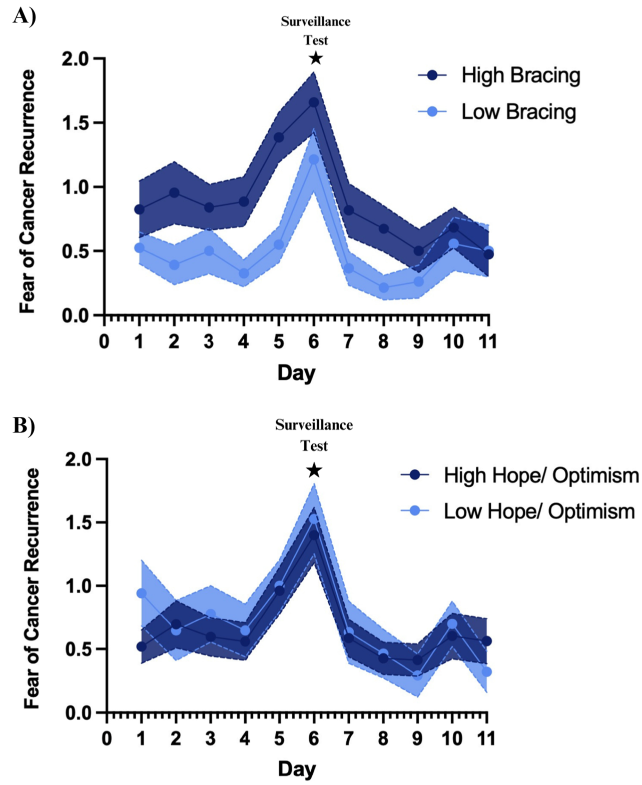
[1] https://www.lifedatacorp.com/.

evaluate individual differences in tendency to brace for the worst while controlling for baseline FCR. Of note, as the models include control variables (e.g., treatment intensity), the *t* statistic reflects the difference after controlling for the other variables. Thus, while a large difference may be visible in the raw data, this effect may be greatly reduced once these other effects are controlled for. In the mixed effects models testing the effect of phase, the participant was included as a random effect, meaning that in the model, each individual was allowed to vary in their intercept (i.e., the level of FCR on scan day). In the mixed effects models testing the effect of day, the slope (i.e., the rate of change) of FCR over the days leading up to scan day and following scan day was also included as random effects, meaning that these too were allowed to vary per individual. All other variables were included as fixed effects. Bayesian information criteria for models testing the relationship between bracing for the worst and daily FCR were compared to assess differences in model fit.

Of note, the *t* tests reported the significance of the parameter estimates in the mixed effects models, as opposed to the raw means of the data. The reported *t*-test statistics reflect tests of the parameter estimates from the models; therefore, correlation coefficients are not informative in this context. Due to the complexity of the modeling approach, using nested, time-varying data, correlation coefficients are less informative and so the raw data are presented in Figure 1A and 1B for visual reference, including means and standard deviations. We have included the means and standard deviations in the figure legend for each phase among those high and low in expectation management utilization.

Figure 1

Daily FCR Among Individuals With High Versus Low Bracing and Hope/Optimism



Note. (A) Daily FCR ratings for those with high versus low bracing scores ($M_{\text{split}} = 6.7$). For high bracing scores: prescan phase ($M = 0.98$, $SD = 0.98$); scan day ($M = 1.66$, $SD = 1.11$); and postscan phase ($M = 0.64$, $SD = 0.81$). For low bracing scores: prescan phase ($M = 0.46$, $SD = 0.65$); scan day ($M = 1.28$, $SD = 1.09$); and postscan phase ($M = 0.37$, $SD = 0.68$). M_{split} is used solely for illustrational purposes. (B) Daily FCR ratings for those with high versus low hope/optimism (positive uncertainty management) scores ($M_{\text{split}} = 10.8$). For high hope/optimism scores: prescan phase ($M = 0.66$, $SD = 0.84$); scan day ($M = 1.32$, $SD = 1.12$); and postscan phase ($M = 0.52$, $SD = 0.76$). For low hope/optimism scores: prescan phase ($M = 0.96$, $SD = 0.98$); scan day ($M = 1.78$, $SD = 1.35$); and postscan phase ($M = 0.60$, $SD = 0.82$). M_{split} is used solely for illustrational purposes. FCR = fear of cancer recurrence. See the online article for the color version of this figure.

Results

Uncertainty Management Strategies: Baseline Data

Participants who reported using more positive uncertainty management strategies (hope and optimism) also reported using less bracing. As expected, those who braced more reported higher general levels of FCR as assessed at baseline, while positive uncertainty management was not significantly associated with baseline levels of fear of recurrence. Participants' previous treatment intensity rating and time since treatment completion were not significantly correlated with bracing, positive uncertainty management (hope and optimism), or baseline FCR. Refer to Table 2 for the correlational output.

Generalized Linear Mixed Effects Models: EMAs

Of note, as presented below M_{base} phase captures fixed effects for FCR levels across phases, whereas M_{base} day accounts for random effects in individual variability of fear fluctuations over days.

FCR Before and After a Routine Surveillance Scan (M_{base})

Prescan Phase

Mean FCR on scan day was significantly higher than FCR in the prescan phase, $t(481) = -7.13$, $p < .01$ ($M_{\text{base phase}}$). Furthermore, there was a significant increase in FCR in the days leading up to scan day, $t(481) = 3.50$, $p < .01$ ($M_{\text{base day}}$).

Postscan Phase

Mean FCR in the postscan phase was significantly lower than mean FCR on scan day, $t(481) = -9.07$, $p < .01$ ($M_{\text{base phase}}$) and significantly lower than mean FCR in the prescan phase, $F(1, 481) = 11.05$, $p = .00$ ($M_{\text{base phase}}$). Furthermore, there was a significant decrease in FCR in the days following scan day, $t(481) = -4.45$, $p < .01$ ($M_{\text{base day}}$).

Bracing and Daily FCR (M_{bracing}; Figure 1A, M_{split} Used Solely for Illustrational Purposes)

Model comparison revealed that adding bracing to the base model improved model fit (Bayesian information criterion base model = 440.18, Bayesian information criterion bracing model = 399.65). The explained variance increased from 48.7% to 50.8%.

Table 2
Associations Between Baseline Uncertainty Management Strategies, FCR, and Cancer Treatment History

Baseline variable	1	2	3	4	5
1. Bracing for the worst	—				
2. Hope and optimism	$r = -.38$, $p = .01$	—			
3. FCR	$r = .34$, $p = .02$	$r = -.17$, $p = .23$	—		
4. Treatment intensity	$r = -.08$, $p = .58$	$r = -.05$, $p = .74$	$r = -.01$, $p = .94$	—	
5. Time since treatment	$r = .14$, $p = .32$	$r = -.18$, $p = .21$	$r = -.03$, $p = .82$	$r = -.02$, $p = .91$	—

Note. FCR = fear of cancer recurrence.

Scan Day

There was a significant positive relationship between bracing and FCR on scan day, $t(443) = 2.98$, $p < .01$ ($M_{\text{bracing phase}}$). Each point increase in bracing was equal to a 1.06 increase in FCR.

Prescan Phase

The positive relationship observed between bracing and FCR on scan day was preserved during the prescan phase, as indicated by a nonsignificant difference in this relationship at the prescan phase compared to scan day, $t(443) = -1.15$, $p = .25$ ($M_{\text{bracing phase}}$). In other words, those who braced more still showed higher FCR in the prescan phase than those who braced less. Furthermore, there was a significant relationship between bracing and FCR slope, indicating that those who braced more showed a sharper increase in FCR in the days leading up to scan day compared to those who braced less, $t(481) = 2.77$, $p = .01$ ($M_{\text{bracing day}}$).

Postscan Phase

Unlike in the prescan phase, the positive relationship observed between bracing and FCR on scan day was different in the postscan phase, as indicated by a significant difference in this relationship at the postscan phase compared to scan day, $t(443) = -2.78$, $p = .01$ ($M_{\text{bracing phase}}$). In other words, bracing was not related to mean levels of FCR during the postscan phase. There was a significant relationship between bracing and FCR slope, indicating that those who braced more showed a sharper decrease in FCR in the days following the scan compared to those who braced less, $t(481) = -4.12$, $p < .01$ ($M_{\text{bracing day}}$).

Sensitivity Analysis Controlling for Baseline FCR

Since FCR and bracing were correlated at baseline, we controlled for baseline FCR in the bracing model to ensure baseline FCR was not driving the significant relationship between bracing and daily FCR during the study period. The observed relationships remained (see the online supplemental materials).

Positive Uncertainty Management and Daily FCR ($M_{\text{posExpMan}}$; Figure 1B, M_{split} Used Solely for Illustrational Purposes)

Scan Day

There was no significant relationship between positive uncertainty management (hope and optimism) and FCR on scan day, $t(443) = -0.77$, $p = .44$ ($M_{\text{posExpMan phase}}$).

Prescan Phase

The null relationship between positive uncertainty management and FCR on scan day was also present at the prescan phase, $t(443) = -0.74$, $p = .46$ ($M_{\text{posExpMan phase}}$), indicating that positive uncertainty management was not related to FCR levels in the prescan phase. Furthermore, FCR slope in the days leading up to scan day was not significantly related to positive uncertainty management, $t(443) = 0.19$, $p = .85$ ($M_{\text{posExpMan day}}$).

Postscan Phase

These null effects were also present at the postscan phase, $t(443) = 0.27$, $p = .79$ ($M_{\text{posExpMan phase}}$), indicating that positive uncertainty management was not related to FCR levels in the postscan phase. Furthermore, FCR slope in the days following the scan was not significantly related to positive uncertainty management, $t(443) = 0.70$, $p = .49$ ($M_{\text{posExpMan day}}$).

Discussion

Bracing for bad news, remaining hopeful, and being optimistic for good news have been identified as common uncertainty management strategies used across diverse stressful waiting periods, from exam results, to political elections, to medical biopsies (Sweeny, 2018). In this study, we found that AYA survivors of childhood cancer also use these strategies while awaiting cancer surveillance scans. There was a negative correlation between bracing and positive uncertainty management strategies, indicating that survivors who brace more are less likely to be hopeful and optimistic for good news. However, some AYA survivors endorsed using all three strategies, indicating that they are not exclusive of one another. This aligns with findings from studies showing compatibility between hope and bracing, such that people can maintain hope for a desired outcome while also bracing for the worst possible outcome (Bruininks & Sweeny, 2008). Participants' historic treatment intensity and time since treatment completion were not associated with the endorsement of a particular uncertainty management strategy, indicating that AYA survivors do not generally become more hopeful or optimistic for scan results over time. This aligns with findings from studies of adult cancer survivors indicating that levels of scanxiety are infrequently associated with time since treatment completion and thus that scan-related worries do not simply remit for all survivors over time (Derry-Vick et al., 2023).

In line with patterns of scanxiety observed in qualitative and descriptive studies (Derry-Vick et al., 2023) and an EMA study of scanxiety in adult populations (Soriano et al., 2019), participants reported an increase in FCR in the days leading up to the surveillance test, a peak of fear on test day, and a decrease in fear after receiving reassuring results. We found that AYA cancer survivors who braced for the worst before surveillance tests experienced greater daily FCR, and a sharper increase in fear of recurrence, in the prescan period. They also experienced greater fear of recurrence on the day of the scan. However, this fear largely remitted following reassuring news, with a steeper decline in fear in the postscan period. These findings held while controlling for general levels of FCR over the preceding month, thus providing evidence for a possible causal role of uncertainty management strategies in the experience of real-time FCR around the surveillance period. Furthermore, these findings suggest that bracing for bad news may contribute to experiencing more scanxiety, at least in the week before undergoing the surveillance test and receiving results. This relationship between bracing and heightened distress is consistent with previous research showing that bracing for negative outcomes is related to increased stress and anxiety when used for prolonged periods of time prior to the moment of truth (Sweeny & Andrews, 2014; Sweeny & Howell, 2017; Sweeny et al., 2016). However, bracing immediately prior to receiving bad news can help individuals to mitigate excessive disappointment and psychologically prepare for an unfavorable outcome (Carroll et al., 2006; Sweeny & Shepperd, 2010). This may be particularly important for survivors facing a significant health threat (Sweeny, 2018; Sweeny & Andrews, 2014; Sweeny & Howell, 2017). Thus, lessening prolonged bracing while not preventing bracing immediately prior to receiving scan results could be a promising approach for helping AYA survivors manage fear around routine surveillance scans.

We found no evidence that engaging in efforts to be hopeful and optimistic relates to the level of FCR during the waiting period. This lack of relationship is surprising, as previous studies in adults have suggested that hopeful thinking and optimism are associated with less distress when awaiting uncertain news (Harcourt, 1999; Sweeny et al., 2016). However, other studies of waiting in the context of significant health threats, namely breast cancer diagnosis, have found no association between those efforts and distress (Sweeny et al., 2019). It may be that even the most hopeful outlook cannot compete with rising fear in the days prior to a potentially life-altering medical test.

Limitations and Future Directions

This study has limitations, which point to future research directions. First, the study sample was heterogeneous in terms of age and cancer history. While analyses controlled for some medical factors, more research is needed to examine the experience and possible predictors of scanxiety within more homogeneous cancer populations so that appropriate intervention approaches can be developed. Second, the experience and predictors of scanxiety across different types of surveillance tests warrant further investigation; our sample included patients receiving both imaging scans (e.g., X-rays, magnetic resonance imaging) as well as nonimaging diagnostic tests (e.g., blood draws). A recent systematic review from Derry-Vick and colleagues indicates that scanxiety is multifaceted, with scanxiety emerging in anticipation of surveillance results regardless of the surveillance method (Derry-Vick et al., 2023). Yet, uncertainty management strategies may be less relevant for anxiety related to the invasiveness of surveillance test—other strategies such as distraction may be more relevant here and warrant empirical investigation. Third, uncertainty management strategies were examined prospectively; future studies could capture real-time engagement in bracing, hope, and optimism by including these assessments in the EMA design. This would provide further insights into the dynamic nature of uncertainty management strategies and their role in the overall experience of scanxiety. Previous studies have shown that bracing oneself just before receiving uncertain news can be protective in mitigating distress, especially when the outcome is undesirable (Sweeny & Shepperd, 2010), and the protective nature of bracing warrants investigation in this sensitive clinical context. Fourth, a more thorough evaluation of uncertainty management strategies is necessary to determine the underlying purpose of bracing in this population. This assessment should explore whether the use of these strategies extends beyond merely managing disappointment and regaining a sense of control, potentially evolving into superstitious beliefs about how expectations affect outcomes (Carroll et al., 2006). For example, it is important to investigate whether bracing for the worst is used as a preventive measure against negative outcomes, or if maintaining optimism is feared to “jinx” the result. Additionally, examining how these differences might influence scanxiety could provide valuable insights. Fifth, the study period captured only 5 days before the surveillance test; studies assessing the emergence of scanxiety in a more protracted period (e.g., weeks) before surveillance testing would be helpful to identify particularly problematic scanxiety. Sixth, all participants in our sample received reassuring surveillance test results that their cancer had not recurred. Studies examining the buffering or amplifying effects of uncertainty management strategies on receiving bad news, particularly in high-risk populations, will be important to guide intervention approaches. Lastly, we were not able to conduct power analyses for the presented mixed effects models given the lack of extant data relevant for the current study design; the data presented here could usefully guide future sample size calculations for similar study designs. Relatedly, assessing whether an improvement in model fit is meaningful remains challenging, especially given no statistical cutoff. Qualitative inspection of the data and results supports that the improvement in model fit by adding bracing to the base model is meaningful and the loss of degrees of freedom due to including the extra variable does not seem to impact the overall model performance. Nonetheless, we cannot assert that the improvement in model fit was significant.

Conclusion

AYA survivors of childhood cancer who brace for bad news may experience a worse FCR while awaiting surveillance scans, yet this fear largely resolves following good news. Positive uncertainty management strategies (hope and optimism) do not appear to buffer against scanxiety. Future research is needed to understand how uncertainty management strategies impact response to bad news such as when scans indicate disease recurrence. Nonetheless, findings can inform scanxiety intervention development and indicate that mitigating prolonged bracing in the days before a routine surveillance scan could be a promising approach for helping AYA survivors manage fear around routine surveillance scans.

Resumen

Objetivos: La ansiedad por la exploración (conocida como “Scanxiety” en inglés) es una experiencia común y angustiante que puede afectar negativamente la calidad de vida tras completar el tratamiento oncológico. Sin embargo, pocas investigaciones han investigado los factores de riesgo de la ansiedad por la exploración en tiempo real. Este estudio utilizó un diseño de evaluación ecológica momentánea para examinar cómo las estrategias de gestión de la incertidumbre predicen la experiencia de ansiedad pro la exploración materializada a través del miedo autodeclarado a la recurrencia del cáncer en los días previos, durante y posteriores a una prueba o examen de control rutinario. ***Métodos:*** Adolescentes y adultos jóvenes (AYA, por sus siglas en inglés) sobrevivientes de cáncer infantil ($N = 55$, EdadMedia $= 17.31$ años, $M = 2.90$ años sin tratamiento) informaron sobre cómo gestionan la incertidumbre en torno a las pruebas de seguimiento, incluyendo estrategias para prepararse para lo peor, esperar lo mejor y mantener el optimismo. Se registró el miedo diario a la recurrencia del cáncer mediante una aplicación para smartphone durante 11 días en torno a una prueba de seguimiento. ***Resultados:*** En los días previos a la ecografía, prepararse para las malas noticias predijo un mayor miedo general a la recurrencia y un aumento más pronunciado del miedo diario a la recurrencia. El prepararse para malas noticias también predijo un mayor miedo a la recurrencia el día de la ecografía y una disminución más pronunciada del miedo a la recurrencia tras recibir resultados tranquilizadores. Los hallazgos se mantuvieron al controlar el miedo inicial a la recurrencia. La esperanza y el optimismo no predijeron el miedo diario a la recurrencia. ***Conclusiones:*** Los sobrevivientes de cáncer AYA que se preparan para recibir malas noticias pueden experimentar un mayor temor a la recurrencia del cáncer mientras esperan las pruebas de seguimiento; sin embargo, este temor se disipa en gran medida tras recibir buenas noticias. Las estrategias positivas para el manejo de la incertidumbre (esperanza y optimismo) no parecen mitigar la ansiedad por la exploración. Los hallazgos pueden orientar el desarrollo de intervenciones para la ansiedad por la exploración.

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