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Future orientation in adolescent and young adult cancer survivors and unaffected peers

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1 INTRODUCTION

Diagnosis and treatment of childhood cancer is a significant, stressful life event that shifts adolescent and young adult cancer survivors' (AYACS) perspectives¹ and delays normative transitions to adulthood (eg, completing education and partnering).^{2–5} Shifts in AYACS future-oriented perspectives may explain delays in adult role transitions. Future orientation is the cognitive, motivational, affective, and temporal aspects of individuals' beliefs about their futures and is important for identifying goals and behaviors needed to accomplish goals to support goal achievement.⁶ Experiencing cancer may alter how AYACS conceptualize their futures; however, this has not been empirically investigated due to the absence of a validated measure of future orientation for AYACS. Understanding future orientation in AYACS and whether it differs from peers without cancer is important because future orientation is modifiable⁷ and may be useful in supporting the well-being of AYACS. As a first step toward investigating the utility of future orientation in AYACS, this study examined the reliability of a measure of future orientation in a sample of AYACSs compared with unaffected peers.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

2 METHODS

2.1 Approach

Adolescent and young adult cancer survivors 12 years old and older and treated at Cincinnati Children's Hospital Medical Center were recruited between May 2012 and November 2013. Eligibility criteria included (a) diagnosis of a childhood cancer before 19 years of age, (b) not currently receiving active cancer treatment, (c) fluent in English, and (d) AYACS and parent (for AYACS under 18) were willing to provide written informed consent and assent (for AYACS under 18).

Once AYACS completed baseline measures, they were matched using age, race/ethnicity, and gender to an unaffected peer. Eligibility criteria for the unaffected peer included (a) being 12 and older, (b) being free of any chronic medical conditions and history of cancer, (c) being fluent in English, and (d) being willing to provide informed consent or assent. Once matched to an AYACS, unaffected peers and their parents (when under 18) were mailed a consent and assent form (for peers under 18). Research staff reviewed consent and assent documents via phone, and participants completed written consent forms returned via mail. Once consent forms were returned, unaffected peers were emailed a link to complete the survey. This study was approved by the Institutional Review Board at Cincinnati Children's (2011-0560).

2.2 Participants

Of 103 AYACS patients approached, 88 agreed to participate in the larger study of cancer survivorship and 51 completed the Prospective Life Course Questionnaire (PLCQ).⁶ The mean age in this study sample is 24.8 (SD = 7.5). The participants were primarily White (94.12%) and male (54.90%).

2.3 Measures

This study used the previously validated PLCQ Career and Family Domain Scales.⁶ The Career Scale includes 34 items that assess 7 subscales: value (5 items), expectance (7 items), internal control (4 items), external control (4 items), cognitive representation (2 items), exploration (6 items), and commitment (6 items).

The Family Scale includes 31 items that assess the same 7 subscales. Additional information about the measure and statistical approach are provided in Appendix S1.

2.4 Statistical analyses

Structural and measurement invariance of the PLCQ was examined for AYACS and unaffected peers.⁸ Analyses were conducted by using Mplus 7.2.⁹ Confirmatory factor analysis was conducted specifying item loadings and the structure of the PLCQ consistent with previously published studies.⁶ A multigroup confirmatory factor analysis estimated the PLCQ separately for AYACS and unaffected peers. Structural invariance (ie, whether the same factors are present and same items load onto factors) and measurement invariance (ie, whether item loadings on factors are similar) were examined by estimating family-related and career-related PLCQ as described by Seginer.⁶ For measurement invariance, factor

loadings for each item and lower-order factor were held equivalent for AYACS and unaffected peers. Once structural and measurement invariance was confirmed, differences between groups on factor scores could be estimated. Model fit was assessed by using established model fit criteria proposed by Hu and Bentler.¹⁰

3 RESULTS

For descriptive statistics, see Table 1. Most (73%) of cancer survivors were diagnosed with leukemia or lymphoma. Average age of diagnosis for AYACS was 9.41 (SD = 6.07), and most were treated with chemotherapy (96%) and/or radiation (39%). Education was significantly higher for AYACS than unaffected peers; $F(1, 103) = 4.46, P = .03$. Personal income and household income were significantly lower for AYACS ($F(1, 103) = 3.84, P = .05$; $F(1, 103) = 4.86, P = .03$, respectively).

3.1 Family-related Prospective Life Course Questionnaire

The model estimated for family-related PLCQ fit well for both groups (see Figure 1), indicating structural invariance (ie, similar model fit) between AYACS and unaffected peers. Measurement invariance was estimated by constraining factor loadings to be equivalent across groups. The chi-square difference test for the unconstrained and constrained models was not significant, indicating measurement invariance (ie, no difference between measurement models) for AYACS and unaffected peers. The final model (Figure 1A) had acceptable fit. Survivor status significantly predicted lower value, internal control, and behavioral exploration ($P < .05$).

3.2 Career-related Prospective Life Course Questionnaire

As with family-related PLCQ, the model for career-related PLCQ fit well for both groups, and structural and measurement invariance was confirmed between AYACS and unaffected peers. The final model (Figure 1B) had acceptable fit. No difference between AYACS and unaffected peers for Career-Related PLCQ was detected.

4 DISCUSSION

This study examined the measurement of future orientation in a sample of AYAs who survived childhood cancer and compare findings with a sample of unaffected peers. The results indicated that the PLCQ, a validated measure of future orientation for typically developing adolescents and young adults, performed similarly in AYACS compared with unaffected peers and is therefore appropriate to use with AYACS. There was no difference between samples for Career-Related PLCQ. Family-Related PLCQ performs similarly with AYACS and unaffected peer samples; however, AYACS place less value on family-related future plans, perceive less internal control over family-related future plans, and engage in less exploration of potential opportunities around family-related future plans when compared with unaffected peers.

4.1 Clinical implications

When these findings are interpreted in the context of the larger literature,^{2,4,6} they suggest that AYACS may fail to engage in relationship-building activities that would support family formation due to their perceived lack of internal control around family formation, which could contribute to noted differences in marriage and parenting for cancer survivors.^{2,4} Likewise, lower value of future goals identified by AYACS may result in decreases in their likelihood of attainment, as suggested in other literatures.⁶ The combination of decreased value and perceived internal control of family goals could result in withdrawal of activities (eg, discussions about fertility and reproductive health, considering alternative methods such as adoption) that ultimately promote family formation.

4.2 Study limitations

This study takes an important first step in understanding the role of future orientation in shaping the adult experiences of survivors of childhood cancer by establishing the reliability of the PLCQ for AYACS. The findings should be interpreted within the context of several limitations. The sample used to validate the PLCQ was small, homogenous with respect to race and ethnicity, from a single site, and included few older AYA (ie, 30 and above); the findings should be replicated with a larger, more diverse sample. Understanding the impact of future orientation on health and social behaviors, which was not addressed in this study, will be important for future research. Despite these limitations, this study makes an important contribution to our understanding of the adult experiences of childhood cancer survivors. The survivors and their families are increasingly confronted with discussions regarding life planning and goal setting. The PLCQ is a reliable tool to examine future orientation and could assist clinicians in supporting AYACS as they achieve important adult milestones.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key points

- Future orientation is the mechanism by which individuals focus on future goals, and childhood cancer could alter future goals for adolescents.
- Career-related future orientation does not differ for cancer survivors and peers.
- Family-related future orientation does vary for childhood cancer survivors.
- Childhood cancer survivors report lower value and internal control around family-related future goals and less behavioral exploration than unaffected peers.
- Future orientation may be a tool to help providers and patients assess goals and target interventions to improve outcomes for childhood cancer survivors.

FIGURE 1. Final models estimating future orientation by using the family-related (A) and career-related (B) Prospective Life Course Questionnaires for cancer survivors and unaffected peers

TABLE 1

Descriptive statistics for adolescent and young adult cancer survivors (AYACS) and unaffected peers

	AYACS		Unaffected Peers	
	Mean	SD	Mean	SD
Education	3.28	1.18	2.40	1.24
Employment status	2.26	0.88	2.11	1.18
Personal income	3.25	2.8	4.26	2.48
Household income	7.42	3.31	8.72	2.72
Married or coupled (%)	38	–	36	–
Diagnosis type				
Leukemia and lymphoma (%)	73	–	–	–
Neurooncology (%)	6	–	–	–
Solid tumor (%)	21	–	–	–
Age of diagnosis	9.41	6.07	–	–
Treatment history				
Chemotherapy (%)	96	–	–	–
Radiation (%)	39	–	–	–
Bone marrow transplant (%)	18	–	–	–
Surgery (%)	16	–	–	–
Family-related Prospective Life Course Questionnaire (PLCQ)				
Value	4.18	0.95	4.49	0.81
Expectations	3.90	0.89	4.15	0.86
Internal control	3.33	1.34	3.93	0.93
External control	2.51	1.10	2.70	0.86
Cognitive representation	3.61	1.15	3.73	1.00
Exploration	2.66	1.24	3.05	1.13
Commitment	3.62	1.25	3.84	1.11
Total score	3.46	0.68	3.76	0.60
Career-related PLCQ				
Value	4.26	0.68	4.33	0.63
Expectance	3.05	0.34	3.10	0.30
Internal control	3.97	0.92	4.08	0.93
External control	3.00	0.81	2.90	0.70
Cognitive representation	3.55	0.56	3.65	0.66
Exploration	3.38	1.00	3.24	1.10
Commitment	3.42	0.93	3.63	0.97
Total score	3.49	0.43	3.52	0.47

Note: Education was assessed on a scale from 1 (less than high school) to 5 (post-Baccalaureate degree); employment was assessed on a scale from 0 (unemployed and not seeking work) to 3 (employed full time); personal income was assessed on a scale from 1 (less than \$9999 annually) to 9 (more than \$80,000 annually); household income was assessed on a scale from 1 (less than \$9999 annually) to 9 (more than \$80,000 annually); marital status was classified as 1 (single), 2 (previously married), or 3 (married or living as married); AYACS may have experienced 1 or multiple types of treatment, and categories are not mutually exclusive.

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